Parent-mediated Intervention and the Expression of Positive Emotion in Toddlers With Suspected Autism

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ABSTRACT

This case study examined whether shared positive affect increased between 4 toddlers with suspected ASD and their mothers, during the follow-up treatment phases of a parent–mediated PRT program. Video recordings of 10 minutes were rated for the occurrence of smiles between the parent and child. Results indicated that there was no significant increase in shared positive affect. More specifically, for 2 of the 4 children increased in rates of smiling, 1 decreased and 1 slightly decreased in their rates of smiling. Respectively, 2 parents increased in their rates of smiling, 1 decreased, and 1, slightly increased. The variability between each of these cases was attributed to the briefness of the training program and that greater focus was on encouraging the child's language. Perhaps future programs could introduce more strategies designed to enhance shared positive affect between parent-child dyads.

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CHAPTER 1

INTRODUCTION

Autism forms part of a family of disorders referred to as the autism spectrum disorders (ASDs; including Asperger's syndrome and atypical autism or pervasive developmental disorder not otherwise specified; APA, 2000). These are pervasive neurodevelopmental disorders that are present at birth and continue throughout one's lifespan (Bailey, Phillips, & Rutter, 1996; Bryson & Smith, 1998). The term "pervasive" is used to convey that these conditions affect diverse areas of functioning, including motor, cognitive, social and emotional domains of development.

Autism is derived from the Greek word *auto* meaning self, and "spectrum" is used to refer to the wide range of abilities, attributes and severity of symptoms seen in individuals with ASD (Rutter, LeCouteur, & Lord, 2003). Autism/ASD is a unique neurodevelopmental disorder that is manifested differently in each individual. In fact, no two individuals share the same "autism." Even in cases of identical twins, they too fall on different areas of the spectrum, differing in their range and severity of symptoms and behaviors (Wing, Leekham, & Gould, 2002).

Three Domains of Impairment

Individuals with ASD share three major domains of impairment: (1) a lack of reciprocal social interactions; (2) disturbances in communication and speech; and (3)

repetitive or restrictive stereotyped patterns of behavior (APA, 2000). The impairment in reciprocal social interactions refers to how children with ASD (hereafter, collectively referred to as "autism") fail to engage in the typical back-and-forth social behaviours such as smiling in response to the smile of another person. They tend not to respond to the social cues in their environment, even with those who are familiar to them such as their parents and siblings. This is probably one of the most salient or recognizable features of autism (Powers, 1992). Children with autism have difficulty detecting the subtle cues involved in reading the emotions of others, and their own expressions of emotion may be atypical (Powers, 1992). Social interactions are idiosyncratic and egocentric or naive, which can help to explain why so many individuals with autism may appear not to "care" for others or express the desire for friendships.

The second recognizable feature of autism is in the area of verbal and nonverbal forms of communication. Some individuals with ASD have little or no speech. In those who do speak, they often use rote-like speech, and words are used out of their proper context (Powers, 1992). Pragmatics or the social use of language and nonverbal forms of communication (i.e., eye gaze and gestures) are also impaired, and their voices often sound flat, high pitched, robotic or monotonous. Speech is often non-functional; words are said but not necessarily for the purpose of communication or social exchange. As previously mentioned, autism affects brain development at birth, which impacts the way that these individuals develop and use their speech, how they socially interact, and how they perceive the world (Schopler, Reichler, & Renner, 1986). Although some individuals with autism may have relatively good speech skills, they may still experience challenges in maintaining an on-topic conversation (Bailey et al., 1996). Individuals with

autism often lack imagination, as shown in their lack of pretend play, and similarly they often cannot communicate with figurative words or gestures (Tager-Flusberg, Joseph, & Folstein, 2001; Lord & Risi, 1998).

The third significant impairment common to individuals with autism is the presence of restricted or stereotyped and repetitive patterns of behavior. Behavior difficulties in autism range from minor to quite severe. These behaviors can occur with an abnormal intensity or frequency, and include self-stimulatory behaviors, self injury and various compulsions (Schopler & Mesibov, 1994). Individuals with autism may have an intense preoccupation with circles or round objects; that is, they may seek out round objects or may fixate on just the rounded part of an object for extended amounts of time (Scholpler & Mesibov, 1994). Children with autism have a need for predictability and routine, and, without it, often experience tremendous stress or frustration that at times can result in aggression or intense emotional outbursts (Mesibov, Schopler & Hearsey, 1994). Children with autism also vary in their degree of hypersensitivity to sensory input and stimulation from their environment (Bauman & Kemper, 1994). Lights, sounds, textures, smells, tastes and how they perceive and respond to pain all affect their behavior and severely limit the child's and family's daily functioning (Kazdin & Weisz, 2003; Wing, Leekam, & Gould, 2002).

Prevalence and Outcomes

Autism is one of the most prevalent childhood disorders (Dumas & Nilsen, 2003). It is now estimated that ASD occurs in 1 in every 150 individuals, and is four times more likely in boys than in girls (Dumas & Nilsen, 2003; Bryson & Smith, 1998). Researchers are continually searching for plausible explanations for this condition, often referred to as

reaching epidemic proportions. Prognosis is generally poor (Moss, Magiati, Charman, & Howlin, 2008), and presently there are no known causes or cures, although genetic factors are strongly implicated (Freitag, Staal, Klauck, Duketis et al., 2010; Kumar & Christian, 2009). However, over the last several decades, increasing educational and scientific efforts have led to more effective and appropriate treatments that can improve the prognosis and quality of life of those who are affected by ASD (Bailey et al., 1996; Koegel & Koegel 1995). Effective autism-specific treatments target core features of the disorder thought to be important for learning.

Positive Emotions

Evidence suggests that children with autism experience low levels of positive emotion and relatively high levels of negative emotion (Czapinski & Bryson, 2003; Garon, Bryson, Zwaigenbaum, Smith et al., 2009). This imbalance of positive to negative emotion has a major impact on all forms of learning. We know that children who are happy learn better and are able to learn how to play and navigate through their environments appropriately (Bryson, Koegel, Koegel, Openden, Smith, & Nefdt, 2007). Critically, the process of sharing positive emotion with others is important for infants' social and emotional development. Children with autism have significant impairments in social and emotional development, often characterized by a lack of appropriate eye-gaze or shifts in eye-gaze, which has many implications for social learning. When the children do look at others such as their parents or care-givers, they tend not to coordinate their eye-gaze with their expressions or objects of interest (Dawson, 1989; Kasari & Sigman, 1997). Moreover, by not looking at their partner, they often miss vital information which,

as a consequence, also prevents them from appropriately responding to social gestures and interacting reciprocally (Dawson, 1989; Kasari & Sigman, 1997).

In the developmental model proposed by Bakeman and Adamson (1982), face-to-face interaction between an infant and his/her caregiver is thought to lead to the exchange of affective or expressed emotional signals that precede the development of nonverbal gesture communication. As well, it is during this period that infants are beginning to formulate, recognize and enjoy the sameness of experiences between self and other (Burack, Charman, Yirmiya, & Zelazo, 2001). This type of sharing of emotional experiences is seen in typically developing infants by 5-7 months of age (Dawson, 1989). Additionally, developmental research has shown that individuals with autism display impairments in face processing that extend to processing the facial expressions of emotion. Interestingly, Dawson, Meltzoff, Osterling and Rinadi (1998) found that individuals with autism were able to distinguish negative and neutral displays of emotion more than positive expressions.

INTERVENTIONS

One of the first and still most common forms of intervention used to improve the social adaptation and behavioral functioning of children with autism is applied behavioral analysis (ABA; also known as the empirically-derived principles of learning; Pierce & Epling, 1999). ABA is focused on addressing each inappropriate behavior directly and repeatedly so that these may be replaced by more appropriate behaviors. Specifically, the principles of contingency and reinforcement are used to alter behaviors and to teach new skills. ABA uses the scientific methodology of observing, assessing and evaluating the

effectiveness of treatment strategies. One application of ABA is discrete trial teaching (DTT), which focuses on teaching individual social skills, self care skills, language, cognitive and behavioral skills (Rogers, 1998). Acquisition of these skills requires teaching them repeatedly in a particular environment, breaking the behavior down into smaller components, and then conducting mass trails of teaching one particular skill for a set amount of time until it becomes automatic for the learner. In DTT, treatment is therapist or teacher directed and most of the skill development is achieved using table work, manipulative objects, flash cards, one-on-one teaching settings and reinforcers (usually edibles) aimed at motivating the child toward the activity directed by his or her teacher (Rogers, 1998).

Lovaas was the first to develop an early intensive behavioural program using discrete trial teaching to treat children with autism, and reported significant improvements in their communication, social interaction and behaviors (Lovaas , Koegel, Simmons & Long ,1973). Claims were that over 40 % of the children were later indistinguishable from normal school children. Although not all claims have been substantiated, the main findings have been replicated in more recent studies (Sallows & Graupner, 2005). However, one of the major concerns arising from this research is that the skills learned during discrete trial teaching have failed to generalize. Consequently, there has been a paradigm shift characterized by applying principles of ABA in naturalistic settings in an attempt to increase generalization and transferability of skills in children with autism (Johnson, Handen, Butter, Wagner, Mulick, et al. 2007).

One of the interventions that represent this shift from formalized structured discrete trial teaching to more naturalistic teaching is Pivotal Response Treatment (PRT)

(Koegel & Koegel, 2006). The term pivotal refers to more general areas of development that, when targeted in treatment, result in the enhancement of multiple skills in several of the core areas of development, thus increasing the daily functioning of the child with autism and their families (Koegel & Koegel, 1996). To date, the five pivotal areas suggested by Koegel and Koegel (1996) are motivation, response to multiple cues, self initiation, self management and empathy. This treatment also incorporates components of ABA into the child's natural environment, while targeting communication in an attempt to change inappropriate behaviours and other adaptive skills (Coolican, 1996; Koegel & Koegel, 2006). The aim in a PRT program is to create opportunities for learning across the child's natural context, with various people.

As discussed previously, there are various forms of treatment for children with autism, but it is the nature of Pivotal Response Treatment and its demonstrated effectiveness that has led to its widespread use (Bryson et al., 2007). By teaching in natural contexts, this treatment allows for generalization of learning across settings, and is also appropriate for use with very young children. PRT adopts a developmental approach and therefore can be applied throughout an individual's lifespan. It also focuses on using the child's natural motivation by following the child's lead to direct and promote intentional and functional communication and social interactions (Koegel & Koegel, 2006).

Early intervention is important for children with autism because, as time goes on, habits and constraints increase and plasticity decreases (Bryson, Rogers, & Fombonne, 2003; Dawson & Osterling, 1997; Rogers, 1998). Moreover, the later the diagnosis, the further away children with autism become from typical development in all areas of

communication, social exchange and behaviours, cognition and affect (Dawson & Zanolli, 2003). For example, one study demonstrated that treatment results were best for children receiving intervention before the age of 2 years, compared to those who received treatment at 5 years of age or later (Johnson et al., 2007).

Recently, PRT was adopted as the main form of treatment in the Nova Scotia Early Intensive Behavioral Intervention (EIBI) program for preschoolers (Bryson et al., 2007). This program includes direct service from health care providers, but also trains parents, early childhood educators, siblings and others who are involved in the child's care to implement the strategies of PRT throughout the child's life. Evidence from a large cohort of children with ASD (n = 45) has demonstrated the effectiveness of this community-based program, with most children showing major gains in IQ, receptive and expressive language and more general adaptive skills (Smith et al., in press).

Recently, Coolican (2008) examined the efficacy of brief parent training in PRT for eight preschoolers newly diagnosed with ASD through the IWK Health Centre in Halifax, Nova Scotia. The parents in Coolican's (2008) study were given 6 hours of individualized training in PRT techniques, and child gains and parents' fidelity of PRT implementation were assessed at baseline, post-training and 2-to-4-month follow-up.

The results from the study indicated that all parents demonstrated an increase in skill level after training. There was no significant change in parental affect. Overall parents reported that they were satisfied with the training program and they found it helpful in developing ways to increase child's communication and language.

PRT is a more inclusive type of training than the traditional therapist-based ABA. In PRT, although others may be trained, parents are viewed as the main implementers of

this intervention. Among the reasons for this focus is that parents help to ensure consistency of treatment, which enables greater generalization and maintenance of skills when compared to no intervention and other parent training programs (Kaiser & Hancock, 2003; Wacker, et al., 2005).

A secondary objective of the Coolican (2008) study was to assess whether positive affect in the children and parents would improve as the children's communication and responsiveness changed during both post- training and follow-up phases.

Secondary results of Coolican's (2008) study indicated that the frequency with which the preschoolers verbally expressed their needs and desires in an appropriate manner (e.g., if the child wanted a ball, a functional verbal utterance would consist of saying the word "ball" or something similar but not saying "apple." This form of expression is also known as functional verbal utterances (FVU's). The results for the child's outcomes indicated all 8 increased in functional verbal utterances (FVU's), six showed tremendous changes greater than 10% after training and two decreased in follow-up. On specific and standardized language measures, three children within the 4-6 months of the study showed age equivalent gains of 7 months. The percentage of incidents of disruptive behaviour per interval decreased in the follow-up phase. Despite large improvements in child communication skills, and decrease in disruptive behaviours there were no significant changes in the expression of positive affect after treatment (Coolican, 2008).

RESEARCH CONTEXT OF THE PRESENT STUDY

In Coolican's (2008) study, the primary target of treatment was child communication skills, not affect. It is thus possible that her failure to demonstrate a significance change for positive affect (vs. communication skills) reflects the fact that positive affect was not a primary target in treatment. The present thesis addressed this possibility by examining children's expressed emotion and specifically focusing on positive affect as a target in treatment. This was achieved within the context of a larger pilot study designed to evaluate the effectiveness of newly developed parent-mediated intervention -- the *Social ABCs* -- which targets both child communication skills and shared (child-parent) positive affect in toddlers with suspected autism (Bryson et al., 2009).

Currently, little is known about the effectiveness of autism-specific interventions provided this early in life (but see Dawson et al., 2010, for preliminary findings). Once effectiveness is demonstrated in the Bryson et al. pilot study, the plan is to conduct a randomized controlled trial of the *Social ABC's* parent-mediated intervention. This study was also designed to explore the child factors of variability in rates of obtaining adaptive, communication and emotional sharing skills.

There was one principal investigator and four co-investigators involved in the pilot study. Parents were educated in PRT strategies through participation in the Social ABC's program and parents were also given the Social ABC's manual (Bryson, Brian, Smith, McCormick et al., 2009). The program involved systematic periods of in-the-moment clinician feedback, and separate phases of coaching and consultation, all while the parents implemented the techniques throughout their child's daily routines. The

Social ABC's model integrates both the PRT model with the IWK Health Centre's Halifax, Nova Scotia, family-centered care philosophy. That is, the program considers each family's needs, values, limitations, and additional stressors as high priority when teaching and implementing the treatment program. In total, the parents were given 16.5 hours of individualized training over a 24 week period, and were given the Social ABC's manual before starting the 24 weeks of training. The first 8 weeks involved training participating families in use of the PRT techniques. Week four to eight involved both training and feedback, followed by four week post-training where the parents and the clinicians are likely to consult and provide coaching over the phone. Finally, the last phase of the program is a 12-week follow-up phase

The overall Social ABC's study involved 20 families; all but 2 were recruited from the Infant Siblings Study which fit with the inclusionary criteria. One criterion for enrollment excluded those whose primary language was not English. Excluded were toddlers enrolled in any other behavioural or speech therapy program. Families outside the 50 km distance from the research locations were also excluded. One family was exempted because they moved prior to the completion of the study and therefore did not complete follow-up.

To date, results of this study indicate that the children showed gains in functional speech (33-55%) and overall responsiveness (4-28%), as coded from the videotapes of the dyadic child-parent interactions of four families. Improved scores in receptive language and all 3 children showed gains on the Mullen Early Learning Scales (Mullen, 1995). Parent satisfaction with both the training and intervention model and delivery was highly positive.

Ultimately, it is hoped that that this intervention might provide a cost-effective way of assisting the large numbers of families who are waiting for a diagnostic assessment or, faced with long waiting lists, are unable to access appropriate treatment.

THE PURPOSE OF THE PRESENT STUDY

The purpose of the present thesis was to examine whether shared positive affect increased in four toddlers with suspected autism and their mothers during the three phases of in the Social ABC's, a newly developed parent-mediated treatment (Bryson et al., 2009). Parents were trained in PRT and treatment targets included shared child-parent positive affect as well as child communication skills. As part of a larger pilot study designed to evaluate the effectiveness of the Social ABC's intervention, it was hypothesized that positive affect would increase in both the children and their parents and that this outcome would translate in an increase in their shared positive affect. The hypotheses in this thesis were examined in the context of studying the effects of intervention on four toddlers with suspected autism.

SIGNIFICANCE OF THE STUDY

The significance of the present study, of examining the effects of positive affect in parent –mediated intervention with toddlers with suspected autism, is that, firstly, it will build on the limited research and literature on what is known about the principles and effectiveness of early intervention for children with autism under the age of 2. Secondly, it has the potential to inform us about how to enhance positive emotional sharing between parent and child, which can result in a sense of connectedness and attachment.

Furthermore, this study may provide insights about the relationship between communication and shared positive affect and about different types of strategies that can be used to create a change in affect for toddlers with suspected autism.

From a broader clinical perspective, this research might provide parents, care-givers, early childhood educators and all of those who are concerned with infant and toddler development with a more effective way of intervening earlier than other treatments. This style of parent-mediated intervention that targets broad domains of significant impairment may ultimately lead to better trajectory outcomes for both the young toddlers and their families.

Practical Significance

The primary practical significance is that this research may eventually help to identify which evidence-based treatments are better for early intervention that focuses on enhancing positive emotional sharing between parents and their toddlers with suspected autism. This research might further help parents, care givers, clinicians, address those factors that influence how parents and educators interact and teach high-risk children with suspected autism. Thirdly, this research might identify which part of the treatment needs to be tailored to help parents and children share in positive emotional and social development.

CHAPTER 2

LITERATURE REVIEW

The first section of this chapter will examine the literature on the early identification of autism and the current challenges associated with such endeavors. The second section will outline the importance of early detection and diagnosis of autism, and, in this context, attention will focus on the best evidence-based treatments for affected children. The purpose of providing a literature review chapter is to offer an extensive overview of the history and current literature about autism as it relates to early intervention and specifically to the importance of focusing on shared positive affect.

IDENTIFICATION OF AUTISM

Brief History

Leo Kanner (1943) was the first to provide a formal definition, identify autism-related social indifference and emphasize the centrality of the social-emotional problem; more broadly, one of lack of social skill/"know how." Uta Frith (1989) was the first to recognize that autism-related symptoms can somewhat be attributed to the difficulty children with autism have comprehending other's mental states. It was actually Baron-Cohen; a student of Uta's who first provided evidence of this impairment, also referred to as a "mind-reading" or "Theory of Mind" deficit. That is, their social indifference and

atypical communication can be understood as a fundamental impairment in being able to "put themselves in another's shoes," or understand another's perspective or state of mind (Baron-Cohen, Leslie, & Frith, 1985; Frith 1989; Oades & Eggers, 1994). In 1954, Kanner suggested that children exhibiting these behaviours resulted from cold rejecting parents otherwise known as "refrigerator Moms." There is no evidence that supports this claim, and therefore this psychological perspective is no longer accepted today (Dumas & Nilsen, 2003). Evidence has unequivocally indicated that autism is a complex neurodevelopmental disorder that is strongly influenced by genetic factors (Bailey et al., 1996; Folstein & Rolsen-Shieldley, 2001; Kumar & Christian, 2009).

Increasing Prevalence

Autism is the most severe form of a spectrum of related disorders referred to as the autistic spectrum disorders (ASD's). Presently there are no biological markers for autism. A staggering increase in the prevalence of the autism has been documented overtime to 1 in 150. The occurrence of this disorder is 3-4 times more likely in boys than girls (Zwaigenbaum, et al., 2009). The debate continues on whether or not there is an actual increase in autism. Some researchers suggest that several factors enhance detection of this disorder and also explain the increase in prevalence rates. Among these factors are increased public awareness, diagnostic screening tools, educational efforts, co-morbidity and broader operational definitions (Bryson, Zwaigenbaum, & Roberts, 2004).

Impaired Social Interactions

Autism is often characterized by the following three broad areas of impairment: reciprocal social interactions, disturbances in speech and communication, specific or stereotyped behaviours, or restricted interests (Durmont-Mathieu & Fein, 2005). The first

is impairment in reciprocal social interactions. Social interactions refer to areas such as joint attention, attachment, and social imitation, face processing and appropriate affect. Social reciprocity refers generally to the ability to engage in back-and-forth, turn- taking interactions (e.g., smiling in the response to others or commenting on something someone else said). One misconception is that children with autism do not want to interact with others, even those who are close to them, which is not the case. It is not that they do not want to interact socially; but they have significant impairments in understanding the meanings and complexities involved in social interactions. These are probably the most recognizable features of autism. For example, there are no distinctive physical characteristic or genetic markers that persons with autism display. Therefore it is not usually recognized until someone approaches a child with autism, with a universal greeting such as "hi", and the child with ASD does not respond appropriately. Perhaps there is an atypical social exchange or response where autism is detected. Children with autism also have difficulties with the subtleties and cues involved in detecting emotions, tuning into facial expressions and eye-gaze, and sustaining joint attention (Dawson, 1989). Social interactions are often extremely idiosyncratic and egocentric, which may also help to explain why many have been described as "aloof" or appear to be off in their own world.

Communication

The second recognizable feature of autism is atypical communication patterns. Communication is a broad concept, which includes paralinguistic elements (e.g., the use of space between the speaker's and the listener's facial expression, rolling eyes, heightened eyebrows, smiling to convey sympathy or appropriate delays, intonation and

creative synchrony between the partners; Landa, 2007). In the majority of cases of autism, delays have been found in the appropriate development of speech and communication, including unusual paralinguistic speech (Landa, 2007). In retrospective reports, parents have described their children as having developed typical speech and then loosing words around the age of two. Children can range from having no or little speech to some speech but not fluent to highly verbal. This spectrum of communication and speech disturbances ranges from one end of the spectrum characterized by the delay or complete lack of speech production. Then, for the individuals who do acquire speech, some use rote-like speech, or speech may be delayed or characterized by immediate or delayed echolalia (Dumas & Nilsen, 2003 p. 94). Echolalia is a form of repetitive speech, that serves as a form of communication but is not relevant to or in proper context of the situation (e.g., a child who is anxious about going to a new environment may echo or repeat the same phrase or words by saying, "watch out, there's a car," for the entire duration that they are at a grocery store). Their voices could sound flat, high pitched, robotic, or monotonous. They may also have difficulties in initiating and sustaining relevant conversations that are of interest to both the speaker and listener (Lord, & Bailey, 2002). Although there are many who may have relatively good speech skills, they may experience challenges maintaining a meaningful, back-and-forth conversation (Lord, & Bailey, 2002). Individuals with autism often lack imagination or the ability to pretend and therefore cannot communicate with figurative words or gestures, which can also lead to dramatic disturbances in acquiring developmentally-appropriate play skills (Landa, 2007).

Restricted or Stereotypical Behaviours

The third recognizable feature of autism is the repetitive or restricted stereotypical patterns of behaviour (APA, 2000). There is also a spectrum of severity in the way these behaviours may affect both the child's and his/her family's functioning (Bryson, Zwaigenbaum, & Roberts, 2004). This domain includes behaviour problems such as aggression, self-injurious behaviours (such as banging their head against the wall or biting themselves and so on) and restricted or stereotypical patterns of behaviours, activities or interests which are the core to defining autism (Durmont-Mathieu & Fein, 2005). More specifically, these behaviours include ritualistic behaviours, repetitive motor movements such as hand flapping, rocking, compulsive adherence to routines, visual fascinations to the symmetry or the lines in the carpet and so on. These behaviours can have a minimal to an enormous impact on the family and their daily routines, depending on how often and what types of behaviours occur. When and how much these behaviours are reinforced could also be influenced by child's sensory needs. For example, a child who is non-verbal may initiate very few social interactions, and may never engage in self-injury or aggressive behaviours, but may still run the risk of exhibiting pushing and screaming as a form of protest when denied a particular item or activity. However, this could be context specific depending on their environment, what time of day it is, and whether the child is being denied access to an item or activity. On the other end of the autism spectrum, a child could have significant language development but still rely on aggressive behaviours as their primary way of communicating, particularly when frustrated. Even when they are excited, they may still lash out in the form of hitting, pinching, pushing, scratching, kicking, and yelling, or exhibit self-injurious behaviours (Schopler & Mesibov, 1994). Certain sensory events

like talking, loud noises like a bell, the smell of popcorn or the touch of someone's brushing up against their skin can evoke high internal warning signals that can lead to cognitive overload, stress and fatigue (Wing, Leekman, & Gould, 2002).

It is important to note that three broad domains of impairment; interactions, communication and behaviours are not independent of one another. A child who does not share joint attention with his/her peers may also have difficulty sustaining meaningful or on-topic conversations, and may become easily preoccupied with a ritualistic stimulatory behavior like rocking (Lord & Risi, 1998).

Just as all parts of the body work together in a holistic fashion, so do these three domains of impairment within a child with autism. The deficits in social interaction can adversely affect how they speak and what they speak about, which in turn affects how they communicate and convey their desires to others. This then affects their behaviours, their environment and the people who are involved with them**.** Furthermore, signs of social and communication disruptions and abnormal patterns of behavior may be present in children with autism as early as the first year of life (Bryson et al., 2007; Landa, 2007).

Spectrum

The term spectrum refers to two particular areas within autism and the autism spectrum disorders. Firstly, it refers to the range of neurodevelopment disorders that are characterized by deficits in social, communication, and restricted areas of behavior. This group of disorders includes autism spectrum disorders, Asperger's syndrome, Rett syndrome, and Childhood Disintegrative Disorder (CDD) and the Pervasive Development Disorders-Not Otherwise Specified (PDD-NOS) (Durmont-Mathieu & Fein, 2005; Landa, 2007; Lord & Risi, 1998). More specifically "spectrum" also refers to the wide

variability in the severity and manifestation of these characteristics both across individuals and within individuals over time (Lord, & Luyster, 2005). Of those who are affected by autism there are wide ranges of cognitive and language levels within their abilities as well as interests, sleep patterns, abnormal fears, or preoccupation with particular aspects of objects all differ as the autism as it is manifested within each individual.

DETECTION AND INTERVENTION

Diagnostic and Screening Instruments

Several screening and diagnostic instruments are used by researchers and clinicians to reliably diagnose autism, in most cases between the ages of three and five years (Lord & Risi, 1998). Most children in North America are diagnosed using the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 2000), supplemented by the Childhood Autism Rating Scale (CARS; Durmont-Mathieu & Fein, 2005; Schopler, Reichler, & Renner, 1986), the Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 2000), the Autism Diagnostic Observational Schedule-Generic (ADOS-G; Lord et al., 2000; Lord & Risi, 1998). In Canada, there are still significant delays in the diagnosis and treatment of autism (Bryson, Zwaigenbaum, & Roberts, 2004). The importance of this situation is underscored by accumulating evidence suggesting that the earlier the intensive treatment, the better, particularly those treatments that target communication and use positive behaviour principles.

Much research is still needed to develop effective screening instruments to detect children with autism, especially for younger children (Ozand et al., 2003). As previously

stated, many of these diagnostic screening tools rely on parent's retrospective reports and the average age of diagnosis still remains at 4 years (Zwaigenbaum et al., 2009).

Early Detection and Identification

Current research is now indicating that there is a strong need for early identification and intervention because of its powerful impact on early experiences and improving children's developmental trajectories (Branson, Vigil, & Bingham, 2008; Bryson et al., 2004; Landa, 2007, Zwaigenbaum et al., 2009). With ASD's increasing prevalence of 1 in 150 (Zwaigenbaum et al., 2009), this disorder is now identified as a health care priority (Bryson et al., 2004), whereas the prevalence rate for genetic disorders such as Down's syndrome is 1 in 800 (Hutchinson, 2007) Despite the need for early identification of ASD, there are still a number of children who are not being detected until the age of 4 (Branson et al., 2008). Therefore, a growing and vital responsibility for parents, care-givers and early childhood educators is the need for community-based screening involving continual monitoring and documenting of ongoing performance during daily routines -- the sooner the better (Branson et al., 2008; Brian, 2008; Bryson et al., 2007; Zwaigenbaum et al., 2009).

Causes and Etiologies of Autism

The cause of autism / ASD is still unknown. Health care practitioners, clinicians, pediatricians, psychologists and researchers are increasing their efforts to search for plausible cause and cures. Many researchers believe that there is a strong genetic basis for autism, although the precise genetic mechanisms remain to be identified (Folstien & Rosen-Sheidley, 2001; Kumar & Christian, 2009; Ozand, et al., 2003). Strong studies of

monozygotic twins provide indicators in which concurrence rates are very high; that is, usually both twins are affected (Bailey et al., 1996; Freitag et al., 2010).

Early brain development sensitive or critical periods within development have been identified as crucial times that are most critical for child development. As children grow older, plasticity decreases; that is, the ability of the brain to alter and change to compensate for impaired functioning diminishes (Branson et al., 2008). Research on areas of hearing, language and social communication indicate that when children are deprived, by not receiving early intervention in these areas, or have missed times of optimal development, then there can be drastic effects on brain structure that cause developmental delays (Branson et al., 2008).

Many researchers from various areas of study are interested in the detection of early neurologic impairments by examining multiple brain regions, as well as genetic and molecular aspects of autism (Branson et al., 2008). In addition, if crucial periods of development are missed, then it is likely that there will be long term impacts on core areas of functioning. It is for these reasons that there is a strong emphasis by policy makers and researchers to employ the best ways of detecting and intervening with all children, but especially with those who have been identified as being at risk, specifically those who have an older sibling with ASD. Researchers are also looking extensively into an environmental causes such as toxins, infectious diseases, pesticides, dietary changes, wheat based foods, and heavy metals. The effect that chemicals have on our environment is also being considered as having a possible role in the increased prevalence of this neurodevelopment disorder under study.

INFANT AND SIBLING STUDIES

A growing body of researchers is interested in the early symptoms of ASD in children with an older sibling with ASD and the behavioral markers that differ from children with typical development (Branson et al., 2008; Durmont-Mathieu & Fein, 2005; Zwaigenbaum et al., 2009). For example, in typical development by 9-10 months, infants follow other's eye-gaze direction; they can shift their attention to something of interest to the other person and share their attention with that person and the same object of interest, and, as such, are becoming heavily reliant on the cues from another (Landa, 2007). Zwaigenbaum et al. (2005) and Bryson et al. (2007) have identified behavioral and developmental markers that distinguish infants with suspected autism from their typical developing peers, including atypical patterns in each of the three domains diagnostic of ASD. In the domain of social-communication, infants may exhibit difficulties in eye-contact or shared (joint) attention, in sharing their interest in what's happening around them, and in expressing a range of facial expressions. In fact, by six months in those babies who are developing neurotypically, many of their tools used for social navigating are already developing, as displayed in gestures, appropriate eye-gaze, facial expressions, distinguishing affect, response to touching and holding, arousal, eye contact, and joint attention (Bryson et al., 2004; Dawson et al., 1998; Zwaigenbaum et al., 2009).

Children with ASD may vary in their abilities to play, displayed as reduced imitation skills, repetitive behaviours or preoccupation with particular parts of objects. In the areas of language and cognition, there may be a lack of back and forth social babbling, unusual voice and tone, and they may seem to prefer to be isolated. Children with ASD may also exhibit atypical patterns in visual tracking, visual fixation, unusual

inspection of objects, decreased flexibility and activity levels, repetitive gross motor activities and irritability or inability to be easily soothed or comforted (Bryson et al., 2007; Zwaigenbaum et al., 2005;). Current researchers not only focus on the early detection of autism through the use of improved screening tools, but also their research is targeted at discovering the best ways of intervening with infants/toddlers .

Applied Behavioural Analysis

There are no medical types of treatments for autism. Therefore, one of the first and still most commonly used ways to intervene with a child with autism is to improve their behavioural functioning, and social and communication skills using the principles of applied behavioural analysis (ABA) (Pierce & Epling, 1999). This approach specifically targets behaviour directly. For example, if a child with autism is having difficulty with learning how to brush her teeth, then, an ABA teaching approach would break down each component of the task into parts (i.e., holding the toothbrush, turning on the water, wetting the toothbrush, putting on the toothpaste, and so on). Each of these steps would be taught in sequence and evaluated separately, and would require a specific level of support. Once the child reached 80% accuracy on three consecutive trials, then she would have met the criteria and mastered that goal.

ABA uses scientific methods to measure and evaluate gains by observing, assessing, recording and graphing each step (Pierce & Epling, 1999). Strategies such as shaping, chaining, and using the contingency principles are integrated with immediate reinforcement and incorporated as a means of increasing skill independence. One way in which ABA is implemented is through discrete trial teaching (DTT) (McBride & Schwartz, 2003). This form of teaching has been adopted in many preschools and schools

as a formalized and highly structured of teaching new skills to children with autism. There are many forms of interventions for children with autism. For those who are involved with choosing an intervention, it is important to choose one that addresses the child's most significant needs, while allowing the child to gain independence and confidence in his/her abilities. More specifically, there are several different types of early intervention approaches that have been used to enhance the functioning of children with autism. They vary in their methodologies, the types of settings involved, trainers and implementers of service delivery, the educational strategies being applied and the desired as well as achieved outcomes.

Developmentally-based Interventions

The Early Autism project at UCLA, initiated by Ivar Lovaas (Lovass et al. 1973), used direct one-on-one discrete trial teaching to teach children with autism social language, self-help skills and reduce inappropriate behavior. They did this by using mainly reinforcement and punishment. This type of intervention involved 40 hours per week of intervention in a restricted atmosphere with limited distractions. The initial phase started by trained students going into the families' homes; the goal was to eventually teach the children enough skills so they could be integrated within regular preschools and community programs, with direct instructional support there as well. As the child makes progress, the student instructors will add to that skill set by setting larger goals for the program. High levels of structure and directed teaching are focal -- adults take the executive role on teaching designed to optimize the child's attention (i.e., the adult makes all of the decisions). Many studies (Foxx, 1993; Gresham & MacMillan, 1997; Lovaas, 1987; McEachin et al., 1993; Mesibov, 1993; Rogers, 1998) examined the effectiveness

of Lovaas's program and found that ratings of symptom severity decreased and IQ's increased in the children studied. However, major concerns have been raised regarding the lack of random assignment, and the lack of documentation of hours of treatment, and claims of full recovery; particularly given evidence that the skills acquired have failed to generalize (Rogers, 1998).

As previously stated, children with autism display a significant imbalance of atypical and often negative behaviours that inhibit their daily functioning and a relative absence of developmentally-appropriate behaviours such as appropriate and functional language or social skills needed to interact functionally within their array of environments (Dawson, 1989; Rogers, 1998). Therefore, many intervention programs have adopted a developmental approach to teaching children with autism the appropriate behavioral patterns.

One of these programs is the Treatment and Education of Autistic and Related Communication-handicapped Children (TEEACH) program that addresses the individual's needs across a lifespan (Rogers, 1998). This approach to intervention has also been cited as being effective for improving behaviour and learning of children with autism (Rogers, 1998). This program helps individuals in areas of imitation, fine, gross motor development and cognitive skills by teaching systematic structured and physical layout (e.g., task-bins), with visuals and work-systems that are used in a step-by-step fashion. In this method, visual cues are used rather than verbal models. These visual supports are constantly available for goal directed activities so that the child knows what they are working for. Reinforcements are given on a schedule basis aimed to help the child learn when to start, stop and maximize on focused attention. This intervention also

differs from others because it directly emphasizes teaching plans to reduce sensory distractions (Rogers, 1998).

Another developmental-behavioural program is the Learning Experiences and Alternative Programming for Preschoolers and Parents (LEAP), developed by Strain, Hoysen and colleagues (Strain, Kohler & Goldstein, 1996). Both the LEAP and Denver-models incorporate a combination of the developmental and ABA approaches to their programs. The researchers have reported a doubling of developmental rates in children with ASD during the intervention period. However, follow-up evaluations do not indicate what the children's level of functioning is or their level of support required (Rogers, 1998). Another developmental-behavioural model, the Denver Model, has been replicated in several sites across Colorado. This model is also developmentally based in that it addresses the needs of the child despite their chronological age. Children are taught skills appropriate to their developmental levels following a sequence of skills seen in typical development. This model attempts to balance adult-directed activities with child-directed activities. Joint attention is also addressed by engaging in routines where the child has to follow the gestures and non-verbal communication attempts of others in a structured yet natural environment. Emphasis is placed on the importance of symbolic play, fine motor skills, and usage with sensory items to alter the child's atypical sensory arousal levels.

PIVOTAL RESPONSE TREATMENTS

This program differs from many of the other forms of treatment in that it focuses on utilizing the child's natural motivation, and it is a more naturalistic behavioral

treatment versus other models such as DTT. The PRT treatment model targets areas that are specific to autism (such as motivation, communication, ritualistic behaviours) and places high emphasis on developmentally appropriate skills such as pretend play and joint attention (Koegel & Koegel, 1996). This model also contrasts with other treatment models like DTT, because it utilizes child-directed motivation or child choices rather than clinician directed activities. For example, PRT techniques can be implemented in the child's backyard or his/her swimming pool and teaching opportunities are interspersed throughout the activity. In contrast, with traditional DTT models, a typical session may be arranged in a particular environment and use only specific materials in a repeated until mastered trial format (e.g., in a designated room where the child and the clinician can sit across from one another during each session and flashcards may be used by drilling until the child has learned the concept). PRT's Effectiveness (Bryson et al., 2007) has led to its world wide use.

PRT differs from other models in the way that direct reinforcers are used in the PRT model instead of non-direct reinforces that are not immediate or natural to the activity, these reinforces are delivered in natural contexts such as within the child's home, during daily routines and other natural-parent child interactions, so that the child quickly learns the response-reinforcer contingency. For example, if a child wants to ride on a bike, the clinician waits until the child makes an attempt to say "bike" or a close approximation to the word, then as a consequence (reinforcer) to that behaviour the child gets the bike. As opposed to other traditional behavioral models where the child may receive a favorite treat as their reinforcer, Koegel and Koegel (2006) reported that, "In addition to child gains, then, collateral effects on parents who implement PRT have also

been documented, including positive family interactions (Koegel, Bimbela, & Schreibman, 1996) and positive affect of parents toward their children" (p.10).

PRT is both an hour intensive and cost effective model because both service and delivery are spread across both person(s) and most significant settings in the child's life (Bryson et al., 2007; Koegel & Koegel, 1996). Families are viewed as the central intervention agents in the PRT model and therefore parent education is an important element of the intervention. This model utilizes parents as the primary interventionist for their child because this increases the effectiveness and helps to maintain treatment gains. PRT programs are individually tailored around the families' socio-cultural value systems and routines (Koegel & Koegel, 1996). For example, one of the first families who were trained in PRT lived in a remote area in South Africa, and French was the only language they had in common with the clinicians. Therefore the principals remained the same, but the specific program design and outcomes different from that used with English speaking, North American families. This is one example of the flexibility and contextual fit incorporated into the treatment program that also leads to the effectiveness of this model. This treatment has been coined "pivotal" because it targets the core areas in the child's life and therefore, intervention will focus on improvements in various behaviours (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Major concerns for treatment with children with ASD involve issues around spontaneity (e.g., starting a conversation, or beginning a game) and generalization; that is, doing the skill in more than one context, and maintenance of treatment gains. Thus, PRT is more comprehensive than other intervention models (Gresham & MacMillan, 1997).

Research on the Natural Language paradigm, the foundation of PRT, compared the traditional teaching approach – highly structured, clinician directed, drilling of target behaviours until the behaviour was learned with teaching in a natural context. In the latter (the Natural Language paradigm), both motivational and ABA principles are incorporated. The desired item is chosen by the child, motivational items are used, acquisition of (new) tasks are interspersed with maintenance (mastered) tasks, and natural rewards are chosen that directly relate to the tasks used. For example, if the child says "open", then the item is opened, in contrast to the traditional approach of using unrelated edibles as rewards for an appropriate response to a verbal request. The study indicated that the children in the Natural Language paradigm (NLP) group used more spontaneous language which then generalized across contexts and also displayed greater positive affect than did the traditional-teaching approach (Koegel, O'Dell, & Koegel, 1987). Therefore due to the positive results obtained in many PRT studies in comparison to other control groups, we hypothesized that along with communication gains and collateral gains such as decrease in inappropriate behaviours, children would also display the increased expression of shared positive affect between parent and child dyads involved in our Social ABC'S program.

EARLY INTENSIVE BEHAVIOURAL INTERVENTION

Throughout North America and Canada, there has been a widespread adoption of early intervention programs for children with ASD. In December 2005, the Nova Scotia (NS) Department of Health provided funding for the development of an early intensive behavioral intervention (EIBI) program (EIBI) for young children with autism (Bryson et

al., 2007). The NS EIBI program adopted Pivotal Response Treatment (PRT) as the major form of intervention. PRT has been historically used for preschoolers and school-aged children, and recently it has also been used as the form of intervention in the Social ABC's program. This program is exclusively available through the IWK Health Centre (Nova Scotia, Canada) and Toronto Sick Kids Hospital (Ontario, Canada) for families with infants/ toddlers (aged 12-24 months) who have just been newly diagnosed with ASD, or are suspected of having ASD (Bryson et al., 2009).

This intervention program has been translated into a manual that consists of 8 modules addressing the ABC's of Learning, Enhancing Communication, Sharing Positive Emotion, Motivation and Arousal, Play and Daily Care-giving Activities, Managing Behavioral Challenges and Taking Care of Yourself. More specifically, Module 3 of this manual provides information about the importance and significance of enhancing and sharing positive emotion between the parents and their toddlers. This module includes both specific and general strategies that parents can use to enhance positive emotion and incorporate these into their daily routines and interactions with their children (see Appendix D).

This program focuses on educating parents in their homes and takes place over 24 weeks. Prior to starting the training the (baseline) the parents familiarize themselves with the manual, then the next 8 weeks, the parent receives direct feedback from a clinician, while interacting with their child (training phase). During the second 4 week period (post training), parents are in the consulting phase of the program where they are free to contact via telephone any concerns that they may have in implementation, or behaviours.

In the final follow-up phase, consists of the last 12 weeks, the clinicians visit the homes and watch how the parents implement the strategies without feedback.

Bryson et al.'s (2009) study had several major aims: The first aim was to design a treatment program with an accompanying manual. The second aim was to evaluate the feasibility of using the intervention methods and procedures with parents. The third aim was to examine infant-post intervention gains in positive emotion sharing, coupled with early communication skills through both observational and standardized measures. This study was also designed to explore the child factors of variability in rates of obtaining adaptive, communication and emotional sharing skills.

CHAPTER 3

METHOD

In this chapter, the research design will be described and details of the participants and assessment instruments will be shared. The intervention program will be outlined followed by a description of the parent training program. Finally, procedures for data collection and analysis will be addressed.

Design

This pilot study used a quasi-experimental, case-series A-B design. This study is quasi-experimental because rate of smiling was assessed in participants compared across three treatment conditions (repeated measures on the same child-parent dyads). However, there was no control group, and the participants were specifically selected (purposive sampling) as opposed to being randomly assigned to treatment groups (Weirsma & Jurs, 2009). The four mother–child dyads were specifically selected from the larger Canadian Infant Sibling Study cohort (n=225). When the toddler intervention study began, they were the first group of infants who met criteria for participation in the study (i.e., they were between 12 and 24 months of age, and were either diagnosed with ASD or were suspected of having ASD).

The design is considered a case series because small numbers were involved. There were only 4 participating mother-child dyads.

The design is considered an A-B design because this study examined changes in smiling across two conditions, baseline and experimental or treatment phases (Weirsma & Jurs, 2009). The baseline phase measured positive affect prior to beginning treatment (A). The post-training and follow-up phases were considered the experimental phases of the treatment (B phase). In the treatment model under study, once the implementers (parents) were trained, then the treatment was measured and expected to be delivered on a continual basis in the absence of the trainer. Therefore, once the treatment began, the participants could not return to baseline (i.e. parents could not be asked or expected to withdraw treatment).

Participants

Participants were four families of toddlers with suspected autism (n = 2) or newly diagnosed with autism (n = 2), as determined by total scores on the Autism Observation Scale for Infants (AOSI; Bryson, Zwaigenbaum, McDermott, Rombough, & Brian, 2008), the Autism Diagnostic Observational Schedule (ADOS; Lord, et al., 2000) and by expert clinical judgment. The infants were also assessed for development level on the Mullen Scales of Early Learning (Mullen, 1995). Two of the families were recruited through the Autism Research Centre at the IWK Health Centre in Halifax, Nova Scotia. The other two families were recruited through the Autism Research Unit at the Hospital for Sick Children in Toronto, Ontario. All four families were participating in the Canadian Infant Sibling Study, a study of infants with an older sibling with ASD (Bryson et al., 2004; Zwaigenbaum et al., 2005). All families spoke English as their primary language and were of middle to upper-middle socioeconomic status. Parents' education ranged from completion of a high school diploma to a graduate degree. Prior to beginning

the training process, all parents gave informed written consent for both themselves and their child to participate in the study. They also gave permission for their child and themselves to be videotaped while implementing the intervention techniques. Approval to conduct the study was obtained by the Ethics Review Committee at the IWK Health Centre. (See Bryson, 2008 for discussion of ethical issues in early detection of ASD).

ASSESSMENT INSTRUMENTS

The *Autism Observation Scale* for Infants (AOSI) (Bryson et al., 2008)

The AOSI is used for observable measurements of behaviour in infants (6-18 months). This instrument involves a series of structured and semi-structured assessments of interaction, and manipulation of developmentally appropriate items. Standardized activities are used to allow the examiner to observe and systematically rate the occurrence or nonoccurrence of behaviors deemed to be informative of the earliest emergence of ASD. The assessment is designed to take 15-20 minutes to complete, although administration times can vary depending on the infants' ability to engage with the examiner, as well as their temperament, state, and developmental levels. The examiner's scores are based on the occurrence and non-occurrence of behaviours identified as being important signs of the early emergence of autism (Bryson et al, 2008). The children's interactions and performance on these tasks are rated on a scale from 0 to 2 or 3, where 0 implies typical function, and higher values indicate increasing deviation from the norm (see Bryson et al., 2008, for details). The AOSI has excellent inter-rater reliability (.94 for total score at 18 months), fair-to-good test-retest reliability at 12 months (.61 for total score; Bryson et al., 2008), and good predictive validity at 12

months (Brian & Dowds, 2008). The AOSI was administered by someone trained to research reliability criteria (>85%).

The Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000).

The ADOS is a semi-structured direct measure of communication, social interaction and play/repetitive behaviours used for the diagnosis of autism spectrum disorder (ASD). The schedule provides a coding system for a wide range of social and communicative behaviours in children aged 18 months to adulthood. The inter-rater reliability for the ADOS is (>.85; Lord et al., 2000). Stability of autism diagnosis has recently been shown to be high when the ADOS is used with two-year-olds; however, diagnoses of Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) are less robust at this age (Lord et al., 2000). Cut-off scores are provided for diagnoses of autistic disorder and ASD. The ADOS was administered by an examiner trained to research reliability criteria (>85%).

The Mullen Scales of Early Learning - AGS Edition (Mullen, 1995)

This scale is used as a measure of cognitive and language development. It consists of five scales, four of which (visual reception, receptive language, expressive language and fine motor) assess different domains of cognitive ability, while the fifth scale measures gross motor development (from 0 to 29 months only). An Early Learning Composite (ELC) is calculated based on scores from the first four scales for children aged 0-69 months (reliability coefficients = .53 to .94; Mullen, 1995). The MSEL was administered by a trained examiner.

THE TODDLERS

Table 1 provides descriptive data on the toddlers at baseline. The four children ranged in age from 17-24 months when they entered the study (baseline). At baseline, 3 of the 4 children had AOSI and/or ADOS scores that are associated with a diagnosis of autism /ASD (Bryson et al., 2007; Zwaigenbaum et al., 2005). The one exception was considered at high risk for ASD based on expert clinical judgment. One child who was administered the AOSI had total scores for 19 (cut-off total scores for ASD are 6). Total social and communication scores on Module 1 of the Autism Diagnosis Observation Schedule (Lord et al., 2000) ranged from 4 to 15 (cut-off for ASD = 7) . Subscale scores on the Mullen Scales of Early Learning ranged from 10 to 31 (t-scores = 20-65), with considerable variation both within and across children (see Table 1). These assessment instruments were used for the larger pilot study.

Table 1 : Descriptive Data for Toddlers at Baseline

Child	Age (mos)	*AOSI Total Scores	ADOS Scores			Mullen t-scores				
			S + C	Play	Rep	GM	VR	FM	RL	EL
1	17	19	15	5	4	n/a	20	n/a	20	24
2	23	n/a	4	1	1	48	43	24	50	30
3	24	n/a	7	1	5	39	49	36	59	41
4	24	n/a	8	1	0	51	65	52	66	51

Note: *AOSI* = Autism Observation Scale for Infants; *ADOS* = Autism Diagnostic Observational Schedule, with S = Social, C = Communication, and Rep. = Repetitive Behavior; Mullen Scales of Early Learning, with GM = Gross Motor, VR = Visual Reception, FM = Fine Motor, RL = Receptive Language and EL = Expressive Language. For *t-scores,* mean = 50, and *SD* =10.

THE SOCIAL ABC'S PROGRAM

The Social ABC's intervention program was specifically designed for families who have a child newly diagnosed with autism. This program is part of a wider initiation to help families and caregivers while they are waiting for other services such as EIBI, speech and language, or other private therapeutic services. This program uses the model of Pivotal Response Treatment (PRT) as the form of treatment. The purpose of this treatment is to target the child's motivation, and to enhance social communication skills and positive affect in children with autism. The strategies can be incorporated throughout the child's daily activities and interactions with their caregivers in naturalistic contexts

such as in the home, during play, bathing, diapering, and meal times as well as during outdoor activities, and in other child care environments.

PARENT TRAINING PROGRAM

The parents were given 16.5 hours of individualized training in the intervention techniques in 8 separate sessions (weeks 1-8), followed by a 4-week post-training (weeks 9-12) and 12-week follow-up phase (weeks 13-24), for a total of 24 weeks in the program. Prior to the first training session, parents were provided with a copy of The "Social ABC's," training manual (Bryson et al., 2009). The study involved one principal investigator and three co-investigators.

The training manual consists of 8 modules, each of which addresses a particular aspect of the intervention (e.g., Introduction to the Social ABC's of Learning, Shared Positive Emotion, Integrating Play and Daily Care-giving Activities, Motivation and Arousal and Managing Difficult Behaviors). Each module is covered in a separate training session. Most of the families went through one module per week, although this was flexible as the trainers reviewed the material at a rate that was comfortable for each family. Before training (baseline), the parents were videotaped playing with their child on 3 separate occasions within the same week; parents were asked to interact with their child as they normally would and to give their child opportunities to produce language. No coaching or feedback was given to parents during baseline.

Direct training of parents took place over 8 consecutive weeks, with 3 training sessions in the first week, 2 training sessions in the second week, and 1 training session in each of the following 6 weeks. In the first training session, the parents were introduced to

basic PRT principles and were given the opportunity to practice them in the context of playing with their child, with coaching and feedback from the trainer. All subsequent training sessions were similar, with a focus on applying the techniques to enhance language and positive affect during play and regular care giving routines.

During the 4-week post-training phase (weeks 9-12), contact with the families was maintained via the phone and, if necessary, an occasional home visit was made to problem-solve on any outstanding issues. There was no scheduled contact with the parents during the 12-week follow-up phase (weeks 13-24). In addition to the 3 baseline videotapes, there were 3 separate videotape sessions at both the end of training and at follow-up, all of which included the parent interacting with her child during play with no feedback from the trainer. During all three phases of the study (baseline, post-training and follow-up), two of the videotapes were randomly selected for coding of the behaviours of interest and the data were averaged across the two video recordings and presented in graphs (see Chapter 4).

DATA COLLECTION AND ANALYSIS PROCEDURES

The mothers and their children were videotaped in their homes while implementing PRT strategies during typical play activities. Positive affect was coded from two separate 10-minute videotapes taken at baseline, post-parent training and at follow-up, using the operational definitions outlined in Appendix A. Positive affect was operationally defined as an observable facial expression of smiling, with widened eyes that are coupled with raised eyebrows, and showing high levels of enjoyment, interest

and comfort. Shared positive affect occurs when both the child and the parent are displaying positive emotions while directing their eye gaze towards one another.

More specifically, the examiners used a similar coding sheet as Coolican (2008), who adapted a scale from a previous study that demonstrated increases in child positive affect when parent training was combined with clinician-provided training (Brookman-Frazee, 2004). However, there has been no formal assessment to date of either the external or internal validity of these scales, although inter-rater reliability has been shown to be excellent (Brookman-Frazee, 2004; Coolican, 2008). The examiners used adaptations from behavioural measurements for this study by using a model of the 40-second interval scale. In the present study, the scoring of the presence/ absence of a smile relied on the operational definitions (Appendix B) as well as the facial rating scale (Appendix C).

The facial rating scale was used taken from Coolican (2008) and used to depict what constitutes a smile. The occurrence and non-occurrence of positive affect in the child was coded during 15-second intervals of 10-minute video segments, using "Windows Media player." In addition to coding for the occurrence and non-occurrence of positive affect the researchers scored for incidents when the child and parent were sharing positive affect; that is, when they were making eye contact with each other or showing gestures or behaviours that displayed mutual enjoyment, interest or pleasure. Affect was not coded if either the parent's or the child's face was not visible (turned away or out of the video-camera frame), and these time periods were eliminated from relevant computations.

Inter–observer Reliability

The examiner and an independent rater, both blind to the treatment phases (baseline, post-parent training, and follow-up), coded a total of 24 videos of 4 children and each observer coded 2 videos for each of the three taken from each of the treatment phases.

Before the raters began the process of coding the video tapes, there was a training session that lasted for 2 hours. This training involved setting the criteria of smiling, operationally defining positive affect as displayed within the child and the parents, and for shared positive affect. The raters then watched and coded a video of a parent-child interaction separately in the research location, and used the child / parent interval coding sheet as practice. The results were immediately compared and any discrepancies during training as well as during the actual coding in the study were discussed and then resulted in the refining of the operational definitions. One of the raters had previous experience with coding for affect and language videos. The second rater (the examiner of the study) had no previous experience in coding videos. Extra time was therefore allotted on two consecutive days prior to coding for the study to review and practice coding videos that were not used in the present study. Both raters consulted with an expert clinical researcher about the refinement of the operational definitions, the interval coding scheme and the facial rating scale used for smiling (see Appendix B & C). The coding of each videotape took approximately 40-80 minutes (i.e., every 15 seconds) for each video segment minutes for each 10-minute video segment, for a total 17-18 hours per rater.

It is important to recognize that coding for smiling and shared positive affect within the context of parent-child interactions was very tedious, and that there was also high variation in the dyadic interactions and types of activities used in the videos. For

example, some videos required multiple reviews of the same 15-second clip interval before a definitive occurrence could be determined and scored. The care and stringent attention to detail required in resolving these and related challenges increased in the amount of time, focus and effort afforded to code each video. Due to the mind-taxing undertaking of coding, each rater coded a total of 2 or 3 videos at any given time to remain accurate and efficient. Inter-rater agreement regarding the presence or absence of a smile in the four children and their mothers' ranged from 82-94%. This high agreement suggests that the operational definitions and coding schemes were clear and straight forward to use. Inter-rater agreement regarding whether the child's smile was directed at his/her parent, activity or otherwise ranged from 76-92%.

Data Analysis

Following standard protocol for a small case series (Kazdin & Weisz, 2003), changes in the behaviour under study were detected by visual inspection of the data. The total number of intervals of smile occurrences and direction of gaze of both the child and the parent were computed for each of the 3 phases of treatment. The average percentage of smiling during each phase (baseline, post-treatment and follow-up) was then recorded and graphed separately for each of the four children and their mothers. The total percentages of shared positive affect were also recoded. However, inspection of the data indicated extremely low to null changes in the occurrence of shared positive affect and therefore those percentages were not graphed. As a substitute for graphing shared positive affect the graphs of each child and his or her parent were juxtaposed and an analytical comparison was provided.

CHAPTER 4

RESULTS

The purpose of the present thesis was to examine post-treatment changes in children's positive emotion, specifically focusing on parent-child shared positive affect. In the Social ABCs, a newly developed parent-mediated treatment for toddlers with ASD (Bryson et al., 2009), parents are trained in PRT and treatment targets child positive affect as well as child communication skills. As part of a pilot study, "Enhancing Inter-subjectivity in high-risk Infants" (Bryson et al., 2009), designed to evaluate the effectiveness of this intervention, it was hypothesized that positive affect would increase in both children and their parents and that this would translate into an increase in shared positive affect between the two.

The present study examined 4 mothers and their toddlers with suspected or diagnosed ASD, three of whom had an older sibling with autism, and were involved in the Canadian Infant Sibling Study (Bryson et al., 2009); the other dyad was referred by a developmental pediatrician at the IWK Health Centre. The three mother-child dyads selected from the larger infant sibling study were, at the point of recruitment into the toddler intervention study, the first ones to have been identified as having autism based on expert clinical judgment as well as assessments conducted by the AOSI and ADOS. The 4 dyads were videotaped across three phases of treatment -- baseline, post-training

and follow-up. The video tapes were analyzed by the researcher and an independent rater for indicators of positive affect**.** The key indicators were smiling, laughter, joyful jumping and so on (please see Appendices' A & B for operational definitions and observational criterion for smiling). Only smiling behaviour is graphed in Figures 1 through 4 because smiling is a positive indicator of pleasure, interest and joy; typically most people are smiling if they are happy or excited.

To determine whether there were changes in the expression of positive affect in the four children who participated in this study, the mean percentage of intervals during which the four children smiled across two sessions of each of the three phases of treatment (baseline, post-training and follow-up) were computed.

As shown in Figures 1 to 4, the overall rate of smiling increased in two of the four children over the three treatment phases: Child 1 (from 25-59%) and Child 3 (19-30%); a slight decrease in smiling is evident in Child 2 (39-29%), and the rate remained unchanged in the fourth child. The frequency of parent smiling over the three treatment phases was also assessed. Figures 5 to 8 show an increase in smiling in two of the four parents: Parent 3 (39-48%) and Parent 4 (17-46%); a large decrease in smiling is evident in Parent 1 (60-15%), and in Parent 2 there was an increase at post-training but then a return back to baseline at follow-up.

Figures: Frequency of smiling (expressed as percentage of intervals) at baseline (B), post-training (PT) and follow-up (FU) for each child

Child's Positive Affect

Figure 1: Child 1

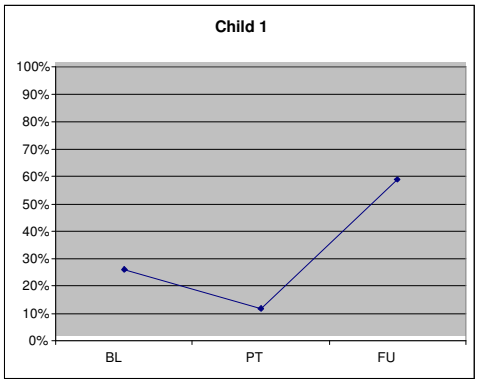


Figure 2: Child 2

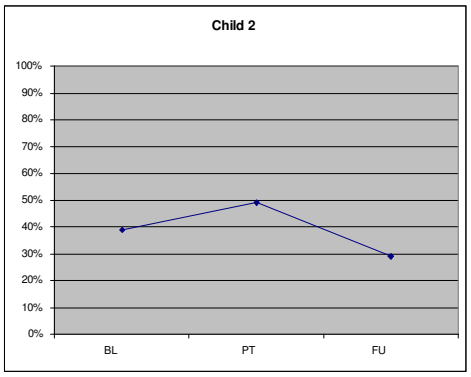


Figure 3: Child 3

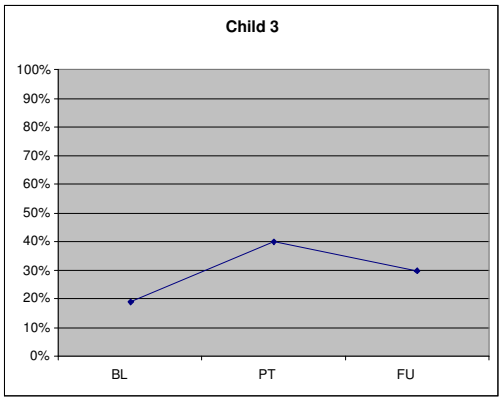
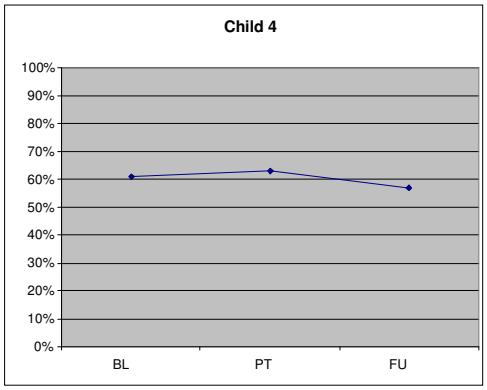


Figure 4: Child 4



Child 1, a 17-month-old, was one of two toddlers who showed an increase in smiling. This child smiled during 25% of the intervals on average over two baseline videotapes. Child 1's rate of smiling actually decreased to 12% during the post-training phase and then rose steeply to 59% during the follow-up videotaping sessions.

Child 2, a 23-month-old toddler, showed a 10% slight increase in smiling from baseline to post-training (from 39-49 %) and then decreased by 20% relative to post-training at follow-up.

Child 3, a 24--month-old toddler, showed an increase in smiling. This child smiled on average during 19% of the intervals across two of baseline videos. The post-training phase revealed a 21% increase in smiling to 40% and a levelling off to 30% in the follow-up phase.

Child 4, a 24-month-old, showed a high level of smiling prior to treatment, at 61%, then a slight increase to 63% during post-training and finally a minimal decrease to 57%.

There was also a significant amount of variation in all four of the children at baseline, as indicated by their AOSI, ADOS and Mullen scores.

Child 1, at 17 months, had a high total AOSI score of 19, and a high ADOS social and communication score of 15, play 5 and repetitive behaviour 4. His Mullen t-scores were all well below the norm for his age: Gross Motor (GM) n/a, Visual Reception (VR) = 20, Fine Motor (FM) n/a, Receptive Language (RL) = 20, and Expressive Language = 24.

Child 2, 23 months, AOSI n /a ADOS scores for social and communication 4, play 1 repetitive behaviour 1 Mullen t-scores gross motor (GM) 48, visual reception (VR) 43, fine motor (FM) 24, receptive language (RL) 50, and expressive language (EL) 30.

Child 3, 24 months, AOSI n/a ADOS scores social and communication 7, play 1, repetitive behaviour 5, Mullen t-scores for gross motor (GM) 39, visual reception(VR) 49, fine motor (fm) 36, receptive language (RL), 59 and expressive language (EL) 41.

Child 4 24 months old, AOSI, n/a ADOS scores social and communication 8 play 1 repetitive behaviour Mullen t-scores gross motor (GM) 51, visual reception (VR) 65, fine motor (FM) 52, receptive language (RL) 66 and expressive language (EL) 51.

The Parents' Positive Affect

Figures: Frequency of smiling (expressed as percentage of intervals) at baseline (B), post-training (PT) and follow-up (FU) for each parent.

Figure 4: Parent (Child 1)

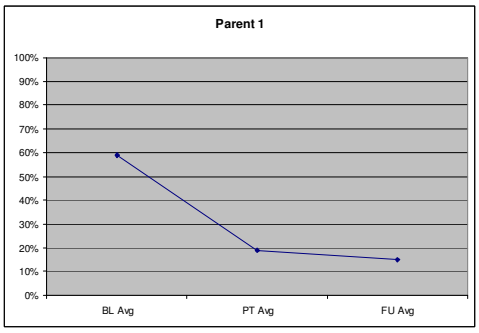


Figure 5: Parent (Child 2)

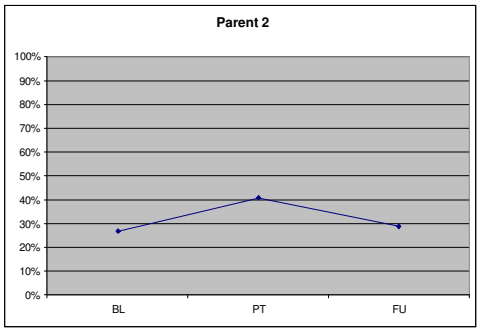


Figure 6: Parent (Child 3)

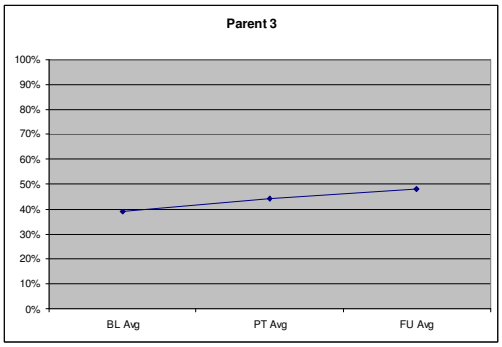
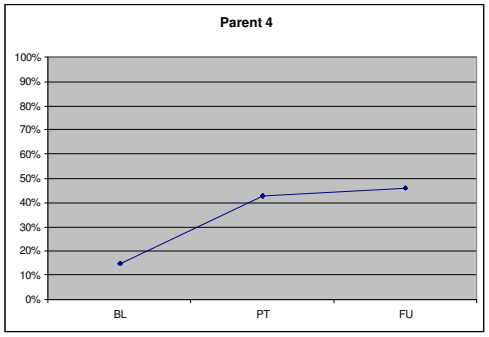


Figure 7: Parent (Child 4)



The parent of Child 1 (Figure 5) had the highest percentage of smiling in the baseline condition of all four parents, at 59% on average across the two baseline videotapes. This parent's smiling decreased steeply to 20% in the post-training phase, representing a 39% drop. There was an additional decrease in smiling in the follow-up condition but it was slight at 4%

The parent of Child 2 (Figure 6) showed a slight increase in smiling of 15% from the baseline to post-training phase (27 to 42%), and then decreased by 13% returning to just above baseline level (42 to 29%) at follow-up.

The parent of Child 3 (Figure 7) was one of the two parents that showed increases in smiling across the treatment phases. Parent 3 showed a steady increase from 39 to 44% in baseline to post-training and then maintained the gain at 48% during the follow-up phase.

The parent of Child 4 (Figure 8) showed the most substantial gains compared to all four parents. This parent increased her rate of smiling by 26% (17 to 43%) from baseline to post-training and maintained this incline at 46% even in the absence of intensive feedback or coaching.

Comparison of parent-child dyads

Figure 1: Child 1

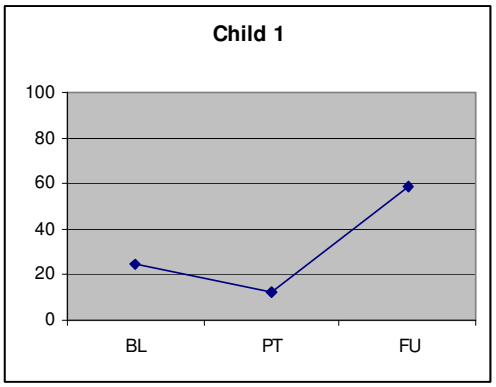
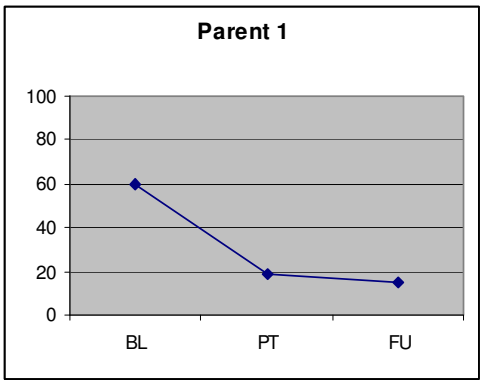


Figure 5: Parent (Child 1)



These figures show that Child 1 has a positive 29% increase in his rate of smiling at follow-up, while his parent showed an inverse effect. The mother had a high level of smiling at baseline and then decreased by 45% after training.

Figure 2: Child 2

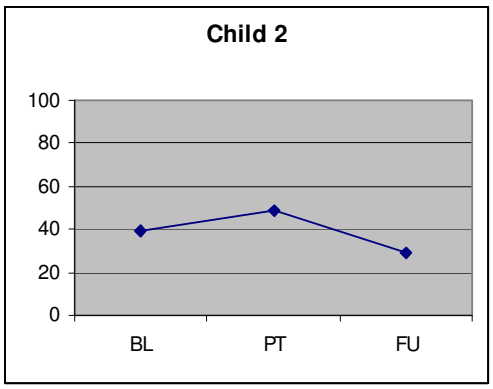
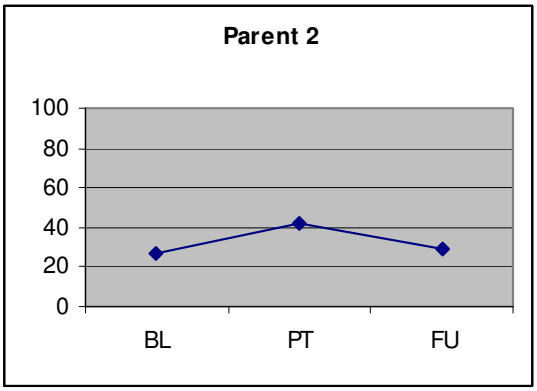


Figure 6: Parent (Child 2)



These figures comparing Child 2 (Figure 2) and Parent 2 (Figure 6) do not show a positive increase in smiling. However, both rates of smiling were very similar throughout each of the treatment phases. Prior to treatment, Child 2 started with a higher rate of smiling (39%) than his mother (27%). Relative to baseline rate of smiling, Child 2 increased by 10% during post-training but then decreased by 10% at follow-up. Similarly, the mother increased more than 10% (27 to 42%) but then returned to baseline

at follow-up. Both Child 2 and Parent 2 had the same rate of smiling (29%) during the follow-up phases of treatment.

Figure 3: Child 3

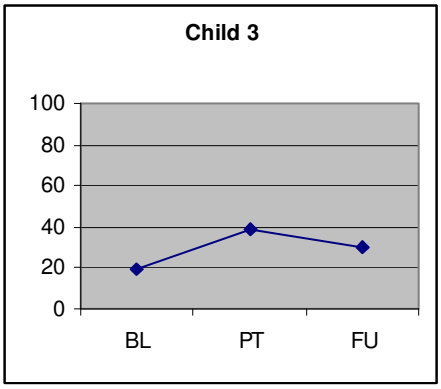
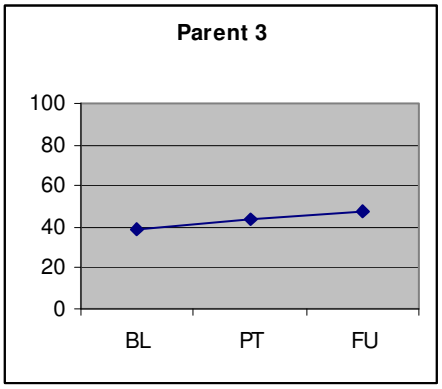


Figure 7: Parent (Child 3)



The comparison of Child 3 to Parent 3 indicated that this mother and child dyad positively increased in their rates of smiling after treatment. Interestingly, this dyad increased at a similar rate. Parent 3 began with a higher rate of smiling of 39% and continued to increase to 48% after treatment (9%) increase. Child 3 began treatment with a low rate of smiling of 19% and then by the end of follow-up was smiling at a rate of 30% (11% increase). Overall, this parent did not show large treatment gains but maintained her rates of smiling.

Figure 4: Child 4

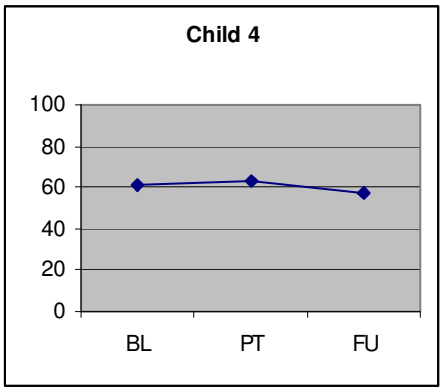
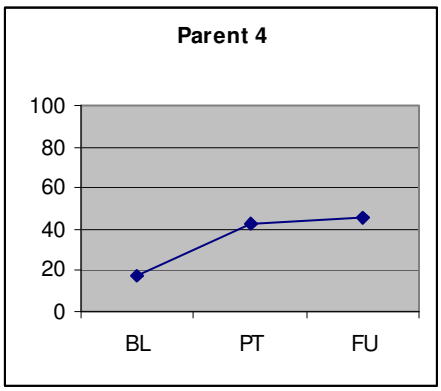


Figure 8: Parent (Child 4)



The comparison of Child 4 and Parent 4 reveals a child who started treatment with an exceptionally high rate of smiling (61%) and who remained relatively unchanged after treatment. Parent 4 showed the largest individual increase in smiling (17 to 46%) in comparison to the other 3 parents, and also to the 4 children in this study.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

The present study examined changes in positive affect in toddlers and their parents following a parent-mediated treatment based on Pivotal Response Treatment (PRT) Koegel & Koegel, 2006). This program, referred to as the *Social ABCs*, specifically targets the child's social and communication skills and positive affect. It was hypothesized that the expression of positive affect would increase in both the children and their parents, and that there would be an increase in shared positive affect between the two. The dependent measure was the proportion of intervals during which the child and parent smiled; intervals during which the child and parent smiled while looking at each other were also recorded. The present findings indicated that there were changes in positive affect in two of the four toddlers and only 1 of the four mothers following treatment. There were no changes in shared positive affect between the parents and their toddlers with suspected autism.

CHILD OUTCOMES

Figures 1 and 3, show that there was an increase in smiling in two of the four children (*Child 1 and Child 3*) following the parent training phase and at follow-up. *Child 2*, in contrast, showed a decrease in smiling following parent training (see Figure 2), and

Child 4 had a ceiling effect, that is, this child exhibited such a high rate of smiling at baseline that there was little opportunity to show an increase. Also, as shown in Table 1, there was a large degree of variability among the 4 children, as reflected on their scores on the AOSI (Bryson et al., 2007; Zwaigenbaum et al., 2005) or ADOS (Lord et al., 2000), and the Mullen Scales of Early Learning (Mullen, 1995). Moreover, this initial variability among the children who participated in this study might also have contributed to the variability in rates of smiling.

PARENT AND CHILD OUTCOMES

There was even less evidence of an increase in the rate of smiling in the toddlers' parents. Parent 4 was the only mother who increased her rate of smiling following training (see Figure 8). As depicted in Figures 5-7, Parent 3 showed only a slight increase in smiling, and the other two mothers showed a decrease in smiling following training. Moreover, there was no evidence of any increase in shared positive affect between the mothers and their toddlers. This outcome stands in contrast with findings of positive changes in communication skills in the same mother-toddler dyads, where there was an overall increase in functional language, and in standardized measures of receptive and expressive language, as coded from the video recordings (Brian & Dowds, 2008).

A number of factors could account for the failure here to replicate previous findings in which an increase in positive affect in both children with ASD and their parents was demonstrated following parent-mediated PRT programs. For example, the present findings are inconsistent with results showing that parent affect becomes more positive following 20-25 hours of parent training in PRT (Coolican, 2008). Concerns of

validity and reliability could be raised. Firstly, it could be questioned whether our measure was sufficiently sensitive to detect positive affect. Secondly, while similar coding schemes were used in previous studies, these studies examined older children who may have started the program with higher levels of affect and or better language skills. Such differences could explain why previous studies did report positive changes in affect, even though similar coding schemes were used. Regarding reliability, inter-rater reliability in this study was high for the coding of smiling in both children and parents. Therefore, it is not likely that unreliable coding of the behaviours examined could account for the difference in findings in the present study. Perhaps particular aspects of this program should be examined. For example, this parent-mediated program targets the children's communication skills, as well as their positive affect. These parents may have been more focused on enhancing their children's language rather than his/her positive affect. This treatment program was designed specifically to target the child's needs, not the parents.' For parents, it is also possible that the primary focus was fidelity (i.e., how well the PRT skills were being learned, implemented and maintained in the trainer's absence) and not sharing positive affect. Moreover, the parents were encouraged to respond to their child's smile with a smile but rate of smiling suggests that the training was insufficient and not effective in that area. The parents looked for and focused on the functional verbal utterances and attempts given by the child when presented with a preferred activity or item. Therefore, it is possible that parents did not emphasize eye contact or smiling as much as communication.

It is also possible that the expression of positive affect takes longer to develop and to be enhanced following the initiation of treatment. The stressful effects of being

videotaped during specific interactions with their toddler may also have effected parents' expressions and interactions with their toddler.

Furthermore, in "The Social ABC's" training manual, module 3, "Having Fun or Being Playful Enhancement and Sharing of Positive Emotion," provides parents with a brief summary of what constitutes positive emotion sharing and its effect on all forms of learning, including the social and emotional development of the child. This module also incorporates strategies for enhancing and sharing positive emotion such as being animated, lively, energetic and enthusiastic while holding their smiling. Thus, through the program, parents' were taught not only how to get their child to communicate with them but also how to enhance positive affect. Therefore, we cannot simply attribute variability in the rate of smiling between each of the four children and parent dyads to not having the sufficient training from this program.

Interestingly, Dawson et al. (1990) found that mothers of children with autism did not smile in response to their children's smiling at the same rate as mother's of typically developing children. Furthermore, children with autism combined smiling and looking at a caregiver less frequently than other children. Consequently, over time, as the child does not share in reciprocal smiling and in positive affect, this behavior could develop into a habitual pattern leading to ongoing avoidance of social interactions (Rogers, 1998).

Another plausible explanation for the discrepancy in findings from other studies that also examined positive affect are differences in the families sampled, in the current study, in one case, the mother had been diagnosed with depression. Nielsen (2002) reported that infants of depressed mothers exhibit lower left frontal activation to positive affective stimuli. This, in conjunction with the long-term exposure to depressed

emotional behaviors, has been reported to have harmful effects on cognitive development (Kasari & Sigman, 1997; Nielsen, 2002; Rogers, 1997). Notably, we should also recognize that the toddlers in these families were just newly diagnosed with suspected autism, and almost immediately afterwards, volunteered to participate in this research study. Thus, their grief could be greater than other comparison groups, and presumably would influence their expression of positive affect.

The inconsistency in findings across studies and the variability in positive affect within the group of toddlers in the current study might also reflect the continuing stress, resulting from the extraordinary demands that may provoke depression, perceived lack of self-efficacy, and poor mental health in parents of children with autism (Rogers, 1998). Two of the participating families were enrolled in the Infant Sibling study; they already had an older child with autism, and had experienced tremendous stress over a considerable period of time. In addition, parents of children with autism have reported more stress when their children are less responsive in social interaction with their caregivers (Kasari & Sigman, 1997). Parenting a child with autism can be stressful, and the child's impairments in social interactions may also impact their parents' interactive behavior, impacting their reciprocal exchanges with one another (Rutgers et al., 2007).

LIMITATIONS

The current study has many limitations that warrant discussion. Firstly, by virtue of using only one video camera to collect the data, there were some angles and frames that did not show both the parents' and the children's faces simultaneously. Also, lighting, glare and obstruction of view were sometimes an issue. The types of interactive

activities could have also been a factor. For example, possibly more highly interactive games could have elicited more laughing and smiling from the parents and children rather than blowing bubbles or playing with play-dough. This could then make it easier for both parties to get caught up in the moment in more naturalistic ways, and thus, have more opportunities to laugh, smile and meaningfully exchange positive emotions with each other.

The present study also used a sample of four parent-child dyads, which limits the generalizability of these findings. The results of the four families who participated may not be generalized to the general population of families with toddlers with suspected autism. As previously stated, perhaps the time frame for training and follow-up was too short for positive affect and emotions to emerge. Even though positive changes were documented in functional speech and on standardized measures of both receptive and expressive language, perhaps it takes longer for positive affect to increase in both the parents and children. A longer duration could be needed for a variety of reasons. For example, in children with autism, researchers have noted particular difficulties in attuning to and sharing positive affect. Parents who are under tremendous stress and in a state of grief also have difficulties displaying positive affect during their interactions with others (Rutgers et al., 2007).

Perhaps adjustments may need to be made to the treatment program, depending on the severity of autism, as it is manifested within each child and each parent. The treatment would then need a greater contextual fit, depending on each parent's specific needs, and specific stress, grief or coping levels. Furthermore parents who are suffering from depression may also need a more individualized or extensive training program

better tailored to fit their specific emotional needs as it relates to positive communication and emotional sharing with their child.

DIRECTIONS FOR FUTURE RESEARCH

Future research might profitably focus on how to create positive affect between parents and their toddler, the enhancement of positive affect and the role of social reinforcement in the reciprocal patterns of emotional exchange between the parent and the child. Examination of the expression of positive emotion between fathers and their toddlers may also be beneficial, whereas this study exclusively examined mothers. The current study could contribute to the limited research in the areas of child and toddler intervention programs and could be utilized as a stepping stone toward programs of effective quality by creating the optimal fit between trainers and parental styles. Moreover, future research may want to systematically evaluate key components of the training and parent skill acquisition, while modifying the programs to tailor the needs of the families with mothers who are depressed. Emphasis should be placed on the enormous impact that shared positive affect has on learning and the social emotional development of all children.

CONCLUSION AND IMPLICATIONS FOR CLINICAL PRACTICE

In summary, early intervention for children with ASD is considered to be a health care priority (Filpek et al., 2000). Although this study showed only limited increases in positive affect in children and their parents following treatment, it will inspire future research to continue to modify certain aspects of the "Social ABC's" parent-mediated

intervention program for parents of toddlers with suspected autism. The present findings have implications for clinical practice by providing parents with brief training shortly after they suspect their child has autism. Evidence that the program enhances communication skills could in turn improve the children's prognosis and trajectory outcomes (Coolican, 2008). We should continue to focus on earlier detection and treatment programs. These programs should focus on child motivation and positive shared affect between the child and their caregivers. Ultimately, our aim is to assist clinicians, educators and program developers with the best evidence practices to enhance all forms of learning for toddlers with suspected autism.

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APPENDIX A

OPERATIONAL DEFINITIONS

Positive affect was operationally defined as an observable facial expression of smiling, with widened eyes that are coupled with raised eyebrows, and showing high levels of enjoyment, interest and comfort.

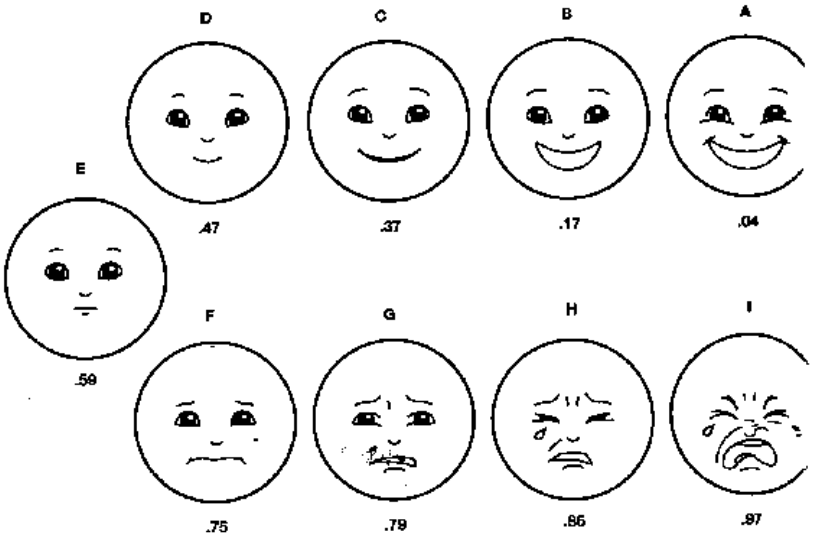
Child positive affect The child displays the above characteristics that are the child appears to be happy, is smiling and engaged, and may laugh, clap, or express joy by jumping or other similar behaviors. These behaviors must be done with the purpose of expressing joy, not just for self-stimulation or to express discontent (Coolican, 2008).

Parent positive affect The parent displays signs of positive affect as defined above, that is, the parent seems to be happy, engaged and enjoying the activity and their child.

Shared positive affect occurs when both the child and parent are displaying their positive emotions while directing their eye gaze towards one another.

APPENDIX B

CHILD/PARENT AFFECT FACES SCALE



Operational Definition: The criteria for smiling was set, that faces A-C were considered as the presence of smile for both the parent and the child. Faces D-I, were considered unequivocal and marked as the absence of a smile. The score for the presence of smiles either (A-C) were scored as 1 and where no positive affect was observed were given 0.

Direction: Coding also included where parent/child directed their smile.

Person (P) : Child/parent is directing their expression of positive affect at the other person (either by directly gazing into the other's eyes or by orientating his/her body toward the other person). This is scored by 1(P).

Activity (A): Child/parent is directing their expression of positive affect toward the current activity such as a toy or a action. This is scored as 1(A).

- Scoring for direction is hierarchical, therefore if the child/parent smiles while gazing at both an activity and person during the time interval they are given a score of 1(P) - the highest possible score for behaviour.

Shared Positive affect: Both the child and parent are displaying positive affect (defined above) simultaneously, while directing their positive expression toward one another (either by their eyes or by their body orientation). This was scored when both the child and parent received 1(P) during the same interval.

Excluded: Intervals in which the parent or child were out of view for more than 5 seconds. Ambiguous smiles were also marked as 0 as they did not meet threshold.

APPENDIX C

CHILD AND PARENT POSITIVE AFFECT

Code: _____ Observer: _____
Date: _____

Interval	Child Positive Affect	Parent Positive Affect	Shared Positive Affect
00:00-00:15			
00:16-00:30			
00:31-00:45			
00:46-01:00			
01:01-01:15			
01:16-01:30			
01:31-01:45			
01:46-02:00			
02:01-02:15			
02:16-02:30			
02:31-02:45			
02:46-03:00			
03:01-03:15			
03:16-03:30			
03:31-03:45			
03:46-04:00			
04:01-04:15			
04:16-04:30			
04:31-04:45			
04:46-05:00			
05:01-05:15			
05:16-05:30			
05:31-05:45			
05:46-06:00			
06:01-06:15			
06:16-06:30			

06:31-06:45			
06:46-07:00			
07:01-07:15			
07:16-07:30			
07:31-07:45			
07:46-08:00			
08:01-08:15			
08:16-08:30			
08:31-08:45			
08:46-09:00			
09:01-09:15			
09:16-09:30			
09:31-09:45			
09:46-10:00			

APPENDIX D

INTRODUCTION TO SOCIAL ABCS

This manual describes the social ABCs, a parent-mediated intervention for infants (12-24months) showing early signs of Autistic Spectrum Disorder (ASD). The manual consists of 8 modules, which are designed for parents to be used together with direct training in the intervention methods used (p.2).

Module 3: Enhancement and Sharing of Positive Emotion

What is positive emotion sharing?

Positive emotion sharing refers to meaningful exchange of smiles or laughter between parent and child which results in a sense of connectedness or attachment, eye-contact, social smiling and mirroring the positive emotion sharing. For example, sharing of positive emotion occurs when the parent begins a smiling/laughing interaction and the child responds by looking at his/her mother and smiling/laughing too (p.12).

Strategies for the enhancement and sharing of positive emotion

-Be animated

-Make the activity Fun

--When you are changing the child's diaper, use the opportunity to be silly and smile. If your child smiles back it's reciprocal-motivating for both of you to continue the game etc. (p.13)

ADDENDUM

RECENT ADVANCES IN AUTISM RESEARCH

An exciting scientific development in autism research was announced the day before the final defence of the thesis. Autism Spectrum disorder has been linked to a mutation on the X chromosome, which helps to explain why the disorder is more prevalent in males than in females. This research was conducted and written prior to their discovery, thus, some of the claims such as "presently there are no biological markers for autism." pp.15 were accurate at the time but are no longer supported.