

University of Windsor

Scholarship at UWindor

Electronic Theses and Dissertations

Theses, Dissertations, and Major Papers

2017

Short-Term Parent-Mediated Pivotal Response Treatment: Teaching Social Initiation to Children with Autism Spectrum Disorder through Question Asking

Svetlana Popovic
University of Windsor

Follow this and additional works at: <https://scholar.uwindsor.ca/etd>

Recommended Citation

Popovic, Svetlana, "Short-Term Parent-Mediated Pivotal Response Treatment: Teaching Social Initiation to Children with Autism Spectrum Disorder through Question Asking" (2017). *Electronic Theses and Dissertations*. 6010.

<https://scholar.uwindsor.ca/etd/6010>

This online database contains the full-text of PhD dissertations and Masters' theses of University of Windsor students from 1954 forward. These documents are made available for personal study and research purposes only, in accordance with the Canadian Copyright Act and the Creative Commons license—CC BY-NC-ND (Attribution, Non-Commercial, No Derivative Works). Under this license, works must always be attributed to the copyright holder (original author), cannot be used for any commercial purposes, and may not be altered. Any other use would require the permission of the copyright holder. Students may inquire about withdrawing their dissertation and/or thesis from this database. For additional inquiries, please contact the repository administrator via email (scholarship@uwindsor.ca) or by telephone at 519-253-3000ext. 3208.

**Short-Term Parent-Mediated Pivotal Response Treatment:
Teaching Social Initiation to Children with Autism Spectrum Disorder
through Question Asking**

By

Svetlana Popovic

A Thesis
Submitted to the Faculty of Graduate Studies
through the Faculty of Education
in Partial Fulfillment of the Requirements for
the Degree of Master of Education
at the University of Windsor

Windsor, Ontario, Canada

2017

© 2017 Svetlana Popovic

**Short-Term Parent-Mediated Pivotal Response Treatment:
Teaching Social Initiation to Children with Autism Spectrum Disorder
through Question Asking**

By

Svetlana Popovic

APPROVED BY:

J. Hakim-Larson
Department of Psychology

C. Cobb
Faculty of Education

E. Starr, Advisor
Faculty of Education

April 25, 2017

DECLARATION OF ORIGINALITY

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication.

I certify that, to the best of my knowledge, my thesis does not infringe upon anyone's copyright nor violate any proprietary rights and that any ideas, techniques, quotations, or any other material from the work of other people included in my thesis, published or otherwise, are fully acknowledged in accordance with the standard referencing practices. Furthermore, to the extent that I have included copyrighted material that surpasses the bounds of fair dealing within the meaning of the Canada Copyright Act, I certify that I have obtained a written permission from the copyright owner(s) to include such material(s) in my thesis and have included copies of such copyright clearances to my appendix.

I declare that this is a true copy of my thesis, including any final revisions, as approved by my thesis committee and the Graduate Studies office, and that this thesis has not been submitted for a higher degree to any other University or Institution.

ABSTRACT

In Ontario, parents of children with Autism Spectrum Disorder (ASD) report high wait time between diagnosis, referral, determining eligibility, financial cost of Applied Behaviour Analysis (ABA), and an inability to continue ABA programs at home. Pivotal Response Treatment (PRT) is a naturalistic evidence-based intervention based on the principles of ABA that occurs in the home and targets pivotal behaviours including social initiation. The purpose of this single-subject multiple baseline design study was to investigate whether a brief parent-mediated PRT intervention, conducted in a child's home environment, would increase the frequency of social initiation through question asking and the frequency of context appropriate questions made by three children with ASD, and whether these results would generalize. Prior to providing PRT to their children, mothers engaged in a total of 12 hours of training (2 two-hour parent training sessions for three weeks). Results support a functional relationship between the behaviour of interest (i.e., social initiation through question asking) and the intervention. Furthermore, the short-term parent-mediated intervention led to a generalization of social initiations to novel items in the home, and/or other family members, and environments beyond those used during intervention for all three children. However, untargeted context appropriate question asking did not increase in frequency. The results of the study have implications regarding the effectiveness of a short-term parent-implemented PRT intervention on the ability to increase the child's frequency of asking, "What's that?".

DEDICATION

For all the children with autism in our community who inspire me to do what I love; you are my day-to-day inspiration.

ACKNOWLEDGEMENTS

There are an incredible number of individuals to whom I owe my success. First and foremost, I wouldn't be where I am today without my supportive family. A deep and sincere thank you to my unbelievably hard-working parents Ranko and Desanka Popovic, my brothers Slobodan and Stefan who have always believed in me, and my boyfriend Adem Cevizli for supporting me through every step of this journey. There are no words that can express how grateful I am for each one of you.

As well, a special thank you to my supervisor Dr. Elizabeth Starr for her endless commitment, vast knowledge, and support during my research project. I would also like to thank Dr. Cam Cobb and Dr. Julie Hakim-Larson for their role as my committee members who brought critical insight to my research.

Lastly, I would like to thank the individuals at Koegel Autism Consultants for providing continuous support during my training as a Pivotal Response Treatment therapist and offering advice that was pivotal to my research. In addition, a sincere thank you goes to the families who participated in my project. Without you, none of this would have been possible.

TABLE OF CONTENTS

DECLARATION OF ORIGINALITY	iii
ABSTRACT	iv
DEDICATION	v
ACKNOWLEDGEMENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF APPENDICES	xii
LIST OF ABBREVIATIONS/SYMBOLS	xiii
CHAPTER I: INTRODUCTION	1
Background to the Problem.....	6
CHAPTER II: REVIEW OF LITERATURE	12
Autism Spectrum Disorder	12
Social Communication.....	14
Pivotal Response Treatment and Social Communication	18
Pivotal Response Treatment and Social Initiation Intervention.....	27
Effectiveness of Short-Term Autism Interventions	33
Parent Empowerment	36
Limitations in Extant Literature.....	38
Rationale for Study	42
Hypotheses.....	44
CHAPTER III: DESIGN AND METHODOLOGY	45
Research Design.....	45
Materials and Instruments.....	47
Inclusion Criteria	51
Participants.....	53
Procedure	59

Measurement	72
Data Analysis	75
Validity and Reliability.....	76
Social Validity and Family Empowerment	77
CHAPTER IV: RESULTS	79
Frequency of “What’s that?” Question Asking	79
Parent Report of Frequency of “What’s that?”	84
Child Affect	89
Parent Fidelity of Implementation in PRT	92
Generalization of Targeted and Untargeted Questions	93
Reliability	95
Treatment Acceptability Rating Form Revised (TARF-R)	96
Family Empowerment Scale (FES)	97
Summary.....	98
CHAPTER V: DISCUSSION	100
Individual Differences Affecting Question Asking	100
Short-term PRT Interventions	103
Context Appropriate Question Asking	104
Generalization of Question Asking to Novel Items, Environments, and Individuals	106
Child Affect	109
Fidelity of Implementation	111
Social Validity of a Short-Term Parent-Mediated PRT Intervention	113
Mothers Report of Empowerment.....	115
Limitations of Study	118
Future Research.....	120
Conclusion	123
APPENDICES	137
Appendix A: Response-reinforcer Survey	137
Appendix B: Letter of Information from Organizations	138
Appendix C: Participant Recruitment Flyer	140
Appendix D: Telephone Interview	141

Appendix E: Letter of Information	142
Appendix F: Letter of Informed Consent	145
Appendix G: Approval for Video Recording.....	148
Appendix H: Researcher’s Frequency Data Recording Sheet.....	149
Appendix I: Parent Intervention Data Recording Sheet	150
Appendix J: Parent Generalization Data Recording Sheet	151
VITA AUCTORIS	152

LIST OF TABLES

Table 1. Child's Characteristics.....	54
Table 2. Mother's Characteristics.....	56
Table 3. Measure of Interest and Measure of Happiness for Each Child.....	91

LIST OF FIGURES

Figure 1. Typical Intervention Day	70
Figure 2. Frequency of Social Initiation through Question Asking, “What’s that?”	80
Figure 3. Hanna - Parent Report of “What’s that?” During Intervention.....	85
Figure 4. Marie - Parent Report of “What’s that?” During Intervention	86
Figure 5. Sarah - Parent Report of “What’s that?” During Intervention	88

LIST OF APPENDICES

Appendix A: Response-reinforcer Survey.....	137
Appendix B: Letter of Information from Organizations.....	138
Appendix C: Participant Recruitment Flyer.....	140
Appendix D: Telephone Interview.....	141
Appendix E: Letter of Information.....	142
Appendix F: Letter of Informed Consent.....	145
Appendix G: Approval for Video Recording.....	148
Appendix H: Researcher’s Frequency Data Recording Sheet.....	149
Appendix I: Parent Intervention Data Recording Sheet.....	150
Appendix J: Parent Generalization Data Recording Sheet.....	151

LIST OF ABBREVIATIONS/SYMBOLS

ABA	Applied Behaviour Analysis
ASD	Autism Spectrum Disorder
EI	Early Intervention
EIBI	Early Intensive Behavioural Intervention
PRT	Pivotal Response Treatment
UCSB	University of California Santa Barbara

CHAPTER I:

INTRODUCTION

Autism Spectrum Disorder (ASD) is a lifelong neurological disorder causing impairments in social communication and social interaction, and restricted and repetitive behaviours (American Psychiatric Association, 2013; [APA]). Social communication and social interaction is a complex construct consisting of conversational skills (e.g., social initiations and maintenance, facing the speaker, and voicing), joint attention skills (e.g., gaze, pointing, and showing), and social interaction skills (e.g., proximity, gestures, and appropriate responses) (Stone, Reed, Cooley Hidecker, Ross, Di Rezze, Zwaigenbaum, & Rosenbaum, 2011). Restricted and repetitive behaviours are the second diagnostic feature of ASD and these can be manifested as difficulties with change, inflexibility with behaviour, engaging in restricted and/or repetitive actions, and distress when trying to change tasks (APA, 2013).

In recent years, the rate of ASD has been rising, and according to The Centers for Disease Control, ASD is now estimated to affect 1 in 68 individuals in the United States, with boys being four to five times more likely to be diagnosed with ASD than girls (Center for Disease Control, 2014; [CDC]). Thus, ASD is now considered to be a high incidence disability (CDC, 2014). The symptoms of ASD usually impede social and emotional growth; in turn, this may lead to fewer initiations with peers, neglect or rejection from peers, lower academic achievement, depression, and risk of developing substance abuse issues in later life (Camargo, Rispoli, Ganz, Hong, Davis, & Mason, 2014; Kim, 2003; Tantam, 2000; Welsh, Park, Widaman, & O'Neil, 2001). How ASD is manifested varies from individual to individual, and the severity of ASD symptomology

can also vary resulting in individuals who are quite low functioning and those who are high functioning with others along the entire spectrum in between.

Social communication and interaction often begins with an individual initiating an interaction with a communicative partner. The ability to initiate a social interaction is a skill that is considered “pivotal” to social and communicative growth. Pivotal behaviours refer to specific behaviours that, when targeted in intervention, can lead to large collateral changes in non-targeted areas of functioning (Koegel & Koegel, 2006). Koegel and Koegel (2006) have identified many behaviours as being pivotal; these include motivation (e.g., child attention and child choice), responsivity to multiple cues (e.g., identifying two aspects of an item such as blue and marker), self-management (e.g., using tally marks to monitor own target behaviour), and social initiations (e.g., initiating a conversation with a question) which are further described in the next chapter. Koegel and Koegel (2006) believe that once these pivotal behaviours are established, they “result in widespread and generalized improvements in children with ASD” (p. 4).

The pivotal area of social initiation is central to communication development and is crucial for successful long-term development in social functioning (Koegel, Koegel, Green-Hopkins, & Barnes, 2010). Social initiation involves the formulation of social-communicative behaviour goals made by the child without external support from a communicative partner (Koegel & Koegel, 2006). For example, a child may ask a partner to play a board game with them by asking, “Would you like to play with me?” Social initiations vary in form as children develop throughout life and include social initiations through question asking (Koegel & Koegel, 2006). Koegel, Bradshaw, Ashbaugh, and Koegel (2014) posit that mastery of social initiation through question asking produces

global improvements across development, across functioning, and across communicative partners. However, the quantity and quality of social initiations are notoriously poor among young children with ASD. According to Koegel et al. (2014), children with ASD primarily use language for requesting objects, requesting actions, and protesting. Children with ASD rarely engage in question asking as a method of instigating social interactions or for the purpose of seeking information as most typically developing children do (Koegel & Koegel, 2006).

Social initiation through question asking refers to a social skill whereby an individual initiates a conversation using a question to elicit a response from the communicative partner. The ability to socially initiate through question asking is a developmental milestone that typically develops at two years of age with the formulation of *wh*-questions (e.g., “What is it?” “Where is it?” “Who is it?” and “What happened?,” and solidifies around four years of age (Koegel & Koegel, 2006). Of the various types of social initiation, social initiation through question asking is rarely used by young children with ASD and this paucity continues into adulthood (Koegel & Koegel, 2012).

A nationwide push for early detection throughout North America has created a need for early intervention services for young children with ASD (National Research Council, 2009). Early intervention (EI) targets all aspects of ASD and is considered extremely important in helping to reduce symptoms of ASD. Specifically, early intensive behavioural intervention (EIBI) is an intervention that occurs 25 hours a week or more. Children usually begin receiving EIBI between 18 months and six years of age (Goldstein, Lackey, & Schneider, 2014; Makrygianni & Reed, 2010; National Research Council, 2009). Empirical evidence supports the efficacy of early behavioural

interventions, such as Pivotal Response Treatment (PRT), to teach, maintain, and generalize social initiations in children with ASD.

Pivotal Response Treatment (PRT) is a naturalistic evidence-based intervention based on behavioural principles (Camargo et al., 2014; Holloway, Healy, Dwyer, & Lydon, 2014; Wang, Parrila, & Cui, 2013). PRT targets a number of the pivotal behaviours mentioned above and social initiations in children with ASD can be taught using PRT (Koegel, Koegel, Harrower, & Carter, 1999a; Koegel, Schreibman, Good, Cerniglia, Murphy, & Koegel, 1989; National Autism Center, 2015). Not only can PRT help teach social initiations, but parents can also be taught to implement the PRT intervention with fidelity in the natural setting of their home.

Research has demonstrated that when intervention begins prior to five years of age, children with ASD are able to make significant gains in IQ, language, improved social behaviour, and have decreased ASD symptomatology (Gillis & Butler, 2007; Hume, Bellini, & Pratt, 2005). However, many of these interventions occur in highly controlled clinician-based centers or university-based centers resulting in a lack of generalization and maintenance of the newly learned skills by the children with ASD (Bryson, Koegel, Koegel, Openden, Smith, & Nefdt, 2007). In response, natural environments are increasingly being used as the early intervention setting and parents are being directly taught intervention strategies. The use of parents as supportive agents in intervention is a quality, cost-effective method of providing services to children with ASD (Koegel & Koegel, 2006). Since parents spend the majority of the time with their child across multiple settings and daily situations, they can be natural teachers in their

home environment, thus enabling greater generalization of the skills being taught (Koegel & Koegel, 2006).

Including parents in the early behavioural intervention for children with ASD can be achieved in a variety of ways, including: (a) parent support interventions where the parent receives information regarding techniques and the child with ASD is the indirect beneficiary, and (b) parent-implemented interventions where the parent is actually taught target skill techniques and their child with ASD is the direct beneficiary (Bearss, Burrell, Stewart, & Scahill, 2015a). Parent-implemented models of intervention expand the parents' understanding of the intervention being used and nurture their ability to support communication and social development in their children with ASD (Ingersoll & Wainer, 2013; Patterson, Smith, & Mirenda, 2012; Smith, Koegel, Koegel, Openden, Fossum, & Bryson, 2010). In addition, parent-implemented interventions can be subcategorized as parent-mediated interventions for core symptoms and parent-mediated interventions for maladaptive behaviour. Both allow parents to learn specific techniques that can be continued beyond the intervention setting and incorporated into daily family functioning but differ depending on the target skill. Regardless of the method used, parent inclusion in intervention is deemed to result in the best child outcomes (Hume et al., 2005).

Even when social initiation skills are targeted in clinical settings, the quantity and quality of these skills tend to be poor in terms of generalization and maintenance for children with ASD because the skills are not generally taught in the natural everyday environment (Koegel & Koegel, 2006). The goal of teaching social initiation skills to a child with ASD is for the child to use the skills in several environments beyond the intervention environment and with other individuals as well as the primary

interventionist. Using the child's natural environment, such as the home, has greatly increased the rate of generalization (Bellini, Peters, Benner, & Hopf, 2007; Koegel & Koegel, 2006). Furthermore, child-initiated approaches to intervention also tend to produce greater generalization and maintenance results (Koegel & Koegel, 2006). In a child-initiated approach to intervention, "a child with ASD is directly taught the skills to initiate and maintain interactions" (Koegel & Koegel, 2006, p. 178) as opposed to adult-initiated interventions where the child relies on an adult prompt and reinforcement even after intervention is completed.

Since social initiation is deemed a pivotal behaviour in terms of social communication and social interaction, it is crucial that the skill of social initiation is directly targeted through an evidence-based intervention such as PRT. Using a PRT intervention to target social initiation through question asking can lead to collateral gains in language skills and learning opportunities, can increase the frequency and quality of social communication interactions, and can offer more control over interactions to the child with ASD (Koegel et al., 2014). According to Koegel et al. (2014), "teaching children specific questions in a systematic intervention can produce gains in their overall initiations of questions" (p. 824). Furthermore, increasing the rate of social initiations has directly reduced problem behaviour that may occur in some individuals with ASD (Loftin, Odom, & Lantz, 2008). Thus, the skill of social initiation may result in several positive collateral effects and long-term outcomes for the child with ASD.

Background to the Problem

As with many provinces and territories across Canada, the government of Ontario funds early intervention for children with ASD through an initiative called the Autism

Intervention Program (Ministry of Child and Youth Services, 2015). Families may opt for direct service (i.e., a trained professional provides treatment out of a centre) or direct funding (i.e., parents receive the funding directly and coordinate private services for their child) (Ministry of Child and Youth Services, 2015). The Autism Intervention Program is primarily centre-based, is rooted in applied behaviour analysis (ABA) strategies, and is the only intervention that is financially covered through the Ministry of Ontario (Ministry of Child and Youth Services, 2015) for a period of two years. In order to qualify for the Autism Intervention Program, the child must have a documented ASD diagnosis from a professional and live in close proximity of the geographical location of the service provider (Ministry of Child and Youth Services, 2015). However, many problems exist with only offering one early intervention program.

According to Koegel and Koegel (2006), parents of children with ASD in USA report limited access to services, trouble obtaining funding, high costs associated with intervention, and a lack of discussion surrounding which intervention model will best fit the individual family. Similar issues are evident in Ontario. Specifically, parents and caregivers report high wait times between diagnosis, the referral process, and determination of eligibility for services (Gordon, 2015). On average, it takes a Canadian family 4.5 visits to a professional and/or three years to obtain an ASD diagnosis (McMorris, Cox, Hudson, Liu, & Bebko, 2013; Siklos & Kerns, 2007). Additionally, caregivers are concerned with the financial costs associated with ABA early intervention program delivery (Gordon, 2015). Regardless of the country a caregiver resides in, most caregivers participating in ABA are concerned with being able to continue the ABA

program in their home environment and 98% of caregivers report a need for future training in ABA (Dillenburger, Keenan, Doherty, Byrne, & Gallagher, 2012).

Furthermore, according to Hume et al. (2005), home programs only account for 16.4% of intervention settings, while public preschools account for 73.8% of the intervention settings in the state of Illinois. Since most ABA interventions are centre-based, without the caregiver present and/or outside of the natural environment, problems with generalization and maintenance of learned social initiation skills and other skills are evident (Smith et al., 2010). However, caregivers are more likely to implement an intervention when a program takes into account the existing family environment and routine (i.e., incorporating intervention into typical daily family routines in the natural home environment), supporting the idea that the home environment is fundamental to the success of intervention (Koegel & Koegel, 2006).

Since there are many problems with the current referral model for early behavioural intervention, some provinces have taken initiatives to disseminate knowledge about community-based interventions that include caregivers as the primary agents of the intervention. Beginning in 2005, the province of Nova Scotia, for example, has chosen to implement a combined therapist- and parent-implemented PRT intervention as the primary early behavioural intervention model (Nova Scotia Department of Health, 2004). The focus of the intervention is to help children with ASD receive intervention before the age of six. Intervention targets expressive communication, specifically the initiations of interactions through requesting preferred objects, asking questions, and joining play interactions (Nova Scotia Department of Health, 2004). A decade later, when the effectiveness of the community-based PRT early intervention was investigated, Smith,

Flanagan, Garon, and Bryson (2015) found that “substantial gains were observed in expressive communication skills, receptive language skills, cognitive and adaptive behaviour abilities” in the children with ASD (p. 1867). The follow-up results observed gains in social initiations made by children in the study (Smith et al., 2015). Results from the study support the efficacy of a combined therapist- and parent-implemented PRT community-based model specifically targeting social initiations.

In a recent report by Gordon (2015), Ontario children with ASD often do not receive interventions until age seven which is far beyond the early intervention preschool years considered essential for optimal development. Furthermore, the average wait time between diagnosis and intervention extends from 22 months to 28 months in some parts of Ontario although it varies significantly based on the geographical location of the family. Wait-time can extend up to 39 months in some areas of Ontario such as Durham, York and the Simcoe County regions (Gordon, 2015). Even more discouraging is that, in 2014, more children were on wait lists (13,966) waiting for ABA than actually receiving an ABA early intervention program (8,572) (Csanady, 2015). This issue is because the demand for early behaviour intervention for families of children with ASD is higher than the number of available trained clinicians and professionals available (Gordon, 2015). As the demands of our society change, interventions need to adapt to fit the needs of the community.

Due to excessive wait times for early behavioural interventions, many Ontario caregivers decide to pay for private ABA-based services. However, given that the cost of early ABA intervention is approximately \$60,000 annually (Gordon, 2015), it takes a financial toll on the family. This cost is highly problematic as, according to Statistics

Canada (2014), the median total income of a family residing in Ontario in the year 2014 was \$74,890. In turn, to afford private intervention, many families are forced to “remortgage homes, borrow from relatives or resort to fundraising through events or crowdsourcing” (Gordon, 2015, p. 1).

An increase in the rate of ASD and a push for early detection has led to quicker assessments and diagnosis of ASD but has created a “bottleneck effect” in Ontario (Gordon, 2015). This bottleneck occurs when more children are being diagnosed earlier but the diagnosed children are unable to obtain services in the early intervention period due to lengthy wait lists for services (Gordon, 2015). Because of this circumstance, researchers are looking towards short-term intervention methods and/or parent-mediated intervention methods since “training parents in evidence-based intervention techniques is generally considered an efficient method of expanding the availability of intervention services to children with autism” (Coolican, Smith, & Bryson, 2010, p. 1321).

Given the above information, the purpose of this single-subject multiple baseline multiple probe design was to investigate whether a brief parent-mediated PRT intervention, conducted in a child’s home environment, would increase the frequency of social initiation through question asking and frequency of context appropriate questions made by the child with ASD. Additionally, the study investigated whether any acquired social initiations would be maintained and generalize beyond the intervention. For the sake of the current study, the term social initiation is defined as an independent formulation of a verbal question, specifically “What is it?” that has social communicative intent (e.g., child will independently ask “What is it?” when presented with an unknown object). The study aimed to address a gap with respect to targeting the pivotal behaviour

of social initiation through question asking using a parent-mediated intervention model after a short-term training.

CHAPTER II: REVIEW OF LITERATURE

The chapter begins with an overview of the nature of ASD and the social communication deficits associated with it. Following this, the chapter addresses the nature of social communicative deficits in terms of social initiations in children with ASD, and a discussion of why social initiations are imperative for long-term development. As mentioned in the introduction, Koegel and Koegel (2006) have developed PRT which aims to increase a number of behaviours in children with ASD in pivotal areas through a naturalistic intervention. The concept of PRT and how PRT addresses social communication deficits associated with ASD, specifically social initiations, are discussed next. Subsequently, the combination of PRT with a parent-mediated approach to intervention is discussed. Lastly, the chapter discusses the effectiveness of short-term studies, and limitations in current research.

Autism Spectrum Disorder

Leo Kanner first described autism in 1943 (Kanner, 1943). Today, ASD is defined as a complex developmental disorder (APA, 2013). As mentioned in Chapter I, ASD is a high incidence neurological disorder affecting 1 in 68 children, and results in persistent difficulties with social communication and social interaction, and restricted, repetitive behaviours (APA, 2013; CDC, 2014). For an individual to be diagnosed with ASD, symptoms must have been present in the early developmental period (even if they are not recognized until later), cause clinically significant impairment in social, occupational, or other important areas of current functioning, and the disturbances are not better explained by an intellectual disability (Harker & Stone, 2014).

The first criterion for an ASD diagnosis, persistent deficits in social communication and social interaction across multiple contexts, encompasses several components. Children with ASD often show a delay in, or total lack of, language development (e.g., no use of words to communicate by age two or use of simple phrases by age three). In turn, children with ASD usually have difficulty in initiating or holding conversations and otherwise using language in a reciprocal fashion. Social communication and social interaction deficits may also manifest themselves as a difficulty in using nonverbal behaviours to regulate social interaction (e.g., minimal eye contact, few or no facial expressions, or unusual intonation). Children with ASD usually display a lack of social/emotional reciprocity and tend to lack understanding regarding the emotions and feelings of others. Often, the child displays little to no interest in others, which may result in a failure to develop age-appropriate peer relationships. Lastly, social communication and social interaction deficits affect the manner in which children with ASD engage in play; the play is often not appropriate for a child's developmental level (e.g., lack of imaginative and/or symbolic play) (Boutot & Myles, 2011).

The second criterion, restricted and repetitive patterns of behaviour, is displayed mainly through the child's interests, mannerisms, and language. Children with ASD often have interests that are narrow, focused, unusual, and/or overly intense (e.g., special interest in a shape or a certain superhero). As well, individuals with ASD can have preoccupations with parts of objects such as fixating on solely spinning the wheel on a toy car instead of playing with the toy car appropriately. In some cases, the child may engage in repetitive or unusual language (e.g., the repetition of others' utterances is known as echolalia). There can also be an insistence on routine or sameness that may

manifest as difficulty when having to change tasks or routines. Lastly, children with ASD may engage in repetitive motor mannerisms. This may be displayed as flapping of the hands, spinning or rocking their body, or walking/running on tip-toes (Boutot & Myles, 2011).

In the current *Diagnostic and Statistical Manual of Mental Disorders-5* (DSM-5), ASD is also categorized by severity level, varying from level one—“requiring support” to level two—“requiring substantial support,” to level three—“requiring very substantial support” (American Psychiatric Association, 2013). Levels of functioning apply to each of the areas of social communication and social interaction, and restricted and repetitive behaviours.

Social Communication

By definition, social communication occurs “when one person sends a message to another person either verbally or nonverbally” (National Autistic Society, 2015, p. 1). For communication to occur between two communicative partners, an individual must know how to initiate such an interaction. Social initiations develop early in preschool years, are essential for social skills to mature, and have been recognized as crucial for promoting positive long-term outcomes (Koegel et al., 2010). Social communication and social interaction are among the primary deficits of ASD.

According to McTear (1985), initiations are defined as utterances that are emitted by an individual and provoke a response from a communicative partner. Initiations can be subdivided into three types: questions, requests for action, and statements (Koegel & Koegel, 2006; McTear, 1985). Koegel and Koegel (2006) subdivide initiations into initiations of request (i.e., developing communicative intent, object-label correspondence,

and discrimination between objects), initiations of question asking (i.e., child begins asking *wh*-questions and engaging in active self-learning), initiations of comments (i.e., child begins to comment on their own/others, actions and objects), initiations for play (i.e., using mutually reinforcing and cooperative activities to facilitate interaction with peers/siblings), and initiations for social conversation (i.e., improving the quality and frequency of on-topic commenting and on-topic question-asking in order to be able to continue conversations).

The development of social initiations tends to follow a predictable path in normally developing children. Foster (1979) explains that young children begin to engage in “self-topic” initiations between one and five months of age; these initiations typically consist of behaviours that draw the attention of others to the child such as crying. The next type of initiation that develops is “environment-topic” initiations, which occurs roughly between five months and one year and three months. In these types of initiations, children try to direct attention to items in their immediate surroundings (Foster, 1979). At around one year, ten months to two years, six months, toddlers develop “abstract-topic” initiations through meaningful first words. Abstract-topic initiations allow typically developing children to refer to objects that are not in their immediate surroundings (Foster, 1979; Koegel & Koegel, 2006).

The development of protodeclarative pointing (i.e., using the index finger to draw attention to an object) and joint attention (i.e., sharing attention or focus on an object) are two of the earliest forms of social initiations to appear in typically developing children around 12-18 months of age. Children who display impairments in these two types of initiations at 18 months have a greater chance of receiving a diagnosis of ASD later on

(Koegel & Koegel, 2006). Being able to initiate an interaction has several collateral effects on social-communicative skills and adaptive skills, and promotes life-long skill development in social interaction (Koegel et al., 2014). Thus, the ability to initiate a social interaction and communication is critical to becoming a functional and competent social communicator.

Social initiation is a social skill where an individual is able to instigate an interaction and provoke a response from a communicative partner (e.g., a child asks, “What’s that?” and the communicative partner replies to his initiation) (Koegel et al., 1999a). Social initiation is also one of four “pivotal behaviours” described by Koegel and Koegel (2006). As mentioned in the introduction, “pivotal areas are those that, when targeted, lead to large collateral changes in other often untargeted areas of functioning and responding” (Koegel & Koegel, 2006, p. 4). The four pivotal behaviours include motivation, responding to multiple cues, self-management, and social initiation, which are further elaborated upon below.

Subsequent to the development of the types of initiations described above, initiation of *wh*-questions tends to develop around age two in typically developing children and is a crucial turning point in development as it allows children to engage in self-learning and gathering of knowledge about their environment (Koegel & Koegel, 2006). By five to six years of age, typically developing children are able to initiate social interactions and conversations through questions, maintain conversation through several turns, and engage in question asking related to various pragmatic functions (Koegel & Koegel, 2006).

Research by Koegel et al. (2014) has shown that children with ASD use language primarily for requesting objects, requesting actions, and protesting, compared to their peers who develop *wh*-questions as some of their earliest forms of communication. Regardless of age, children with ASD tend to engage in fewer social initiations than their typically developing peers (Koegel & Koegel, 2006). For example, Stone and Caro-Martinez (1990) observed 29 verbal and nonverbal children with ASD for a period of two to three hours (i.e., two hours of observation for verbal child or three hours of observation for nonverbal child) to measure their frequency of requesting, gaining attention, rejecting/refusing, commenting, seeking information through questions, expressing feelings, social routine, and social interaction through play. Results showed that the children with ASD engaged in anywhere from 0 to 34 communicative acts ($M = 8.9$) per observational period of two to three hours. Specifically, seeking information through question asking occurred a mean of 0.6 times during the two-hour observational period for verbal children or did not occur at all during the three-hour observational period for nonverbal children. This study shows that many children with ASD have a particularly hard time with question asking indicating that it is a rare event.

Similarly, Anderson, Moore, Godfrey, and Fletcher-Flinn (2004) examined play behaviour and social interaction initiations of 10 children with ASD in mainstream schools. Each child's raw score of social interaction initiations was divided by the number of minutes observed and multiplied by 60 to obtain the mean number of interactions per hour. They found that kindergarten children with ASD engaged in a mean of 121.8 interactions per hour (89% were adult initiated interactions and only 11% of those interactions were initiated by the child with ASD) while school-aged children with

ASD engaged in 13.3 interactions per hour (85% were adult initiated interactions and only 15% of those interactions were initiated by the child with ASD) (Anderson et al., 2004). The social interaction initiations made by the children with ASD were mainly for seeking assistance and/or requests for help. However, the study is limited in that they did not use a control group to record the number of social interactions made by typically developing children as a comparison to children with ASD (Anderson et al., 2004). This study demonstrates the paucity of the variety of social initiations made by children with ASD.

The types of social initiations used differ depending a child's developmental level, and all types of initiations play an important role in social and communicative development in a child. The ability to engage in social initiations is important because it increase the complexity of language function and leads to collateral increases in active learning (Koegel & Koegel, 2006). Social skills deficits in childhood are a predictor of later adjustment difficulties in adulthood and adolescence; therefore, it is essential that social initiations be addressed in interventions for children with ASD in order to cultivate the skill of engaging in positive interactions and promoting continuous social communication development (Koegel & Koegel, 2006). Social initiations can be targeted in intervention, and "teaching children [with ASD] specific questions in a systematic intervention can produce gains in their overall initiations of questions" (Koegel et al., 2014, p. 824).

Pivotal Response Treatment and Social Communication

A number of social skills interventions have empirical support (Wang et al., 2013) and such intervention is considered crucial for social communication development in

children with ASD (National Research Council, 2001, 2009). Early social skills interventions are typically begun when the child with ASD is between 18 months and six years of age and directly targets several pivotal areas of growth including social development, emotional development and communication skills (Goldstein et al., 2014; Makrygianni & Reed, 2010; National Research Council, 2009).

Previously known as the Natural Language Paradigm (Koegel & Koegel, 2006; National Research Council, 2001, 2009), PRT is one evidence-based intervention recognized by the National Research Council as an empirically validated intervention for children with ASD (Koegel & Koegel, 2006; National Research Council, 2001, 2009). PRT is conducted in naturalistic settings and is widely used for children with ASD (Koegel, Robinson, & Koegel, 2009). As mentioned earlier, the four pivotal behaviours include motivation, responding to multiple cues, self-management, and social initiation. Motivation refers to characteristics of a child's responding such as the number of responses, attention to stimuli, and changes in affect (e.g., interest or happiness) (Koegel et al., 1999a). Responding to multiple cues is the ability to differentiate several components or characteristics of an object (e.g., a small blue ball is small and blue) (Koegel et al., 1999a). Self-management is a strategy used to teach children with ASD to evaluate their own target behaviour and choose an action to engage in (e.g., identify whether their target behaviour is present or not through a self-monitoring notebook) (Koegel et al., 1999a).

PRT differs from traditional early intervention in that it is child-led and play-based compared to EIBI which is clinician-led and uses repetitive modes of Discrete Trial Training (DTT). EIBI tends to focus on one target behaviour at a time (e.g., learning to

differentiate between red colour and blue colour) while PRT aims to target the “pivotal” areas of motivation, responding to multiple cues, self-management, and social initiations, which often produce widespread gains in several other areas of functioning (Koegel & Koegel, 2006).

PRT is based on principles of ABA, which is a widely-used evidence-based intervention for children with ASD. Both ABA and PRT use a response-reinforcement contingency. A response-reinforcement contingency refers to the temporal relation between the time a response is emitted and the reinforcement is given to the child. A response-reinforcement contingency is crucial for creating teaching opportunities and increasing motivation for the child to respond. Furthermore, in PRT, reinforcers are directly related to the task itself and are considered highly motivational for the child (e.g., child says “ball” and immediately receives the ball, thus, pairing the item to a response while receiving the desired stimulus). Also, by reinforcing any attempt or any reasonable attempt by the child, PRT uses the response-reinforcement contingency to create further learning opportunities and motivation to learn (e.g., child says “buh” for ball, thus, it is considered a clear attempt and child receives desired item) (Koegel, 2014a).

PRT can be used to increase the frequency of social initiation through question asking, joint attention initiations, maintaining eye contact, orienting to name, engagement in activities, play dates, social interactions, friendships, understanding feelings, recognizing facial expressions, cultivating first words, functional utterances, mean length of utterance, and pretend play (Koegel & Koegel, 2006). Since many children with ASD do not spontaneously engage in social initiation through question asking, they must first

be taught the significance of question asking; targeting the skill of question asking itself does this.

PRT addresses three principle goals: (a) to teach the child to become responsive to multiple learning opportunities and interactions that occur in natural settings, (b) to reduce the need of an intervention provider, and (c) to reduce the number of services that take the child out of a natural environment (Koegel et al., 1999a). PRT takes into consideration the intervention setting, amount of intervention, intervention agents, and target behaviour when developing a individual treatment plan for a child with ASD (Koegel et al., 1999a).

Many caregivers spend most their child's waking hours with their child, thus providing caregivers with opportunities to become direct agents of intervention for their child immediately upon diagnosis. According to Hume et al. (2005), the majority of parents of children with ASD strongly believe that services become more effective and contribute to their child's growth when parent training is incorporated as part of the intervention.

Bearss et al. (2015a) describe how including parents in early intervention for children with ASD can be achieved in two ways: (a) parent support interventions where the parent receives information regarding techniques and the child with ASD is the indirect beneficiary, and (b) parent-implemented interventions where the parent is directly taught skills so they can teach their child with ASD and the child with ASD is the direct beneficiary (Bearss et al., 2015a). Parent-implemented interventions are subdivided further into parent-mediated interventions for core symptoms (i.e., targeting core symptoms such as social communication, imitation, and play) and parent-mediated

interventions for maladaptive behaviour (i.e., targeting disruptive behaviour and adaptive skills). Parent-mediated interventions are categorized as either primary or complementary interventions and “this distinction is based upon whether the parent is the primary change agent or a team member in a therapist-led intervention” (Bearss et al., 2015a, p. 173). If the parent is the primary agent of intervention, it is considered a primary parent-mediated intervention. On the other hand, if the researcher or clinician is implementing the intervention and the parent is coached to implement the intervention as well, then it is considered a “complementary parent-mediated intervention.” In the current study, parents will be actively engaged in implementing the PRT intervention from the onset. Thus, the procedure used in the current study is primary parent-mediated intervention according to the above taxonomy.

In their study, Patterson et al. (2012) reviewed a variety of different parent training studies that used a single-subject research design. The study reviewed Improvement Rate Difference scores (i.e., a score which measures intervention effects through effect size in single-subject research design) and the methodological quality of the following interventions: Discrete Trial Training intervention, PRT intervention (previously known as Natural Language Paradigm), Early Start Denver Model, joint attention parent training, augmentative and alternative communication, general case teaching approach, milieu teaching, and reciprocal imitation training. Overall, 11 studies with a total of 44 participants diagnosed with ASD were discussed. To determine methodological quality of the studies, the review used a 14-item questionnaire that focused on the selection and/or description of participants, the research design, intervention methods, and accuracy of measurement. Each question was worth one point;

thus, a score between 11 to 14 points indicated a study of strong quality, a score between 7 to 10 points represented a study of moderate quality, and a score of 6 or lower represented a study of low quality. Most studies were rated as “moderate” in quality based on the 14-point scale used by the researchers. Next, the IRD score was assessed, with a value of 0.71 or higher showing statistically significant results. When measuring outcomes related to child verbal language and child vocalizations, the highest IRD scores were found across DTT intervention, and PRT/NLP intervention. In other words, PRT interventions using parents have exhibited large statistically significant treatment effects post intervention with respect to various child outcomes and parent implementation measured by IRD (Patterson et al., 2012). Lastly, the review found only one study that aimed at increasing the frequency of social initiations from a parent perspective. This was a study by Vismara, Colombi, and Rogers (2009) (discussed below) where spontaneous functional verbal utterances and joint attention initiations were targeted using a combined therapist- and parent-mediated Early Start Denver Model intervention. Many of the studies included in the review had limited generalization and follow-up data. However, the review demonstrated that parents have the ability to implement validated evidence-based practices with a high degree of fidelity (Patterson et al., 2012). Interventions in which parents were taught to implement techniques resulted in better social, emotional, and cognitive outcomes for the child with ASD (Hume et al., 2005; Patterson et al., 2012).

In their literature review, Suppo and Floyd (2012) evaluated 23 parent training studies for parents of children with ASD living in rural areas who had limited access to services. The purpose of the review was to examine existing parent training programs

available for parents and to examine alternative training methods. Like previous reviews, the studies included in the literature review support the notion that parent-mediated interventions and parent support interventions lead to better outcomes for the child with ASD (e.g., increase in social communication, decrease in behaviour problems, and emotional development) as well as for the parent (e.g., decreased stress level, increased competency, and confidence in ability to help their child). In the review, 7 of the 23 studies reviewed included a PRT component. Once again, none of the 7 studies in this review were focused on increasing social initiation through question asking from a parent-mediated perspective (Suppo & Floyd, 2012). In addition, the review does not compare which training and/or intervention type may lead to better outcomes for the child with ASD and the parent.

Using parents to implement a PRT intervention has also been shown to decrease parental stress, improve family quality of life, and improve parent-child communication and interaction (Buckley, Ente, & Ruef, 2014; Smith et al., 2010). In their systematic review, McConachie and Diggle (2007) reviewed the methodological quality of 71 studies to determine the effectiveness of parent-implemented interventions for children with ASD between ages one and six. Child outcomes (e.g., social communication, adaptive behaviour, and problem behaviour) and parental outcomes (e.g., ASD knowledge, stress levels, and communication with their child) were reviewed. Results show that parent-implemented interventions are a cost-effective method of intervention that can be used to extend interventions to multiple environments, empower parents in becoming more involved in interventions, increase parental understanding of ASD, increase positive interaction between parent and child, nurture the child's social skills,

and significantly reduce stress for the parents (McConachie & Diggle, 2007).

Nonetheless, the methodological quality of many of the studies proved to be a concern (i.e., methodology incorrectly implemented, small sample size causing problems with generalizability, and random-control trials missing from literature).

The two types of intervention, the parent-mediated approach and the parent support approach, offer diverse outcomes for the child with ASD. Research has demonstrated that parent-mediated interventions have been superior to parent support interventions. For example, when looking at maladaptive behaviours and comparing parent-training interventions to parent support interventions in a randomized control trial of 180 children with ASD, Bearss, Johnson, Smith, Lecavalier, Swiezy, Aman, McAdam, Butter, Stillitano, Minshawi, Sukhodolsky, Mruzek, Turner, Neal, Hallett, Mulick, Green, Handen, Deng, Dziura, and Scahill (2015b) concluded that a parent-training intervention model was superior in producing skill acquisition compared to a parent support intervention model. Although this study concerns maladaptive behaviours and parent training, similar results have been shown with primary parent-mediated interventions for core symptoms of social communication, imitation and play. For example, Kasari, Lawton, Shih, Barker, Landa, Lord, Orlich, King, Wetherby, and Senturk (2014) addressed the core symptoms of social communication in ASD while investigating whether a parent-mediated intervention or a parent support intervention was superior. The researchers used a short-term version of Joint Attention Symbolic Play Engagement and Regulation (JASPER) intervention to coach parents in promoting engagement with their caregiver in day-to-day environments. Using a randomized control trial and 112 children with ASD between two to five years old, parents were assigned to

either an individual caregiver-mediated intervention or a small group caregiver educational support program where their children were not present. Results from the study showed improvements in joint attention in both groups; however, the caregiver-mediated intervention group showed greater improvements in joint attention with the gains being maintained at 3-month follow-up (Kasari et al., 2014).

As mentioned in Chapter I, the province of Nova Scotia (NS) has chosen to implement PRT as the province wide early intensive behaviour intervention (EIBI) for children with ASD known as PRT-based NS-EIBI. PRT-based NS-EIBI combines clinician-led PRT with parent-mediated intervention methods. In their review of the PRT-based NS-EIBI, Smith et al. (2010) examined the effects of PRT intervention on 45 children with ASD. The first parent-child cohort received PRT training through a workshop by the Koegel Autism Consultants from the University of California Santa Barbara (UCSB) and engaged in 15 hours of intervention per week for 12 months. The second parent-child cohort received training for PRT intervention by the local trainers. The second cohort received 15 hours of intervention per week for six months, then 10 hours of intervention per week for three months, then 5 hours of intervention per week for three months. The results between the cohorts compared the children's language/communication development, cognitive ability, adaptive behaviour, autism symptomology, and behaviour. In addition, parental stress was also compared between the two cohorts. Results from the PRT-based NS EIBI showed that children with ASD in both cohorts made improvements; however, the children in the second cohort made larger gains across several domains such as communication, language, purposeful utterances, cognition, IQ, adaptive behaviour, fewer problem behaviours, and autism symptoms. The

results demonstrate that parent-mediated PRT intervention methods are feasible in a community setting (i.e., the home) and can provide sustainable growth for children with ASD.

Even though a child with ASD can receive a PRT intervention for social initiation, generalization and maintenance of the social initiations is difficult when each environment (i.e. home, school, and/or playgroup) that the child is a part of does not work collaboratively. In response, since parents tend to spend much of time with the child outside of intervention, parents can be taught to continue the intervention in the home environment. Parent-implemented interventions can “enhance generalization of skills to the child’s natural environment as well as maintenance of treatment effects by increasing the likelihood that intervention will be carried over into daily routines” (Smith et al., 2010, p. 506).

Parents often play four roles when it comes to their child with autism: the role of the negotiator, the role of the monitor, the role of the advocate and the role of the supporter (Stoner & Angell, 2006). Each role is crucial in the long-term support of their child with ASD. By educating parents about intervention techniques and allowing them to become the primary agents of intervention, parents can embody all four roles more constructively by creating a knowledge base that is carried out to all environments in which their child with ASD engages.

Pivotal Response Treatment and Social Initiation Intervention

The purpose of social initiation intervention is to increase the frequency and quality of social communication interactions. Initiations are pivotal because they promote long-term language acquisition, offer the child with ASD more control over interactions,

and produce global improvements in development, functioning, and communicative partners. In addition, the acquisition of the pivotal behaviour of social initiation tends to generalize to other communication behaviours imperative for social-communicative functioning while being taught in the natural home setting (Holloway et al., 2014; Koegel, 2014a, 2014b; Koegel et al., 2010; Koegel et al., 1999a; Koegel, Kuriakose, Singh, & Koegel, 2012; Koegel et al., 1989; Wang et al., 2013). As discussed earlier, numerous researchers have found that children with ASD make fewer spontaneous social initiations than their typically developing peers (Koegel & Koegel, 2006). However, research has also shown that social initiations can be improved for children with ASD using a PRT intervention that focuses on question asking. As Reynolds, Gast, and Luscre (2014) note, “acquisition of this pivotal skill will increase availability of social opportunities” (p. 1).

In a systematic review of PRT studies, Vershuur, Didden, Lang, Sigafos, and Huskens (2014) report that only 16 of the 39 studies that were included in the review had researched the various types of initiations. Of those 16 studies, one had a staff member (e.g., paraprofessional) provide the intervention, eight studies had peers provide the intervention, two studies included parents in the intervention (e.g., Coolican et al. (2010) and Randolph, Stichter, Schmidt, O'Connor, and Schultz (2011) which are both discussed below), and five studies had clinicians provide the intervention (Koegel, Camarata, Valdez-Menchaca, & Koegel, 1998; Koegel, Carter, & Koegel, 2003; Koegel et al., 2010; Koegel, Koegel, Shoshan, & McNerney, 1999b; Vismara & Lyons, 2007). The five studies that had a clinician implementing the intervention focused specifically on social initiation through question asking and are discussed below. Overall, the review concluded

that 56.4% of the included studies had methodological concerns. However, most parents and caregivers of children with ASD were able to learn to implement PRT.

In an early study, Koegel et al. (1998) investigated whether incorporating motivational procedures of PRT would be successful when teaching social initiation through question asking to children with ASD. Specifically, the researchers taught the social initiation question, “What’s that?” to three children with ASD. Intervention was conducted twice a week in 30-minute sessions in two different settings (i.e., one 30-minute session in the clinical setting and one 30-minute session in the home environment). Using a multiple baseline across participants design, the results demonstrated that all three children made significant gains both in vocabulary development and in the frequency of initiations through question asking. In addition, “What’s that?” question asking generalized to new, unfamiliar stimuli. Thus, this initial study helped to support the concept that social initiation through question asking could be taught using the motivational procedures of PRT. Results of the above study held promising results of adding social initiations as a pivotal behaviour to PRT.

Subsequently, the long-term outcomes of using PRT procedures for teaching social initiation through question asking was investigated to determine if social initiations met the criteria of a pivotal behaviour. Koegel et al. (1999b) investigated social initiation through question asking in two phases. Phase One of the study used archival data to explore the difference in the frequency of social initiations between children with ASD who had exceptionally good outcomes in PRT early intervention and those who had exceptionally poor outcomes in PRT early intervention. Phase Two explored whether social initiation through question asking could be taught to children with ASD who

displayed exceptionally poor outcomes in early intervention. The archival data of six children (i.e., three with exceptionally good outcomes and three with exceptionally poor outcomes) were used in Phase One while four different children with exceptionally poor outcomes participated in Phase Two. Analysis of the archival data in Phase One of the study showed that children who displayed exceptionally good outcomes in the PRT early intervention exhibited more spontaneous social initiations even prior to early intervention compared to children with ASD who displayed exceptionally poor outcomes (Koegel et al., 1999b). During Phase Two, PRT procedures for teaching social initiation through question asking were implemented with the four children having exceptionally poor outcomes from early intervention. Phase Two results supported that children with ASD who displayed exceptionally poor outcomes from early intervention and engaged in little to no social initiation through question asking were able to learn social initiation through question asking when using PRT procedures for social initiation through question asking (Koegel et al., 1999b). Thus, social initiation through question asking began to be considered a pivotal behaviour.

Research has also shown that teaching a child with ASD how to initiate through question asking can result in collateral gains in several areas of functioning. For example, Koegel et al. (2003) investigated whether two children with ASD could be taught social initiations through question asking while probing for the effects the initiation intervention had on the development of grammatical morphemes. A grammatical morpheme is the smallest unit of language that holds meaning (e.g., dog signifies a single noun but adding the morpheme “s” now labels the item as plural). Through single-subject multiple baseline across participants design, two participants were taught social initiation through

question asking, specifically, “What happened?” and “What’s happening?” while focusing on the morpheme “s.” Results show that both participants were able to increase their frequency of self-initiated questions and increase the use of the targeted morpheme “s.” Furthermore, the participants generalized the skill of question asking to their home environment and engaged in spontaneous learning opportunities beyond the clinical setting (Koegel et al., 2003).

In another study, Koegel et al. (2010) investigated whether children with ASD could be taught to use social initiation through question asking for the purpose of information seeking. Three children with ASD were explicitly taught the question “Where is it?” using a multiple baseline across participants design. Intervention occurred for 60 minutes twice a week in a clinical setting. The length of intervention varied from 5.5 weeks to 11 weeks. Results showed that the children in the study were able to increase the frequency of asking the question, “Where is it?” Generalization of the social initiation was also investigated and occurred with the parent in the home environment. The researchers discovered that intrinsic motivational procedures (e.g., using child preferred items as the rewards in the intervention) may have been helpful in promoting generalization of the question. The results of this study support the increase of the frequency of social initiations and the generalization of question asking to multiple environments. However, caregivers were only used in the generalization phase and caregiver fidelity of implementation was not measured.

Randolph et al. (2011) examined whether caregivers’ education affected their fidelity of implementation in PRT while simultaneously recording social interaction and play (i.e., communicative responses, nonverbal responses, frequency of communicative

initiations, and play) made by the child with ASD. Using a concurrent multiple baseline design, caregivers (i.e., a mother, a father, and a grandmother) were trained to implement PRT through 10 sessions lasting between 45 to 55 minutes each occurring at a university research center. The first session consisted of a 30-minute overview of PRT. The remaining 9 sessions had the caregiver observe the target behaviour being implemented by the clinician with the target child for 15 minutes through a one-way mirror, and then the caregiver engaged in 15 minutes of guided practice with the clinician providing immediate feedback. The last 15 minutes of each session consisted of independent practice whereby the child and caregiver worked alone in the research classroom while being observed by the clinician. Results showed that caregivers without college degrees were able to implement PRT with fidelity, with two of the three parents continuing to meet fidelity of implementation at follow-up. The third caregiver who did not meet fidelity of implementation had a family emergency that interrupted the intervention for three weeks, which may have influenced their fidelity of implementation in PRT. The frequency of communicative initiations made by the children with ASD had also increased. However, the study has several limitations. Specifically, the natural home environment was not used and there is a lack of generalization and maintenance information on the frequency of communicative initiations. As well, the clinician provided the initial intervention for the target behaviour; therefore, the influence of the clinician on the child's increase in communicative initiations is unknown.

In a more recent study by Koegel et al. (2014), three children with ASD were systematically taught all four main *wh*-questions: "What is it?" "Where is it?" "Who is it?" and "What happened?" over a period of ten months using a multiple baseline across

participants design. Each child received 10 hours of intervention in three sessions per week and intervention lasted 10 months. In addition, intervention included two hours of weekly parent education sessions where parents learned how to implement PRT procedures for question asking. The children were not present during these two hours of parent education. Results showed that all three children with ASD engaged in a higher frequency of question asking in the targeted and untargeted questions following intervention. Moreover, collateral gains were shown in communication (e.g., expressive and receptive communication) and adaptive behaviour (e.g., daily living skills, and socialization) for all three children in the study. Since parents were not present during the intervention but received information on how to implement PRT procedures for question asking, the study is limited by the degree to which parent-mediated PRT influenced each child's improvements in question asking.

Effectiveness of Short-Term Autism Interventions

On average, it takes a Canadian family 4.5 visits to a professional and/or three years to obtain an ASD diagnosis (McMorris et al., 2013; Siklos & Kerns, 2007). Even when a diagnosis is secured, the average wait time between diagnosis and intervention extends from 22 months to 39 months in some parts of Ontario (Gordon, 2015). Obtaining early intervention in a timely fashion for a child with ASD is becoming highly problematic in Ontario. Short-term interventions that teach parents to implement intervention may be used until a child with ASD on a wait list is able to receive early intensive behavioural intervention. Short-term interventions have been supported to provide substantial gains for children with ASD.

In a short-term intervention study of one hour per week for 12 weeks, Vismara et al. (2009) used a parent-mediated Early Start Denver Model (ESDM) intervention. The ESDM combines two existing empirically validated interventions: the Denver Model (i.e., focusing on teaching pragmatics of language and non-verbal language development) and PRT. The intervention used a non-concurrent multiple baseline design and took place in a large clinic-based room. Eight parent-child dyads participated in the intervention. The results show that all eight children with ASD improved their spontaneous functional verbal utterances and joint attention initiations and these gains were maintained three months later (Vismara et al., 2009). However, the study did not occur in a naturalistic setting nor did the parents provide the intervention.

In another short-term intervention study specifically using PRT, 47 parents were assigned to two groups: a PRT parent training group (PRTG) or a parent psychoeducational control group (PEG). Both groups received 12 weeks of intervention. The 25 parents in PRTG received 12 weeks of training in PRT strategies for functional communication consisting of eight 90-minute sessions when only the parents were in attendance, and four 60-minute individual sessions with the PRT therapist and a parent-child dyad. The 22 parents in the PEG group received 12 weeks of psychoeducational information sessions (i.e., information about what ASD is and what PRT is) consisting of ten 90-minute sessions with only the parents, and two 60-minute individual sessions with the PRT therapist and a parent-child dyad. The primary outcome measure was the frequency of the child functional utterances which was categorized as (a) unintelligible, (b) imitative, (c) verbally prompted, (d) non-verbally prompted, and (e) spontaneous. The frequency of child functional utterances was measured through 10-minute structured

laboratory observations. The secondary outcome measures included the *Mullen Scales of Early Learning (MSEL)*, *Preschool Language Scale—Fourth Edition (PLS-4)*, *MacArthur-Bates Communicative Development Inventories*, *Vineland Adaptive Behavior Scales—Second Edition*, *Social Responsiveness Scale*, and Parent fidelity of PRT implementation. All measures were taken at baseline, week 12 and week 24 with the exception of the MSEL, which was only taken at baseline and week 24. A repeated measures analysis-of-variance was used to compare the lasting effects of the 12-week intervention at three points in time (i.e., baseline, at 12-week, and 24-week assessments). Overall, children in the PRTG group showed greater gains in functional communication [$F(2, 21) = 5.9, p = 0.009$] and greater implementation of PRT procedures at the end of the intervention (19 out of 23 or 83% met fidelity of implementation) compared to parents in the PEG group. Further, these results were maintained at 3-month follow-up (Gengoux, Berquist, Salzman, Schapp, Phillips, Frazier, Minjarex, & Hardan, 2015). The results of such short-term studies implemented by parents help authenticate the effectiveness of short-term intervention that may be easily implemented upon diagnosis. Nonetheless, 12 weeks for a total of 16 hours of intervention is a considerable time commitment that some families may not have the means to commit.

The shortest PRT parent training study to date was conducted by Coolican et al. (2010) in the province of Nova Scotia. The focus of the study was to explore the fidelity of implementation in PRT by parents while investigating whether communication (i.e., functional verbal utterance and type of utterance) and/or language (i.e., receptive and expressive language) would improve for the child with ASD. The study used a non-concurrent multiple baseline across participants design. Eight parents of children with

ASD were seen individually in three two-hour training sessions over two weeks. As a result of the six-hour parent training in PRT, child outcomes (i.e., communication and language) improved significantly and the results were maintained at follow-up (Coolican et al., 2010). However, the study revealed that participation in the brief six-hour parent training in PRT assisted only 50% of the parents of preschoolers with ASD in achieving fidelity of implementation at the follow-up stage. Such a lack of fidelity may be problematic in relation to the child's long-term gains if the parent is implementing intervention incorrectly.

As seen in the literature review above, overall, short-term PRT interventions have supported the increase of various skills in children with ASD. Moreover, parents can be taught to implement the specific strategies used in a PRT intervention with fidelity. By giving parents the skills required to implement the PRT intervention for social initiation through question asking, both the child and parent are given the opportunity to succeed.

Parent Empowerment

In the past, parents of children with ASD were often “blamed” for their symptoms; in turn, clinicians separated the child with ASD from the family in order to provide intervention that would reduce ASD symptomology (Koegel, Koegel, & Carter, 1999c). As time went on, intervention procedures for children with ASD began to integrate components of learning theory, and the parent causation hypothesis began to fade (Koegel et al., 1999c). Nowadays, parents are usually considered an important aspect of intervention, and parent education/training is considered an essential component of each child's treatment plan. By becoming more involved and having more say over their child's intervention, parents are feeling empowered. According to the Cornell

Empowerment Group (1989), parent empowerment is defined as, “an intentional, ongoing process centered in the local community involving mutual respect, critical reflection, caring, and group participation through which people lacking an equal share of valued resources gain greater access to and control over those resources” (p. 2).

Empowerment can occur at three levels: the community level (i.e., which refers to the actions by a group of people that shape access to social, political, and economic resources), the organizational level (i.e., organizations within the community that provide opportunities and hold the ability to influence social and economic resources), and the individual level (i.e., the ability of the individual to take action and development of personal strength) (Shulz, Israel, Zimmerman, & Checkoway, 1995). All factors interplay when addressing components related to empowerment.

When analyzing empowerment, the *Family Empowerment Scale (FES)* is frequently used. In the questionnaire developed by Koren, DeChillo, and Friesen (1992), empowerment consists of two dimensions: “Level of Empowerment” (i.e., three subscales assessing the community level, the organizational level, and the individual level) and “Expression of Empowerment” (i.e., attitudes, knowledge, and behaviour related to empowerment). The three subscales in “Level of Empowerment” mentioned above are typically reported as an empowerment score for family, child services, and community and are obtained by calculating the mean for each of the three levels. The questionnaire has an internal consistency of .88 is frequently used to assess the empowerment of parents of children with emotional/behavioural disorders (Koren et al., 1992).

The *FES* (Koren et al., 1992) can be used to measure empowerment in relation to other variables. In their study, MacMullin, Viecili, Cappadocia, and Weiss (2010) administered the *FES* (Koren et al., 1992) to 176 parents of children with ASD to determine if parental empowerment along with the mental health status of the parent would influence the parents' perception of their child's educational experience. Results of the study indicate that feelings of empowerment and the mental health status of the parent is significantly related to the perception of their child's educational programming. In other words, parents who felt more empowered tended to rate their child's educational experience as more positive. Results such as these help researchers understand how empowerment may lead to action or how empowerment influences perception of the economic or social resources available to the family.

Overall, parent empowerment is an important component within parent-mediated research that addresses a parent's feelings of empowerment at the individual, community, and organizational level along with the actions associated with the expression of empowerment. By understanding empowerment from a parental perspective, there is a greater understanding of how some parents access treatment for their child while some parents may face potential barriers when trying to access treatment.

Limitations in Extant Literature

Although extant research suggests parent-mediated interventions can be helpful, several limitations exist in the current literature. In their reviews, McConachie and Diggle (2007) and Vershuur et al. (2014) conclude that there is sufficient evidence that parent-mediated interventions for children with ASD may lead to higher rates of communication by the child, better parent-child interaction, increased understanding of ASD by the

caregiver, and reduced maternal depression. However, of the 71 studies reviewed by McConachie and Diggle (2007) and the 39 studies reviewed by Vershuur et al. (2014), very few of the studies involving parent-mediated interventions had adequate research designs (i.e., inclusion of fidelity of implementation and social validity measures). Vershuur et al. (2014), for example, concluded that only 9 out of the 39 studies evaluated the fidelity of implementation by the caregivers. In addition, Vershuur et al. (2014) noted that the majority of the studies were conducted by one research centre. According to Horner, Carr, Halle, McGee, Odom, and Wolery (2005), replication across researchers is key for establishing evidence-based interventions. Therefore, the study will contribute to single-subject research design literature by engaging in research conducted by an independent researcher in a different geographical location while employing a high quality methodological intervention (e.g., experimental control through replication across individuals and documenting fidelity of implementation).

In their review of PRT studies, Vershuur et al. (2014) also concluded that limited data on social initiations are available with only 16 out of 39 reviewed studies addressing the various types of social initiations. Vershuur et al. (2014) found that of the 16 studies that included PRT and social initiations, only five studies evaluated social initiation through question asking (Koegel et al., 1998; Koegel et al., 2003; Koegel et al., 2010; Koegel et al., 1999b; Vismara & Lyons, 2007). The five studies that evaluated social initiation through question asking had a clinician provide the intervention and the intervention, did not occur in the natural home environment. Based on literature review conducted, the present study was the first to evaluate parent-implemented PRT for social initiation through question asking occurring in the child's home environment.

As mentioned above, parents of children with ASD residing in Ontario report high wait times when it comes to obtaining early intervention for their child. Short-term interventions that teach parents to implement intervention may be used until a child with ASD on a wait list is able to receive early intensive behavioural intervention. To date, only one study has investigated the effects of a short-term PRT intervention from a parental-mediated perspective (e.g., Coolican et al., 2010). However, the study also revealed that only 50% of the parents achieved fidelity of implementation in PRT at the follow-up stage. Thus, not only did the study assess implementation fidelity, the likelihood that caregivers achieving fidelity will be improved by doubling parent training from 6 hours to 12 hours (i.e., two 2-hour sessions weekly for three weeks) and through incorporating daily parental feedback during the intervention phase. In addition, the study focused on teaching social initiation through question asking, rather than just teaching parents to implement the motivational components included in PRT.

In the most recent study on social initiations through question asking, Koegel et al. (2014) implemented a clinician-led intervention targeting social initiation through question asking. However, during the intervention, parents of the children included in the study received two parent education hours. Since parents were not present during the intervention but received information on how to implement PRT procedures for question asking, the effect of the parent on the child's improvements in question asking was unknown (i.e., clinicians did not know if parents implemented PRT procedures for question asking at home and whether this may have influenced their data). Thus, by isolating the PRT intervention for social initiation through question asking from a parent-mediated perspective, this creates an interesting area for inquiry that investigates the

impact a parent may have on increasing the frequency of social initiations through question asking made by the child with ASD. Thus, the present study did not have the researcher working directly with the child and ensured the parents provided intervention from the onset in order to address diffusion of treatment effects (i.e., increase internal validity by minimizing the influence from external or confounding variables) (O'Neill, McDonnell, Billingsley, & Jenson, 2011).

Other reoccurring problems are existent in PRT research, such as limited generalization data, maintenance data, and social validity measures. According to Vershuur et al. (2014), 22 out of 39 PRT studies measured generalization data, maintenance data was measured in 13 out of the 39 studies, and social validity was measured in 10 out of 39 studies. Since PRT is a naturalistic intervention, generalization and maintenance measures should occur more frequently in order to assess the effects of the intervention on the learned behavior across environments and/or individuals. Social validity measures are also important especially with PRT since the intervention is meant to include parents and occur in the natural environment. The present study collected generalization data across individuals/environments for one week after the intervention and collected maintenance data one month after generalization probes had finished. In addition, a social validity measure titled the *Treatment Acceptability Rating Form – Revised (TARF-R)* (Carter, 2010) was used to investigate caregivers' perceptions towards the intervention along with the *Family Empowerment Scale (FES)* (Koren et al., 1992) was used to measure a caregivers' level and expression of empowerment in relation to family, services, and broader community.

According to National Autism Center (2015), PRT is an established evidence-based practice and the “key to the delivery of PRT is parent involvement and implementation in the natural environment such as the home, community, and school setting” (p. 61). As a pivotal behaviour in PRT, the area of social initiation through question asking is still quite a new field. To date, very few studies have addressed social initiations through question asking and the researchers who developed the intervention method have primarily been those conducting the studies done thus far. Furthermore, interventions for social initiation through question asking are limited with no studies to date using parents as the primary service provider (Vershuur et al., 2014). The majority of parents of children with ASD strongly believe that services are more effective and contribute to their child’s growth when parent training is incorporated as part of the intervention (Hume et al., 2005). Although extant research supports using PRT to address social initiation for question asking through a clinician-led intervention model, based on the literature review conducted, the present study was the first of its kind in providing a parent-mediated perspective from the onset of intervention. In addition, the study is the first to provide short-term training specifically teaching the PRT procedures for social initiation through question asking.

Rationale for Study

The province of Nova Scotia has realized the importance of parental involvement in early intervention and has included interventions such as PRT that stress parental involvement as a core component of intervention (Smith et al., 2015; Smith et al., 2010). Since ASD lies on a continuum, intervention methods being offered should be reflective of the varying needs in the ASD community. In Ontario, the diversity of needs in the

ASD community is not mirrored in the types of interventions currently being offered (Rayer, Konkin, Doig, & Petch, 2015). Furthermore, a problem exists with the acquisition of services as well as the costs associated with the interventions. Strict rules in the publicly funded ABA based program (e.g., must live in geographical boundaries of the program and have an ASD diagnosis from a professional) (Ministry of Child and Youth Services, 2015) make it difficult for parents to access intervention during the crucial early intervention age range (i.e., 18 months to six years of age) (Grindle, Kovshoff, Hastings, & Remington, 2009). Consequently, parents of children with ASD resort to expensive private services (Gordon, 2015).

As seen in this literature review, there is support for the idea that parents can be taught to implement an evidence-based practice such as PRT in the natural environment (i.e., the home) on a short-term basis. By increasing the skills of the parents and the question asking initiations by the child with ASD, continual opportunities for learning emerge beyond the intervention setting for both parties. The purpose of this study is to investigate whether parents can specifically teach the target skill of social initiation through question asking to their child with ASD through a primary parent-mediated PRT model. Moreover, the study aims to answer the following questions:

1. Can a short-term parent-mediated PRT lead to an increase in the frequency of social initiation through question asking made by children with ASD?
2. Does the parent-mediated PRT question asking intervention increase the frequency of context appropriate questions?

3. Does the parent-mediated PRT question-asking intervention lead to generalization of social initiation to novel items, another family member and/or environment beyond intervention?

Hypotheses

It was hypothesized that the short-term parent-mediated PRT would increase the frequency of social initiation through question asking and frequency of context appropriate questions made by the child with ASD. In addition, it was hypothesized that the skill of social initiation through question asking would maintain and generalize to novel items, other family members and/or environments.

CHAPTER III: DESIGN AND METHODOLOGY

Research Design

Single-subject research design (SSRD) is a research method that grew out of the field of applied behaviour analysis in which functional relationships between independent variables and dependent variables are sought (O'Neill et al., 2011). SSRD is a rigorous research design yet it enables research with very few individuals (O'Neill et al., 2011). In SSRD, participants act as their own control, which allows for direct replication of the experimental effects and the capability to investigate the functional relationship between the variables which allows the researcher to draw clear conclusions regarding the effect of the independent variable on the dependent variable (O'Neill et al., 2011).

The multiple baseline design is one of many SSRD designs and is the one that was used in the current study. A multiple baseline design includes two or more baseline and intervention phases where baseline data are collected concurrently across a minimum of three participants, settings or behaviour, and then the intervention is then subsequently introduced to one participant, setting, or behaviour at a time (O'Neill et al., 2011).

To begin, baseline data are collected on the dependent variable. After a minimum of five data points have been obtained and after a stable baseline is evident, the intervention is then introduced to the first dependent variable. According to O'Neill et al. (2011), baseline stability occurs when “the final three data points in a phase are within plus or minus 10% of the mean level of performance in that phase” (p. 58). However, baseline data gathering continues for the remaining dependent variables (e.g., participants, behaviours, or settings) until a change in the first dependent variable is

evident after intervention. Only then is the intervention introduced to the next dependent variable in a staggered fashion in order to establish a functional relationship (O'Neill et al., 2011). This process is repeated with the additional dependent variables and can then demonstrate a functional relationship between the intervention and the dependent variable of interest.

In the present study, the independent variable was the short-term parent-mediated PRT intervention, and the dependent variables were the frequency of social initiation through question asking (i.e., “What’s that?”), and the frequency of context appropriate questions asked by the children with ASD (i.e., other *wh*- questions such as “Who is that?” “Where is it?”). Using a multiple baseline design allowed the researcher to show a functional relationship between the behaviour of interest (i.e., social initiation through question asking) and the intervention (i.e., three-week parent-mediated intervention) by replicating the experimental effects across several individuals (O'Neill et al., 2011).

In an effort to improve the low implementation fidelity among parents found by Coolican et al. (2010), the present study implemented parent training for twelve hours over the span of three weeks; the sessions occurred twice a week and each session lasted two hours. It is also important to note that, in the present study, each child was taught, “What’s that?” without the focus of grammatical morphemes (e.g., adding “s” to the end of a word to make it plural) or other components of language development that can occur within question asking. Some flexibility in the phrase being taught was also permitted, such as in the style of adult prompting, (e.g., “What is that?” “What is it?” or “What’s in the bag?”). However, there was a specific process that was used for teaching the first developmental *wh*-question, “What’s that?” which is further elaborated upon below.

Materials and Instruments

A variety of materials and instructional manuals were used in the study. The caregivers received a copy of three PRT handbooks: *Using Pivotal Response Treatment to Teach First Words to Children with Autism* (Koegel, 2014c), *Pivotal Response Treatment: Using Motivation as a Pivotal Response* (Koegel, 2014a) and *Teaching the Pivotal Behaviour of Initiations to Children with Autism* (Koegel, 2014b). In addition, numerous materials were used in the intervention. These included an opaque bag for the toys used to teach “What’s that?” along with a minimum of ten toys specific to the interest of the child that was determined through caregiver input, twenty neutral items determined through the response-reinforcer survey, and an iPad to video-record the probes.

Numerous instruments were also used in the study. First, a demographic survey was administered to the caregiver at the beginning of the study. This asked about the parents’ education, employment, income, child age, age of diagnosis, ethnicity, specific toys that may be highly motivating to the child and other services the child may be receiving. Additionally, the caregiver provided insight as to the family’s typical weekly activities (e.g., grocery shopping on Saturday, soccer on Wednesday, etc.) so that the researcher could include PRT procedures specific to the child and the family. Since the study was conducted in the home environment, it was important to take the family routines into consideration to create an individualized treatment plan. When engaging in family interventions for children with ASD, it is crucial to match the intervention with the context of the individual, values of the family, and the existing eco-cultural routines (Koegel & Koegel, 2006). In doing so, there is a better chance for intervention to become

a part of family life after intervention is complete. Motivational procedures specific to the cultural practices of the family may help promote further participation in the PRT intervention (Koegel & Koegel, 2006).

Following completion of the demographic survey, a response-reinforcer survey (see Appendix A) was conducted to determine neutral items that the child could not yet label (e.g., household items, clothing, additional toys, etc.) that could be included in the intervention. During the response-reinforcer survey, common items found around the home were presented to the child and the child was asked to label each item. The caregiver simply presented each item and asked, “What is it?” and gave the child time to respond. If the caregiver noticed the child became disengaged or uninterested, the item was labeled as neutral. This was done until 20 items were found. Once the items were found, they were placed to the side and were considered neutral items for the intervention (Koegel, 2014b). Since the child might not be particularly interested in labeling the neutral items, it was important to keep motivational techniques of PRT in mind when conducting the response-reinforcer survey to keep the child’s motivation high (e.g., hold up preferred item until child requests, then hold up neutral item and ask “What is it?”). Items known to be highly motivating to the child were interspersed into the response-reinforcer survey until the 20 neutral items were found. The neutral items were noted so that they could be used when the intervention was faded, and for promoting generalization of question asking beyond preferred items.

Caregivers also completed the *MacArthur Bates Communication Development Inventory (CDI) Level II A* (Fenson, Pethick, Renda, Cox, Dale, & Reznick, 2000). The *CDI* (Fenson et al., 2000) is a parent report measure that analyzes a child’s

communicative skills development. For the purposes of this study, the caregiver completed the Toddler Form Level II A which is a 100-word checklist that measures how many words are in the child's repertoire. The caregiver simply checks which words they have heard their child say/use and the number of words is tallied to determine how many words the child uses functionally. Regarding two-word combinations, the caregiver is asked whether their child has begun combining two-words at the end of the form (Fenson et al., 2000). A Cronbach's alpha of .99 indicates that the *CDI Toddler Form Level II A* (Fenson et al., 2000) is reliable. Similar results are shown within validity with a Pearson correlation co-efficient of .74. Thus, the *CDI Toddler Form Level II A* is considered a reliable and valid parent measure of their child's language (Fenson et al., 2000).

At the end of the study, the caregiver completed a social validity questionnaire, the *Treatment Acceptability Rating Form – Revised (TARF-R)* (Carter, 2010) and the *Family Empowerment Scale (FES)* (Koren et al., 1992). The *TARF-R* (Carter, 2010) is a 20-item questionnaire using a six-point Likert scale that asks the caregiver to rate the practicality of continuing the intervention, willingness to carry out the intervention, and cost/time associated with the intervention. Each participant's answers are summed, with higher numbers indicating greater acceptability of the treatment by the caregiver (Carter, 2010). The total possible score is 120. According to Carter (2010), the *TARF-R* has an internal consistency of 0.92, displaying high reliability.

Empowerment refers to how confident an individual feels in relation to a certain topic and this was measured through the *Family Empowerment Scale (FES)* at the end of the current study (Koren et al., 1992). The *FES* (Koren et al., 1992) is a 34-item questionnaire addressing how empowered a caregiver feels in their day to day family life,

accessing services for their child, and involvement in community events pertaining to their child. Response choices for each question ranged from 1 = Never to 5 = Very Often. The first 12 questions ask how empowered the mother feels when discussing her own family (i.e., Q2. “I feel confident in my ability to help my child grow and develop”); the following 12 questions relate to how empowered the mother feels when discussing her child’s services (i.e., Q.13 “I feel that I have a right to approve all services my child receives”); and the last 10 questions focused on the mother’s community involvement (i.e., Q.25 “I feel that I can have a part in improving services for children in my community”). An empowerment score for family, child services, and community are obtained by calculating the mean for each of the three levels. According to Koren et al. (1992), the *FES* has an internal consistency of .88, displaying high reliability and is frequently used to assess empowerment of caregivers of children with emotional/behavioural disorders. Although the researcher intended to administer the *FES* (Koren et al., 1992) before and after intervention, its administration was accidentally omitted prior to the study’s initiation and was administered only after the conclusion of study. Thus, only post-study results are available.

Finally, The *Rating Scale for Child Affect* measured the interest and happiness of the child throughout the intervention (Baker, Koegel, & Koegel, 1998). This measure is a six-point affect scale that helps to identify if the child is motivated during the intervention (Koegel & Koegel, 2006) and whether performance on a given day may have been affected by the general mood of the child. On the “Interest” scale, a score of zero or one indicates a disinterested child (e.g., child looks bored or uninvolved). A score of two or three indicates a neutral interest displayed by the child (e.g., child is inactively accepting

the situation). Lastly, a score of four or five indicates an interested child (e.g., child is attending to the task at hand).

On the “Happiness” scale, a score of zero or one indicates an unhappy child (e.g., tantrums, crying, or avoiding task). A score of two or three indicates a neutral child (e.g., child is neither smiling nor upset). Lastly, a score of four or five indicates a happy child (e.g., child is smiling or seems to be enjoying interaction).

The Child Affect score is calculated by adding the score for interest and the score for happiness to compute an average score during the 10-minute videoed probe; a rating of 0 to 1.7 indicates a negative affect (i.e., disinterested/unhappy), a rating of 1.71 to 3.29 indicates a neutral affect (i.e., neither disinterested or interested/neither happy nor unhappy), and a rating of 3.3 to 5 indicates a positive affect (interested/happy) (Baker et al., 1998).

Inclusion Criteria

Ultimately, three boys and their mothers were included in the study. All names have been changed to maintain confidentiality. To be included in the study, all children were required to have a documented ASD diagnosis (conducted by qualified professional), no co-morbid neurological or sensory disability (to control the characteristics of the participants), a minimum of 50 functional words and multiple word utterances (i.e., two-word combinations in the form of requests which is a pre-requisite for question asking) as determined by the Communication Development Inventory, and not have had any prior training for social initiations (to control for potential effects).

Each caregiver was required to have a minimum of a grade eight education, speak English at home, be available daily to engage in data collection procedures during the

intervention stage. There also needed to be an additional family member (i.e., father or sibling) and environment (i.e., grocery store or backyard) available to assist during the generalization stage.

As part of the diagnostic procedures, each boy had had the *Autism Diagnostic Observation Schedule, Second Edition – Module 1 (ADOS-2)* administered for their diagnosis. In addition, all three children had been assessed during the diagnostic procedures using the *Vineland-II Adaptive Behaviour Scales: Parent/Caregiver Rating Form (VABS-II)*. Both measures were conducted by a Clinical Psychologist.

Autism Diagnostic Observation Schedule, Second Edition – Module 1 (ADOS-2). The ADOS-2 is a standardized instrument used to diagnose ASD and is coded for language and communication, reciprocal social interaction, play and imagination, stereotyped behaviours and restricted interests, and other behaviours (Lord, Luyster, Gotham, & Guthrie, 2012). According to the ADOS-2, a score of 7 signifies a cut-off for a diagnosis of autism spectrum disorder, a cut-off score of 10 signifies an autism diagnosis while a maximum score of 28 can be obtained. The severity of the diagnosis and the level of support required depends on what score the child receives.

Vineland Adaptive Behaviour Scales, Second Edition (VABS-II). The VABS-II is an assessment that measures adaptive functioning in four domains: communication (e.g., listening/understanding, talking, early reading/writing skills), daily living skills (e.g., self-care, household participation, use of time/money), socialization (e.g., social interactions, play and leisure, responsibility and sensibility towards others), and motor skills (e.g., use of arms/legs and use of hands/fingers). The child's level of functioning is displayed by year: months (e.g. 1:6 = 1 year, 6 months). *The Vineland-II Adaptive*

Behaviour Scales: Parent/Caregiver Rating Form contains the same content as the VABS-II; however, it is completed by the caregiver.

Participants

After Research Ethics Board Approval (REB) cleared the research, the researcher contacted various autism early intervention centres. Before flyers could be distributed by each organization, the organization had to sign a letter of permission (see Appendix B) stating that they agree to distribute the researcher's flyer (see Appendix C). All organizations were provided with evidence that the study had been cleared by the University of Windsor REB committee. Upon approval from the organization, caregivers were provided with a recruitment flyer.

After a family initiated contact with the researcher, the researcher phoned the family to establish rapport and verify inclusion criteria (see Appendix D). Initially, four families met inclusion criteria (as described above) and were selected to participate in the study. However, the one mother-child dyad dropped out of the study prior to finishing baseline. Ultimately, three boys and their biological mothers participated in the study.

Liam

Child number one, Liam, was 4 years and 2 months at the beginning of the study (see Table 1). He is a white male with no co-morbid neurological or sensory disability. Liam was diagnosed with mild to moderate ASD using the ADOS-2 at the age of 3 years and 1 month. No exact score was reported on the assessment; however, a diagnosis was confirmed. During the clinical assessment, Liam was described as a happy child who smiled frequently and was responsive to most social contexts. However, Liam had little to no speech at the time, had inconsistent eye contact, did not share or give toys, gazed at

Table 1

Child's Characteristics

	Liam	Jackson	Eli
Chronological Age ¹	4:2	4:8	3:9
Diagnostic Information			
• Age at Diagnosis	3:1	4:3	3:8
• ADOS-2 ² Score	--- ⁴	16	19
• VABS-II ³ Communication Score			
• Listening/understanding	1:0	1:0	1:2
• Talking	0:9	2:6	2:3
• Early reading/writing	1:10	3:1	4:3
• VABS-II Daily Living Score			
• Self-care	1:0	1:9	2:11
• Household participation	0:7	0:10	2:2
• Use of time/money/phone	0:11	0:11	3:5
• VABS-II Socialization Score			
• Social interactions	0:8	0:2	0:6
• Play and leisure	0:9	0:6	1:2
• Responsibility/sensitivity towards others	No concern	1:11	1:9
• VABS-II Motor Skills			
• Use of arms/legs		1:8	2:10
• Use of hands/fingers	No concern	2:3	2:4
• VABS-II ABC Score	1:3 1 st percentile	0.2 percentile	3 rd percentile
CDI ⁵			
• Has the child more than 50 words?	Yes	Yes	Yes
• Does the child speak in two-word phrases?	Yes	Yes	Yes

¹ Year: Month² ADOS-2 = Autism Diagnostic Observation Schedule, Second Edition – Module 1³ VABS-II = Vineland Adaptive Behaviour Scales II: Parent/Caregiver Rating Form⁴ Score not provided⁵ CDI = MacArthur Bates Communication Development Inventory Level II A

lights, covered his ears during songs (i.e., he had sensory issues with visual stimuli and sound), and he engaged in repetitive play.

In terms of the VABS-II: Parent/Caregiver Rating Form, Liam had delays in all four domains: communication, daily living skills, socialization, and motor skills. With a chronological age of 4:2, Liam functioned at the age of 1:0 in both the communication and daily living skills domain. In the socialization domain, Liam functioned at the 0:8 to 0:9 month-old level. Motor skills were also low, with Liam functioning at the 1:3 age. The overall adaptive behaviour composite score was very low, within the 1st percentile.

Although Liam had little to no language prior to his diagnosis, his mother indicated on *CDI-Level II A* (Fenson et al., 2000), completed during the initial meeting of the mother with the researcher, that he had well over 50 functional single words, and often combined words into two-to-three word phrases.

At the time of the study, Liam was a happy child who smiled continuously. He loved playing with letters of the alphabet, toy cars, singings songs, squeaking toys that made noises, and tickles.

Liam's mother, Hanna, is a Caucasian female between 35 and 44 years of age. She is Liam's biological mother and has obtained a community college diploma. The demographic characteristics of Hanna and the other mothers are shown in Table 2.

Jackson

Jackson, was 4 years and 8 months at the beginning of the study. He is a white male with no co-morbid neurological or sensory disability. Jackson was diagnosed with moderate ASD using the ADOS-2 at the age of 4 years and 3 months with a total score of 16 (autism cut-off = 10, autism spectrum cut-off = 7, maximum = 28). During the

Table 2

Mothers' Characteristics

	Hanna (Liam's Mother)	Marie (Jackson's Mother)	Sarah (Eli's Mother)
Gender	Female	Female	Female
Age Range	35-44	35-44	45-54
Marital Status	Married and living with partner	Married and living with partner	Divorced
Household income	\$75,000 and over	\$75,000 and over	Under \$25,000
Education	College Diploma	University Undergraduate Degree	College Diploma
Employment Status	Home	Home	Part-Time
Relationship to child	Birth mother	Birth mother	Birth mother
Race/Ethnicity	White	White	White

diagnostic assessment, Jackson was described as a smart, very loving, forgiving, and independent child. Jackson would spontaneously make requests during the assessment and was engaged with the examiner during some imaginary play and toys that involved cause-and-effect (e.g., click the cow button and it makes a “moo” sound). However, Jackson was not able to answer questions appropriately (i.e., would only respond “yep” to all questions being asked) and did not respond to others’ initiations of play. In addition, Jackson displayed frustration when unable to play with toys that were of particular interest to him (e.g., trains).

On the VABS-II: Parent/Caregiver Rating Form, Jackson displayed delays in all four domains. In the communication domain, Jackson’s receptive language was as low as 1:1 but his written language was as high as 3:1. Daily living skills showed significant delays with functioning ranging from a 10-month age level for household tasks to 1:9 for eating, dressing, and personal hygiene. In the socialization domain, Jackson scored at the 2-month level for relationships but 1:11 for coping skills. Jackson’s motor skills were also delayed with his level of functioning typically being between the 1:8 to 2:3 age range. Overall, Jackson’s ABC was in the 0.2 percentile.

According to his mother, Jackson was non-verbal and was not walking until he was three years old. However, at the time of the study, he had an extremely large vocabulary for his age. Based on the *CDI-Level II A* (Fenson et al., 2000) completed by his mother during the initial meeting with the researcher, Jackson had well over 100 functional words and often combined words into two-to-three word phrases.

At the time of the study, Jackson was described as a loving child who smiled and was often cooperative. He loved engaging in social games, playing with advanced

robotics or video games, and squishy toys for sensory purposes. Jackson has an older sibling also with a diagnosis of ASD.

Jackson's mother, Marie, is a Caucasian female between 35 and 44 years of age. She is Jackson's biological mother and has obtained a university undergraduate degree (see Table 2).

Eli

Eli, was 3 years and 9 months at the beginning of the study. He is a white male with no co-morbid neurological or sensory disability. Eli was diagnosed with severe ASD using the ADOS-2 at the age of 3 years and 8 months with a total score of 19 (autism cut-off = 10, autism spectrum cut-off = 7, maximum = 28). During the diagnostic assessment, Eli was described as a child with a remarkable memory who had strengths when it came to ABC's, numbers, reading, and colours. However, concerns were expressed related to Eli's lack of eye contact, giving up objects to others, lack of joint attention, and repetitive movements with his fingers. In addition, Eli displayed major frustration when his snack was cut into smaller pieces.

On the VABS-II: Parent/Caregiver Rating Form, Eli displayed delays in all four domains. In the communication domain, Eli functioned at the 1 year 2 month level in receptive language but as high as 4:3 for written language. Daily living skills were moderately low at the 2 year 11 month level for eating, dressing, and personal hygiene. Socialization was low with a functioning level of 6 months for interpersonal relationships but 1:9 for coping skills. Motor skills were also moderately low scoring between the 2 year 4 month level and the 2 year 10 month level. Eli scored in the 3rd percentile on his overall ABC.

Based on the *CDI-Level II A* (Fenson et al., 2000) completed by Eli's mother during the initial meeting with the researcher, Eli had well over 50 functional words and often combined words into two-to-three word phrases.

At the time of the study, Eli was a social child who loved Toy Story characters, letters, story time, and Halloween. He loved engaging in social games and playing outside on his swing. Eli has an older sibling from the mother's previous relationship; however, this sibling does not live at home with them.

Eli's mother, Sarah, is a Caucasian female between 45 and 54 years of age. She is Eli's biological mother and has obtained a college diploma (see Table 2).

Procedure

Prior to the beginning of the study, the researcher obtained full certification in PRT from the University of California Santa Barbara Koegel Autism Center in order to be able to train parents and/or professionals how to implement PRT. The researcher obtained the following certification: level one – introductory awareness of PRT, level two – introductory implementer of PRT for first words, level three – generalizing PRT procedures for multiple children with ASD, level four – advanced implementer for teaching self-initiations, and level five – trainer of trainers.

After it was established that the child and mother met the initial inclusion criteria, the researcher met with each mother and provided them with the letter of information (see Appendix E). After all questions were answered, the researcher requested the mothers to sign both the letter of informed consent (see Appendix F) and the form permitting video recording (see Appendix G). Subsequently, each parent completed the *MacArthur Bates Communication Development Inventory (CDI) Level II A* (Fenson et al., 2000) to measure

how many words their child had in their repertoire. During the initial visit, the researcher also verified that the children did not already engage in social initiation through question asking. To determine this, the researcher video recorded a 10-minute interaction of each mother and child participating in the child's preferred activity. After the play interaction was over, the researcher scored the presence of the target behaviour (i.e., the researcher counted the number of times the child asked "What's that?" in the 10-minute video probe) using the data sheet (see Appendix H). To be included in the study, the child should not have engaged in any social initiation through question asking.

After the video determining eligibility was scored and the child was deemed eligible to participate in the study, the researcher returned to the home and each mother completed a demographic form and response-reinforcer survey. At the end of the visit, the mothers received a brief overview of the 3-week training, their responsibilities for each week and scheduled the baseline sessions. The researcher provided the mothers with a copy of each of the signed forms (i.e., letter of informed consent and video recording form). The mothers also provided names of family members and environments that could be used in the generalization phase.

Baseline. Baseline data was collected for all participants following established single-subject multiple baselines procedures as described by O'Neill et al. (2011). For participant one, Liam, baseline data collection occurred every day for one week (i.e., five days). For the remaining participants, baseline data collection occurred twice a week until training was ready to be introduced. Immediately prior to introducing training to each subsequent participant, the researcher collected baseline data for three days in a row for

those participants. The introduction of the caregiver training was staggered by one week for each participant dyad.

During each baseline session, the researcher took a 10-minute video recording sample of the child with ASD and the caregiver engaging in a play routine that is typical for the family (e.g., playing with toys after snack time, etc.). Each mother was instructed to try to elicit social initiations from their child. The researcher scored the baseline probes after each session. Probes were evaluated through a frequency count and coded for child affect. The researcher also observed and noted the toys the child liked and the contexts in which social initiations through question asking occurred, if any (e.g., child liked playing with dinosaur toys). By doing this, understanding the child's interest and motivation was better understood and could be incorporated into the intervention.

After baseline sessions were scored by the researcher, the caregiver received the first two manuals, *Using Pivotal Response Treatment to Teach First Words to Children with Autism* (Koegel, 2014c) and *Pivotal Response Treatment: Using Motivation as a Pivotal Response* (Koegel, 2014a). The mother was asked to read the material prior to the first week of parent training.

Training. After a stable baseline data was established, parent training continued for three weeks. The researcher provided two, two hour sessions each week for three weeks for a total of 6 sessions, or 12 hours of training.

Week one of training targeted PRT and the motivational components of PRT. Week two targeted social initiation through question asking and taught the mothers how to implement the intervention to their child. The final week consisted of problem solving and troubleshooting the intervention, which gave the mothers an opportunity to further

comprehend the intervention and ask any questions they may have had. The first two weeks of training included only the mothers in order to avoid diffusion of treatment effects (O'Neill et al., 2011). In the third week, however, the child was included so that the mother could practice the PRT intervention with their child.

First week of training. Prior to their first week of training, the mothers read the first two manuals *Using Pivotal Response Treatment to Teach First Words to Children with Autism* (Koegel, 2014c) and *Pivotal Response Treatment: Using Motivation as a Pivotal Response* (Koegel, 2014a).

Session One. In the first training session, the researcher presented a PowerPoint presentation to the mothers. The presentation consisted of the seven motivational procedures of PRT with video examples. The researcher then modelled each of the seven motivational techniques described below and allowed the mothers to practice with the researcher, with the researcher providing feedback to the caregiver as necessary. The researcher and the mothers engaged in role reversal to practice PRT from both perspectives (e.g., the mother's and the child's perspective). The motivational techniques taught to the mothers included the following techniques (Koegel & Koegel, 2006):

1. **Child attention and clear opportunities** – The child should be attending before the mother provides the instruction and the instruction should be clear, uninterrupted, and related to the task.
2. **Interspersion of maintenance tasks and acquisition tasks** - The instructions that the mother provides should vary frequently, and maintenance tasks (i.e., tasks that the child has already mastered) should be interspersed with acquisition tasks

(i.e., targeted skills). Although there is no specific set ratio, it is recommended that three maintenance tasks should be offered for each acquisition task.

3. **Shared control** - The child should have significant input in the selection of toys and activities to keep motivation in the activity at a high level. The mother should have control over the remaining pieces of the activity to provide language opportunities (e.g., shared control and interruption procedures).
4. **Child choice and child lead** - Within an activity, mothers can let the child choose stimulus materials or guide the direction of the activity. This can include: following the child's lead to another activity, switching activities if child becomes bored while engaging in an activity, and/or letting the child choose stimulus material within an activity.
5. **Contingent reinforcement** – Reinforcers are dependent on the child delivering a response to a language opportunity and the response must be appropriate to what is going on. The response-reinforcer contingency means that the reinforcer should be provided immediately after a response to establish a connection between a response and a reward. During the first training session, the mothers were taught the response-reinforcer contingency to pair the target behaviour with a natural reward. In this way, when the mother worked with her child later in the study, the child would be supplied with the reinforcer immediately contingent upon successful completion of target skill or a reasonable attempt at communication.
6. **Reinforcement of attempts** - Reinforcers should be given to the child following clear attempts as well as clear responses. A reasonable attempt is considered a response that is clear and goal-directed (e.g., child says “Dat” for “What’s that?”)

while a clear response produces the target behaviour (e.g., child says “What’s that?”).

7. **Use of direct and natural reinforcers** - Reinforcers should be directly related to the child’s response (e.g., child says red ball therefore the red ball is provided).

These natural rewards should be functionally related to the activity and should be administered immediately and contingently following the child’s attempt.

Session Two. In session two, the mothers were provided with an opportunity to further practice implementing each of the seven PRT motivational procedures across different activities or family routines with the researcher. The researcher provided guidance and suggestion for proper implementation through modeling, coaching, and role reversal. This permitted the mothers to ask any further questions they may have had regarding PRT and implementing motivational procedures in PRT.

At the end of the first week of training, the mothers were given a copy of the third manual *Teaching the Pivotal Behaviour of Initiations to Children with Autism* (Koegel, 2014b). The mothers were asked to read through the third manual prior to the start of week two of the intervention to familiarize themselves with the procedures, but were asked not to implement the procedures. By reading the manual on her own prior to the second week, the caregiver was offered an opportunity to understand the material beforehand and could ask questions when sessions begin.

Second Week of Training. During the second week of training, the researcher focused on teaching the mothers to implement procedures for social initiations through question asking. Specifically, training focused on the *wh*-question “What is it?” Only the researcher and the mother was present during sessions three and four. Both individuals

took turns “acting” as the child in a role-play situation so that the mothers could learn how to implement the intervention.

During the sessions, the researcher used 10 toys that the child with ASD preferred based on each mother’s input and an opaque bag in which to put both the previously identified neutral and preferred items. This time was used to practice the intervention. Neutral items that had been identified through the response-reinforcer survey administered prior to the study’s initiation were included in the training to promote further question asking initiations directed at unfamiliar or undesired items.

Session Three. In session three training focused on “What’s that?” This *wh*-question is the first to appear developmentally in typically developing children, and leads to vocabulary acquisition (Koegel, 2014b). The researcher also noted to the mother that there is a process when teaching the first developmental *wh*-question, “What’s that?” Firstly, when the child pairs “What’s that?” with the model prompt for “What’s that?” then the child is immediately reinforced with an item from the opaque bag and the mother labels the item. This is done to keep motivation high at the beginning of teaching the first *wh*-question. Once the child understands this contingency and is asking, “What’s that?” consistently following the model prompt, then the mother also added a model prompt for the label of the item being removed from the opaque bag and had the child repeat the label before receiving the reinforcing item. This ensured the child understood what response was required of them when engaging in the procedures for teaching social initiation through question asking. Following this, when neutral items were added, the child knew to ask, “What’s that?” for the unknown objects.

Since the child was not present in this session, an adult played the role of the child. The steps for teaching “What is it?” were as follows:

1. To begin, all 10 of the child’s preferred toys/items were gathered and placed in the opaque bag. The mother was taught that a prompt is an external cue that helps signal what the child should do; in this case, the prompt is the question “What’s that?” The mother will then prompt the child to ask, “What’s that?” Upon the child repeating, “What’s that?” the mother will take one of the preferred items out of the opaque bag and immediately reinforce the child while labeling the item.
2. Once the child understood the above contingency, the mother added additional procedures for teaching, “What’s that?” The mother labelled the item and now required the child to repeat the name of the item before receiving the reinforcing item (Koegel, 2014b). For example, if the mother prompted, “What’s that?” and child repeated, “What’s that?,” the mother would then follow up with prompting, “red ball.” If the child repeated, “red ball,” the child was naturally and contingently reinforced with the red ball. In addition, the mother could interchangeably use, “What’s that?” “What is that?” or “What’s in the bag?” or any other form to help the child understand the phrase is not rigid.
3. After the child asked, “What’s that?” following the prompt (if needed), the mother was able to fade the verbal prompt in order for the child to spontaneously ask the question. A prompt could be faded in several ways and was dependent on the child. A few methods that were used to fade the verbal prompt included: looking to the child expectantly for an answer, shaking the bag in order to direct attention to the bag, or fading the verbal prompt through time delay. Fading the verbal

prompt through time delay had the mother say, “What’s th...?” and leave the rest of the question for the child to finish. Gradually, the caregiver would say less of the question (e.g. “What’s?” or “Wha...” or “Wh...”) and let the child to finish the *wh*-question (Koegel, 2014b).

Session Four. In session four, training focused on explaining data collection procedures, how to add the neutral items, and methods of fading the intervention. Adding neutral items and fading the intervention helped teach the child to ask, “What’s that?” only for items they do not know. The procedure for how this was done is outlined below.

1. The mother received many copies of a daily data collection sheet to be used during the intervention (see Appendix I), and the researcher explained how to collect data. The mother would be collecting data twice daily during each of the 10-minute intervention sessions and the researcher would be scoring one additional daily 10-minute intervention session for a total of 30 minutes of question asking intervention a day.
2. Once the prompt for question asking was faded and the child was asking, “What’s that?” on his/her own, it was time to add neutral items to the bag. The decision to include neutral items was based on the daily data collected by the mother during the two 10-minute intervention sessions completed independently and the one 10-minute intervention session scored by the researcher. Mastery criteria was met once the child asked, “What’s that?” with 80% accuracy across three consecutive sessions. The mother then added four to six neutral items to the opaque bag and interspersed a neutral item after every third trial as an acquisition task. In other words, once the child completed three trials with a desired or preferred item, a

neutral item was removed from the opaque bag as the fourth trial. The mother followed the same steps as they did with the preferred item; that is, once the child asked, “What’s that?” the mother took one of the preferred items out of the opaque bag, labelled the item, had the child repeat the label and quickly give the item to the child. Once the child was done with the neutral item, the mother returned the item into the opaque bag (Koegel, 2014b).

3. To fade the intervention procedures and increase spontaneous asking of “What’s that?” by the child, the mother gradually reduced the number of desired items in the opaque bag until only one to two highly preferred items were left in the opaque bag. This was done so that the child with ASD only asked, “What’s that?” for items they did not know while keeping their motivation high. Next, the bag itself was faded so that the items were sitting around the mother and child (Koegel, 2014b).

Third Week of Training. During the third week of training, the focus was on ensuring that the mothers achieved fidelity of implementation in PRT procedures for the question asking while practicing PRT with the child in the presence of the researcher.

Session Five. In session five, the mothers had the opportunity to practice implementing the procedures for the question asking intervention while focusing on obtaining implementation fidelity. According to Koegel and Koegel (2006), fidelity is measured by obtaining 80% or higher correct implementation in the PRT procedures for question asking discussed above. Week three of the training focused on problem-solving any issues of fidelity. In-vivo feedback is considered highly beneficial for the caregiver

as it allows the caregiver to quickly ask questions the moment when they arise (Coolican et al., 2010).

Session Six. Lastly, in session six, the caregiver was taught to use the daily data sheet to record the frequency of question asking. The mothers learned to record the type of prompt that was needed (if any) (e.g., full verbal prompt, partial verbal prompt, etc.). Once again, the mothers had the opportunity to ask any questions they may have had regarding implementing the intervention or recording data.

Intervention. After the three-week training, the mothers were asked to implement the intervention three times a day in 10-minute sessions for a total of 30 minutes of question asking intervention a day (see Figure 1). Intervention data collection occurred until the child met mastery to “What’s that?” criterion. Each mother completed the data sheet for two of the three sessions. The researcher videoed and scored the third daily session using frequency count for social initiation through question asking and partial interval recording in one-minute increments to measure the fidelity of implementation in PRT. Once a child successfully asked, “What’s that?” with 80% accuracy across three consecutive sessions, the mother began to implement the procedures for adding neutral items and fading the intervention as described above.

In addition to scoring the videos, the researcher also used the videos to provide daily feedback to the mothers regarding fidelity of implementation. Feedback from the previous day was provided to each mother the following day before the video session was recorded. In doing so, the mothers had the opportunity to implement the feedback in the next recorded session.

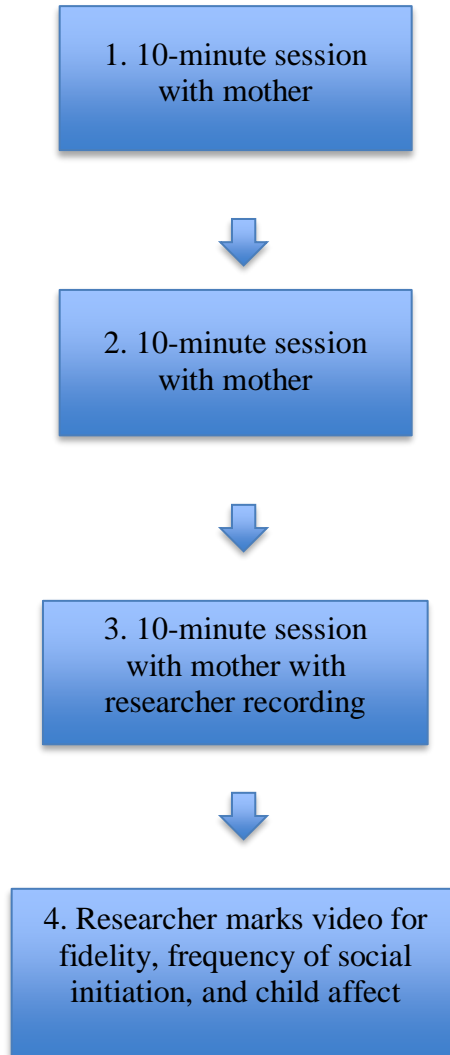


Figure 1. Typical Intervention Day

Generalization Probes. As part of the inclusion criteria for the present study, there needed to be an additional environment and member of the family with whom the child could generalize question asking after the intervention was faded. The mothers conducted generalization probes every day for one week (i.e., 5 data points) using a frequency count. The mothers were asked to set up a question asking opportunity across several different environments (e.g., grocery store, morning routine, different part of the home, etc.) and record responses using the pre-made generalization data-recording sheet (see Appendix J). If the sheet was not with the mother, she could record the occurrence as close to the occurrence as possible. This was done to probe whether the child with ASD was able to generalize his frequency of social initiations and context appropriate questions across environments and across individuals.

Follow-up. Lastly, follow-up data was gathered one month after generalization probes had finished. Mothers were instructed to continue providing opportunities for question asking between generalization and follow-up. Follow-up data were collected twice in the home environment and twice in a different environment (e.g., grocery store, park, etc.) in the span of a week. Follow-up measures were collected to monitor the earlier intervention and decipher whether frequency of social initiation through question asking were sustained. The researcher took a 10-minute probe of the mother-child interaction and the frequency of social initiation through question asking was measured using a frequency count along with partial interval recording in one-minute increments to measure the fidelity of implementation in PRT.

Measurement

Social Initiations. As mentioned above, a frequency count was used to determine the number of times the child with ASD engaged in social initiation through question asking during the 10-minute segment that the researcher recorded. These video probes were taken during baseline, intervention, and at follow-up.

Caregivers were instructed to implement the intervention daily in two additional 10-minute segments in addition to the segment videoed by the researcher. During these sessions, they were to score each instance of “What’s that?” with the type of prompt they used. “Independent” was defined as a spontaneous asking of “What’s that?” made by the child without any verbal or physical prompt from the mother. “Full verbal prompt” referred to the mother verbally providing the question for the child; for example, the mother would say, “What’s that?” so that child was aware of what was required of him. “Partial verbal prompt” was defined as the mother providing some portion of the question for the child. For example, the mother might start saying “Wha...” to signal to the child that they need to either finish the statement or remind the child that they have to ask, “What’s that?” “No response” was recorded when the child did not respond regardless of the type of prompt provided by the mother because the child was not engaged in the activity or otherwise lost interest. “Time delay” was defined as the mother waiting expectantly for the child to ask, “What’s that?” In this case, the mother provided a behavioural cue (e.g., shaking the bag) to help signal to the child that they needed to ask “What’s that?” in order to obtain the object. In some cases, the child engaged in disruptive behaviour. This was defined as any behaviour which interrupted the trial (e.g., hitting, biting, screaming, kicking).

To measure generalization of question asking, the researcher looked at the total number of targeted initiations (i.e., “What is it?”) and untargeted initiations that were not specifically taught (e.g., “Who is that?”) that may have occurred in the generalization phase of the study. The mothers collected the generalization data and frequency recording was used to determine the number of times the children engaged in social initiation through question asking for novel items in the home, while in a different environment, or with the other family member. Data on the targeted and untargeted initiations made by the participant were collected every day for a week resulting in five generalization data sheets. These data determined whether the child made generalized improvements in the skill of question asking beyond the target question in the intervention along with investigating whether the skill generalized to novel items, across individuals (i.e., family member) and across environments.

Context Appropriate Questions. As discussed in Chapter II, when children with ASD do engage in social initiation through question asking, it rarely appears to be for the purpose of obtaining additional information (Koegel et al., 2014). Thus, it is important to investigate not only the frequency of the *wh*-question being addressed but also the functional intent of the question. Context appropriate questions refers to verbalizations that are used appropriately in the given context (Koegel & Koegel, 2006). In this study, a context appropriate question was defined as a functional question that was purposeful to the given context (e.g., child asks “Who is it?” to an unknown person at the door) (Koegel, Symon, & Koegel, 2002) and was not the direct question targeted during intervention.

The mothers recorded the number of context appropriate questions through frequency recording on the pre-made generalization data sheet; this was recorded once a day during the generalization probes to measure whether the parent-mediated program further increased appropriate verbal initiations. The mother noted the question the child asked (it could not be the question that was directly targeted in the study) and scored the question as an appropriate (i.e., self-initiated question asking) or inappropriate (e.g., echolalia or incorrect question) response that the child with ASD engaged in. Any context appropriate questions that the child asked were calculated as a percentage of the number of times the child with ASD initiated appropriately (Coolican et al., 2010).

Child Affect. The *Rating Scale for Child Affect* was scored on two measures: happiness and interest and combined as one score as described above (Baker et al., 1998). The researcher measured child affect during baseline, intervention probes, and at follow-up. This was done to monitor the child's mood during any session and determine if that may have affected the data collection.

Fidelity of Implementation. Probes to determine the fidelity of implementation were conducted during each videotaped intervention probe and at follow-up in order for the researcher to assess if the mothers were implementing the procedures of the intervention correctly (Koegel & Koegel, 2006). According to Koegel and Koegel (2006) "fidelity is attained when each of the seven PRT categories listed in the scoring sheet chart are performed correctly by the parent 80% of the time during the probe intervals" (p. 146). To measure the mother's implementation fidelity, the researcher measured correct implementation of the PRT procedures for question asking (i.e., whether the stimuli were appropriate in the given context, if child choice and shared control were

incorporated, whether the child was attending, whether the mother prompted a clear opportunity, the label/response provided by the child, if the reinforcer was natural, contingency of the response, and reinforcement of attempts). Observational measures of fidelity were recorded by the researcher and scored using partial interval recording in one-minute intervals during the 10-minute probes. These video recorded probes were scored as either correct (mother used technique properly) or incorrect (mother did not use technique properly) for the PRT techniques (Koegel et al., 2002).

Data Analysis

Once data were collected, they were displayed graphically. Graphic displays of data communicate overall experimental design, the sequence of the conditions and, the amount of time lapsed in each condition, thus providing a detailed picture of the functional relationship between independent and dependent variable (O'Neill et al., 2011). This graphic analysis allows the researcher to understand the impact intervention may have had on the behaviour exhibited by the participants in the study.

Graphed data were analyzed using visual analysis techniques common to single-subject research design. This practice included analysis of the level, trend, and percentage of non-overlapping data both within and across the study phases for each child (O'Neill et al., 2011). Analysis of the level refers to the mean performance in a phase while the analysis of the trend examines whether the responses was increasing, decreasing or remaining flat by looking at the slope (O'Neill et al., 2011). Trend analysis was completed using the split middle analysis technique where the researcher finds the medians of the two halves in the data and determines the direction of the data for that phase (Wolery & Harris, 1982). The percentage of non-overlapping data points refers to

the proportion of data points in the intervention that are higher or lower than the highest or lowest data point in the baseline phase for each participant (in the case of multiple baseline design across participants (O'Neill et al., 2011). If the goal of the intervention is to increase the target behaviour (as is the case within this study), PND is calculated by taking the highest level in baseline as the frame of reference and counting how many data points are higher in the intervention phase than the highest point in the baseline phase. A percentage is then calculated by dividing the number of non-overlapping data points with the total number of data points in intervention and multiplying by 100. According to O'Neill et al. (2011), 90% to 100% indicates a highly effective intervention, 70% to 89% indicates a moderately effective intervention, 50% to 69% indicates a minimally effective intervention, and less than 50% indicates an ineffective intervention.

Validity and Reliability

The validity of the results in the study was addressed through the replication of experimental effects across participants that is inherent in multiple baseline designs (O'Neill et al., 2011). This replication helps to support the idea that the intervention was the cause of the change in the child's behaviour.

Interrater reliability was completed for the frequency of "What's that?" question asking, the fidelity of implementation, and for child affect. For each child, 30% of the data across the phases was randomly selected by the researcher to be used to determine interrater reliability (O'Neill et al., 2011). The percentage for interrater reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplied by 100 to obtain a percentage (O'Neill et al., 2011). O'Neill

et al. (2011) recommends that an interrater reliability score of 90%-100% be considered a conventional standard.

In total, 20 video probes (i.e., eight videos for Liam, six videos for Jackson, and six videos for Eli) were sent through Dropbox to the Koegel Autism Centre at the University of California Santa Barbara. Two research assistants who work at the Koegel Autism Center, assisted the researcher in determining interrater reliability. Between the 20 videos sent, 10 of the videos were marked by one research assistant (i.e., all eight video probes for Liam and two video probes for Jackson) and the other 10 videos (i.e., the remaining four video probes for Jackson and all six video probes for Eli) were marked by the other research assistant. Both research assistants have graduate training in psychology or education along with level five training in Pivotal Response Treatment. Since the assistants were already trained in the scoring procedures, no training was necessary.

Reliability was an important measure that helped assess potential inconsistencies in data collection procedures. By measuring reliability, the certainty of the operational definition of the target behaviour was increased (O'Neill et al., 2011).

Social Validity and Family Empowerment

Social validity of the intervention was considered as well. Social validity was examined to determine the social goals of the treatment, the social appropriateness of the procedures in the treatment and to understand the social importance of the effects the treatment may have (Carter, 2010). The caregiver was asked to complete the *Treatment Acceptability Rating Form – Revised (TARF-R)* at the end of the study once generalization data collection was finalized (Carter, 2010). In addition, empowerment

was measured by the *Family Empowerment Scale (FES)* to probe how empowered a caregiver felt in regards to their family life, accessing services for their child, and community involvement (Koren et al., 1992).

CHAPTER IV: RESULTS

Overall, the results of the study demonstrate that the short-term parent-mediated PRT led to an increase in the frequency of asking the social initiation question, “What’s that?,” with all three children reaching mastery criterion. In addition, question asking generalized to novel items, various family members and environments beyond intervention. However, the frequency of other context appropriate questions did not increase for any of the participants during the generalization stage (i.e., the participants did not ask further developmental *wh*-questions).

The chapter begins with a discussion of the results of each child’s frequency of “What’s that?” throughout the study, the frequency of context appropriate questions as measured by the mother in the generalization stage, the child affect throughout the phases, and the fidelity of implementation by each mother. Following this, the parent report of “What’s that?” taken during intervention is examined. The chapter continues with a discussion of the results of the *TARF-R* (social validity) and whether the mothers found the intervention acceptable to them, and concludes with an examination of the *Family Empowerment Scale (FES)*, administered to mothers at the end of the study.

Frequency of “What’s that?” Question Asking

Liam

As seen in Figure 2, Liam was unable to spontaneously ask, “What’s that?” when engaging in a play interaction with his mother and being presented with unknown objects on any day during baseline data collection. Thus, the baseline was stable with no questions asked across the five days of baseline data collection.

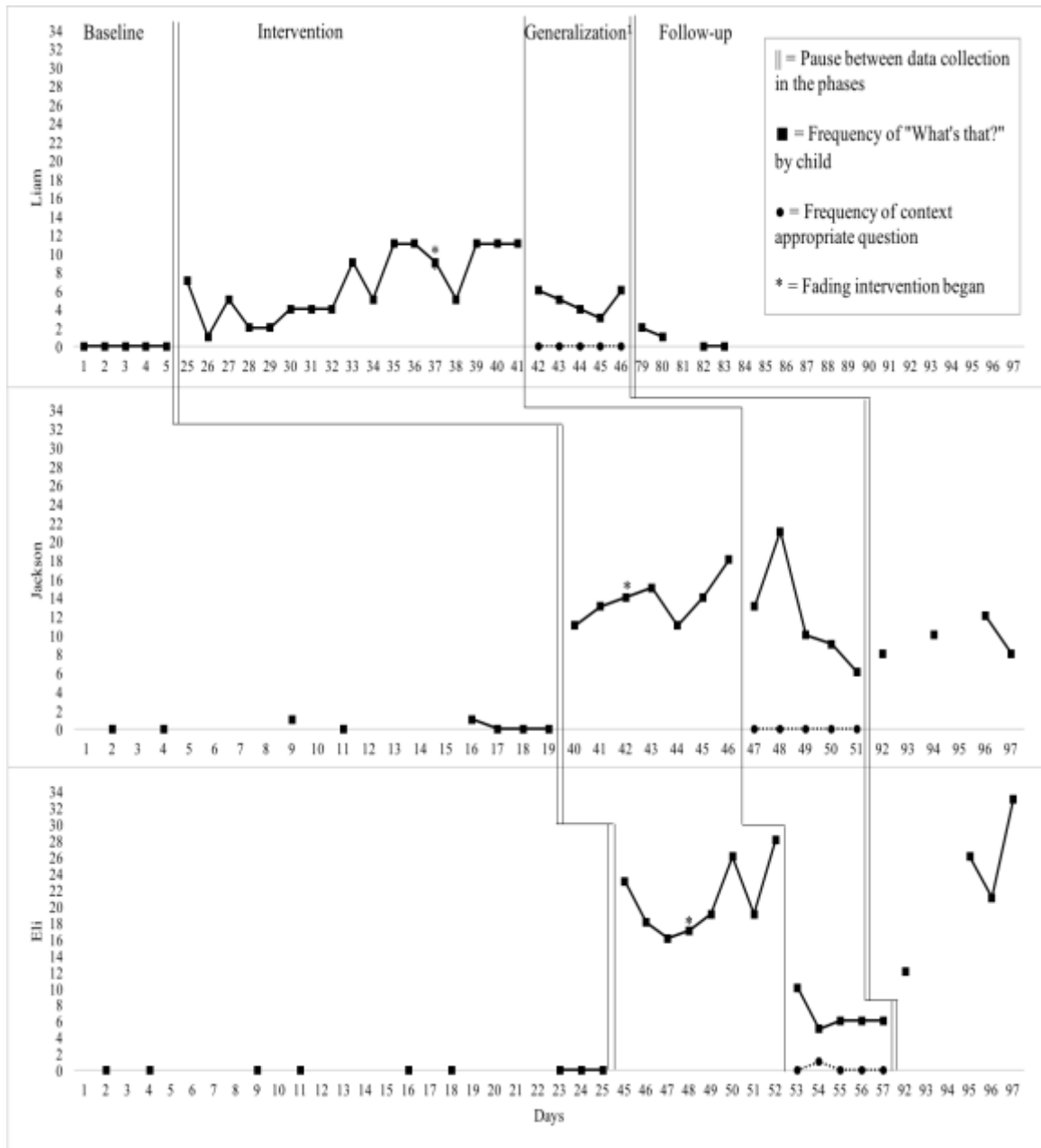


Figure 2. Frequency of “What’s that?”

¹Generalization Data and Context Appropriate Questions were collected by the mother

Over the course of the intervention, the frequency of Liam asking, “What’s that?” increased to a mean of 6.6 occurrences with a range of 1 to 11 instances thus showing an increase in the target behaviour in the therapeutic direction. He reached criterion (i.e., correctly asked, “What’s that?” with 80% accuracy across 3 consecutive sessions) on days 37 through 39 of intervention. The percentage of non-overlapping data points (PND) was evaluated to determine if the dependent variable (i.e., the frequency of “What’s that?”) increased because of the independent variable (i.e., the intervention). As seen in Figure 2, no data points overlap between baseline and intervention. Thus, the PND was 100%.

During the generalization phase, after the intervention was discontinued, the number of times Liam asked, “What’s that?” decreased to a mean of 4.8, although the data in this phase were less variable (range = 3 to 6) than during the intervention phase. Trend was analysed using the split middle analysis technique and the slight downward trend in the generalization phase means there was a decrease in the frequency of question asking once intervention was taken away. The frequency of context appropriate questions was also measured during generalization by the mother; as shown in Figure 2, Liam did not ask any other context appropriate questions. During the follow-up phase, Liam asked “What’s that?” at a much lower frequency ($M = 0.75$) and there was some variability (range = 0 to 2) in his question asking during these 10-minute probes. Although Liam decreased the frequency of asking “What’s that?” from intervention to follow-up, it appears that Liam could ask, “What’s that?” when the appropriate opportunity was presented as shown during the first two follow-up probes (i.e., day 79 and day 80, respectively).

Jackson

As seen in Figure 2, Jackson did spontaneously ask, “What’s that?” on two occasions during baseline (i.e., day 9 and day 16) when engaging in a play interaction with his mother. However, variability of the baseline was low with a range of 0 to 1 and, thus, was stable enough to introduce the intervention.

During intervention, Jackson’s “What’s that?” question asking increased to a mean of 13.7 occurrences with a range of 11 to 18 instances thus showing an increase in the target behaviour in the therapeutic direction. He reached criterion (i.e., correctly asked, “What’s that?” with 80% accuracy across 3 consecutive sessions) on days 40 through 42 of intervention. Visual inspection of Figure 2 shows that the PND between baseline and intervention for Jackson was 100%.

During the generalization phase, after the intervention was withdrawn, the number of times Jackson asked, “What’s that?” decreased slightly to a mean of 11.8, but the data in this phase were more variable (range = 6 to 21) than during the intervention phase. Analysis of the trend using split middle technique showed a slight downward trend in the generalization phase which means there was a decrease in the occurrences of question asking once intervention was taken away. The frequency of context appropriate questions was also measured during generalization by the mother; as shown in Figure 2, Jackson did not ask any other context appropriate questions. During the follow-up phase, Jackson asked “What’s that?” at a similar frequency ($M = 9.5$) and there was some variability (range = 8 to 12) in his question asking during these 10-minute probes. The frequency of Jackson’s question asking decreased slightly from intervention to follow-up but the behaviour was maintained.

Eli

As seen in Figure 2, Eli was unable to spontaneously ask, “What’s that?” during baseline. Thus, the baseline was stable at 0 questions asked across the nine days.

During intervention, Eli’s “What’s that?” question asking increased to a mean of 20.7 occurrences with a range of 16 to 28 instances showing an increase in the target behaviour in the therapeutic direction. He reached criterion (i.e., correctly asked, “What’s that?” with 80% accuracy across 3 consecutive sessions) on days 46 through 48 of intervention. Visual inspection of Figure 2 shows that the PND between baseline and intervention for Jackson was 100%.

During the generalization phase, after the intervention was removed, the number of times Eli asked, “What’s that?” decreased to a mean of 6.6, but the data in this phase were less variable (range = 5 to 10) than that during the intervention phase. Analysis of the trend using split middle technique shows a downward trend in Eli’s question asking during the generalization phase. The frequency of context appropriate questions was also measured during generalization by the mother; as seen in Figure 2, Eli did not ask any other context appropriate questions but did engage in further social initiations known as initiations of play (discussed further below). During the follow-up phase, Eli asked “What’s that?” at a higher frequency ($M = 23$) than during intervention ($M = 20.7$) and there was high variability (range = 12 to 33) in his question asking during these 10-minute probes. In conclusion, Eli slightly increased the frequency of asking “What’s that?” from intervention to follow-up.

Parent Report of Frequency of “What’s that?”

Caregivers were instructed to implement the intervention daily in two 10-minute segments in addition to the segment videoed by the researcher. The results of these other intervention sessions are presented below. Each instance of “What’s that?” was scored by the mother along with the type of prompt they used. The prompts included: independent, full verbal prompt, partial verbal prompt, no response, time delay or disruptive behaviour.

As seen in Figure 3, Liam’s mother Hanna reported many instances of no response for Liam near the beginning of the intervention, with some successful trials through a full verbal prompt. Liam was not used to having to ask for an item to obtain it; therefore, this cycle had to be taught first. As intervention continued, independent and/or full verbal prompt became the main type of recorded prompt used by Liam’s mother. Once more spontaneous instances occurred (i.e., when Liam met mastery criterion on days 37-39), intervention then began to be faded slowly by adding neutral items. Intervention lasted 17 days for Liam.

Results from Jackson’s mother Marie are reported in Figure 4. It is important to note that during the third week of parent training when Jackson’s mother had the opportunity to practice the procedures for question asking with Jackson in the presence of the researcher (and before parental intervention had begun), Jackson began asking, “What’s that?” after the mother provided a full verbal prompt for “What’s that?” This occurred one time during the two-hour training session as the child began to understand the full verbal prompt trial and what was required of him. This does not mean Jackson learned the skill as it was not an example of the child asking, “What’s that?” when presented with an unknown object. If Jackson were to have asked, “What’s that?”

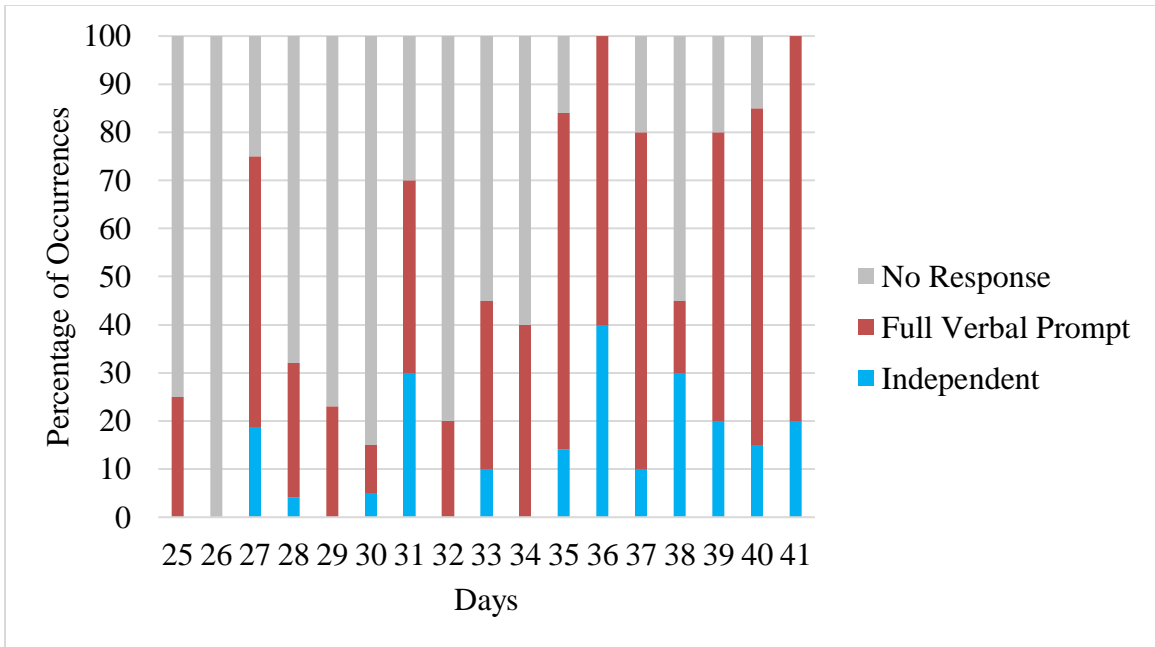


Figure 3. Hanna – Parent Report of “What’s that?” During Intervention

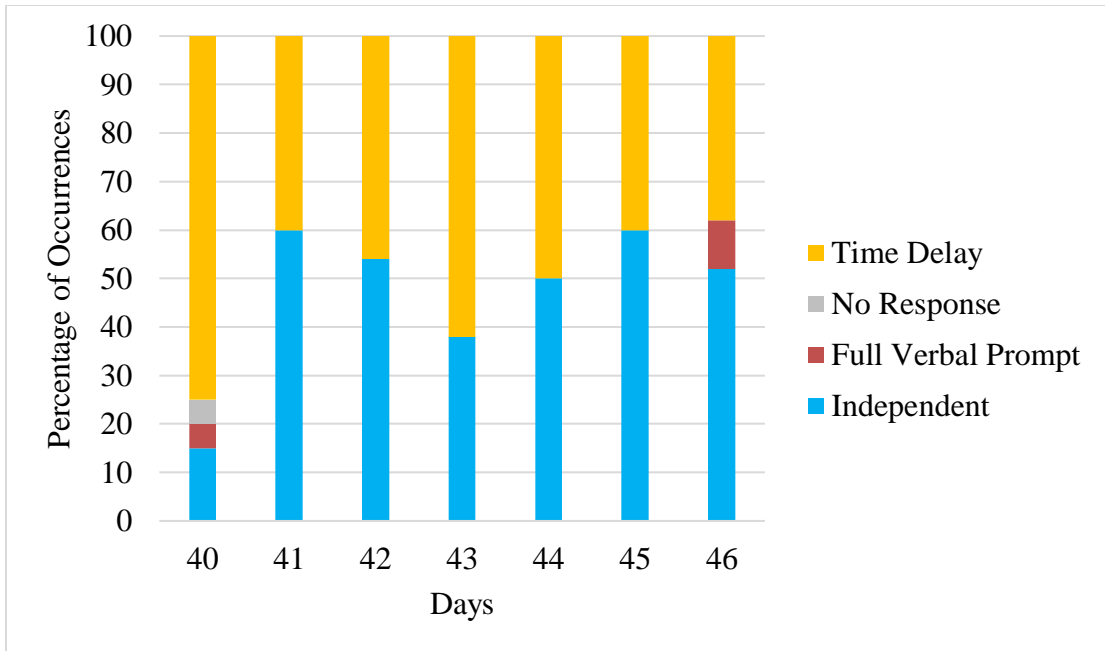


Figure 4. Marie - Parent Report of “What’s that?” During Intervention

for a novel item during the third week, then the question asking would have been considered appropriate independent question asking to prove the skill was learned. However, this was not the case.

As seen in Figure 4, when intervention began, Marie reported using time delays for Jackson near the beginning of the intervention with successful instances at independent question asking. As intervention continued with the fading procedures, all of the instances were mainly independent question asking or time delays. Once mastery criterion was met (i.e., days 40-42 of intervention), intervention began to be faded slowly. Intervention lasted for seven days in total for Jackson.

Similar results were obtained by Eli and his mother, Sarah. As with Jackson, during the third week of training when Sarah was able to practice the intervention procedures with Eli, he began asking, "What's that?" after the mother provided a full verbal prompt for "What's that?" Again, this occurred one time during the two-hour training session as the child began to understand the trial and what was required of him. Again, this does not mean Eli learned the skill as it was not an example of the child asking, "What's that?" for a novel item, which resembled Jackson's scenario.

As seen in Figure 5, Sarah reported some successful instances at independent question asking, with most the trials being full verbal prompts or partial verbal prompts in the beginning of intervention. Some behaviours (i.e., yelling, crying, and running away) were displayed in the beginning on intervention with fewer instances as intervention moved on. Once mastery criterion was met (i.e., days 46-48 of intervention), intervention began to be faded slowly. For Eli, intervention lasted for eight days.

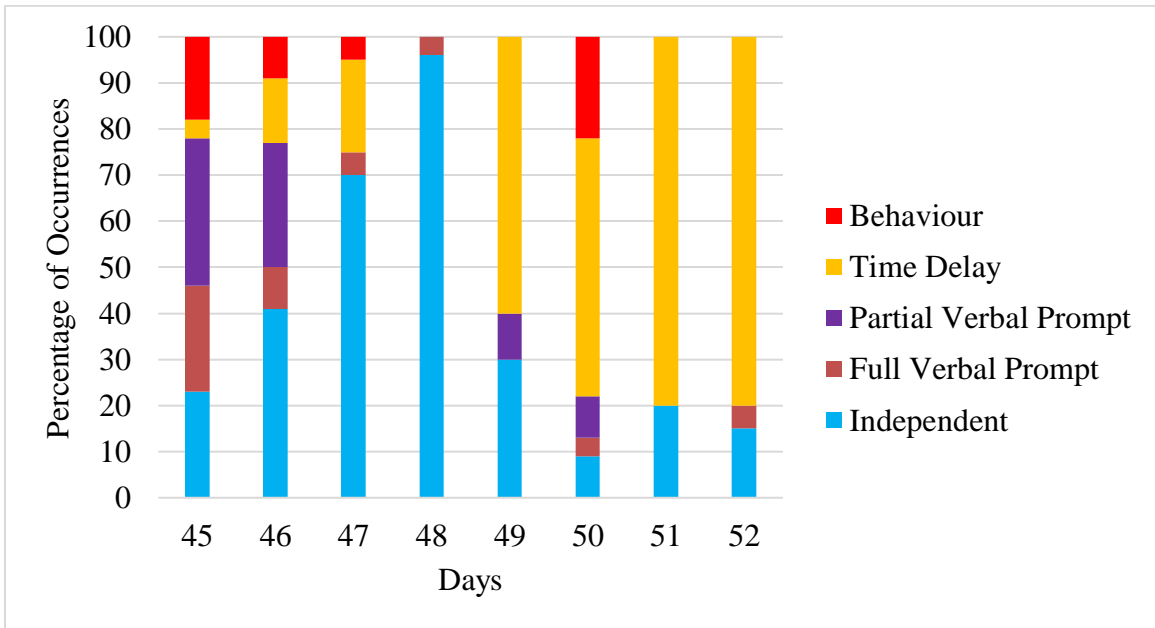


Figure 5. Sarah - Parent Report of “What’s that?” During Intervention

Child Affect

Child affect (i.e., interest and happiness) was scored during baseline, intervention, and follow-up. The results for each child are discussed as a composite score first, and then each component (interest and happiness), is considered separately.

As seen in Table 3, overall, Liam demonstrated a neutral affect during baseline ($M = 2.7$) with scores ranging from 1 to 4.5. Similar neutral affect was shown during intervention ($M = 3.2$) with scores ranging from 1 to 5 and during the follow-up ($M = 3.0$) with scores ranging from 2 to 3.5.

Jackson demonstrated a positive affect in both baseline ($M = 4.2$) and intervention ($M = 4.4$) with scores ranging from 2 to 5 and 3 to 5, respectively. During the follow-up sessions, Jackson's affect was neutral overall ($M = 3.0$) with scores ranging from 2 to 5.

Lastly, Eli demonstrated a neutral affect during baseline ($M = 3.2$) with scores ranging from 1.5 to 4.5. During intervention, Eli demonstrated a positive affect ($M = 3.9$) with scores ranging from 2 to 5. During follow-up sessions, Eli demonstrated a positive affect ($M = 4.0$) with scores ranging from 3 to 5.

Measuring child affect is crucial in understanding whether the interest or happiness of the child on the particular day had affected the data collection or their frequency of question asking. It is possible that low affect may have influenced the daily data collection. For Liam, this occurred on four sessions and occurred once for Eli while Jackson has no instances. For example, in session 26 (i.e., day 2 of intervention), Liam's affect was low with a score of 1. As seen in Figure 2, Liam asked, "What's that?" once during the 10-minute probe. This also occurred on session 28 (i.e., day 4 of intervention where affect was scored as 1 with only two instances of question asking), session 29 (i.e.,

day 5 of intervention where affect was scored as 1.5 with only two instances of question asking) and session 38 (i.e., day 14 of intervention where affect was scored as 1.5 with only five instances of question asking). Although his mother Hanna was implementing the intervention correctly, his low affect may have influenced the frequency of question asking during that day. There was a drop in Eli's frequency of question asking (i.e., 19 instances of "What's that?" in the 10-minute probe) in session 51 (i.e., day 7 of intervention) when his affect was marked as low (i.e., child affect score of 2). Similarly, his mother Sarah was implementing intervention correctly.

As seen in Table 3, when each component is considered separately, there is a high correlation between means of interest and happiness. For Liam, the mean of his baseline interest ($M = 2.4$) and baseline happiness ($M = 3.0$) were neutral, with scores ranging from 1 to 4 and 1 to 5, respectively. Liam's intervention interest ($M = 2.9$) score fell in the neutral category with scores ranging from 0 to 5. However, Liam's intervention happiness ($M = 3.5$) indicated a positive score, with score ranging from 2 to 5. At follow-up, the mean of Liam's interest ($M = 2.7$) and the mean of Liam's happiness ($M = 3.2$) were neutral, with scores ranging from 2 to 3 and 2 to 4, respectively.

The mean score of Jackson's baseline interest ($M = 4.2$) and baseline happiness ($M = 4.2$) were both positive, with scores ranging from 2 to 5 in each. When looking at the mean of Jackson's intervention interest ($M = 4.4$) and intervention happiness ($M = 4.4$), his score fell in the positive category with scores ranging from 3 to 5. At follow-up, the mean of Jackson's interest ($M = 3.0$) and the mean of Jackson's happiness ($M = 3.0$) was neutral, with scores ranging from 2 to 5.

Table 3

Mean Ratings and Range of Child Interest and Happiness for Each Phase for Each Child

	Liam M (range)	Jackson M (range)	Eli M (range)
Baseline Interest	2.4 (1-4)	4.2 (2-5)	3.5 (2-5)
Baseline Happiness	3.0 (1-5)	4.2 (2-5)	2.8 (1-4)
Composite Score	2.7 (1-4.5)	4.2 (2-5)	3.2 (1.5-4.5)
Intervention Interest	2.9 (0-5)	4.4 (3-5)	4.4 (3-5)
Intervention Happiness	3.5 (2-5)	4.4 (3-5)	2.5 (1-5)
Composite Score	3.2 (1-5)	4.4 (3-5)	3.9 (2-5)
Follow-up Interest	2.7 (2-3)	3.0 (2-5)	4.0 (3-5)
Follow-up Happiness	3.2 (2-4)	3.0 (2-5)	4.0 (3-5)
Composite Score	3.0 (2-3.5)	3.0 (2-5)	4.0 (3-5)

The mean score of Eli's baseline interest score ($M = 3.5$) was positive, with scores ranging from 2 to 5. For baseline happiness ($M = 2.8$), Eli's score was neutral, with scores ranging from 1 to 4. The mean of his intervention interest ($M = 4.4$) was positive, with scores ranging from 3 to 5. For intervention happiness ($M = 2.5$), Eli's score was neutral, with scores ranging from 1 to 5. At follow-up, the mean of Jackson's interest ($M = 4.0$) and the mean of Jackson's happiness ($M = 4.0$) was positive, with scores ranging from 3 to 5.

Parent Fidelity of Implementation in PRT

During intervention and follow-up, the researcher scored each mother for her fidelity of implementation of the PRT procedures for question asking. Each 10-minute video was scored using partial interval recording in one-minute intervals. Each mother was scored on how accurately she adhered to the following aspects: use of appropriate stimuli, incorporating child choice and shared control, child attention, prompting a clear opportunity, ensuring the label/response was given by the child, whether the reinforcer was natural, contingency of the response, and whether the attempts were reinforced).

During the intervention phase, Liam's mother Hanna had achieved fidelity on 12 of the 17 days (or 71% of the intervention days) while working with Liam. During the four follow-up sessions, however, she did not achieve fidelity on either of the four scheduled days (i.e., two sessions in the home and two sessions in an external environment). Issues with prompting clear opportunities made it difficult to Liam to understand what was required of him, thus, little to no instances of question asking occurred. In addition, when she was fading the intervention procedures, Hanna failed to

include more neutral items appropriately (i.e., include more neutral than preferred items and keep switching up the neutral items once the child learned them).

The intervention phase was shorter for Jackson and his mother Marie because Jackson met the mastery criterion earlier. Of the seven intervention days, Marie achieved fidelity on all seven days (or 100%). During the four follow-up sessions, Marie did not achieve fidelity on any of the four scheduled days. Again, issues with prompting clear opportunities were evident which made the task more difficult for Jackson to understand.

Eli's mother, Sarah, also achieved fidelity of implementation on all eight possible days of intervention (i.e., 100% of the total days). During follow-up, Sarah achieved fidelity on all four days (100%).

Generalization of Targeted and Untargeted Questions

Generalization of the targeted question, "What's that?" and untargeted context appropriate questions (i.e., "Who is it?") was reported by each mother for five continuous days after intervention was discontinued. For all three children, generalization of asking "What's that?" occurred as shown above in Figure 2. However, generalizing to further wh- context appropriate questions did not occur.

When looking at the parent report data for Liam, Hanna noted that all instances of generalization occurred with novel items at home with her. Marie, Jackson's mother, reported that his question asking generalized to novel items at home, several environments (e.g., grocery store, fast food restaurant, electronics store, and car rides) and another family member (e.g., sibling). Eli's mother, Sarah, noted that Eli generalized question asking to novel items at home, several environments (e.g., backyard, car ride,

cousins home, the garage, and the grocery store) and two family members (e.g., father and cousin).

Overall, for all three children, the context appropriate question asking did not generalize after intervention had been faded (i.e., none of the children asked further developmental *wh*-questions beyond “What’s that?”). However, it is interesting to note that Eli did, on one occasion, spontaneously ask an untargeted initiation on day two of the generalization phase. Specifically, Eli initiated play with his mother by asking, “Will you play with me on the swings?” and, according to his mother, this had never previously occurred.

According to Koegel et al. (2014), untargeted initiations typically lag in development by two to four months after the child develops *wh*-questions. These untargeted questions are social in nature in that they occur for the purposes of continuing or instigating an interaction. For example, in a study by Koegel et al. (2014), all four *wh*-questions were targeted in the intervention phase (e.g., “Who is it?”). In their study, “Want to play?” was categorized as an untargeted version of “Who is it?” during the generalization stage. Therefore, in the present study, Eli’s social initiation was categorized as an instance of an untargeted question. However, as noted above, this initiation occurred only once during data collection and it is impossible to determine if the PRT delivered in the current study played any role in facilitating this one-off behavior.

To summarize, the results of the study showed that all three children with ASD increased their frequency of asking, “What’s that?” during intervention. In addition, the children generalized the skill to novel items, across environments, and family members

albeit at a lower frequency than that obtained during intervention. However, other context appropriate *wh*-questions did not increase in frequency after the intervention was faded.

Reliability

Reliability was assessed using the interrater reliability method discussed in Chapter III. For each child, thirty percent of the data across the phases was randomly selected by the researcher to be used to determine interrater reliability (O'Neill et al., 2011). Two members from the Koegel Autism Center who was blind to the phases (i.e., baseline, intervention, follow-up) scored the frequency of “What’s that?” and fidelity of implementation in PRT procedures for question. As well, interrater reliability was calculated for child affect for each child.

Scoring the number of initiations should have yielded the same frequency between the observer and researcher. Similarly, for fidelity of implementation in PRT, the researcher and blind observer should have both agreed on whether the parent achieved fidelity or did not achieve fidelity. For child affect, an agreement between the outside observer and researcher was defined as both observers’ score being within one point of each other in relation to the six-point Likert scale.

When scoring the frequency of “What’s that?”, there was a high level of agreement between the researcher and observer. More specifically, there was a 100% agreement for Liam, Jackson and Eli’s frequency of question asking. This means the researcher and observer both scored the same frequency of “What’s that?” in all videos that were marked.

In terms of scoring fidelity of implementation, the researcher and observer displayed a high level of agreement once again. For all three mothers, a score of 100% agreement was calculated for PRT fidelity procedures.

Lastly, interrater reliability was calculated for the Child Affect scores. For Liam and Eli, interrater reliability was 100%. However, for Jackson, there was an 83% agreement when marking his affect. The result of this calculation is a disagreement on one of the six videos. In this video, the researcher scored Jackson's affect as a score of 5 (i.e., interested and happy) while the blind observer scored the child's affect as 3 (i.e., neutral interest and happiness). This discrepancy may be due to Jackson being overly happy in some instances but then displaying some instances of neutrality. Nonetheless, the researcher and blind observer still displayed a moderate level of agreement when it came to Jackson's affect.

Treatment Acceptability Rating Form Revised (TARF-R)

The *TARF-R* (Carter, 2010) was designed to measure a caregiver's perceptions towards the acceptability of the intervention and the ease of implementation. In the *TARF-R* (Carter, 2010), scores are summed, with higher scores indicating a greater treatment acceptability by the parents (total possible score of 120). Overall, all three mothers' scores indicated a high level of acceptability of the PRT short-term intervention. Specifically, Hanna's total score was 94 points, Marie's total score was 82 points, and Sarah's total score was 94 points.

The three mothers answered similarly on numerous questions. Specifically, when asked, 1. "How clear is your understanding of the treatment?" 2. "How acceptable do you find the treatment to be regarding your concerns about your child?" and 3. "How willing

are you to carry out this intervention?”, all three mothers endorsed a six on the Likert scale indicating a high understanding, high acceptability and were very willing to carry out the treatment.

When looking at the answers for 4. “Given your child’s behavioural problems, how reasonable do you find the treatment to be?” and 7. “How likely is this treatment to make permanent improvements in your child’s behaviour?”, all three mothers indicated that the treatment is very likely (i.e., six on the Likert scale) to make long-term improvements to their child’s behaviour.

The following three questions related to the effectiveness of the intervention based on the mother’s perception. All three mothers circled the same answer (i.e., “Very confident”) to the following questions: 9. “How confident are you that the treatment will be effective?” 12. “How effective is this treatment likely to be for your child?” and 14. “How much do you like the procedures used in the proposed intervention?” This showed that all three mothers were confident that the treatment was effective and liked the procedures within the intervention.

Lastly, when discussing the potential to change their family routine in 19. “How willing would you be to change your family routine to carry out this intervention?,” all three mothers relayed that they were very willing to change the routine to incorporate treatment beyond intervention procedures.

Family Empowerment Scale (FES)

As described in Chapter III, the *FES* (Koren et al., 1992) is a Likert scale and it was used to measure the mothers’ level and expression of empowerment in three areas: (a) relation to family, (b) relation to services received, and (c) relation to the broader

community after the study had concluded. Thus, only post-study results are available. A score for family, child services, and community is obtained by calculating the mean for each of the three levels.

Liam's mother, Hanna, reported sometimes feeling empowered when discussing her family ($M = 3.3$) but often felt empowered when it came to her son's services ($M = 4.2$). However, when looking at the community level, Hanna reported feeling empowered on some occasions ($M = 3.3$).

Jackson's mother, Marie, often reported feeling empowered when asked about her family ($M = 4$) but only felt empowered sometimes when it came to her child's services ($M = 3.9$). However, when looking at the community level, Marie reported feeling empowered on some occasions ($M = 3.2$).

Eli's mother, Sarah, often reported feeling empowered when asked about her family ($M = 4.3$) and her child's services ($M = 4.6$). However, when looking at the community level, Sarah reported feeling empowered on some occasions ($M = 3.7$).

Summary

The purpose of the current study was to investigate whether parents can specifically teach the target skill of social initiation through question asking to their child with ASD through a primary parent-mediated PRT model. The study aimed to answer the following research questions:

1. Can a short-term parent-mediated PRT lead to an increase in the frequency of social initiation through question asking made by children with ASD?
2. Does the parent-mediated PRT question asking intervention increase the frequency of context appropriate questions?

3. Does the parent-mediated PRT question-asking intervention lead to generalization of social initiation to novel items, another family member and/or environment beyond intervention?

Given the results described above, there is support for a functional relationship between the behaviour of interest (i.e., social initiation through question asking) and the intervention (i.e., three-week parent-mediated intervention). Thus, the first hypothesis, that short-term parent-mediated PRT will lead to an increase in the frequency of social initiation through question asking, is supported. Furthermore, the parent-mediated PRT question-asking intervention led to a generalization of social initiations to novel items in the home, other family members and/or environment beyond intervention for all three children. Thus, the parent-mediated PRT question-asking intervention led to generalization of social initiation to another family member and/or environment beyond intervention, providing support for the third hypothesis. However, although the frequency of asking, “What’s that?” increased and generalized, the untargeted context appropriate question asking did not increase in frequency; thus, the second hypothesis probing whether the parent-mediated PRT question asking intervention would increase the frequency of context appropriate questions was not supported.

All three mothers were able to successfully implement the PRT procedures with fidelity for question asking throughout the study although Eli’s mother, Sarah, was able to maintain fidelity of implementation during the follow-up probes. Overall, the results support the notion that the short-term PRT intervention was successful for all mothers and children with ASD involved.

CHAPTER V: DISCUSSION

Social initiation through question asking is a social skill where an individual begins an interaction using a question (such as “What’s that?”) to elicit a response from a communicative partner or to seek further information. The ability to socially initiate through question asking is considered a developmental milestone that develops at two years of age with the formulation of the four main *wh*-questions: “What is it?” “Where is it?” “Who is it?” and “What happened?” Generally, this social skill solidifies around four years of age and continues to evolve and mature into further social initiation skills throughout life (Koegel & Koegel, 2006). Of the various types of social initiations, social initiation through question asking is rarely used by young children with ASD and this scarceness continues into adulthood (Koegel & Koegel, 2012). The pivotal area of social initiation is central to communication development and is crucial for successful long-term development in social functioning (Koegel et al., 2010) which is why it is important to teach children with ASD to move past requesting into engaging in self-learning through question-asking.

Individual Differences Affecting Question Asking

It was hypothesized that the short-term parent-mediated PRT would increase the frequency of social initiation through question asking and this hypothesis was supported. Although all three children increased their frequency of social initiation through question asking and met the criterion by asking, “What’s that?” when presented with unfamiliar objects, there were individual differences in how quickly they met criterion and in their overall frequency of question asking.

In the present study, frequency of question asking seemed to be affected by the child's level of engagement in the intervention and the child's frequency of repetitive behaviours. The two children who achieved criterion more quickly (i.e., Jackson and Eli) had less repetitive behaviour (i.e., hand flapping or other stimming behaviours, scripting songs, etc.) affecting their interaction, and were more engaged in the trial itself (i.e., able to hold attention and were motivated by their favourite items) based on anecdotal observations made by the researcher. It was evident that it was difficult for Liam to sit down and engage in intervention. During intervention, Liam would ask anywhere between two questions to 11 questions in the 10-minute video probe as measured by the frequency of "What's that?" data sheet used by the researcher. However, during most opportunities, Liam would resort to scripting songs, engage in repetitive behaviour (i.e., hand flapping), or run away. As a result, Liam took more time to reach mastery criterion compared to the other two children (i.e., reached criterion during days 11-13 of intervention which corresponds to day 35-37 of the study) prior to being able to add neutral items and begin fading procedures. In total, Liam spent 17 days in intervention. The other two children, however, reached mastery criterion quickly. Jackson reached criterion during days 1 to 3 of intervention (i.e., days 40-42 of the study) and asked anywhere from 11 to 18 questions during the 10-minute video probe, and Eli reached criterion during days 2 to 4 of the intervention (i.e., days 46-48 of the study) and asked anywhere from 16 to 28 questions during the 10-minute video probe. Overall, Jackson and Eli were less likely to engage in repetitive behaviours that interrupted the trial and were more likely to be engaged. This is a possible explanation as to why these two children reached criterion for question asking more quickly than Liam.

When looking at the frequency of question asking during follow-up, all three children displayed differing results. During follow-up, Liam asked anywhere between 0 to 2 times during the 10-minute video probe with a mean of 0.75 questions. During his follow-up sessions, Jackson asked questions between 8 to 12 times during the video probe with a mean of 9.5 questions. Lastly, during his follow-up probes, Eli asked questions between 12 to 33 times during the 10-minute video with a mean of 23 questions. After the intervention was finished, the mothers were not obligated to continue providing 30 minutes of question asking opportunities each day. Instead, they were asked to provide appropriate opportunities for question asking throughout the day. Two of the children (i.e., Jackson and Eli) had started school so their mothers (i.e., Marie and Sarah, respectively) were unable to keep track of whether question asking occurred in this environment nor were they able to provide opportunities in that environment. Additionally, the mothers reported providing fewer opportunities for their child to engage in question asking from generalization to follow-up since no data collection was occurring during this time.

By targeting the skill of question asking, children with ASD can increase the complexity of the types of interactions they engage in. The ability to engage in social initiations is important because it can increase the complexity of language function and lead to collateral increases in learning (Koegel & Koegel, 2006). Anderson et al. (2004) found that children with ASD typically engaged in interactions that were adult initiated. By teaching social initiation through question asking, specifically teaching “What’s that?,” children with ASD are able to move towards child-initiated interactions for communication (Koegel & Koegel, 2006). In other words, PRT for social initiation

intervention teaches children with ASD the skills to initiate interactions on their own or for the purposes of seeking information for unknown items/objects. This was evident in the present study during the generalization phase for all three children. Liam generalized to novel items in the home but Jackson and Eli generalized and maintained the skill to several environments and other family members. Thus, these results help support the importance of teaching social initiations and that it may be achieved through short-term parent training. Overall, the more that a child is taught to become responsive to multiple learning opportunities and interactions that occur in natural settings, the need for an intervention provider is reduced, and the number of services that take the child out of a natural environment might be reduced (Koegel et al., 1999a).

Short-term PRT Interventions

Short-term interventions for a child with ASD are proving to be beneficial in terms of communication gains. Similar positive increases in communication were shown in another short-term parent training study that used PRT to increase functional communication in a child with ASD. As described in Chapter III, Coolican et al. (2010) trained parents in PRT procedures for using motivation to teach first words through six hours of parent training (i.e., three two-hour sessions). As a result of the parent training in PRT, child outcomes (i.e., communication and language) improved significantly and the children's communication gains were maintained at follow-up (Coolican et al., 2010). However, while the Coolican et al. (2010) study focused on the pivotal behaviour of motivation, the current study focused on the pivotal behaviour of social initiations. Since motivation is typically the first pivotal behaviour taught, the present study also taught parents to understand how to use motivation in the first week of parent training. In doing

so, the mothers learned the core of PRT procedures and how this translates into the PRT procedures for question asking. The children in the present study already had functional means of communication (i.e., two word utterances) as part of the inclusion criteria, but were not using communication for the purpose of information seeking (i.e., question asking). The children in the Coolican et al. (2010) study, however, did not have any functional communication. Although both studies targeted distinctive pivotal behaviours in their short-term training, both studies were able to increase the targeted pivotal behaviour in the child with ASD, thus providing support for the efficacy of short-term trainings in PRT.

Context Appropriate Question Asking

It was important for the present study to investigate not only the frequency of the *wh*-question being addressed but also the potential for further functional context appropriate *wh*-questions to develop (i.e., “Where is it?” “Who is it?” or “What happened?”). Due to time constraints, the generalization phase occurred right after the intervention was taken away in the present study. In this phase, mothers were asked to record instances of generalization of “What’s that?” that may have occurred, along with any further developmental context appropriate *wh*-questions that their child engaged in (if any). Overall, the second hypothesis examining whether further context appropriate questions would occur because of the intervention was not supported since the children did not increase their frequency of context appropriate questions. However, the research literature indicates that after teaching “What’s that?” further untargeted *wh*-questions typically lag in development by approximately two to four months (Koegel et al., 1998; Koegel et al., 2014). Thus, it is possible that the children might have asked other context

appropriate questions if data collection on this aspect had been done two to four months later, taking the developmental lag into account, rather than immediately after the cessation of the intervention. Nonetheless, context appropriate question asking was recorded during the generalization phase just in case any instances did occur.

However, it is interesting to note that child number three, Eli, had spontaneously initiated play with his mother on day two of generalization. Specifically, Eli asked his mother, “Will you play with me on the swings?” which is considered an untargeted version of “Who is it?” based on the criteria listed in Koegel et al. (2014) study of question asking. According to Eli’s mother, this had never previously occurred. However, as noted above, since this initiation and turn-taking behavior occurred only once during data collection and attributing this one occurrence as being a result of the present study cannot be done. Therefore, no conclusions are being drawn regarding Eli’s example of further social initiations skills.

The occurrence or nonoccurrence of context appropriate question asking may have also been affected by the length of the intervention itself or the amount of time spent daily teaching question asking. In their study, Koegel et al. (2014) spent 10 hours weekly (i.e., eight hours of a clinician providing intervention for question asking and two hours of parent training) for 10 months (i.e., two months spent teaching “What is it?,” two months spent teaching “Where is it?,” two months spent teaching “Who is it?,” two months spent teaching “What happened?” and two months spent teaching all four *wh*-questions together) thus systematically teaching all four of the main *wh*-questions. According to Koegel et al. (2014), all three children in their study improved and generalized both their targeted and untargeted, context appropriate question asking. Thus,

the developmental lag of two to four months was built into the study and this may have enhanced the possibility that the children would ask context appropriate questions. On the other hand, the present study only taught the mothers to implement PRT intervention procedures specifically for “What’s that?” for 30 minutes a day until mastery criterion was met by the child. This translated into roughly 3.5 hours of intervention weekly for each child with intervention lasting anywhere from one week to 17 days. Because the current study was only short-term parent training, the intensity and duration of the intervention was much lower than that of the Koegel et al. (2014), and this may have affected the frequency of context appropriate questions being asked by the children with ASD in the current study.

In addition, the present study used mothers as the primary agents of intervention whereas Koegel et al. (2014) used clinicians certified in PRT to teach question asking during all phases of the study. Mothers in the current study, however, did not have to report to the researcher generalization data collection and follow-up data collection. It is interesting to note that two of the three mothers reported being unable to provide daily opportunities for question asking in the time between generalization and follow-up due to external factors affecting their family life. The inability to actively provide opportunities for various question asking to occur may have affected the lack of development of further *wh*-questions for the children with ASD in the present study.

Generalization of Question Asking to Novel Items, Environments, and Individuals

It is widely known that many children with ASD have problems with applying the new skills they have learned to different contexts (Koegel & Koegel, 2006). To promote generalization, PRT interventionists typically teach the skill within the context it is to be

used and actively promote using the newly learned skill in several environments. Nonetheless, home environments only account for 16.4% of intervention settings (Hume et al., 2005). Therefore, it is necessary to teach parents to include intervention at home so that children with ASD may begin to generalize their skills they are being taught across all environments.

There are several advantages associated with using parents as agents of intervention. According to Patterson et al. (2012), parents possess the capability to implement an evidence-based intervention with fidelity. Moreover, many parents feel that services are more beneficial to their child when parent training was involved (Hume et al., 2005). Typically, parent intervention can be achieved in two ways: the parent-mediated approach and the parent support approach (Bearss et al., 2015a). Each one results in different outcomes for the child with ASD but research has demonstrated that parent-mediated interventions have been superior to parent support interventions when it comes to increasing a child's communication.

Research shows that parent-implemented interventions increase the generalization of skills to the child's natural environment because the caregiver increases the probability that intervention will be included in daily family routines (Smith et al., 2010). More specifically, training parents to use PRT as an intervention practice can be beneficial for the whole family since PRT already embeds intervention in the natural environment and takes into account the existing family routine, structure, and environment (Koegel & Koegel, 2006). By using the mother as the primary agent of intervention when teaching question asking, the present study taught the skill in a context where it may occur with an important figure in the child's life, thus greatly increasing the probability of

generalization to occur. Extant research supports using natural environments in intervention since natural environments may increase the ability of the child to generalize and maintain the skill being taught (Bellini et al., 2007; Koegel & Koegel, 2006).

Limited data are available on the generalization and maintenance of the skills being taught using PRT (Patterson et al., 2012). According to Vershuur et al. (2014), 22 out of 39 PRT studies included generalization data and only 13 out of the 39 studies included maintenance data. Because of this, the present study incorporated data collection that measured the generalization of question asking to novel items, in several environments and across individuals. Furthermore, the study also incorporated maintenance probes one month after intervention was faded to draw conclusions about whether the skill being taught was maintained. Thus, this study adds to the literature regarding the impact an intervention led by mothers can have on the generalization of question asking in children with ASD. In addition, the present study included maintenance data that probed whether the children would continue to present the skill one month after intervention was faded. Since all three children also displayed the skill of asking, “What’s that?” during the follow-up probes, the present study further supports the notion that natural environments help with the generalization and the maintenance of skills.

As described above, after intervention had been completed, the caregiver conducted generalization probes every day for one week (i.e., 5 data points) using a frequency count. It was hypothesized that the skill of social initiation through question asking would be maintained and generalize to novel items in the home, other family members and/or environments. Results from the generalization data support the idea that

question asking was able to be generalized to novel items in the home, family members and environments past the context of intervention. As discussed in Chapter IV, Jackson and Eli were able to generalize the skill to novel items in the home, several environments and other family members. Liam, however, only asked questions with his mother in the home environment. It is important to note that two of the three mothers (i.e., Liam's mother Hanna and Jackson's mother Marie) relayed to the researcher that they did not have the opportunity to practice the question asking procedures once generalization probes finished due to home renovations and health issues affecting their family. This point will be discussed further in the discussion concerning fidelity of implementation.

Skills taught by parents in the natural environment help support the continuation of the skill being taught. Natural environments are crucial when teaching a child to maintain a skill even when the intervention provider is removed and to generalize the skill across individuals and/or environments. However, sometimes the mothers encountered "real life" issues that prevented this from happening.

Child Affect

When working with children, it is imperative to measure how the child is feeling during intervention to determine whether this may influence data collection. In the present study, child affect was calculated by averaging a score for interest and a score for happiness to determine if child affect on a certain day may have influenced the frequency of question asking.

Overall, Liam demonstrated a neutral affect during baseline ($M = 2.7$), during intervention ($M = 3.2$), and during follow-up ($M = 3.0$). This meant that he was not particularly happy/unhappy or interested/disinterested throughout the study. Through

discussion with Liam's mother, it was discovered that Liam had never received any interventions prior to participation in the study. His mother also mentioned that it was difficult at time for him to sit for a few minutes to participate in intervention as he had never been required to do this with her previously. When looking at specific days within intervention, there were instances where Liam's affect could have influenced his frequency of asking, "What's that?". There were four sessions in total (i.e., session 26, session 28, session 29, and session 38). For example, on day 4 of intervention (i.e., session 28 of the study) and day 5 of intervention (i.e., session 29 of the study), Liam's affect was low with a score of 1 and 1.5, respectively. During these two days, Liam asked, "What's that?" at a frequency of two times during each 10-minute probe. Although his mother was implementing intervention correctly, his low affect may have influenced the frequency of question asking during that day.

Jackson, on the other hand, demonstrated a positive affect in both baseline ($M = 4.2$) and intervention ($M = 4.4$), revealing that he was interested and happy throughout these two phases. However, during the follow-up sessions, Jackson's affect fell in the neutral category ($M = 3.0$). The decrease in affect could be related to his hospital stay between generalization and follow-up as the follow-up probes were conducted shortly after he was released.

Lastly, Eli demonstrated a neutral affect during baseline ($M = 3.2$) revealing that he wasn't particularly interested/disinterested or happy/unhappy during this phase. During intervention ($M = 3.9$) and follow-up ($M = 4.0$), Eli's affect became positive showing interest in learning the skill and happiness with the favourite objects being used. Similarly, Eli had displayed a low affect on session 51 (i.e., day 7 of the study) which

seemed to lower his frequency of question asking (i.e., 19 instances) even though his mother Sarah was implementing intervention correctly. Overall, it was evident that the increase in his mother's skillset played a role in determining Eli's affect. During baseline, Eli's mother, Sarah, seemed nervous and stressed at times when engaging with Eli as he was prone to exhibiting behaviours (i.e., yelling or screaming). However, as the study progressed, Sarah's confidence in the intervention procedures increased as did her ability to deal with Eli's behaviours. In turn, Eli's affect also improved. These observations lead to an interesting speculation that the increase in the affect of the child may be related to the increase in the mother's confidence and capability to teach her child.

Fidelity of Implementation

Fidelity of implementation by each mother was achieved on most days of intervention. However, days where changes were introduced (e.g., adding time delay as a prompt, adding the label, and adding neutral items) tended to coincide with days where fidelity was not met. It is possible that these changes to the structure of the trial may have influenced this. Whenever a change to the trial was implemented, the researcher noticed that the mothers' affect and confidence in the procedures dropped slightly. Typically, the researcher would take the video from the day before and provide suggestions for the mother to implement during that subsequent day of recording. Because the mother may not have had time to practice these suggestions, this might have influenced her confidence and ability to reach fidelity on the day where changes to the trial occurred.

During the four follow-up sessions, Liam's mother, Hanna, and Jackson's mother, Marie, did not achieve fidelity of implementation in PRT procedures for question asking. Eli's mother, Sarah, was the only mother who achieved fidelity of implementation during

all four of her scheduled follow-up sessions. Hanna disclosed that some home renovations occurred in her household between generalization and follow-up; as well, a busy household with multiple siblings near the same age as Liam created a difficult environment to get one-on-one time with him. Thus, it proved difficult to be able to continue providing opportunities for question asking once generalization data collection had finished. These conditions may have affected Hanna's ability to reach fidelity of implementation at the follow-up stage. As well, this may explain why Liam exhibited a lower frequency of question asking during follow-up since Hanna did not actively seek to provide Liam with opportunities for question asking to occur.

Jackson's mother, Marie, was in school at the time between generalization and follow-up making it tough to continue opportunities for question asking when she had night classes or was studying for exams. In addition, Jackson had become hospitalized for an illness in the time between generalization and follow-up which made it difficult for the mother to provide opportunities for question asking while trying to balance life, school, the other sibling, and other responsibilities in life. In turn, this may have affected Jackson's frequency of question asking in the follow-up probes.

Eli's mother, Sarah, was the only mother who said that she continued to provide some opportunities for maintaining and generalizing question asking. Although there were days where some opportunities weren't present, she made a conscious effort to keep up with providing opportunities for asking, "What's that?" In addition, Eli's father began implementing opportunities for question asking between generalization and follow-up probes. As a result, Sarah was able to continue providing opportunities for Eli to further ask "What's that?" across environments and family members.

Two of the three mothers (i.e., Hanna and Marie) did not continue to provide opportunities for question asking to occur between the generalization phase and follow-up phase. In turn, these two mothers did not achieve fidelity at follow-up and this factor may have influenced their ability to achieve fidelity. As well, their child's frequency of asking, "What's that?" may have been influenced by their lack of continuing intervention procedures. The success of PRT is limited by the degree to which caregivers can keep up with the intervention procedures. Overall, it seemed that the mothers had more confidence in their ability to teach their child during the intervention when the researcher was present. The mothers' confidence in their ability to provide intervention may have decreased during the time between generalization and follow-up as the researcher was not present daily to provide guidance and positive feedback. Thus, this may have caused the mothers to question whether they were implementing intervention correctly. In addition, perhaps the researcher's presence during intervention was a source of accountability that encouraged them to engage in the procedures daily with the child. Once the researcher was removed, however, so was the accountability. To address issues pertaining to fidelity of implementation, perhaps more time is needed during the fading portion of the intervention so that caregivers are continuously encouraged to provide intervention procedures within everyday routines.

Social Validity of a Short-Term Parent-Mediated PRT Intervention

Parent satisfaction with their child's intervention is typically measured through social validity measures. Social validity measures, such as the *TARF-R* (Carter, 2010), allow the parent to analyze the intervention and the results of the intervention. According to Carter (2010), the consideration of social validity in a study is important for two

reasons: it allows for an understanding of which procedures are liked and disliked (i.e., high social acceptance or low social acceptance, respectively), and it allows for innovation in the field surrounding the intervention practices. By including the *TARF-R* (Carter, 2010), the researcher could probe how satisfied a mother was in certain areas of the study along with areas where improvements could be made in the future.

Social validity measures are imperative in PRT intervention since the intervention is meant to include parents and occur in the natural environment. In their review of 39 PRT studies, Vershuur et al. (2014) discovered that social validity was only measured in 10 out of 39 possible studies. Thus, the present study included a social validity measure.

Overall, all three mothers' high ratings on the *TARF-R* (Carter, 2010) in the current study suggested they were satisfied with the intervention, found the intervention to be acceptable in addressing question asking, and saw themselves using the procedures. The three mothers also agreed that the intervention may be able to make long-term improvements to their child's problematic behaviour (i.e., yelling, self-harm, etc.). When looking at the overall effectiveness of the intervention, all three mothers perceived the intervention as effective in relation to the goals outlined by the intervention (i.e., increase frequency of question asking) as well as the intervention being effective specifically for their own child. In addition, all three mothers liked the procedures used in the intervention and they were very willing to change their routine to incorporate treatment beyond intervention procedures.

Extant research has shown that parent-mediated interventions models are an effective method of providing evidence-based intervention and extending services to children with ASD (Coolican et al., 2010; Suppo & Floyd, 2012). In their review, Suppo

and Floyd (2012) supported the idea that parent-mediated interventions lead to better outcomes for the child with ASD (e.g., increase in social communication, emotional development, and decrease in behaviour problems) as well as the parent (e.g., stress level decreases, increased competency, and confidence in ability to help their child). Moreover, according to Hume et al. (2005), the majority of parents of children with ASD strongly believed that intervention become more effective and contributed to their child's growth when parent training was incorporated into the intervention. The results of the *TARF-R* (Carter, 2010) in the present study further support positive findings associated with providing parent training (i.e., satisfaction within child's intervention and increase in child's communication). Overall, it seems the mothers reported high parental satisfaction with being involved in their child's intervention. In addition, by teaching the mothers the intervention procedures, the mothers felt that they had more opportunities to offer their child to progress across several different environments and situations.

Mothers Report of Empowerment

Parent empowerment is also an important element to investigate when looking at home therapies as it allows the researcher to investigate how empowered a parent may feel while learning to become an intervention provider for their child. At the conclusion of the present study, the *FES* (Koren et al., 1992) was used to measure empowerment in relation to family dynamics in the home environment, how empowered parents may feel when it comes to their child's services, and empowerment within the autism community. The researcher intended to administer the *FES* (Koren et al., 1992) before and after intervention, however, its administration was accidentally omitted prior to the study's initiation. Thus, only post-study results are available. Although this omission makes it

impossible to determine any specific effect of the intervention on the mothers' feelings of empowerment, it is interesting to note the general level of empowerment a mother was experiencing in terms of these three levels. Overall, family empowerment for each mother seemed to be influenced by their role in the family and how many other siblings were present in the family. How empowered a mother felt in terms of accessing services for her child seemed to be related to the mother's role as the primary advocate for her child. In relation to community empowerment experienced by the mother, it seemed that the more involved a mother and her family were in the autism community, the more likely she was to feel empowered.

Liam's mother, Hanna, reported sometimes feeling empowered when discussing her family ($M = 3.3$). For example, when asked Q4. "I feel my family life is under control," Hanna reported sometimes feeling empowered. These results could be influenced by the fact that two other siblings close to Liam's age are also in the household under her care, each having their own special needs (i.e., one sibling with ASD and another sibling with developmental delay). However, Hanna often felt empowered when it came to advocating for her son's services ($M = 4.2$). This is evident when she was asked, Q13. "I feel I have the right to approve all services my child is receiving." Hanna is not afraid to voice her opinions about the services her children receive and is the primary advocate for each of her children. When looking at the community level, Hanna reported feeling empowered on some occasions ($M = 3.3$). For example, when asked Q26. "I get in touch with my legislators when important bills or issues concerning my children are pending," Hanna relayed she seldom does this. Hanna had mentioned that, because of her busy home schedule with multiple children near the same age, it is

extremely difficult to reach out to the ASD community and attend events that would impact her children's services.

Jackson's mother, Marie, often reported feeling empowered when asked about her family ($M = 4$). For example, when asked Q1. "When problems arise with my child, I handle them pretty well," Marie reported often feeling empowered. These results could be influenced by her previous exposure to ASD with her older, high functioning child. However, Marie reported feeling only empowered sometimes when it came to her child's services ($M = 3.9$). When asked Q23. "I have a good understanding of the service system that my child is involved in," Marie reported that she has some understanding. Because her children are high functioning, services are often denied to her children which may influence how empowered Marie feels when it comes to gaining access to services for her children. When looking at the community level, Marie reported feeling empowered on some occasions ($M = 3.2$). For example, when asked Q26. "I get in touch with my legislators when important bills or issues concerning my children are pending," Marie relayed she seldom does this. Instead of getting in touch with legislators, Marie relayed that she is more personally involved with helping families undergoing an ASD diagnosis for their child navigate access to services rather than getting involved on a community level.

Eli's mother, Sarah, reported feeling very empowered when asked about her family ($M = 4.3$) (i.e., Q4 "I feel my family life is under control." and her child's services ($M = 4.6$) (i.e., Q15 "I make sure that professionals understand my opinions about what services my child needs.")). These results could be due to Eli being an only child in the home (i.e., older sibling has moved out) or influenced by the active father figure who

helps with providing services and taking care of Eli. At the community level, Eli's mother Sarah reported feeling empowered on some occasions ($M = 3.7$). It is important to note that a recent diagnosis occurred for this family and they have only just become involved in the ASD community. This outcome may impact their knowledge surrounding current events occurring in the community or their understanding of the power their voice may have.

Generally, all three mothers felt most empowered when it came to accessing their child's services and reported that they did not feel empowered when it came to community involvement. In relation to empowerment felt at the family level, individual differences in family life typically influenced this. Although the results of the *FES* (Koren et al., 1992) cannot be interpreted in the context of the current study, they are nevertheless important in helping to understand how a mother feels empowered and where she does not in relation to her family, her child's services, and the community. By investigating parental empowerment, there is a greater chance of understanding treatment access from a parental perspective and gauging what potential barriers parents may face when trying to access intervention for their child.

Limitations of Study

As with any study, there are several limitations to the current research. Visual analysis techniques are somewhat subjective and depend on the researcher's interpretation. This can be problematic since two researchers may interpret the data in different ways; however, the use of statistics (e.g., percentage of non-overlapping data, determination of level and trend) in the analysis of the current research helped to minimize subjective interpretation (O'Neill et al., 2011). In addition, the interrater

reliability procedures help to assess potential inconsistencies in data collection procedures and increase the certainty of the operational definition of the target behaviour (O'Neill et al., 2011).

The study also contributes to single-subject research surrounding parent training and PRT by conducting research in a different geographical area. Horner et al. (2005) mentions that, for interventions using single-subject research designs to be considered evidence based, there must be a minimum of five single-subject studies that meet methodological criteria, that research should be conducted by at least three different researchers, and the five studies should have a minimum of 20 participants in total. The researchers who developed the PRT intervention method have primarily been those conducting the studies done thus far. By engaging in research in another part of the world conducted by a different researcher, this study adds to existing research supporting question asking as a pivotal behaviour and parent training within PRT.

Issues surrounding the treatment fidelity and accuracy of caregiver recording is another potential limitation of the current study. To address this issue, the mothers' fidelity of implementation was consistently documented by the researcher during intervention in order to be able to draw conclusions about the functional relationship between the independent and dependent variable (O'Neill et al., 2011).

Multicultural issues are present in the field of autism research; however, it is an under-researched area. Dyches, Wilder, Sudweeks, Obiakor, and Algozzine (2004) note that ASD can occur equally across race, socioeconomic status, types of families, lifestyle, and/or educational level. The current study did not address the cultural differences with respect to how question asking develops across differing cultures (since all participants

were Caucasian), thus limiting generalization of the results in this respect. In fact, very little PRT research has addressed multicultural aspects and how culture may influence parent training in PRT (Steiner, Koegel, Koegel, & Ence, 2012). On the other hand, because by its nature, PRT imbeds intervention within existing family routines and home environments. Thus, it should be possible to include PRT interventions that are acceptable to families of widely varying cultures. Regardless, this is an area in which more research is needed.

Lastly, when children were brought in during the third week of training so that the mother could practice the intervention procedures in front of the researcher, two of the three children (i.e., Jackson and Eli) exhibited positive instances of asking, “What’s that?” following a full verbal prompt. Although the children had not yet learned to ask, “What’s that?” for unknown items or understand how to use question asking appropriately in a given context, this may be viewed as a potential limitation. These instances do not mean the two children had learned the skill prior to intervention as they were not clear examples of the child asking, “What’s that?” when presented with an unknown object. If this were to have happened, then the question asking would have been considered appropriate and independent to prove the skill was learned before intervention was even put into place. However, this did not happen but it is important to note.

Future Research

As mentioned above, multicultural issues are present in the field of autism research; however, it is an under-researched area. According to Steiner et al. (2012), “research of parent training in autism does not directly address culture and ethnic differences” (p. 8). In regards to PRT research specifically, this area is highly under-

researched (Steiner et al., 2012). Future research could investigate how question asking may differ across cultures in terms of the methods involved in teaching question asking or the period in which question asking may develop in children with ASD of varying cultures. When looking at parent training practices and culture, future research can also probe whether the parent's culture may influence how a caregiver learns the procedures for implementing PRT intervention. Also, it would be interesting to investigate the role of a father when conducting parent-mediated interventions and whether this may produce any differences in the frequencies of question asking made by the child with ASD.

When looking at parent training and PRT, it was evident that two of the three mothers had difficulty following PRT procedures for question asking at follow-up. More research is needed in the area of short-term training for parents in the PRT procedures. Future studies can investigate how many hours may be ideal for parents to reach fidelity of implementation when using a short-term training model. In addition, it would be important for future research to qualitatively investigate what factors may influence the caregivers learning to implement PRT appropriately (e.g., do families differ when it comes to understanding the motivational procedures of PRT?). Furthermore, two of the three mothers did not continue intervention in the time between generalization and follow-up, citing instances where life got in the way. This creates an interesting area for research surrounding parent motivation and interest to continue intervention procedures in daily life. It would be ideal if future research could investigate how to motivate parents to continue implementing intervention procedures once intervention is complete as the success of their child's intervention relies on the willingness of the caregiver to continue implementing procedures.

Although child affect was monitored in the current study, parent affect was not. The researcher noticed that throughout the study if the mother was not completely invested in intervention on a specific day, it had some influence on the child's motivation and willingness to participate (e.g., if the mother was less happy because she was tired, the child seemed less interested in intervention on that day). Thus, it would be important to also monitor parent affect during intervention procedures to see if their affect has any influence of the fidelity of implementation or even their own child's affect.

Each family context is unique. Some families may have a sole caregiver as the primary advocate for the child with ASD while others may have a strong support system with an extended family member living in the home or two highly involved parents. It is imperative that researchers take into consideration and understand the whole family context (i.e., presence of siblings, other members of the family with their own special needs, etc.). In addition, these factors may influence the generalization of the skills being taught (i.e., an involved grandparent may watch the procedures of intervention and continue implementing the procedures). Thus, it would be crucial for future researchers to consider such factors when developing individualized treatments plans while using PRT.

In the present study, all three children were more or less similar in terms of their characteristics (e.g., Caucasian male under five). In terms of the child with ASD, it would be helpful if future research could focus on which child characteristics (e.g., age of the child, the number of functional words in the child's repertoire, or ability to speak spontaneously) may be associated with best outcomes (i.e., greater frequency of initiations). Such factors may be related to the maintenance and generalization of question asking. This is an important area of study for future research. Although this

study was not focused on the individual differences in the child's characteristics, it did seem to have an influence on the child's frequency of question asking.

Lastly, researchers can look at the long-term consequences of short-term interventions focused on question-asking. For example, does a question asking intervention affect the mean length of utterance made by the child with ASD? As well, how does question asking intervention affect peer interaction in social settings (e.g., the playground)? It would also be interesting to see if similar age peers implementing maintenance/generalization procedures (i.e., peer telling their peer with ASD that they may ask if they don't know) for the question asking intervention may influence the frequency of questions asked by the child with ASD.

Conclusion

The development of pivotal behaviours, such as social initiation, are imperative to long-term development. However, intervention for social initiations are rarely targeted. To date, very few studies have addressed social initiations through question asking. Furthermore, research in which caregivers of children with ASD are trained to develop their child's social initiation skills through question asking skill occurs even less frequently, with no studies to date using parents as the primary service provider (Vershuur et al., 2014). The current study aimed to address a gap with respect to parent-mediated models of intervention that target the pivotal behaviour of social initiation. Overall, the results of the study support the notion that a short-term parent training in PRT for social initiation through question asking can produce an increase in the frequency of asking, "What's that?" for children with ASD. Thus, short-term parent training in PRT can produce a difference in a child's behaviour and short-term

interventions that teach parents to implement PRT intervention may be used until a child with ASD on a wait list is able to receive early intensive behavioural intervention.

Overall, the results of such short-term studies implemented by parents help authenticate the effectiveness of short-term intervention that may be easily implemented by parents upon diagnosis. Training parents in evidence-based interventions, such as PRT, is a cost-effective method of providing services that can teach the child with ASD several pivotal skills, improve the interaction between the child and the parent, extend intervention to multiple environments, empower parents in the process, and reduce parent stress (McConachie & Diggle, 2007).

REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing, Inc.
- Anderson, A., Moore, D. W., Godfrey, R., & Fletcher-Flinn, C. M. (2004). Social skills assessment of children with autism in free-play situations. *Autism, 8*(4), 369-385. doi:10.1177/1362361304045216
- Baker, M. J., Koegel, R. L., & Koegel, L. K. (1998). Increasing the social behavior of young children with autism using their obsessive behaviors. *Journal of the Association for Persons with Severe Handicaps, 23*, 300-308.
- Bearss, K., Burrell, L., Stewart, L., & Scahill, L. (2015a). Parent Training in Autism Spectrum Disorder: What's in a Name? *Clinical Child and Family Psychology Review, 18*(2), 170-182. doi:10.1007/s10567-015-0179-5
- Bearss, K., Johnson, C., Smith, T., Lecavalier, L., Swiezy, N., Aman, M., . . . Scahill, L. (2015b). Effect of parent training vs parent education on behavioral problems in children with autism spectrum disorder: a randomized clinical trial. *Journal of the American Medical Association, 313*(15), 1524-1533. doi: 10.1001/jama.2015.3150
- Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A meta-analysis of schoolbased social skills interventions for children with autism spectrum disorders. *Remedial and Special Education, 28*, 153-162.
- Boutot, A., & Myles, B. S. (2011). *Autism Spectrum Disorders: Foundations, Characteristics, and Effective Strategies*. Boston, MA: Pearson.

- Bryson, S. E., Koegel, L. K., Koegel, R. L., Openden, D., Smith, I. M., & Nefdt, N. (2007). Large Scale Dissemination and Community Implementation of Pivotal Response Treatment: Program Description and Preliminary Data. *Research & Practice for Persons with Severe Disabilities, 32*(2), 142-153.
- Buckley, T. W., Ente, A. P., & Ruef, M. B. (2014). Improving a family's overall quality of life through parent training in pivotal response treatment. *Journal of Positive Behavior Interventions, 16*(1), 60-63.
- Camargo, S. P. H., Rispoli, M., Ganz, J., Hong, E. R., Davis, H., & Mason, R. (2014). A review of the quality of behaviorally-based intervention research to improve social interaction skills of children with ASD in inclusive settings. *Journal of Autism and Developmental Disorders, 44*(9), 2096-2116.
- Carter, S. L. (2010). *The Social Validity Manual* London, UK: Elsevier.
- Center for Disease Control. (2014). Facts About ASD. Retrieved from <http://www.cdc.gov/ncbddd/autism/facts.html>
- Coolican, J., Smith, I. M., & Bryson, S. E. (2010). Brief parent training in pivotal response treatment for preschoolers with autism. *Journal of Child Psychology and Psychiatry, 51*(12), 1321-1330.
- Cornell Empowerment Group. (1989). Empowerment and Family Support. *Networking Bulletin, 1*(1), 1-23.
- Csanady, A. (2015). Over 16,000 children on Ontario wait lists for autism services: More kids are waiting than are getting support. *National Post*. Retrieved from <http://news.nationalpost.com/news/canada/canadian-politics/over-16000-children->

on-ontario-wait-lists-for-autism-services-some-families-are-waiting-years-for-help

- Dillenburg, K., Keenan, M., Doherty, A., Byrne, T., & Gallagher, S. (2012). ABA-Based Programs for Children Diagnosed With Autism Spectrum Disorder: Parental and Professional Experiences at School and at Home. *Child & Family Behavior Therapy, 34*, 111-129. doi:10.1080/07317107.2012.684645
- Dyches, T. T., Wilder, L. K., Sudweeks, R. R., Obiakor, F. E., & Algozzine, B. (2004). Multicultural Issues in Autism. *Journal of Autism and Developmental Disorders, 34*(2), 211-222.
- Fenson, L., Pethick, S., Renda, C., Cox, J. L., Dale, P. S., & Reznick, S. J. (2000). Short-form Versions of the MacArthur Communicative Development Inventories. *Applied Psycholinguistics, 21*, 95-116.
- Foster, S. H. (1979). *From non-verbal to verbal communication: a study of the development of topic initiation strategies during the first two-and-a-half years*. Unpublished doctoral dissertation. University of Lancaster England.
- Gengoux, G. W., Berquist, K. L., Salzman, E., Schapp, S., Phillips, J. M., Frazier, T. W., . . . Hardan, A. Y. (2015). Pivotal Response Treatment Parent Training for Autism: Findings from a 3-Month Follow-Up Evaluation. *Journal of Autism and Developmental Disorders*. doi:10.1007/s10803-015-2452-3
- Gillis, J. M., & Butler, R. C. (2007). Social skills interventions for preschoolers with autism spectrum disorder: A description of single-subject design studies. *Journal of Early and Intensive Behavior Intervention, 4*(3), 532-547.
doi:http://dx.doi.org/10.1037/h0100390

- Goldstein, H., Lackey, K. C., & Schneider, N. J. (2014). A new framework for systematic reviews: Application to social skills interventions for preschoolers with autism. *Exceptional Children, 80*(3), 262-286.
- Gordon, A. (2015). Chronic wait times persist for families coping with autism. Retrieved from <http://www.thestar.com/life/2015/04/17/chronic-wait-times-persist-for-families-coping-with-autism.html?referrer=http%3A%2F%2Fm.facebook.com>
- Grindle, C. F., Kovshoff, H., Hastings, R. P., & Remington, B. (2009). Parents' experiences of home-based applied behavior analysis programs for young children with autism. *Journal of Autism and Developmental Disorders, 39*(1), 42-56.
- Harker, C. M., & Stone, W. L. (2014). Comparison of the Diagnostic Criteria for Autism Spectrum Disorder Across DSM-5 DSM-IV-TR and the Individuals with Disabilities Act (IDEA) Definition of Autism. Retrieved from <http://iris.peabody.vanderbilt.edu/wp-content/uploads/2014/09/ASD-Comparison-092214.pdf>
- Holloway, J., Healy, O., Dwyer, M., & Lydon, S. (2014). Social skills deficits in children with autism spectrum disorder: Evidence-based interventions. *Comprehensive Guide to Autism* (pp. 1133-1158). New York, NY: Springer.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S. L., & Wolery, M. (2005). The Use of Single-Subject Research to Identify Evidence-Based Practice in Special Education. *Council for Exceptional Children, 71*, 165-179.

- Hume, K., Bellini, S., & Pratt, C. (2005). The Usage and Perceived Outcomes of Early Intervention and Early Childhood Programs for Young Children With Autism Spectrum Disorder. *Topics in Early Childhood Special Education, 25*(4), 195-207. doi:10.1177/02711214050250040101
- Ingersoll, B. R., & Wainer, A. L. (2013). Pilot study of a school-based parent-training program for preschoolers with ASD. *Autism: The International Journal of Research and Practice, 17*(4), 434-448.
- Kanner, L. (1943). *Autistic disturbances of affective contact*: Publisher not identified.
- Kasari, C., Lawton, K., Shih, W., Barker, T. V., Landa, R., Lord, C., . . . Senturk, D. (2014). Caregiver-mediated intervention for low-resourced preschoolers with autism: An RCT. *Pediatrics, 134*(1), 72-79. doi:10.1542/peds.2013-3229
- Kim, Y. A. (2003). Necessary Social Skills Related to Peer Acceptance: Review Of Research *Childhood Education, 79*(4), 234-236.
- Koegel, L. K. (2014a). *Pivotal Response Treatment: Using Motivation as a Pivotal Response*. Santa Barbara, CA: UCSB Koegel Autism Center.
- Koegel, L. K. (2014b). *Teaching the Pivotal Behavior of Initiations to Children with Autism*. Santa Barbara, CA: UCSB Koegel Autism Center.
- Koegel, L. K. (2014c). *Using Pivotal Response Treatment to Teach First Words to Children with Autism*. Santa Barbara, CA: USCBA Koegel Autism Center.
- Koegel, L. K., Camarata, S. M., Valdez-Menchaca, M., & Koegel, R. L. (1998). Setting generalization of question-asking by children with autism. *American Journal on Mental Retardation, 102*(4), 346-357.

- Koegel, L. K., Carter, C. M., & Koegel, R. L. (2003). Teaching Children with Autism Self-Initiations as a Pivotal Response *Topics in Language Disorders, 23*(2), 134-145.
- Koegel, L. K., & Koegel, R. L. (2006). *Pivotal Response Treatments for Autism: Communication, Social & Academic Development*. Baltimore, Maryland: Paul H. Brookes Publishing Co.
- Koegel, L. K., & Koegel, R. L. (2012). *The PRT pocket guide: Pivotal response treatment for autism spectrum disorders*. Baltimore, MD: Paul H Brookes Publishing.
- Koegel, L. K., Koegel, R. L., Green-Hopkins, I., & Barnes, C. (2010). Brief report: Question-asking and collateral language acquisition in children with autism. *Journal of Autism and Developmental Disorders, 40*(4), 509-515.
doi:10.1007/s10803-009-0896-z
- Koegel, L. K., Koegel, R. L., Harrower, J. K., & Carter, C. M. (1999a). Pivotal Response Intervention I: Overview of Approach. *Journal of the Association for Persons with Severe Handicaps, 24*(3), 174-185.
- Koegel, L. K., Koegel, R. L., Shoshan, Y., & McNerney, E. K. (1999b). Pivotal response intervention II: preliminary long-term outcome data. *Journal of the Association for Persons with Severe Handicaps, 24*, 186-198.
- Koegel, L. K., Kuriakose, S., Singh, A. K., & Koegel, R. L. (2012). Improving generalization of peer socialization gains in inclusive school settings using initiations training. *Behavior Modification, 36*(3), 361-377.

- Koegel, L. K., Robinson, S., & Koegel, R. L. (2009). Empirically Supported Intervention Practices for Autism Spectrum Disorders in School and Community Settings: Issues and Practices In W. Sailor, Dunlap, G., Sugai, G., Horner, R. (Ed.), *Handbook of Positive Behavior Supports* (pp. 149-176): Springer US.
- Koegel, R. L., Bradshaw, J. L., Ashbaugh, K., & Koegel, L. K. (2014). Improving Question-Asking Initiations in Young Children with Autism Using Pivotal Response Treatment. *Journal of Autism and Developmental Disorders, 44*(4), 816-827. doi:10.1007/s10803-013-1932-6
- Koegel, R. L., Koegel, L. K., & Carter, C. M. (1999c). Pivotal Teaching Interactions for Children with Autism. *School Psychology Review, 28*, 576-594.
- Koegel, R. L., Schreibman, L., Good, A., Cerniglia, L., Murphy, C., & Koegel, L. K. (1989). *How to teach pivotal behaviors to children with autism: A training manual*. University of California, Santa Barbara.
- Koegel, R. L., Symon, J. B., & Koegel, L. K. (2002). Parent Education for Families of Children with Autism Living in Geographically Distant Areas. *Journal of Positive Behavior Interventions, 4*(2), 88-103.
- Koren, P. E., DeChillo, N., & Friesen, B. J. (1992). Measuring Empowerment in Families Whose Children Have Emotional Disabilities: A Brief Questionnaire. *Rehabilitation Psychology, 37*(4), 305-321.
- Loftin, R. L., Odom, S. L., & Lantz, J. F. (2008). Social Interaction and Repetitive Motor Behaviors. *Journal of Autism and Developmental Disorders, 38*(6), 1124-1135 doi:10.1007/s10803-007-0499-5

- Lord, C., Luyster, R. J., Gotham, K., & Guthrie, W. (2012). Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) Manual (Part II): Toddler Module. *Journal of Psychoeducational Assessment, 32*, 88-92.
- MacMullin, J. A., Viecili, M. A., Cappadocia, M. C., & Weiss, J. A. (2010). Parent Empowerment and Mental Health: Understanding Parent Perceptions of the Educational Experience. *Journal on Developmental Disabilities, 16*, 68-71.
- Makrygianni, M. K., & Reed, P. (2010). A meta-analytic review of the effectiveness of behavioural early intervention programs for children with autistic spectrum disorders. . *Research in Autism Spectrum Disorders, 4*(4), 577-593.
- McConachie, H., & Diggle, T. (2007). Parent implemented early intervention for young children with autism spectrum disorder: a systematic review *Journal of Evaluation in Clinical Practice, 13*(1), 120-129. doi:10.1111/j.1365-2753.2006.00674.x
- McMorris, C. A., Cox, E., Hudson, M., Liu, X., & Bebko, J. M. (2013). The Diagnostic Process of Children with Autism Spectrum Disorder: Implications for Early Identification and Intervention. *Journal on Developmental Disabilities, 19*, 42-40.
- McTear, M. F. (1985). *Children's conversation*. Oxford: Basil Blackwell.
- Ministry of Child and Youth Services. (2015). Autism Intervention Program – Program Guidelines. Retrieved from http://www.children.gov.on.ca/htdocs/English/topics/specialneeds/autism/aip_guidelines.aspx - 1.1

- National Autism Center. (2015). *Findings and Conclusions: National Standards Project, Phase 2: Addressing the need for evidence-based practice guidelines for Autism Spectrum Disorder*. Randolph, MA: Author.
- National Autistic Society. (2015). Communication and Interaction. Retrieved from <http://www.autism.org.uk/living-with-autism/communicating-and-interacting/communication-and-interaction.aspx>
- National Research Council. (2001). *Educating Children with Autism*. Washington, DC: National Academy Press.
- National Research Council. (2009). *Educating Children with Autism*. Washington, DC: National Academy Press.
- Nova Scotia Department of Health. (2004). Early Intensive Behavioural Intervention. Retrieved from <http://novascotia.ca/dhw/mental-health/autism.asp>
- O'Neill, R. E., McDonnell, J. J., Billingsley, F. F., & Jenson, W. R. (2011). *Single Case Research Designs in Educational and Community Settings*. Upper Saddle River, NJ: Pearson Education Inc.
- Patterson, S. Y., Smith, V., & Mirenda, P. (2012). A systematic review of training programs for parents of children with autism spectrum disorders: Single subject contributions. *Autism: The International Journal of Research and Practice*, 16(5), 498-522.
- Randolph, J. K., Stichter, J. P., Schmidt, C. T., O'Connor, K. V., & Schultz, T. P. (2011). Fidelity and effectiveness of PRT implemented by caregivers without college degrees. *Focus on Autism and Other Developmental Disabilities*, 26, 230-238.

- Rayer, M., Konkin, J., Doig, C., & Petch, C. (2015). Ontario families struggle to find services for children with autism. Retrieved from <http://healthydebate.ca/2015/04/topic/community-long-term-care/autism-services>
- Reynolds, B. M., Gast, D. L., & Luscre, D. (2014). Self-management of social initiations by kindergarten students with disabilities in the general education classroom. *Journal of Positive Behavior Interventions, 16*(3), 137-148.
- Shulz, A. J., Israel, B. A., Zimmerman, M. A., & Checkoway, B. N. (1995). Empowerment as a multi-level construct: Perceived control at the individual, organizational, and community levels. *Health Education Research: Theory and Practice, 10*(309-327).
- Siklos, S., & Kerns, K. (2007). Assessing the diagnostic experiences of a small sample of parents of children with autism spectrum disorders. *Research in Developmental Disabilities, 28*, 9-22.
- Smith, I. M., Flanagan, H. E., Garon, N., & Bryson, S. E. (2015). Effectiveness of Community-Based Early Intervention Based on Pivotal Response Treatment. *Journal of Autism and Developmental Disorders, 45*(6), 1858-1872.
doi:10.1007/s10803-014-2345-x
- Smith, I. M., Koegel, R. L., Koegel, L. K., Openden, D. A., Fossum, K. L., & Bryson, S. E. (2010). Effectiveness of a novel community-based early intervention model for children with autistic spectrum disorder. *American Journal on Intellectual and Developmental Disabilities, 115*(6), 504-523.

- Statistics Canada. (2014). Median total income, by family type, by province and territory (All census families). Retrieved from <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/famil108a-eng.htm>
- Steiner, A. M., Koegel, L. K., Koegel, R. L., & Ence, W. A. (2012). Issues and Theoretical Constructs Regarding Parent Education for Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 42*, 1-15.
- Stone, A. C., Reed, B., Cooley Hidecker, M. J., Ross, B., Di Rezze, B., Zwaigenbaum, L., & Rosenbaum, P. (2011). *Defining social communication in autism spectrum disorders: A scoping review*. Paper presented at the The ASHA Convention.
- Stone, W. L., & Caro-Martinez, L. M. (1990). Naturalistic Observations of Spontaneous Communication in Autistic Children. *Journal of Autism and Developmental Disorders, 20*(4), 437-453.
- Stoner, J. B., & Angell, M. E. (2006). Parent Perspectives on Role Engagement: An Investigation of Parents of Children With ASD and Their Self-Reported Roles With Education Professionals. *Focus on Autism and Other Developmental Disabilities, 21*(3), 177-189.
- Suppo, J., & Floyd, K. (2012). Parent Training for Families Who Have Children with Autism: A Review of the Literature. *American Council on Rural Special Education, 31*(2), 12-26.
- Tantam, D. (2000). Psychological disorder in adolescents and adults with Asperger syndrome. *Autism, 4*(1), 47-62. doi:10.1177/1362361300004001004
- Vershuur, R., Didden, R., Lang, R., Sigafos, J., & Huskens, B. (2014). Pivotal Response Treatment for Children with Autism Spectrum Disorders: A Systematic Review.

Journal of Autism and Developmental Disorders, 1(1), 34-61.

doi:10.1007/s40489-013-0008-z

Vismara, L. A., Colombi, C., & Rogers, S. J. (2009). Can one hour per week of therapy lead to lasting changes in young children with autism? *Autism*, 13, 93-115.

Vismara, L. A., & Lyons, G. L. (2007). Using preverbal interests to elicit joint attention behaviours in young children with autism: theoretical and clinical implications for understanding motivation. . *Journal of Positive Behavior Interventions*, 9, 214-228.

Wang, S., Parrila, R., & Cui, Y. (2013). Meta-analysis of social skills interventions of single-case research for individuals with autism spectrum disorders: Results from three-level HLM. *Journal of Autism and Developmental Disorders*, 43, 1701-1716.

Welsh, M., Park, R. D., Widaman, K., & O'Neil, R. (2001). Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology*, 39, 463-481.

Wolery, M., & Harris, S. R. (1982). Interpreting Results of Single Subject Research Designs *Physical Therapy*, 62, 445-452.

APPENDICES

Appendix A: Response-reinforcer Survey

Edible:	REINFORCER	NOVEL
Candy		
Cereals		
Liquids		
Other		

Material:	REINFORCER	NOVEL
Toys		

Social:	REINFORCER	NOVEL
Social game		

Activity:	REINFORCER	NOVEL
Activity		



Appendix B: Letter of Information from Organizations

Dear [Organization Name]:

I would like to let you know about a research study that may be of interest to your participants and ask you to consider referring your participants for possible participation.

I am specifically looking for caregivers of children that have been diagnosed with ASD. I am investigating whether parents can teach their child with ASD to initiate a social interaction through question asking.

ELIGIBILITY:

- Child with autism:
 - 2 to 5-years old
 - Documented ASD diagnosis
 - No other neurological or sensory disability
 - Speaks in single words and two-to-three word sentences
 - No prior training in social initiations
- The caregiver of each child with ASD
 - Must hold a minimum of a grade eight education
 - Have English as the spoken language at home
 - Must be the primary caregiver of the child with ASD
 - Be available daily during the intervention

PARENTS WILL BE ASKED TO:

- Read 3 short manuals provided by researcher
- Engage in two 2-hour training sessions each week for 3 weeks (12h total)
- Implement intervention 30 minutes a day after training for 2-3 weeks with one of the 10-minute session recorded daily
- Collect generalization data every day for one week after intervention is over to see if the skill is learned across environments
- Complete 2 questionnaires at the end of the study
- Participate in follow-up measures one month after generalization (twice in home, twice in different environment)

Please advise whether permission is obtained by your facility to distribute the copy of the recruitment flyer at your facility.

Signature of Organization

Date

I look forward to speaking with participants in your facility who may be interested in participating in this study. Please feel free to contact me with questions, or have your participants contact me directly, using the contact information provided below.

Thank you for your time and consideration.

Sincerely,

Svetlana Popovic, B.A.H., B.Ed., M.Ed. Candidate
popovic1@uwindsor.ca

Appendix C: Participant Recruitment Flyer



Caregivers needed for short-term research study on teaching their child with autism spectrum disorder (ASD) to initiate through question asking.

Are you a caregiver of child that has been diagnosed with ASD? I am investigating whether parents can teach their child with ASD to initiate a social interaction through question asking.

ELIGIBILITY:

- Child with autism:
 - 2 to 5-years old
 - Documented ASD diagnosis
 - No other neurological or sensory disability
 - Speaks in single words and two-to-three word sentences
 - No prior training in social initiations
- The caregiver of each child with ASD
 - Must hold a minimum of a grade eight education
 - Have English as the spoken language at home
 - Must be the primary caregiver of the child with ASD
 - Be available daily during the intervention

PARENTS WILL BE ASKED TO:

- Read 3 short manuals provided by researcher
- Engage in two 2-hour training sessions each week for 3 weeks (12h total)
- Implement intervention 30 minutes a day after training for 2-3 weeks with one of the 10-minute session recorded daily
- Collect generalization data every day for one week after intervention is over to see if the skill is learned across environments
- Complete 2 questionnaires at the end of the study
- Participate in follow-up measures one month after generalization (twice in home, twice in different environment)

For more information, please contact the primary researcher by phone or email:
Svetlana Popovic, B.A.H., B.Ed., M.Ed. Candidate
popovic1@uwindsor.ca

ALL INFORMATION WILL BE KEPT CONFIDENTIAL AND YOU MAY WITHDRAW YOUR PARTICIPATION AT ANY POINT DURING THE RESEARCH.

This research is being supervised by: Elizabeth Starr, Ph.D., University of Windsor Faculty of Education, 401 Sunset Drive, Windsor, Ontario, N9B 3P4

This study has been reviewed and received clearance by the Research Ethics Board at University of Windsor. If you have questions regarding participant rights and ethical conduct of research, contact the University of Windsor Research Office at (519) 253-3000 ext. 3948.

Appendix D: Telephone Interview

1. How old is your child? _____
2. Does your child have a documented ASD diagnosis? (Yes) (No)
3. Have they been diagnosed with anything else? (Yes) (No) If so, what is the diagnosis?

4. How frequently does your child ask, “What’s that?” or begin a conversation with, “What’s that?”
 - Never
 - 1-2 times a day
 - More than 3 times a day
 - 1-2 times per week
 - More than 3 times a week
5. What kind of questions do they ask?

6. Has your child previously received training for social initiations? (Yes) (No)
7. Does your child use single words? Provide examples.

8. Does your child talk in 2-3 word sentences? Provide examples.

9. Are you the primary caregiver of the child? (Yes) (No)
10. What is your level of education?

11. Is English the spoken language at home?

12. Are you available daily for the study? (Yes) (No)

Appendix E: Letter of Information



LETTER OF INFORMATION

Title of Study: Short-Term Parent-Mediated PRT: Teaching Social Initiation to Children with Autism Spectrum Disorder through Question Asking.

You are asked to participate in a research study conducted by Svetlana Popovic from the Faculty of Education department at the University of Windsor in partial completion of my Master of Education degree. I am qualified to provide therapy and train others in Pivotal Response Treatment (PRT), an evidence-based treatment for individuals with Autism Spectrum Disorder (ASD). PRT is a naturalistic treatment that incorporates motivation to target pivotal areas of growth and is based on principles of Applied Behaviour Analysis.

If you have any questions or concerns about the research, please feel to contact Dr. Elizabeth Starr, Professor in the Faculty of Education, University of Windsor, estarr@uwindsor.ca, (519) 253-3000 x 3836.

PURPOSE OF THE STUDY

The purpose of the study is to investigate whether a brief parent-mediated PRT intervention, conducted in a child's home environment, will increase the frequency of social initiation through question asking and context appropriate questions made by the child with ASD. In addition, the study will investigate whether the social initiations will be maintained and generalize beyond the intervention setting.

PROCEDURES

If you volunteer to participate in this study, you will be asked to:

- Read 3 short manuals provided by researcher
- Engage in two 2-hour training sessions each week for 3 weeks (12h total)
- Implement intervention 30 minutes a day after training for 2-3 weeks with one of the 10-minute session recorded daily
- Collect generalization data every day for one week after intervention is over to see if the skill is learned across environments
- Complete 2 questionnaires at the end of the study
- Participate in follow-up measures one month after generalization (twice in home, twice in different environment)

POTENTIAL RISKS AND DISCOMFORTS

During the screening procedures, the researcher will ask to view and obtain a copy of personal medical information (i.e., documented ASD diagnosis). Please note, the researcher is not a medical professional nor is the researcher professionally trained on how to read the diagnostic forms. This information will be kept confidential and locked in a safe. The researcher will inform the caregivers that once all eligibility criteria is met, only then will they be invited to the study.

During the videotaping, some individuals may experience discomfort while being videotaped. The caregiver is able to stop the recording at any point if they feel discomfort. In addition, all video files taken with the iPad will be password encrypted. Video files from the iPad will be transferred onto a password encrypted external hard-drive that is locked in a safe (reserved for 5 years) and will be deleted from the iPad once transferred. The caregiver reserves the right to view/delete all video files. The video files will only be viewed by the researcher, supervisor, and a member of the research team at the Koegel Autism Center at the University of California Santa Barbara for scoring purposes.

During the adult interactions, the caregiver may experience some psychological/social stress when trying to implement intervention for their child. At any point of distress, the caregiver and/or researcher will stop the recording. The caregiver's health and well-being is the number one priority. In addition, the caregiver may be worried about confidentiality. The researcher will relay to the caregiver that confidentiality is a top priority and personal identifiable information will not be released at any point in the research. The caregiver is able to ask questions at any point of time in the research.

During the interactions with the child, the researcher will not be working directly with the child in order to avoid influencing the development of the skill. However, the researcher is aware that their presence may be an issue for the child with autism and some discomfort may occur with changes to routine. The researcher will speak to the caregiver to provide transitional cues and try to provide sessions during the same time. Should the caregiver require childcare during the parent training period, the same individual may provide care for the child (i.e., family member, friend of the family with whom the child is familiar with). Or, if required, a research assistant who has experience working with children with autism will provide childcare in the participant's home. The research assistant will have prior police clearance. Safety is the number one priority; therefore, those children who may require childcare will be in a different part of their home.

POTENTIAL BENEFITS TO PARTICIPANTS

The caregiver will learn how to implement Pivotal Response Treatment, an evidence-based practice for children with ASD. Other benefits are the potential for children to learn the skills that are being taught which may be a foundation for building further skills.

COMPENSATION FOR PARTICIPATION

The caregiver will be able to keep the manuals for future reference.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Procedures for confidentiality include: assigning a participant number for each caregiver-child dyad and password encrypting all video files that will be retained on an external hard-drive. The hard-drive will remain locked in a safe in the researcher's home. The video files from the camera will be deleted once saved on the hard-drive, which will be kept for 5 years. In addition, to ensure anonymity of participants, the research will use pseudonyms in the thesis.

Since the activities are videoed, the participant holds the right to review the video files. As well, they have the right to determine who will have access to the video. Lastly, the participant holds the right to when the video files will be erased.

PARTICIPATION AND WITHDRAWAL

All information is kept confidential and the participant reserves the right to withdraw participation at any point during the research. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

Summary of the research findings will be available to participants online through the University of Windsor's electronic thesis portal.

Web address: <http://scholar.uwindsor.ca/etd/>

The results should be available by the end of June, 2017

A reader friendly summary of the results will be posted at <http://svetlanapopovic.weebly.com>

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations. If you would like the researcher to contact you for further studies, please provide an e-mail address (you may leave this blank if you do not wish to be contacted for future studies):

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

Or you may contact the supervisor of the study, Dr. Elizabeth Starr, Professor in the Faculty of Education, University of Windsor, estarr@uwindsor.ca, (519) 253-3000 x 3836.

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

Date

Appendix F: Letter of Informed Consent



CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: Short-Term Parent-Mediated PRT: Teaching Social Initiation to Children with Autism Spectrum Disorder through Question Asking.

You are asked to participate in a research study conducted by Svetlana Popovic from the Faculty of Education department at the University of Windsor in partial completion of my Master of Education degree. I am qualified to provide therapy and train others in Pivotal Response Treatment (PRT), an evidence-based treatment for individuals with Autism Spectrum Disorder (ASD). PRT is a naturalistic treatment that incorporates motivation to target pivotal areas of growth and is based on principles of Applied Behaviour Analysis.

If you have any questions or concerns about the research, please feel to contact Dr. Elizabeth Starr, Professor in the Faculty of Education, University of Windsor, estarr@uwindsor.ca, (519) 253-3000 x 3836.

PURPOSE OF THE STUDY

The purpose of the study is to investigate whether a brief parent-mediated PRT intervention, conducted in a child's home environment, will increase the frequency of social initiation through question asking and context appropriate questions made by the child with ASD. In addition, the proposed study will investigate whether the social initiations will be maintained and generalize beyond the intervention setting.

PROCEDURES

If you volunteer to participate in this study, you will be asked to:

- Read 3 short manuals provided by researcher
- Engage in two 2-hour training sessions each week for 3 weeks (12h total)
- Implement intervention 30 minutes a day after training for 2-3 weeks with one of the 10-minute session recorded daily
- Collect generalization data every day for one week after intervention is over to see if the skill is learned across environments
- Complete 2 questionnaires at the end of the study
- Participate in follow-up measures one month after generalization (twice in home, twice in different environment)

POTENTIAL RISKS AND DISCOMFORTS

During the screening procedures, the researcher will ask to view and obtain a copy of personal medical information (i.e., documented ASD diagnosis). Please note, the researcher is not a medical professional nor is the researcher professionally trained on how to read the diagnostic forms. This information will be kept confidential and locked in a safe. The researcher will inform the caregivers that once all eligibility criteria is met, only then will they be invited to the study.

During the videotaping, some individuals may experience discomfort while being videotaped. The caregiver is able to stop the recording at any point if they feel discomfort. In addition, all video files taken with the iPad will be password encrypted. Video files from the iPad will be transferred onto a password encrypted external hard-drive that is locked in a safe (reserved for 5 years) and will be deleted from the iPad once transferred. The caregiver reserves the right to view/delete all video files. The video files will only be viewed by the researcher, supervisor, and a member of the research team at the Koegel Autism Center at the University of California Santa Barbara for scoring purposes.

During the adult interactions, the caregiver may experience some psychological/social stress when trying to implement intervention for their child. At any point of distress, the caregiver and/or researcher will stop the recording. The caregiver's health and well-being is the number one priority. In addition, the caregiver may be worried about confidentiality. The researcher will relay to the caregiver that confidentiality is a top priority and personal identifiable information will not be released at any point in the research. The caregiver is able to ask questions at any point of time in the research.

During the interactions with the child, the researcher will not be working directly with the child in order to avoid influencing the development of the skill. However, the researcher is aware that their presence may be an issue for the child with autism and some discomfort may occur with changes to routine. The researcher will speak to the caregiver to provide transitional cues and try to provide sessions during the same time. Should the caregiver require childcare during the parent training period, the same individual may provide care for the child (i.e., family member, friend of the family with whom the child is familiar with). Or, if required, a research assistant who has experience working with children with autism will provide childcare in the participant's home. The research assistant will have prior police clearance. Safety is the number one priority; therefore, those children who may require childcare will be in a different part of their home.

POTENTIAL BENEFITS TO PARTICIPANTS

The caregiver will learn how to implement Pivotal Response Treatment, an evidence-based practice for children with ASD. Other benefits are the potential for children to learn the skills that are being taught which may be a foundation for building further skills.

COMPENSATION FOR PARTICIPATION

The caregiver will be able to keep the manuals for future reference.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Procedures for confidentiality include: assigning a participant number for each caregiver-child dyad and password encrypting all video files that will be retained on an external hard-drive. The hard-drive will remain locked in a safe in the researcher's home. The video files from the camera will be deleted once saved on the hard-drive, which will be kept for 5 years. In addition, to ensure anonymity of participants, the research will use pseudonyms in the thesis.

Since the activities are videoed, the participant holds the right to review the video files. As well, they have the right to determine who will have access to the video files. Lastly, the participant holds the right to when the video files will be erased.

PARTICIPATION AND WITHDRAWAL

All information is kept confidential and the participant reserves the right to withdraw participation at any point during the research. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

Summary of the research findings will be available to participants online through the University of Windsor's electronic thesis portal.

Web address: <http://scholar.uwindsor.ca/etd/>

The results should be available by the end of June, 2017

A reader friendly summary of the results will be posted at <http://svetlanapopovic.weebly.com>

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations. If you would like the researcher to contact you for further studies, please provide an e-mail address (you may leave this blank if you do not wish to be contacted for future studies):

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

Or you may contact the supervisor of the study, Dr. Elizabeth Starr, Professor in the Faculty of Education, University of Windsor, estarr@uwindsor.ca, (519) 253-3000 x 3836.

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study [*insert title*] as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Name of Participant

Signature of Participant

Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

Date

Appendix G: Approval for Video Recording



Child's/Research Subject Name:

Title of the Project: Short-Term Parent-Mediated PRT: Teaching Social Initiation to Children with Autism Spectrum Disorder through Question Asking.

I consent to the video recording of interviews, procedures, or treatment (of my child).

I understand these are voluntary procedures and that I am free to withdraw at any time by requesting that the video recording be discontinued. I also understand that my name or (my child's name) will not be revealed to anyone and that video recording will be kept confidential. Videos are filed by number only and store in a locked cabinet on an external hard drive.

I understand that confidentiality will be respected and the viewing of materials will be for professional use only. For fidelity purposes, some of the videos will be viewed by the Koegel Autism Center at the University of California Santa Barbara.

(Signature of Parent or Guardian)

(Date)

Or

(Research Subject)

(Date)

Appendix I: Parent Intervention Data Recording Sheet

Name: _____ Date: _____ Criteria for mastery: _____%

+	Independent
FP	Full Verbal Prompt
PP	Partial Verbal Prompt
NR	No Response
TD	Time Delay
B	Behavior

Trial	Prompt Present					
1	+	FP	PP	NR	TD	B
2	+	FP	PP	NR	TD	B
3	+	FP	PP	NR	TD	B
4	+	FP	PP	NR	TD	B
5	+	FP	PP	NR	TD	B
6	+	FP	PP	NR	TD	B
7	+	FP	PP	NR	TD	B
8	+	FP	PP	NR	TD	B
9	+	FP	PP	NR	TD	B
10	+	FP	PP	NR	TD	B
11	+	FP	PP	NR	TD	B
12	+	FP	PP	NR	TD	B
13	+	FP	PP	NR	TD	B
14	+	FP	PP	NR	TD	B
15	+	FP	PP	NR	TD	B
16	+	FP	PP	NR	TD	B
17	+	FP	PP	NR	TD	B
18	+	FP	PP	NR	TD	B
19	+	FP	PP	NR	TD	B
20	+	FP	PP	NR	TD	B
21	+	FP	PP	NR	TD	B
22	+	FP	PP	NR	TD	B
23	+	FP	PP	NR	TD	B
24	+	FP	PP	NR	TD	B
25	+	FP	PP	NR	TD	B

Trial	Prompt Present					
26	+	FP	PP	NR	TD	B
27	+	FP	PP	NR	TD	B
28	+	FP	PP	NR	TD	B
29	+	FP	PP	NR	TD	B
30	+	FP	PP	NR	TD	B
31	+	FP	PP	NR	TD	B
32	+	FP	PP	NR	TD	B
33	+	FP	PP	NR	TD	B
34	+	FP	PP	NR	TD	B
35	+	FP	PP	NR	TD	B
36	+	FP	PP	NR	TD	B
37	+	FP	PP	NR	TD	B
38	+	FP	PP	NR	TD	B
39	+	FP	PP	NR	TD	B
40	+	FP	PP	NR	TD	B
41	+	FP	PP	NR	TD	B
42	+	FP	PP	NR	TD	B
43	+	FP	PP	NR	TD	B
44	+	FP	PP	NR	TD	B
45	+	FP	PP	NR	TD	B
46	+	FP	PP	NR	TD	B
47	+	FP	PP	NR	TD	B
48	+	FP	PP	NR	TD	B
49	+	FP	PP	NR	TD	B
50	+	FP	PP	NR	TD	B

% independent _____
 % full verbal prompt _____
 % partial verbal prompt _____
 % no response _____
 % time delay _____
 % behaviour _____

VITA AUCTORIS

NAME: Svetlana Popovic

PLACE OF BIRTH: Windsor, ON

YEAR OF BIRTH: 1991

EDUCATION: Vincent Massey Secondary, Windsor, ON, 2009

University of Windsor, B.A.H, Windsor, ON,
2013

University of Windsor, B. Ed., Windsor, ON,
2014

University of Windsor, M. Ed., Windsor, ON,
2017