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FROM PLAY TO TALK: SYMBOLIC PLAY A CUSP IN EARLY DEVELOPMENT OF COMMUNICATION SKILLS

Soo Wee HO

B.Soc.Sci.(Hons), PGDE, M.Sc.(Educational Psychology)

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Soo Wee HO

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EXECUTIVE SUMMARY

Deficits in communication skills, both verbal and nonverbal, are central in Autism Spectrum Disorder (ASD) and Social (Pragmatic) Communication Disorder (SCD). Treatment goals focused on the acquisition of functional communication skills are among the most prevalent targets for instruction in education plans for persons with developmental disabilities (Sigafoos, 1997). This thesis explores the importance of teaching symbolic play skills in early interventions and its role in developing early social communication skills in young children with developmental disabilities, with a focus on children with ASD. This thesis comprises: (i) two parallel systematic reviews on measures used by authors since 2000 for assessing early social communication and for assessing symbolic play, (ii) a report of an intensive one-on-one daily targeted symbolic play intervention for a three-year-old child diagnosed with Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS), and (iii) a report of a developmental trajectory study involving both children with ASD (n=4) and neurotypical children (n=4), tracking their play and language development over three time-points across a six-month period.

The two systematic literature reviews on measures revealed a total of 46 different measures being employed for assessing early social communication and 26 measures for symbolic play. Of these measures, eight were reported in both reviews. Psychometric properties of the top ten most frequently cited measures on both lists were listed. Implications of the results were discussed. The author put forward the proposition that symbolic play and early social communication are closely linked in early childhood development, such that teaching symbolic play can lead to improvements in early social communication and potentially result in collateral gains in language.

Supporting evidence for this hypothesis was presented. A single participant behavioural paradigm was employed to present findings on a targeted symbolic play intervention. Teaching and learning processes are explicated from this experiment. The child made gains in her play skills, becoming a more active player and was able to display more pretend play and more combinations of toys. Even though language skills were not explicitly targeted, the child made gains in language skills, especially in her expressive communication, as assessed by Preschool Language Scale, Fifth Edition (Zimmerman, Steiner, & Pond, 2011).

From the developmental trajectory study, the neurotypical group of children made better progress compared to the group of children with ASD, both in their language and in their play skills. The group of children with ASD had a greater percentage of indiscriminate play actions. Indiscriminate play actions are non-specific and non-targeted interactions with the toys or materials presented such as mouthing, sniffing and rubbing the toys against the skin, dropping or throwing the toys off the play table or floor play area. The findings provide validity support for the selected measures used in this study. The child who received targeted symbolic play intervention made significant gains in her play skills, including self pretend play and making many different toy combinations. She also made gains in her expressive communication skills even though these skills were not directly targeted. Overall, this study has provided supporting evidence that targeted symbolic play may be a cusp to developing social communication skills, with collateral gains in language skills. Going beyond using play as a backdrop to teaching various skills, the author argued that symbolic play targets are worthy early intervention goals by themselves.

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PART I:

BACKGROUND AND APPROACH

CHAPTER 1 – INTRODUCTION

This thesis explores the importance of teaching symbolic play skills in early interventions and its role in developing early social communication skills in young children with developmental disabilities, with a focus on children with autism spectrum disorder (ASD).

This chapter starts with a discussion of the background and motivation for the focus of the research, followed by a presentation of the research aim and approach. It concludes with an outline of the thesis structure.

1.1   Background

Many children with ASD have difficulties with daily social communication. For these children, signs of social and communication disruption may be present from the first year of life. The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5) also includes a new and related diagnostic category of Social Communication Disorder (SCD) or Social (Pragmatic) Communication Disorder for individuals with "persistent difficulties in the social use of verbal and nonverbal communication" (American Psychiatric Association, 2013, pp. 47). Deficits in communication skills, both verbal and nonverbal, are central in diagnosing ASD and in SCD. Consequently, many early intervention efforts target communication skills. Treatment goals focused on the acquisition of functional communication skills are among the most prevalent targets for instruction in education plans for persons with developmental disabilities (Sigafoos & Iacono, 1993).

Communication is a broad concept, encompassing linguistic, paralinguistic, and pragmatic aspects of functioning (Landa, 2007). According to Landa, the linguistic

domain includes phonological, morphological, syntactic, and semantic rule systems. Paralinguistic communication includes proxemics (e.g. the use of space in communication as in distance between speaker and listener), facial expression (e.g. rolling the eyes to indicate that a comment was intended as sarcasm, or smiling as criticism is given to convey tenderness and sincerity so that the listener knows that the comment was made out of concern rather than merely to criticize), intonation, and gesture. Pragmatics involves discourse management (e.g. topic initiation and maintenance) and communicative intentions. Language, a more commonly used term on the other hand, comprises semantics, phonology and grammar. Chapter 2 will provide the definitions for communication and language and describe them in greater details.

Studies have shown that infants engage in a range of early social communicative behaviours within the infant-caregiver relationship. Two of these early social communicative behaviours, joint attention and symbolic play, have been found to be predictive of later communication and language development. Joint attention involves sharing attention with others through pointing, showing and coordinated looks between objects and people. In typical development, by nine to ten months of age, infants understand that others' direction of gaze and pointing gestures signal something important, and they shift their attention to the object being "referenced" by these behaviours in others, thereby establishing a state of joint attention with another (Landa, 2007).

Play has been found to be concurrently associated with expressive language functioning as early as 20 months of age (Charman, Swettenham, & Baron-Cohen, 1997; Sigman & Ungerer, 1984). Symbolic play (or pretend play) is seen as behaviour that is simulative or nonliteral (Fein, 1981), acting "as if" something is the case when in reality it is not (Leslie, 1987). Joint attention abilities and early play skills are predictive of later

language functioning in typical development (McCune, 1995; Tomasello & Todd, 1983) and in individuals with autism (Charman et al., 2003; Mundy, 1995). Symbolic communication differentiates children with ASD from those with other developmental disorders from two to five years of age (Charman et al., 1997; Dawson et al., 2004; Lord, 1995; Mundy, Sigman, & Kasari, 1990; Wetherby, Cain, Yonclas, & Walker, 1988). From a developmental perspective, there appears to be close linkages between the constructs of early social communication, play and language skills. For Vygotsky (1978), play is central in child development:

> In play a child always behaves beyond his average age, above his daily behaviour; in play it is as though he were a head taller than himself. As in the focus of a magnifying glass, play contains all developmental tendencies in a condensed form and is itself a major source of development. (Vygotsky, 1978, pp. 102)

In echoing Vygotsky's view on the importance of play in child development, it has more recently been argued that the developmental domain of play is critical to early intervention efforts (Casby, 2003b). Casby (2003b) posits that play is often one of few areas that can be reliably and validly observed in infants, toddlers and young children with, or suspected of having, developmental disabilities. He opined that it is imperative for professionals involved in early intervention efforts to have a deep and broad knowledge and understanding of play (Casby, 2003b). His article presents a comprehensive and illustrative review of notable research on the development of play in typically developing children from 1970s. The review demonstrated that the quality of children's play changes dramatically as they approach their second year of life and through their third. For play to be considered symbolic (Casby, 1991), it must possess aspects of decontextualisation, decentration and symbolisation. According to Casby (2003a), decontextualisation is the dissociation of actions from typical settings and

contexts. Decentration is a child's moving of actions away from his or her self. Finally, symbolisation involves the active, purposeful use of symbols – something standing in for or representing something else.

Playing is the norm in early childhood and a lack of play skills makes it harder for a child with ASD to gain the social, emotional and cultural experiences needed for normal development (Jordan & Libby, 1997). In this regard, the lack of play skills can be interpreted as a barrier for a child with ASD to practise and develop social communication skills. Conversely, play skills when gained can facilitate opportunities for practising and developing new social communication skills. Newly acquired play skills continue to facilitate an expansion of opportunities for further practise and development of new skills. The relationship between play and social communication skills is iterative in nature. Jordan described the interlocking nature between cognitive and social play:

> At the same time as play is developing cognitively, it is also developing socially and the separation of these two strands of play is only in abstraction for academic purposes; in reality they are intertwined. (2003, pp. 349-350)

From a more cognitive viewpoint, acquisition of symbolic function constitutes an essential phase of cognitive and communicative development for the child (Bretherton, 1984). Piaget (1962) contended that symbolism emerges during the period of sensorimotor development as a distinction grows between "signifier" (present object/action) and "signified" (absent object/action). The capacity of children to use information related to hidden objects and imaginary actions in the form of representations, and thus to manipulate symbols, enables them to produce and understand five main types of behaviours during the second year of life: language, delayed imitation, drawing, mental imaging and pretend play (Blanc, Adrien, Roux, & Barthélémy, 2005). The authors argued that enhancement of symbolisation through treatment strategies based

on symbolic play may also have an effect on the development of communication skills (Blanc et al., 2005).

Development of communication is essential for daily living. Social communication development is conceptualised as part of one's adaptive behaviour. The most recent definition of adaptive behaviour published by the American Association on Intellectual and Developmental Disabilities (AAIDD) states adaptive behaviour as a collection of conceptual, social, and practical skills that allows people to function in their daily lives (American Association of Intellectual and Developmental Disabilities (AAIDD), 2010). Conceptual skills refer to the basic educational concepts a person learns over time and include literacy, self-direction, and concepts of number, money, and time. Social skills refer to the friendships and social interactions a person forms or experiences over time and include interpersonal skills, social responsibility, self-esteem, naïveté, social problem solving, following rules, obeying laws, and avoiding being victimised. Practical skills refer to the everyday life skills, including personal care, occupational skills, use of money, safety, health care, transportation, routines, and use of the telephone (American Association of Intellectual and Developmental Disabilities (AAIDD), 2010). The development of social communication skills is central across these various skill domains, especially for social and practical skills.

Early intervention for communication impairment in ASD is important (Bristol & Schopler, 1984). In addition, and perhaps more significantly for parents and practitioners, gains in communication skills are related to prevention and reduction of maladaptive behaviours (Carr & Durand, 1985; Reichle & Wacker, 1993). Howlin (1998) suggested that many so called "challenging" behaviours result from the child's fundamental difficulties in communication and social understanding, or from the ritualistic and obsessional tendencies that are also characteristic of autism. Carr and Durand (1985)

provided evidence to support the hypothesis that some child behaviour problems may be viewed as a nonverbal means of communication. According to this hypothesis, behaviour problems and verbal communicative acts, though differing in form, may be equivalent in function. Therefore, Carr and Durand (1985) argued that strengthening the latter should weaken the former.

Applied behaviour analysis (ABA) has been successfully employed to teach children with ASD. ABA is the "science in which the principles of the analysis of behavior are applied systematically to improve socially significant behavior and experimentation is used to identify the variables responsible for behavioral change" (Cooper, Heron, & Heward, 2006, pp. 20). It is the foundation for many interventions, including one of the most commonly employed behavioural approaches: discrete trial teaching. Behavioural treatments for individuals with ASD increasingly incorporate developmental elements, utilising the child's motivation and focusing on child initiations. Such applications of ABA can be seen in approaches such as Incidental Teaching (McGee, Morrier, & Daly, 1999), Natural Language Paradigm (R. Koegel, O'Dell, & Koegel, 1987), Pivotal Response Training (L. Koegel, Koegel, Harrower, & Carter, 1999) and the Milieu Teaching approach (Warren & Bambara, 1989). They emphasise increasing children's motivation to communicate. These approaches employ strategies aimed at facilitating spontaneous language and communication development and focusing on the child's role as an active communication partner, using natural rewards, embedding teaching activities within natural settings.

Research in recent years has begun to focus on early interventions targeting early social communication skills, both joint attention and symbolic play skills. Communication intervention will envelop many aspects of development, including social engagement, social reciprocity, joint attention, imitation, play, vocal-manual

coordination, language, flexible communicative contingencies and social communicative abilities (Landa, 2007). Systematically building the capacity for representational or symbolic play may facilitate the development of representational thought which is linked to symbolic language development (Landa, 2007).

At the same time that research on early interventions is growing, our understanding on various developmental disabilities including ASD is also improving. More recently, various authors have started advocating for using a developmental trajectory approach in understanding different developmental disorders (Landa, 2007; Thomas et al., 2009). Defining the developmental trajectory of communication skills in ASD will yield insights into diagnostically relevant developmental disruptions, providing information pertinent to the development of early interventions (Landa, 2007). Based on this body of theoretical foundations and empirical data, it is hypothesised that symbolic play is potentially a behavioural cusp to early social communication and language development. A behavioural cusp is defined as "a behaviour change that has consequences for the organism beyond the change itself, some of which may be considered important" (Rosales-Ruiz & Baer, 1997, pp. 533). Within a framework for understanding early brain plasticity in ASD and its role in prevention, Dawson (2008, pp. 775) even argued that "prevention of ASD is plausible". She explained that prevention will entail detecting infants at risk before the full syndrome is present and implementing treatments designed to alter the course of early behavioural and brain development. These findings support the notion that early interventions targeting specific and meaningful behavioural skills have great potential in altering developmental trajectories of individuals with ASD for much improved outcomes.

A randomised controlled trial on targeted joint attention and symbolic play interventions showed that these skills could indeed be effectively taught to three- and

four-year-olds with ASD (Kasari, Freeman, & Paparella, 2006). In addition, the authors found that the children in the targeted symbolic play interventions group made collateral gains in joint attention even though joint attention was not specifically targeted in that treatment condition. In a five-year longitudinal follow up study, the children's baseline play level and initiation of joint attention predicted spoken vocabulary at eight years of age (Kasari, Gulsrud, Freeman, Paparella, & Hellemann, 2012). This provides further evidence on the temporal relationship between early play skills and later language skills in a longitudinal study.

1.2   Research Aim

Working within a behavioural paradigm, the current thesis proposed to investigate the importance of teaching symbolic play acts as target behaviours to a young child with ASD, in terms of its impact on communication and language development. An attempt was made to systematically replicate the Kasari et al. (2006) study on symbolic play interventions here using a single case design. The single case design, in contrast with a pre- and post-interventions randomised controlled trial design, will allow for an explication of teaching and learning processes that will be relevant to informing early interventions efforts.

> Certain behaviour changes open the door to especially broad or especially important further behavior change, leading to the concept of the behavioural cusp. A behavioral cusp, then, is any behavior change that brings the organism's behavior into contact with new contingencies that have even more far-reaching consequences. (Rosales-Ruiz & Baer, 1997, pp. 533).

It is hypothesized that symbolic play skills, when acquired, will lead to the development of new behaviours, by bringing the child into contact with new

contingencies that have even more far-reaching consequences, illustrating the concept of a behavioural cusp (Rosales-Ruiz & Baer, 1997). Using a behavioural and developmental paradigm, this research will examine collateral outcomes in related areas of child development, namely broader social communication development, auditory comprehension and expressive communication through targeted symbolic play intervention.

A developmental trajectory approach will be used to examine the unfolding of communication, language and play skills of two groups of children longitudinally, one with ASD and the other neurotypical group. The single case symbolic play intervention study will be layered over this developmental trajectory study to provide insights on the development of these skills for the child receiving targeted play interventions.

In order to track the development of these skills, reliable and valid measures are required. While various measures of early social communication and symbolic play are available, there has not been a systematic study conducted to describe the range of different types of instruments available for capturing the important constructs of early social communication and symbolic play. This thesis will also include an investigation of existing measures of early social communication and symbolic play relevant to the teaching and learning of play skills in young children through two systematic literature reviews, one for measures of early social communication and the other one on measures for symbolic play. The findings from the systematic reviews will inform researchers and practitioners on the choice of measurement instruments for assessing early social communication and symbolic play.

1.3 Thesis Structure

The overall structure is split into four parts as follows and shown in **Figure 1.1**.

Part I: Background and Approach   Chapters 1-3

Part II: Systematic Review of Measures   Chapters 4-5

Part III: Direct Developmental Studies   Chapters 6-7

Part IV: Synthesis and Conclusions   Chapter 8

The next chapter, Chapter 2, reviews the literature on early social communication and language development, play in children with ASD, early interventions, and measures for early social communication and symbolic play. Chapter 3 describes the methodology employed for this research, Chapters 4 and 5 detail two separate systematic reviews of measures for early social communication and symbolic play respectively. Chapter 6 reports the findings from the single case study of a symbolic play intervention as well as the findings of a social validity questionnaire completed by a parent. Chapter 7 details the results from the longitudinal study tracking the developmental trajectories of four children with ASD in comparison with the developmental trajectories of age- and gender-matched typically developing children across three time points over a six-month period. The final chapter, Chapter 8, provides a discussion of the results of this series of reviews and studies, limitations of the current research and recommendations for further studies.

PART I: Background and Approach

> **Chapter 1 – Introduction**
> Background; Objectives; Thesis Structure

> **Chapter 2 – Literature Review**
> Early Social Communication; Symbolic Play; Early Interventions

> **Chapter 3 – Research Methodology**
> Study Framework; Participants; Materials and Procedures

PART II: Systematic Reviews of Measures

> **Chapter 4 – Systematic Review of Measures for Early Social Communication**
> Results and Discussion

> **Chapter 5 – Systematic Review of Measures for Symbolic Play**
> Results and Discussion

PART III: Direct Developmental Studies

> **Chapter 6 – Targeted Symbolic Play Intervention**
> Single Case Design Daily Interventions, Social Validity

> **Chapter 7 – Developmental Play Trajectories in Children with and without ASD**
> Cross Sectional and Longitudinal Study of Early Social Communication and Language Skills

PART IV: Synthesis and Conclusions

> **Chapter 8 – Synthesis and Conclusions**
> Key Findings and Contribution; Future Research Directions

Figure 1.1: Thesis Structure

CHAPTER 2 – LITERATURE REVIEW

A review of the literature was done in order to present the latest research in early social communication, language and symbolic play development. A developmental trajectory approach was used to review the literature on each of these key child developmental domains, both in typical development and in children with ASD. The section also reviews the literature on early interventions on these early skills and measures available for early social communication and symbolic play. **Figure 2.1** shows the domains of interest and focus in this research.
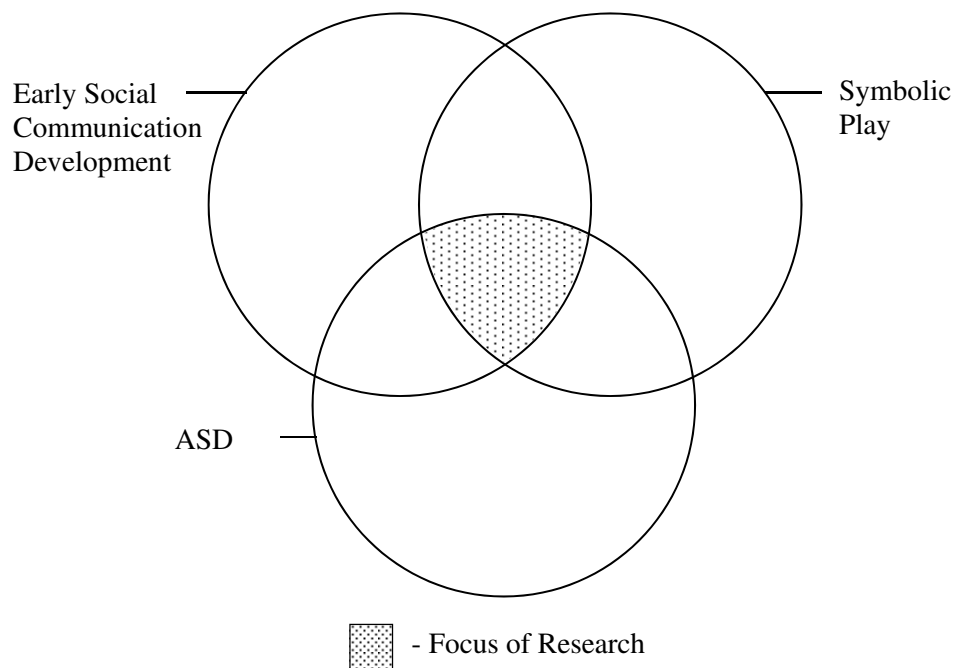
Figure 2.1: Focus of Research Area

2.1 Definitions of Communication and Language

Communication skills are essential for daily functioning for both adults and children. For children who are dependent on others around them to support their daily

physical and social needs, the ability to communicate with significant others is crucial. Research has shown that infants communicate with their cries before speech is developed. For example, infants cry when they need to be fed or when they are cold. Parents can quickly learn to discriminate between the different types of crying, illustrating the reciprocal nature of communication. These early communicative efforts evolve to more complex vocal and nonvocal communication as a child develops.

Communication is a socially shared activity that allows humans to develop relationships with each other and convey meaning or messages to others (Carrow-Woolfolk & Lynch, 1982; Eisenson & Ogilvie, 1983; Haslett & Samter, 1997). Communication is the process by which individuals exchange information and convey ideas (Owens, 2006). It is an active process requiring a sender who encodes, or formulates, a message. It also requires a receiver who decodes, or comprehends, the message. Each partner need to have the required receptive and expressive communication skills to ensure that messages are effectively conveyed and understood.

Four stages of development of early communication skills have been described (Haslett & Samter, 1997). The first stage is recognising the interpersonal basis of communication which is commonly observed in the infant-caregiver relationship (zero to 60 weeks). The second stage is creating communicative effects (four month to three years). This stage comprises three sub stages. First, there are prevocal routines in which children acquire an understanding of dialogue conventions such as turn taking. Second, communicative intentionality begins in which children commence signalling their wants or needs. Thirdly, linguistic communication commences in which children demonstrate a functional mastery of language to achieve social goals. The third stage of development begins when children are around three years of age and have begun using communicative strategies. From toddlerhood onwards, they gradually increase linguistic forms to

accomplish a variety of communicative goals. The fourth and final stage is monitoring communication (around five years of age). At this stage, children develop the ability to evaluate messages appropriately and to repair messages in conversation with others (Haslett & Samter, 1997).

Language on the other hand, is a system that can take different forms such as written symbols, sounds or signs for the purpose of communication (Bochner & Jones, 2008; Haslett & Samter, 1997). Language plays a vital role in social life and helps speakers to communicate or exchange information, ideas or feelings in social contexts through interactions between listeners and speakers (Eisenson & Ogilvie, 1983).

Language is:

…a complex and dynamic system of conventional symbols that is used in various modes for thought and communication. Contemporary views of human language hold that (a) language evolves within specific historical, social, and cultural contexts …(d) effective use of language for communication requires a broad understanding of human interaction including such associated factors as nonvocal cues, motivation, and socio-cultural roles. (Kamhi 1989 cited in Buckley, 2003, pp. 3)

To better understand the concept of language, it is important to be aware of the components of language. The five main language com ponents are phonology, morphology, syntax, semantics, and pragmatics (Bernstein & Tiegerman, 1989; Eisenson & Ogilvie, 1983).

First, phonology describes the sound system of a natural language (Crystal, 2004) and comprises consonants, vowels and diphthongs organised into intelligible units called phonemes (Eisenson & Ogilvie, 1983). The phoneme is the smallest linguistic unit of sound that can signal a difference in meaning (Kuder, 1997).

Second, morphology describes the structure of words and how they are formed (Bernstein & Tiegerman, 1989; Crystal, 2004). In English, it means devising ways of describing the properties of such disparate items as *a*, *dog*, *took* and *washing dishes* (Crystal, 2004). A *morpheme* is a minimal unit that carries meaning. For example, *quick* consists of four phonemes: / k/, /w/, / í/, and /k/. Since all four phonemes are needed to make a unit that carries meaning, *quick* is a morpheme which stands alone and is accordingly a *free morpheme*. When *–er, -s, -ed, -ness, -ship, un-, de, anti-, super-* is added to a free morpheme then it becomes two morphemes in one word. For example, the word "dog*s*" has two morphemes that are *dog* and *s*, the word stopp*ed* has two morphemes, *stop* and *ed*.

Third, syntax is the sentence structure of words (Crystal, 2004). The use of syntax allows individuals to combine words into phrases and sentences. For example, a small child might say "Chris help" or "mom balloon blow" both sentences express the child's wants or needs but not in accordance with the syntactic rules of English. Eventually children develop more advanced syntactic skills, such as *why* or *how* questions and constructing sentences such as "*I go home*" (Eisenson & Ogilvie, 1983). Syntax specifies the order of words (the grammar of an utterance) and the organisation of different sentence types.

Fourth, semantics is the study of meaning in language (Crystal, 2004; Hoff, 2013). Semantics is the meaning or interpretation of words, phrases, sentences and an individual's knowledge of objects, events, situations and people (Bernstein & Tiegerman, 1989). For example, words such as "no", "more" and "this" express a variety of semantic meaning relations such as rejection, existence, recurrence, etc., in social contexts (Layton, 1987). As children develop their semantic skills increase. They learn, for example, that "couch" and "sofa" represent the same object but with different sounds whereas some

words have the same sound but different meanings (e.g., "buy" and "bye") (McCormick, 1997).

Finally, one of the most critical components of language is pragmatics that is the use of language in social contexts (Hoff, 2013; McCormick, 1997). It involves conversational rules such as turn-taking, relevant responses, and maintaining a topic using cohesive sentences (Scott, Clark, & Brady, 2000). Pragmatics not only focuses on the phonological, morphological, syntactic and semantic components but also on the child's ability to understand his or her intended message in relation to the social context. Context includes social, physical, linguistic, and historical context, which in turn affects the way language is used by a speaker (Layton, 1987).

In this section, communication and language have been defined. The main language components including phonology, morphology, syntax, semantics and pragmatics were described. These basic concepts of communication and language provide the context for our understanding of social communication development for both children with ASD and typically developing children.

2.2   Communication, Language and Play Development in Typical Development

The developmental changes that occur from birth through first words and/or early symbol use have been studied and documented for a variety of purposes and in diverse populations. Bates and colleagues have documented a typical progression in presymbolic communication and found that this progression relates to later symbol use and language (Bates & Dick, 2002; Thal, Bates, Goodman, & Jahn-Samilo, 1997). Pre-intentional communication (also referred to as perlocutionary) includes behaviours that are purposeful but not clearly directed to another person, such as crying without accompanying gesture and eye gaze. Intentional communication includes gestures and

vocalisations that are clearly directed to another person. Behavioural indications of directionality include eye gaze, touching, and body posture. Presymbolic communication varies in function. Some communication acts have behaviour regulation functions such as requesting and rejecting, and others have declarative/joint attention functions such as pointing out something of interest (Brady, Marquis, Fleming, & McLean, 2004). Children can typically use different forms to convey these different functions. Complexity cuts across functions (McLean, Brady, McLean, & Behrens, 1999). Developmentally, these pre-symbolic behaviours are followed by symbolic communication, typically spoken words (Brady et al., 2008).

One of the early presymbolic communicative behaviours is joint attention. Joint attention skills involve sharing attention with others through pointing, showing and coordinated looks between objects and people. A child may respond to joint attention bids by others or s/he may initiate joint attention with others. Initiation of joint attention is not to be confused with requesting behaviours. Requesting behaviours would typically involve a command or demand, and followed by characteristic reinforcement often specified by a response to the requesting behaviour. Joint attention, on the other hand, does not necessarily involve a request. Joint attention typically emerges by nine to 12 months of age (Brooks & Meltzoff, 2002). By 12 months of age, most typical infants display all aspects of joint attention, including sharing attention (e.g., through the use of alternating eye gaze), following the attention of another (e.g., following eye gaze or a point), and directing the attention of another (Carpenter, Nagell, & Tomasello, 1998). Importantly, it is within the context of joint attention episodes that infants also begin to communicate intention by using sounds and gestures, such as reaching to request objects, and pointing and vocalising to direct attention to objects. Joint attention skills correlate not only with early language learning but also with later language functioning in typically

developing children (Tomasello & Todd, 1983). Longitudinal associations between these early social-communicative abilities and later language development have been found in typically developing children. For example, many studies have demonstrated longitudinal associations between joint attention abilities including, protodeclarative pointing, following eye gaze and pointing, and later language ability (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979; Carpenter et al., 1998; Tomasello & Farrar, 1986).

Bates and her colleagues (Bates, Bretherton, Snyder, Shore, & Volterra, 1980; Bates, Thal, Whitesell, Fenson, & Oakes, 1989) found that in typically developing infants, elicited functional play with toy objects was associated with language comprehension and elicited pretend play was associated with language production. Sigman and Ungerer (1984) found that functional play acts at 13 months were associated with receptive and expressive language ability nine months later. Play, both functional and symbolic, provides the child with opportunities for social interaction and social communication. Similarly, play has been found to be concurrently associated with expressive language functioning as early as 20 months of age (Charman et al., 1997).

Play is regarded as the "work" of childhood and accordingly serves several important functions in development (Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993). As children engage in play activities they learn about objects and events, learn language for talking about these objects and events, and develop a range of interactions with parents and peers (Garvey, 1974; Piaget, 1962; Rubin, Fein, & Vanderberg, 1983; Smilansky, 1968). Changes in play have been used as indices of developments in cognition (Belsky & Most, 1981; Fenson, Kagan, Kearsley, & Zelazo, 1976; Lowe, 1975; Odom, 1981) and have been related to developments in language (Bates et al., 1979; Bloom, Lifter, & Broughton, 1985; Fein, 1979; Lifter & Bloom, 1989; Wing, Gould, Yeates, & Brierly, 1977) for children with and without disabilities. Symbolic play is often

defined as children's deliberate distortion of reality in play when they act "as if something is the case when it is not" (Leslie, 1987). Symbolic play typically emerges in the second year of life. Its frequency appears to be greatest during the late preschool years and begins to decline around age six years (Fein, 1981). The beginning of symbolic play mirrors the period of vocal language development in typical development. Consequently, play is used as a measure of developmental progress (Fewell & Rich, 1987; Lifter, Edwards, Avery, Anderson, & Sulzer-Azaroff, 1988; Lowe & Costello, 1976).

Play also appears to be intrinsically motivated (Fewell & Rich, 1987), for, left to their own devices under minimally restricted circumstances, children will devote much of their time to play. Play sets the occasion for a variety of social and communicative interactions (Fein, 1981; Garvey, 1974) and provides a vehicle for implementing social and communicative objectives (Odom & Strain, 1984). The natural context provided by play activities is used for implementing language objectives (Martin, McConkey, & Martin, 1984).

Children's play evolves from exploration of sensory properties of objects to simple repetitive play, to relational and constructive play with objects, to functional play, and finally to play that is symbolic in nature (Jordan, 2003; Piaget, 1962). While the above describes a cognitive dimension to play, a more social dimension to play is also commonly referenced. A widely used classification system of play focusing on the social dimension of play is Parten's six different types of play (Parten, 1932):

(a) Unoccupied (play) – when the child is not playing, just observing;

(b) Solitary (independent) play – when the child is alone and maintains this status by being focused on his/her own activity;

(c) Onlooker play (behaviour) – when the child watches others at play but does not engage in it;

(d) Parallel play (adjacent play, social coaction) – when the child plays separately from others but close to them and mimicking their actions;

(e) Associative play – when the child is interested in the people playing but not in the activity they are doing, or when there is no organized activity at all; and

(f) Cooperative play – when a child is interested both in the people playing and in the activity they are doing. In cooperative play, the activity is organized, and participants have assigned roles

According to Parten, as children become older, and as opportunities for peer interaction become more common, the preschool (solitary and parallel) types of play become less common, and the social (associative and cooperative) types of play become more common (Parten, 1932).

Theoretically, joint attention and play skills represent beginning understanding of mental representations of others (Baron-Cohen, Tager-Flusberg, & Cohen, 1994). In play, it has been argued that all of a child's actions take on symbolic meaning, and play involves an emphasis on these meanings rather than on the specific actions that signify them (Vygotsky, 1978). Play is the context within which learning and development takes place. "Zone of proximal development" (ZPD) is Vygotsky's term for the range of tasks that a child can complete with the guidance and assistance of adults or more-skilled children (Vygotsky, 1978). The lower limit of ZPD is the level of skill reached by the child working independently. The upper limit is the level of additional responsibility the child can demonstrate or achieve with scaffolding. The ZPD captures the child's cognitive skills that are in the process of maturing and can be accomplished only with the assistance of a more-skilled person. Vygotsky's concept of zone of proximal development has major implications for those who study child development. Appropriate social experiences are a key mechanism by which teaching and learning happens. For young children, these social

experiences are present in the context of their play. Children typically engage in pretend play behaviours at about 18 months of age. Pretend play is considered a marker for a child's ability to use symbols to represent objects and events (Piaget, 1962; Vygotsky, 1967) and it may be an early area of cognitive competence (Rutherford & Rogers, 2003).

Vygotsky (1978) stated, "Symbolic representation in play is essentially a particular form of speech at an earlier age, one which leads directly to written language" (pp.111). For Vygotsky, play is a causal force in the development of very specific skill areas (Pellegrini & Galda, 1993).

What then is the relationship between play and early social communication development? Play behaviours are often described as paralleling development in language and cognition because of simultaneous advances in complexity (Brown & Murray, 2001; Wing et al., 1977).

The separation of the two strands of play, social and cognitive, is only an abstraction for academic purposes; in reality they are intertwined (Jordan, 2003). From a social cognitive point of view, play facilitates the development of early social communication competencies which provide further opportunities for play and social interactions which in turn provides social contexts for the practice of newly acquired skills and the emergence of new skills.

We now turn to a description of children with ASD, before reviewing the literature on the development of early social communication, language and play in children with ASD.

2.3   Children with ASD

ASD is a neurodevelopmental disorder defined by impairments in social and communication development, accompanied by stereotyped patterns of behaviour and

interests. Pervasive Developmental Disorder – Not Otherwise Specified (PDD-NOS) and Asperger Syndrome were commonly used diagnostic categories in clinical practice, but are no longer distinct categories under the DSM-V (American Psychiatric Association, 2013). For this paper, in alignment with DSM-V, the term ASD will be used as it inclusively refers to autism and PDD-NOS.

It is now widely accepted that ASD has an onset in infancy or early childhood (Volkmar, Stier, & Cohen, 1985), and many parents of children later diagnosed with ASD have serious concerns about their child's development in the first year of life (Frith, Soares, & Wing, 1993; Gillberg et al., 1990; Howlin & Moore, 1997). These early anxieties tend to focus on abnormalities in communication, play or social responsiveness or on repetitive behaviours (Howlin, 1998).

In the course of typical development during the preschool years, children develop abilities that have become widely referred to as theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Premack & Woodruff, 1978; Wellman, 1990). Several studies have provided empirical evidence showing that children with ASD appear to have severe and specific impairment of theory of mind (Baron-Cohen et al., 1985; Leslie & Frith, 1988).

Theory of mind (ToM) refers to an understanding of mental states, such as belief, desire and knowledge, that enables us to explain and predict others' behaviour (Miller, 2006). Children who have developed ToM ability can negotiate social interactions by taking the perspective of others, anticipating others' intentions and understanding their needs (Slomkowski & Dunn, 1996). An appreciation of others' thoughts, feelings, knowledge, and wishes, or a "theory of mind", is essential for competent communication (Miller, 2006). The finding that typically developing children become able to pass false belief tasks consistently at around four to five years of age is a robust one (see **Table 2.1**) (Miller, 2006).

Table 2.1

Approximate Developmental Timeline of Some Aspects of Theory of Mind, with Illustrative References (Miller, 2006)

Age	Aspects of theory of mind
6-12 months	✓ Joint attention, including gaze and point following, and alternation of gaze between person and object (Bruinsma, Koegel, & Koegel, 2004; Carpenter et al., 1998) ✓ First words (Tomasello, 1995)
13-24 months	✓ Recognize intentionality in others as demonstrated in word use (Tomasello, 1995) ✓ Recognize that others have desires different from one's own (Repacholi & Gopnik, 1997) ✓ Early pretend play (Leslie, 1987)
30-36 months	✓ Begin to use mental state terms with truly mentalistic functions (Bartsch & Wellman, 1995) ✓ Increasing sophisticated pretend play (Youngblade & Dunn, 1995)
37-48 months	✓ Increasing ability to understand how things look from another's perspective (Flavell, Speer, Green, August, & Whitehurst, 1981) ✓ Begin to understand sentences complements (De Villiers & Pyers, 2002)
49-60 months	✓ Consistently pass false belief and appearance-reality tasks (Wellman, Cross, & Watson, 2001)

As children with ASD grow older, the pattern of their development is largely affected by their degree of cognitive impairment (Howlin, 1998). Although the syndrome of ASD can occur in individuals of all levels of ability, the majority (around 70-75%) have some associated learning disabilities and around 50% have an IQ below 50 (Howlin, 1998).

Challenging behaviours are common in these populations (J. M. Campbell, 2003; S. B. Campbell, 1995). Some child behaviour problems may be viewed as alternative means of communication. Behaviour problems and vocal communication acts may be different in form but may be functionally equivalent (Carr & Durand, 1985). Therefore, it

is argued that strengthening communication skills should reduce behavioural problems in some children with developmental disabilities.

Apart from children with ASD, there are other clinical populations that may also present with social communication difficulties, namely intellectual disabilities and specific language disorder. Intellectual disability is characterised by significant limitations both in intellectual functioning and adaptive behaviour as expressed in conceptual, social, and practical skills (American Association of Intellectual and Developmental Disabilities (AAIDD), 2010). In children with developmental disabilities such as intellectual disability or specific language disorder, communication development might be delayed or might not occur in a typical manner. Effective communication is important to gain access to essential physical needs such as foods and drinks, to negotiate with others for wanted toys and activities and to build socially rewarding relationships with significant adults and other children.

One area in which there has been interest for many years is the possible overlap between individuals with ASD and those with language disorders (Bishop & Norbury, 2002). Children with language disorders may present with social communication difficulties as well.

2.4 Communication, Language and Play Development in Children with ASD

Signs of social and communication disruption may be present in children with ASD as early as the first year of life (Landa, 2005), even before spoken language is expected to emerge in typically developing children. Such disruption may be seen in the desynchronisation of vocal patterns with the caregiver, early sharing of affective expression (Trevarthen & Daniel, 2005; Yirmiya et al., 2006), delayed onset of babbling

(Iverson & Wozniak, 2007), as well as in gestures and responsiveness to the communicative bids of others (Baranek, 1999).

Children with autism are characterised by significant deficits in social communication skills. They show impairments in joint attention skills as compared to children with delayed and typical development (Charman, 1998). In the second and third years of life, communication development in ASD is generally characterised by reduced frequency and diversity of communicative forms, including complex babbling, gestures, consonants in syllables, words and word combinations (Goldberg et al., 2005; Mitchell et al., 2006; Wetherby et al., 2004). Gestures tend to be isolated acts, less often integrated with vocalisation than in typically developing prelinguistic children (Wetherby et al., 1988). Initiation of social communication acts (e.g. showing, initiating joint attention), which requires integrated attention to social and non-social aspects of context, is impaired relative to requesting (a non-social use of communication) in two- and three-year-old children with ASD (Loveland & Landry, 1986; Mundy et al., 1990; Sigman, Mundy, Sherman, & Ungerer, 1986; Wetherby & Prutting, 1984). Children with ASD have very restricted means of communicating needs and preferences to others. They are likely to be significantly less effective communicators compared with their same age peers. They are likely to have decreased flexibility in adapting and responding to the fluid and dynamic nature that characterises typical communicative exchanges. Young children with ASD less often initiate communication bids to regulate the behaviour of others in order to achieve a desired object or action (Charman et al., 1997; Wetherby et al., 2004). Likewise, perhaps more diagnostically relevant for ASD, is a reduced frequency of initiation of and response to joint attention bids to share experiences and objects of attention (Lord, 1995; Wetherby et al., 2004). This characteristic also differentiates ASD

from other developmental disorders from two to five years of age (Charman et al., 1997; Dawson et al., 2004; Lord, 1995; Mundy et al., 1990).

Aspects of early social communicative behaviour that best characterise individuals with ASD have been well recognised for some time (Charman et al., 2003). Children with ASD demonstrate deficits in protodeclaratives (acts that demonstrate sharing attention such as showing an adult a well-liked toy), but use of protoimperatives (acts that function to gain access to an object) often remain relatively intact (Loveland & Landry, 1986). Similarly, Brady and her colleagues were of the view that ASD is marked by a delay in certain functions (i.e. declarative), while growth in communication complexity within other functions (i.e., requesting) may be observed (Brady et al., 2012).

Rate of nonverbal communication in two-year-olds with ASD is a significant predictor of communication and social functioning at age seven years (Charman et al., 2005). Charman and his colleagues examined longitudinal associations between diagnosis, joint attention, play and imitation abilities and language outcomes in infants with ASD and pervasive developmental disorder (Charman, 2003). Measures of joint attention, play and imitation were taken with a sample of infants with ASD at age 20 months. Language outcome was assessed at age 42 months. They found that language skills at 42 months were higher for children with a diagnosis of Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS) than for children with a diagnosis of ASD. Language at follow-up was also positively associated with performance on experimental measures of joint attention and imitation, but not with experimental measures of play and 'goal direction' at 20 months. The authors concluded that individual differences in social communication abilities as well as diagnostic status may predict language outcomes in preschoolers with ASD. The authors also concluded that imitation and joint attention abilities may be important targets for early intervention.

Language is the earliest disruption reported by most parents with children with ASD (Filipek et al., 1999). Some have suggested that young children with ASD have particular difficulty in play and developing symbols into language, and that these two systems, though distinct, are closely linked in development (Libby, Powell, Messer, & Jordan, 1998; Riguet, Taylor, Benaroya, & Klein, 1982; Sigman & Ungerer, 1984; Stahmer, 1995). Symbolic skills often do emerge to some degree in ASD, although they may be most apparent in highly structured contexts (Curcio & Piserchia, 1978; Libby et al., 1998; Ungerer & Sigman, 1981). Symbolic communication differentiates children with ASD from those with other developmental disorders from two to five years of age (Charman et al., 1997; Dawson et al., 2004; Lord, 1995; Mundy et al., 1990), and thus is considered a core deficit in ASD (Sigman, Dijamco, Gratier, & Rozga, 2004).

Children with ASD show specific impairments in symbolic play as early as 18 months of age relative to children with delayed and typical development (Baron-Cohen et al., 1996). It has long been known that individuals with ASD produce less functional and symbolic play than controls (Mundy, Sigman, Ungerer, & Sherman, 1986; Riguet et al., 1982; Sigman & Ungerer, 1984). Individuals with ASD are impaired in their development of imitation abilities with regard both to body movements and actions on objects (Curcio, 1978; Dawson & Adams, 1984; Hammes & Langdell, 1981).

In terms of impairments in play, in unstructured or free-play conditions, children with ASD produce significantly less pretend play, but intact functional play, compared with chronological and mental age-matched comparison group (Baron-Cohen, 1987; Lewis & Boucher, 1988). Under structured, or prompted, conditions, children with ASD produced as many functional and symbolic acts as controls in some studies (Lewis & Boucher, 1988), but not in others (Sigman & Ungerer, 1984). However, in structured

settings, their play may lack the generativity and imaginative quality shown by non-autistic individuals (Lewis & Boucher, 1988).

In the early years, social communication skill deficits centre on an inability to engage in joint attention and symbolic play. There is considerable clinical and research evidence that children with ASD show delay, difficulty and deviance in their development of social play (Wolfberg & Schuler, 1999). Some theorists have argued that joint attention ability lays a foundation not only for the development of language but also for other complex abilities such as pretend play and theory of mind (Meltzoff & Brooks, 2001).

In typically developing children, as well as children with ASD, joint attention skills have been repeatedly demonstrated to relate to the development of language, cognition, social skills and behavioural competence problems (Charman et al., 2003; Murray et al., 2008). Early dyadic behaviours (eye contact and affect) and triadic (joint attention) behaviours, particularly sharing attention, were associated with later social responsiveness (Clifford & Dissanayake, 2009).

Representational ability is a central characteristic of intellectual functioning in early childhood, and symbolic play is the most cognitively dependent of all forms of play. Make-believe play of children with cognitive delays is thought to be delayed, rather than deviant or different (Hughes, 2010). According to Wing et al. (1977), mental age, not chronological age, is a better predictor of the onset of symbolic play. In a study on children with developmental delays, symbolic play was found, but it did not occur before the children had attained a mental age of 20 months (Wing et al., 1977).

2.5   Early Interventions for Children with ASD

Research has demonstrated that early intervention services can prevent or mitigate the impact of various risk factors and impairments in children (Girolametto, Wiigs,

Smyth, Weitzman, & Pearce, 2001; National Research Council, 2001; Thelin & Fussner, 2005). In some cases, early intervention can alter a child's developmental trajectory. In others, early intervention services can prevent secondary complications or reduce the extent of a child's disability (Guralnick, 2005). Thus, time is of essence (Paul & Roth, 2011). Ideally, every child who experiences delays or appears to be at risk for delayed development during the first three years of life would have access to high-quality early intervention services aimed at improving developmental momentum and minimising impairment (Paul & Roth, 2011).

In his article, Simpson (2005) outlined issues and factors that relate to identifying and using effective practices with students with ASD. Behavioural interventions are commonly sought for supporting the learning and development for children with a range of developmental disabilities. Applied behaviour analysis (ABA), is considered to be a scientific and evidence-based approach for children with ASD (Simpson, 2005).

One of the most commonly employed approaches in ABA is discrete trial teaching. It is based on principles of operant conditioning (Newsom & Hovanitz, 2006) where skills are dissected into discrete intervention targets based on task analysis and the child's task performance. Intervention targets are addressed through trials of antecedent-behaviour-consequence chains, initiated by an adult, using adult-selected materials and tasks, and presented in massed trials to promote success. The therapist maintains tight control over antecedents, stimuli, the prompt hierarchy, and reinforcers, which are usually not specifically related to the targeted tasks. After initial skill acquisition, the emphasis is on systematically generalising skills to activities typical of the child's daily life. Curriculum manuals provide step-by-step guidelines for teaching component skills, usually within the domains of language, nonverbal cognitive and preacademic skills (Lovaas, 2003; Sundberg & Partington, 1998). Studies of the effects of traditional

behaviour analytic intervention delivered for a period of one to four years, with 30 to 40 hours per week of one to one intervention, report an average IQ gain of 20 points for preschoolers with ASD (Lovaas, 1987; Sallows & Graupner, 2005), with greater improvement associated with greater intensity (e.g. 40 hours per week versus 10 hours per week (H. Cohen, Amerine-Dickens, & Smith, 2006; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; McEachin, Smith, & Lovaas, 1993; Smith, Groen, & Wynn, 2000).

Apart from having to decide which treatment options to adopt, families with children with ASD are faced with the question of how many hours of interventions are needed. The literature supports intensive intervention for children with ASD (Harris & Handleman, 2000; Lovaas, 1987; Sheinkopf & Siegel, 1998; Smith et al., 2000). Number of hours of speech-language therapy received between two and four years is related to the development of spoken language in children with ASD (Stone & Yoder, 2001). Intervention intensity is a somewhat elusive concept, since the quality of the intervention, degree to which the child's attention and engagement are secured and sustained during therapeutic activities, the number and nature of response opportunities and other related factors are likely to contribute to the "intensity" (or dosage) of the intervention (Landa, 2007). However, the way that these intervention ingredients interact with hours of intervention per week and characteristics of children with ASD or their parents (e.g. parents' buy-in to the intervention or their responsivity to the child (Yoder & Warren, 2001)) has not been addressed in the literature (Landa, 2007).

A comprehensive literature review supported the provision of communication intervention to persons with severe intellectual and developmental disabilities, including ASD and multiple disabilities (Snell et al., 2010). Over the past two decades, there has been increasing interest in developing effective interventions for young children with developmental disabilities, and in particular for children with ASD. Intervention

programmes tend to incorporate a mix of behavioural, developmental and educational approaches (National Research Council, 2001; Scottish Intercollegiate Guidelines Network (SIGN), 2007). Although methods vary, the general goal of most programmes is to enhance cognitive, communication and social skills while minimising symptoms of ASD and other problem behaviours. Three main strands of intervention have been the focus in the majority of studies conducted to date: programs that have a specific focus on communication; those in which developmental/educational strategies have been employed, and those with a particular emphasis on the use of behavioural principles to improve learning and behaviour (Howlin, Magiati, Charman, & MacLean, 2009). Although the various programs employ somewhat different methodologies, they also have important elements in common; for example, techniques developed from learning theory (Skinner, 1953) are essential components of most approaches (Howlin et al., 2009). Operant approaches, as exemplified in Applied Behavior Analysis (ABA) (Dunlap, Kern-Dunlap, Clark, & Robins, 1991) are particularly fundamental to behavioural techniques such as Pivotal Response Training (Schreibman & Koegel, 2005), Discrete Trial Training (Maurice, Green, & Luce, 1996) and Verbal Behavior (Barbera & Rasmussen, 2007) that form part of many modern-day early intervention programs for children with ASD (Howlin et al., 2009).

Increasingly, early interventions are focused on communication skills due to their centrality in daily functioning of individuals.

2.6   Symbolic Play Interventions for Children with ASD

Children with ASD can experience dramatic improvements in the quality of their play and joint attention if provided with instruction and a supportive social environment. One such intervention targeting joint attention and symbolic play using a combination of

behavioural and developmental approaches was associated with improvements in joint

attention, symbolic play and communication skills (Kasari et al., 2006). In this study, the

authors examined the effectiveness of targeting joint attention and symbolic play in a

randomised controlled trial involving three groups of children: children receiving targeted

joint attention interventions, children receiving targeted symbolic play interventions and

children in the control group. The participants were three- and four-year-olds with ASD.

The interventions were daily 30-minutes sessions that were carried out over a period of

five to six weeks, as part of a broader six-hour daily Early Intervention Program

employing applied behaviour analysis. **Tables 2.2** and **2.3** show the operational

definitions of levels of joint attention and symbolic play levels taught in the study.

Table 2.2

Joint Attention Levels (Kasari et al., 2006)

Joint Attention Level	Category	Definitions
I	Show	The child responds to a show or shows an object just to share it with another
II	Give	The child gives or receives an object just for sharing purposes
III	Proximal point	The child initiates or responds to a close by point just for sharing purposes
IV	Distal point	The child initiates or responds to a far-away point just for sharing purposes
V	Look	Child makes eye contact with parent
VI	Coordinated joint look	Child alternates gaze between a toy and an adult then back to the toy to share attention.

The results of this study indicated that both intervention groups improved

significantly over the control group on certain behaviours. Children in the joint attention

intervention initiated significantly more showing and responsiveness to joint attention on

a structured joint attention assessment and more child-initiated joint attention in the

mother-child interaction. The children in the play group showed more diverse types of symbolic play in interaction with their mothers and higher play levels on both the play assessment and in interaction with their mothers (Kasari et al., 2006). Both joint attention and symbolic play groups increased two types of joint attention initiation, showing and coordinated looks, as compared to the control group. In this way, the symbolic play intervention can be seen as having a collateral effect on some joint attention initiations, since joint attention initiations were acquired, but not directly taught in the symbolic play intervention.

Table 2.3

Symbolic Play Levels (Kasari et al., 2006; Lifter et al., 1993)

Symbolic Play Level	Category	Definitions
I	Indiscriminate actions (IA)	All objects are treated alike (e.g., all objects are mouthed)
II a	Discriminative actions on single objects (DA)	Differentiates among objects, preserving their physical conventional characteristics (e.g., rolls round beads, squeezes stuffed animal)
II b	Takes apart combinations (TAC)	Separates configurations of objects (e.g., takes all pieces out of puzzle)
III a	Presentation combinations (PC)	Recreates combinations of objects according to their presentation configuration (e.g., puts puzzle pieces into puzzles; nests the nesting cups)
III b	General combinations (GC)	Creates combinations of objects that result in simple, nonspecific configurations such as containers/contained relations (e.g., puts beads & puzzle pieces in cups)
III c	Pretend self (PS)	Relates objects to self, indicating a pretend quality to the action (e.g., brings empty cup to mouth to drink)
IV	Specific combinations (physical attributes) (SCPA)	Preserves unique physical characteristics of objects in the configuration (e.g., stacks nesting cups, strings beads)
V a	Child as agent (CAA)	Extends familiar actions to doll figures, with child as agent of the activity (e.g., extends cup to doll's mouth)
V b	Specific combinations (conventional attributes) (SCCA)	Preserves unique conventional characteristics of objects in the configuration (e.g., places cup on a saucer; places string of beads on self)
VI a	Single scheme sequences (SSS)	Extends same familiar action to two or more figures (e.g., extends cup to baby doll, to stuffed lamb, to interactant)
VI b	Substitutions (SUB)	Uses one object to stand in place for another (e.g., puts bowl on head for hat)
VI c	Substitutions without object (SUB)	Pretends to use something that is not there (e.g., shakes an imaginary salt shaker)
VII a	Doll as agent (DAA)	Moves doll figures as if they are capable of action (e.g., moves figure to load blocks in a truck; puts mirror into doll's hand as if to see itself)
VII b	Multischeme sequences (MS)	Extends different actions to same figure (e.g., feeds doll with spoon, wipes it with cloth, then puts to bed)
VIII a	Sociodramatic play (SP)	Adopts various familiar roles in play themes (e.g., plays house, assigning the various roles)
VIII b	Thematic fantasy play (TF)	Adopts roles of fantasy characters (e.g., plays "Superman" or "Wonderwoman", assigning the various roles)

In a five-year longitudinal follow up, 40 of the original 58 participants remained in the study. Kasari et al. reported that 80% of all children at the five-year follow up had achieved functional use of spoken language with baseline play level and initiation of joint attention ability predicting spoken language at the five-year follow up (Kasari et al., 2012). Of children who were using spoken language at eight years, several baseline behaviours predicted their later language ability including earlier age of entry into the study, initiating joint attention skill, play level, and assignment to either the joint attention or symbolic play intervention group. The authors suggested that the joint attention and play interventions had a common mechanism of joint engagement between the adult and child affecting language (Kasari et al., 2006). Theoretically, joint engagement serves as a platform for the continued development of social, communication, and language skills over time (Kasari et al., 2006). Effectively teaching joint attention skills may have collateral effects on social interaction and language development in children with ASD. Research has shown that by teaching joint attention skills, social initiations, functional and symbolic play skills, and spontaneous speech could increase (Whalen, Schreibman, & Ingersoll, 2006). Both targeted joint attention and symbolic play interventions are seemingly promising in producing collateral outcomes within the domain of social communication skills.

2.7   Behavioural Cusps

The following section describes the idea of behavioural cusps as relevant to the notion that teaching specific play skills may bring about collateral gains in other important and related developmental skills. What are behavioural cusps (sometimes referred to as developmental cusps)? A behavioural cusp is defined as "a behavior change that has consequences for the organism beyond the change itself, some of which may be

considered important" (Rosales-Ruiz & Baer, 1997, pp. 533). The authors provided an example of what can happen when a baby learns to crawl. The baby suddenly has increased access to the environment and its contingencies, gaining access to toys, family and other things more easily. These encounters produce interactions that will further shape the baby's behaviour. According to the authors, certain behaviour changes open the door to especially broad or especially important further behaviour change, leading to the concept of a behavioural cusp. A behavioural cusp, then, is any behaviour change that brings the organism's behaviour into contact with new contingencies that have even more far-reaching consequences (Rosales-Ruiz & Baer, 1997). As the cusps "bring the developing organism into contact with other, subsequent contingencies crucial to further, more complex, or more refined development, in a thereby steadily expanding, steadily more interactive realm, that will connote the conventional label of *developmental*" (Rosales-Ruiz & Baer, 1997, pp. 536). It is intended in this research that by changing a central behaviour, other aspects of the human organism's experience changes as well. These behavioural changes have more far-reaching consequences for the individual than those targeted by the interventions in the first place.

2.8   Developmental Trajectories

In typically developing children, first words typically appear between 10-16 months. Typically developing children learn .81 new words per day before 24 months (Fenson et al., 1994). The average two-year-old has a vocabulary of 200 to 300 words (Owens, 2006). Between 24 and 30 months, children acquire 1.64 new words per day (Fenson et al., 1994). While much is already known about early language development in typically developing children, the same cannot be said for children with developmental disabilities. Rice, Warren and Betz called for research that systematically compares

various developmental disorders that can lead to linguistic phenotypes for each disorder (Rice, Warren, & Betz, 2005). Detailing the developmental trajectory of communication and language skills in ASD will yield insights into diagnostically relevant developmental disruptions, providing information pertinent to the development of early interventions (Landa, 2007). Knowledge on developmental trajectory of communication and language skills in ASD will provide parents and teachers with useful reference points in evaluating and monitoring progress. These trajectories will also have the potential to serve as guidance for intervention programme planning.

Thomas et al. (2009, pp. 336) argued for the utility of the developmental trajectories approach or growth models with the aim of "constructing a function linking performance with age on a specific experimental task and then to assess whether this function differs between the typically developing group and the disorder group". They argued that an understanding of the underlying mechanism will be furthered by the richer descriptive vocabulary provided by the trajectories approach and an optimal design for studying developmental disorders is to combine initial cross-sectional designs with longitudinal follow-up (Thomas et al., 2009).

2.9   Measures of Early Social Communication Development and Symbolic Play

Given how important these early social communication skills are, it is necessary to have good measures for them for several reasons. Measures are needed for screening purposes. Screening ensures that there is a process of identifying children who are at risk for communication deficits so that their needs and eligibility for services can be evaluated. Measures allow for more in-depth assessment to guide the development and assessment of an intervention programme. In educational and therapeutic settings, measures are necessary for monitoring of a child's progress or in evaluation of

programmes. At an organisational level, measures are needed for accountability purposes especially if public funds are involved. Last but not least, reliable and valid measures when used appropriately will facilitate the advocacy for more quality early interventions for groups requiring support in developing these central skills. The Individuals with Disabilities Education Improvement Act (US Department of Education, 2004) makes a distinction between the terms evaluation and assessment. Evaluation refers to procedures that determine a child's current level of functioning and his or her initial continuing eligibility for early intervention (EI) services. Assessment, on the other hand, refers to a more detailed process of identifying needs, concerns, priorities, and resources, as well as the EI services required to meet the needs of the child and family.

There are currently measures in three related domains that are of relevance, viz. language, play and social communication. While social communication and symbolic play behaviours are crucial early skills predictive of later social functioning, these skills are often overlooked in standardised, normed tests of language for young children. Language tests for the young ages tend to focus on morpho-syntactic and semantic comprehension and production abilities (Landa, 2005).

Although many theorists have discussed the importance of play in young children's lives, Vygotsky's theory of symbolic play will be discussed as it is tied explicitly to assessment (Pellegrini, 2001). A primary concern for Vygotsky (1978), as stated in the title of his article, was the role of symbolic play in children's subsequent development. Through symbolic play children come to organise meaning in language and thought (Fein, 1979). For Vygotsky, play created a "zone of proximal development" (Pellegrini, 2001). In the zone of proximal development, children exhibit higher levels of competence than when outside the zone. The zone of proximal development was an important assessment/diagnostic construct because it revealed children's optimum levels

of competence whereas more traditional assessment contexts often inhibited exhibition of high levels of competence (Pellegrini, 2001).

There are several assessments which examine the play skills of children in a broad sense but few standardised assessments specifically examine symbolic play. Two such assessments are the Symbolic Play Test (Lowe & Costello, 1976) and The Test of Pretend Play (Lewis & Boucher, 1997). However, the Symbolic Play Test does not assess the preschool aged child and The Test of Pretend Play assesses the child's ability to substitute objects, attribute properties to objects and refer to absent objects as if present but not conventional-imaginative play, for example sitting a doll at a table. There is no standardised assessment that provides a developmental sequence of symbolic and pre-symbolic play skills, with the exception of the Developmental Play Assessment (Lifter et al., 1993).

For social communication skills, there are caregiver questionnaires, interviews or direct social communication sampling methods that are available to assist clinicians or researchers in documenting social communication skills (Landa, 2005). Some assessments of social communication skills include symbolic play components. An example is the Communication and Symbolic Behaviour Scales Development Profile (Wetherby & Prizant, 2002). Several of these tools are based on parental reports. Some of these tools are outgrowths of ASD research and are oriented towards ASD diagnosis.

Eadie and colleagues pointed out that there were no gold standards for what to include on parent reports of early communication skills, and no agreement on what skills represented symbolic or communicative acts (Eadie et al., 2010).

Observation of symbolic play behaviour on the other hand, can be an informative and powerful assessment strategy for those engaged in early intervention (Casby, 1992). Across practice settings, screening and assessment serve as gateway to services, so

measures used for these purposes need to have sound psychometric properties, such as validity and reliability. A valid instrument measures what it claims to measure, such as communication skills and not something else, such as the fine motor skills needed for a pointing response. A reliable measure is stable and does not change based on who administers the test or when it is administered (Crais, 2011).

Contemporary evaluations and assessment approaches recognise the value of combining standardised and non-standardised methods, and one such method can be found in play-based assessments (Crais, 2011). In play-based assessments, play serves as the primary context for observation and documentation of a child's behaviour as he or she interacts with toys or people. Play assessment (or evaluation to determine eligibility) may be accomplished with a parent, a primary facilitator, or multiple facilitators who take turns eliciting targeted behaviours from the child while the other team members observe and track the child's responses. Most play-based assessments include both free and structured play opportunities. Myers, McBride, and Peterson (1996) examined the social validity of play-based assessments and reported that parents and professionals had positive perceptions of the assessment, team meetings, feedback from professionals, and resulting reports. Further, the play-based assessments were completed in a significantly shorter time frame than traditional assessments, and the resulting reports contained more useful information that could be directly translated into intervention.

Developmental Play Assessment (DPA). The Developmental Play Assessment (Lifter et al., 1988) instrument was constructed based on descriptive studies of unstructured and structured play among children developing without disabilities (Belsky & Most, 1981; Bloom et al., 1985; Fein, 1981; Fenson et al., 1976; Lifter, 1982; Piaget, 1962) and among children with developmental delays (Ungerer & Sigman, 1981). Developmental order was derived from developmental sequences identified in the

descriptive studies of play, with the categories and order of emergence identified in Lifter and Bloom (1989) forming the foundation of the sequence generated. Quantitative criteria, such as the emergence and achievement of play forms (Lifter & Bloom, 1989), shifts in the relative proportion of categories over time (Bloom et al., 1985; Lifter, 1982; Lowe, 1975) and scalogram (Belsky & Most, 1981; Lifter & Bloom, 1989) were used to order the play categories in relation to one another. The developmental sequence and definitions of play categories used in the DPA are presented in **Table 2.3**.

Although several assessment instruments have been developed to assess children's play (Fewell & Rich, 1987; Lowe & Costello, 1976; Westby, 1980) and may be equally useful for assessing play development, the strengths of the DPA for children with developmental disabilities include a focus on presymbolic (manipulative) play and a distinction between emergence and mastery of play categories for selecting play objectives for intervention (Lifter et al., 1993). In addition, the DPA follows the model of curriculum-based assessment set forth in Neisworth and Bagnato (1988) because it provides a continuum of objectives in a developmental order along which a child's progress can be monitored. The procedures used in the DPA are based on procedures of behavioural assessment (Powers & Handleman, 1984) and parallel the procedures used for naturalistic assessment of language (Bloom & Lahey, 1978; Lahey, 1988).

Lifter and her colleagues described the use of the DPA to address the issue of the selection of play activities as instructional objectives, given that play activities can be taught (Lifter et al., 1993). The authors discussed the distinction between age and developmental level.

Given the myriad of assessment tools and measures that are currently available, researchers and practitioners need to know which tool to use for which population and for what purpose. A systematic review of current literature on measures of early social

communication and symbolic play and an examination of the psychometric properties of these assessment instruments were warranted.

2.10   Summary

In this chapter, a review of the existing literature concerning early social communication, language and play development, both in typically developing children and in children with ASD, early interventions for children with ASD, more specifically, targeted symbolic play interventions, as well as a literature review on measures for early social communication and symbolic play have been outlined. The review highlighted gaps in existing knowledge and accentuates the need for further research to be done in these areas, which are summarised in **Table 2.4**.

Table 2.4

Existing Knowledge Gaps that Provide Further Research Opportunities

Area	Knowledge Gaps	Research Opportunities
Assessment and measurement of early social communication and symbolic play	Various assessment tools have been reported and used, but the rationale for and implications of these choices are unclear	Systematic reviews to investigate which measures have been used and to find out characteristics of these measures
Targeted symbolic play intervention	Previous study by Kasari and her colleagues (2006) used an RCT approach and found data supporting the effectiveness of the intervention for children with ASD, behavioural data on the intervention are however lacking	A partial systematic replication of the symbolic play intervention (Kasari et al., 2006) using a behavioural paradigm will explicate the teaching and learning processes with a target child with ASD
Collateral gains in specifically targeting play in early interventions	Even though play is intricately related to early social communication and language development, both in cross-sectional and prospective studies, no studies have yet reported on collateral language gains through targeted play interventions	Investigate collateral gains in related and important domains of child development such as language with targeted symbolic play intervention

Area	Knowledge Gaps	Research Opportunities
Developmental trajectories in children with ASD	Studies are beginning to use the developmental trajectories approach to understand symptomatology of ASD. No studies have yet used this approach to examine how developmental trajectory can be changed with an intervention	Examine developmental trajectories of children with ASD vis-à-vis typically developing children on their communication, play and language development Layer an intensive targeted play intervention for one child with ASD and examine the developmental trajectory changes if any

Based on the research opportunities identified above, the following chapter presents the research objectives that are established to address identified knowledge gaps. An outline of the research methodology will be provided.

CHAPTER 3 – RESEARCH METHODOLOGY

This chapter lays out the research objectives to address knowledge gaps identified in the literature review. The research methodologies adopted to achieve the research objectives are then put forward.

3.1   Research Objectives

Following the research aim established in section 1.2, four specific objectives were established as follows:

1. Identify the range of measures used by researchers for assessing early social communication skills, including the frequency of use and the reported psychometric properties of these measures.

2. Identify the range of measures used by researchers for assessing symbolic play skills, including the frequency of use, the assessment formats and contents of the measures, and the reported psychometric properties of these measures.

3. Using a behavioural paradigm, design and carry out a single case design study on a targeted symbolic play intervention for a preschooler with ASD. This is a partial systematic replication of the targeted symbolic play intervention in an earlier study conducted by Kasari and her colleagues (Kasari et al., 2006).

4. Examine the developmental trajectories of social communication, language and play skills for three groups of children: an ASD group, a neurotypical group, and a child with ASD receiving targeted symbolic play intervention. In particular, investigate possible collateral gains in relation to the targeted symbolic play intervention.

To identify the range of measures used for assessing early social communication skills and symbolic play skills (Objectives 1 and 2), two separate systematic reviews were conducted. The methodology for both these systematic reviews will be described in Chapters 3 and 4 for the systematic review on measures for early social communication and symbolic play respectively. The following sections detail the methodology employed to achieve Objectives 3 and 4.

3.2   Symbolic Play Intervention Study and Developmental Trajectories

Research Design. The overall design uses a developmental trajectory approach. It combines initial cross-sectional designs with longitudinal follow-up (Thomas et al., 2009). There were a total of three time-points across this longitudinal study, Time 1, Time 2 and Time 3. Two groups of children, one with ASD, the other a Neurotypical group were followed up over these three time points.

After the initial cross-sectional data collection at Time 1, one target child with ASD from the ASD group of four children received daily targeted play intervention over a ten-week period. This part of the study is a partial systematic replication of the symbolic play intervention by Kasari and her colleagues (2006). However, a single case behavioural design is used in the current study. A single case, multiple baseline design across teaching targets was used. Post-intervention data collection took place at Time 2. Time 3 data collection took place three months after and acted as a maintenance probe. Prior to the recruitment of participants, approval was obtained from the ethics committee to ensure that the study design was in compliance with ethical guidelines established by Monash University (**Appendix A** is a copy of the ethics approval letter).

Participants. A total of eight preschool-aged children participated in this investigation. Four children had a diagnosis of ASD (two ASD, one autism, and one

PDD-NOS), and the other four children were gender and aged matched neurotypical children. The children with ASD were recruited from an Early Intervention Centre and they all presented with difficulties with communication skills. The neurotypical children were recruited from a Childcare Centre. As part of the recruitment process, copies of the explanatory statement and consent form were extended to the parents of children with ASD (**Appendix B**) and parents with typically developing children (**Appendix C**). A completed consent form for each child was obtained before the commencement of any data collection.

The average chronological age of the children with ASD was 50.00 months and that for the neurotypical group was 52.75 months.

To be included in the ASD group for this study, the participants had to be between three and four years old, diagnosed with ASD and present with social communication difficulties. Children with seizures or other medical conditions were excluded. **Table 3.1** shows background information on the participants.

One participant, CH from the Neurotypical group dropped out of the study at Time 3 and was excluded from further analysis.

Table 3.1

Details of Participants

Participant	KK	AH	MO	TG
Ages	46 months	53 months	51 months	50 months
Gender	Female	Female	Male	Male
Diagnosis	PDD-NOS	Autism	Autism	ASD
Early Intervention Centre	2 hours, once a week	2 hours, once a week	2 hours, once a week	2 hours, once a week
Mainstream, Kindergarten or Childcare Attendance	Yes, 32 hours a week	Yes, 7.5 hours a week	Not attending	Yes, 2 hours a week
Speech and Language Sessions	2-3 sessions a month	1 hour per fortnight	Half an hour per week	Half an hour per fortnight
Occupational Therapy sessions	Nil	1 hour every two months	1hour per fortnight	45minutes per month
Psychologist sessions	1hour per month	1hour per month	1hour per month	Nil
Gender and Age Matched Neurotypical Participant				
Participant	NB	CH	LZ	WT
Age	45 months	58 months	57 months	51 months
Gender	Female	Female	Male	Male

Setting. The research was conducted primarily at playrooms in a university. The playrooms had a small table, three small chairs and toys. Every session was video-recorded using a video recorder on a tripod stand. Intervention sessions for the one target child took place at either the university playrooms or at the child's preschool.

Materials. Two sets of assessments were used, Preschool Language Scales- Fifth Edition (Zimmerman et al., 2011) and the Developmental Play Assessment (Lifter et al., 1988).

Preschool Language Scales- Fifth Edition (PLS-5). PLS-5 offers a comprehensive developmental language assessment, with items that range from pre-verbal, interaction-based skills to emerging language to early literacy (Zimmerman et al., 2011). This interactive, play-based assessment provides comprehensive and reliable

information about language skills for children from birth through age seven. It requires

pointing or verbal responses to pictures and objects (**Figure 3.1**). It takes 45 to 60 minutes

to complete in a one-to-one administration. It provides total language, auditory

comprehension, expressive communication standard scores, growth scores, percentile

ranks, and language age equivalents.

Figure 3.1: Administration of PLS-5

Developmental Play Assessment (DPA). The DPA includes a video recorded 30-

minute sample of unstructured play, in which the child plays sequentially with four

groups of toys, in the presence of a tester (Lifter et al., 1988). According to Lifter and

Bloom (1989), the toys were selected based on their manipulative and pretend play

possibilities. In the current study, the toys included were similar to those used in the

original study. **Figure 3.2** shows the full set of DPA toys used in the current study. It is

noted that a basic premise of the DPA is that children of different developmental levels

play differently with the same group of toys (Lifter et al., 1988). The emphasis is on what

the children do with the toys and not on the characteristics of the toys.

During the 30-minutes free play observation the tester does not direct the play but comments descriptively on what the child does with the toys (e.g. "You have a cup," after the child picks up a cup) and repeats what the child says (child says "dog" while pointing to a puzzle piece, picturing a dog, whereupon the teacher says, "Yes, that's a dog") (Lifter et al., 1993). In this way, a baseline play level is established. Expressive or receptive language skills are not required for this assessment, making the DPA useful for children with language delays and other developmental disabilities.

Procedure. At each of the three time-points each child was administered two assessments: the Preschool Language Scales, Fifth Edition – Australia and New Zealand Adapted Version (Zimmerman et al., 2011) and the Developmental Play Assessment (Lifter et al., 1988). The three time-points were Time 1 (pre-intervention), Time 2 (post-intervention) and Time 3 (three-month maintenance probe). Parents also completed a demographic questionnaire regarding background characteristics of the child, and any interventions the children received during the course of the study (refer to **Appendix D**).

Figure 3.2: Full Set of Toys for DPA

Symbolic play intervention procedures. One participant from the ASD group, KK, participated in the daily targeted symbolic play intervention between Time 1 and Time 2 of the longitudinal study.

Defining the treatment goals (content). Treatment goals were derived from the target child's DPA results (Kasari et al., 2006). A mastery criterion of 85% on the table top play, discrete trials approach, was adopted. When a play skill was mastered, a new goal was developed using the DPA as a guide. A list of treatment goals adopted for this intervention is provided in the following table.

Table 3.2

List of Treatment Goals

Session	Target Play Category	Target Play Activity	Play Toys / Examples
1	Discriminative Actions	1. To hold utensils	Forks, knives, cups, plates
		2. To open toys	Pot with lid, flip-phone
		3 To press buttons for effects	Phone – sounds Comb – light
2-3	Discriminative Actions	1. Walks figures	Farmer doll, horse, cow
		2. Sits figures	Farmer doll, horse, cow
4-5	Discriminative Actions	1. Says "chugga chugga/ choo choo" when moving a train	3-part train set
6-7	Discriminative Actions	1. Rolls pig (in mud)	Pig
		2. Gallops horse	horse
8-12	Discriminative Actions	1. Makes animal sounds	Pig "oink oink" Cow "moo" Horse "neigh" Rooster "Cockadoodle doo"
13-20	Pretend Self	1. Drinks from cup 2. Eats with fork from plate	Cup, plate and fork
21	Pretend Self	1. Holds phone to ear 2. Brings comb to hair	Phone, comb
22-23	Child as Agent	1. Gives a doll a drink with a cup	
		2. Feeds doll with a fork	
24-25	Specific Combination (Conventional Attributes)	1. Puts doll to bed	Doll and bed
		2. Sits doll on armchair	Doll and armchair
		3. Combs doll's hair	Doll and comb
26-27	Doll as Agent	1. Uses doll's hand to feed animals	Doll, cow, pig, horse and rooster

Structure. The author worked with the target child daily (Mondays to Fridays) for approximately 30 minutes. The intervention period lasted 10 weeks.

Approach. The approach involved applied behaviour analysis and developmental procedures of responsive and facilitative interactive methods (Kasari et al., 2006). The child received approximately five to eight minutes of discrete trial training to 'prime' the particular treatment goal. Both, a least to most prompt hierarchy (verbal prompt, model, physical prompt) and positive reinforcement were used to achieve the child's appropriate response. Following the table training, the child worked on the same goal on the floor in a semi-structured session with the author. During this session, the targeted skill was still shaped using techniques of systematic prompting and reinforcement, but on the floor, the researcher used naturally occurring opportunities, similar to milieu teaching (L. Koegel et al., 1999; Warren & Bambara, 1989). Principles applied on the floor included following the child's lead and interest in activities, talking about what the child was doing, repeating back what the child said, expanding on what the child said, giving corrective feedback, sitting close to the child, making eye contact and making environmental adjustments to engage the child. The floor session was child-driven rather than adult-directed, and environmental manipulations were strategically used to facilitate the child's social and communicative attempts. The advantage of this combined (behavioural drill and milieu teaching) treatment approach is that the possibility of shaping the targeted behaviour is maximised through repetition and drill (Kasari et al., 2006). Generalisation of the behaviourally trained skill is increased by moving the skills into a semi-structured social-play context. **Appendix E** shows a copy of the score sheets used for each session.

Mastery or moving to the next goal. Targeted goals were considered mastered if the child demonstrated 85 percent correct trials on the table top discrete trial play.

Figure 3.3 and **3.4** show the table and floor play component in the symbolic play intervention procedure.

Figure 3.3: Symbolic Play Intervention (Table Play)

Figure 3.4: Symbolic Play Intervention (Floor Play)

PART II:

SYSTEMATIC REVIEWS OF MEASURES

CHAPTER 4 – MEASURES FOR ASSESSING EARLY SOCIAL COMMUNICATION

4.1 Methodology

A systematic literature review was conducted in October 2012 using PsychINFO database (American Psychological Association). A search was conducted for measures of early social communication. Search terms used were "early social communication" and "measure*", together with their respective synonyms and alternatives. Please see **Appendix F** for a full list of search terms. The aim was to obtain more recent trends, therefore, articles published before Year 2000 were excluded. Non-English articles were excluded. Articles in the "birth to 12 years" age group were included. While this study focuses on children of preschool age, this upper age limit was chosen to ensure that studies with children who were six years of age but which might only be listed in the "six to 12 years" category in the database were included. This decision was made to over-capture, rather than under-capture, journal articles in this initial search process.

From the results of the electronic searches, the author selected articles involving measures of early social communication by reading the titles and abstracts. Target articles were those which reported on the measure itself or where the measures were used as independent variables, dependent variables, and in some cases, for child profiling within the study. Articles judged relevant were retained whilst the rest were eliminated from the search process. When a decision could not be reached by reading the title and abstract, the author read the article with emphasis on the Method section to determine the relevance of the article to this review.

The initial electronic search generated 1028 hits of which 464 articles remained after the English only, from Year 2000 and up to 12 years limits were applied. Of these

464 articles, 183 were deemed to be relevant and were retained for this review. An inter-rater reliability check on the articles selection process was conducted with an experienced researcher and practitioner in the area of early interventions for children with ASD. Slightly over 20% of the articles (100 articles) were randomly selected for this check and the second reviewer was provided with written instructions on the procedure (**Appendix G**). An inter-rater reliability of .83 was achieved for the selection of articles. For instances where decision differed, the author's decision was deemed final on the premise that the author had greater familiarity with the field.

The following phase of the review involved the identification of measures used in the 183 retained articles. A list of measures used and information on these measures were extracted. A data extraction protocol (**Appendix G**) was used to extract information on the list of measures including the names of authors and test properties. Primary publications on these measures were obtained where possible. From these publications, further information on the measures was extracted using the same protocol.

4.2 Review Outcome

The 183 journal articles retained for this review came from various disciplines including Psychology, Education, Speech and Language Pathology, Psycholinguistics, Early Intervention, Medicine and Paediatrics.

Out of 183 articles, 22 (12.0%) employed individual coding systems devised by the respective authors. These approaches were specific to each of these 22 separate studies and were mainly behavioural observational measures. These individual coding systems did not count as named measures and were excluded from further analyses. Apart from these individual coding systems, 46 different named measures were reported in the 183 articles. Please refer to **Table 4.1** for the complete list of 46 measures used for

assessing early social communication in young children. These measures are listed in

order of frequency counts, from the most to least frequently reported.

Of the 46 reported measures, 22 (47.8%) had a frequency count of one. Thus,

since 2000 each of these 22 measures has been reported once in the published literature to

assess early social communication.

Table 4.1

List of 46 Measures for Early Social Communication Skills

Rank	Name of Measure	Author(s)	No. of Articles
1	Autism Diagnostic Observation Scale (ADOS)	Lord et al. (2000); Lord et al. (1989)	55
2	Social Communication Questionnaire (SCQ)	Rutter, Bailey, and Lord (2003)	47
3	Autism Diagnostic Interview- Revised (ADI-R)	Lord, Rutter, and Couteur (1994)	40
4	Early Social Communication Scales (ESCS)	Mundy et al. (2003)	33
5	Vineland Adaptive Behavior Scales (VABS)	Sparrow, Balla, and Cicchetti (1984)	24
6	Mullen Scales of Early Learning (MSEL)	Mullen (1995)	20
7	MacArthur Communication Development Inventory	Fenson et al. (1993)	18
8	Communication and Symbolic Behavior Scales – Developmental Profile (CSBS-DP)	Wetherby and Prizant (2002)	16
9	Children's Communication Checklist (CCC)	Bishop (1998)	14
10	Social Responsiveness Scale (SRS)	Constantino et al. (2003)	14
11	Childhood Autism Rating Scale (CARS)	Schopler, Reichler, and Renner (1986)	9
12	Preschool Language Scales (PLS)	Zimmerman et al. (2011)	8
13	Reynell Developmental Language Scales (RDLS)	Reynell and Gruber (1990)	6
14	Batelle Development Inventory (BDI)	Newborg, Stock, Wnek, Guidubaldi, and Svinicki (1984)	5
15	Early Communication Index (ECI)	Greenwood, Walker, and Buzhardt (2010)	5
16	Structured Play Assessment (SPA)	Ungerer and Sigman (1981)	5
17	Checklist for Autism in Toddlers (CHAT)	Baron-Cohen, Allen, and Gillberg (1992)	4

Rank	Name of Measure	Author(s)	No. of Articles
18	Developmental, Dimensional and Diagnostic Interview (3Di)	Skuse et al. (2004)	3
19	The Diagnostic Interview for Social and Communication Disorders 9th Revision (DISCO-9)	Wing, Leekam, Libby, Gould, and Larcombe (2002)	3
20	Social Communication Disorders Checklist (SCDC)	Skuse, Mandy, and Scourfield (2005)	3
21	Developmental Play Assessment (DPA)	Lifter et al. (1988)	2
22	Fewell Play Assessment Scale (PAS)	Fewell and Rich (1987)	2
23	Scales of Independent Behavior – Revised (SIB-R)	Bruininks (1996)	2
24	Social Skills Rating System (SSRS)	Gresham and Elliott (1990)	2
25	Autism Observation Scale for Infants (AOSI)	Bryson, Zwaigenbaum, McDermott, Rombough, and Brian (2008)	1
26	Autism Spectrum Disorder – Diagnostic for Children (ASD-DC)	Matson, Gonzalez, Wilkins, and Rivet (2008)	1
27	Autism Treatment and Evaluation Checklist (ATEC)	Rimland and Edelson (2000)	1
28	British Ability Scales (BAS)	Elliott, Smith, and McCulloch (1996)	1
29	Checklist for Early Signs of Developmental Disabilities (CESDD)	Dereu et al. (2010)	1
30	Communication Complexity Scale (CCS)	Brady et al. (2012)	1
31	Developmental Behavior Checklist (DBC)	Einfeld and Tonge (2002)	1
32	Early Development Interview (EDI)	Werner, Dawson, Munson, and Osterling (2005)	1
33	Early Screening for Autistic Traits (ESAT)	Dietz, Swinkels, van Daalen, van Engeland, and Buitelaar (2006)	1
34	First Year Inventory (FYI)	Reznick, Baranek, Reavis, Watson, and Crais (2007)	1
35	Modified – Classroom Observation Schedule to Measure Intentional Communication (M-COSMIC)	Clifford, Hudry, Brown, Pasco, and Charman (2010)	1
36	Naturalistic Observation Schedule of Infants /Toddlers Behaviors (NOSIB)	Poon, Watson, Baranek, and Poe (2012)	1
37	Pediatric Evaluation of Disability Inventory (PEDI)	Haley (1992)	1

Rank	Name of Measure	Author(s)	No. of Articles
38	Parent Interview for Autism- Clinical Version (PIA-CV)	Stone, Coonrod, Pozdol, and Turner (2003)	1
39	Peer Play Code (PPC)	Craig-Unkefer and Kaiser (1998)	1
40	Pragmatics Profile of Everyday Communication Skills (PPECS)	Dewart and Summers (1995)	1
41	Preverbal Communication Schedule (PVCS)	Kiernan and Reid (1987)	1
42	Screening Tool for Autism for Two-year-olds (STAT)	Stone, Coonrod, and Ousley (2000)	1
43	Sequenced Inventory of Communication Development – Revised (SICD-R)	Hedrick, Prather, and Tobin (1984)	1
44	Social Communication Assessment for Toddlers with Autism (SCATA)	Drew, Baird, Taylor, Milne, and Charman (2007)	1
45	Social-Communication Assessment Tool (S-CAT)	Murdock, Cost, and Tieso (2007)	1
46	Visual Impairment and Social Communication Schedule (VISCS)	Absoud, Parr, Salt, and Dale (2011)	1

Note: Measures are listed in alphabetical order for those sharing the same number of frequency count(s).

Ten of these 46 measures had more than 10 citations reporting their use for the purpose of assessing early social communication skills. **Table 4.2** lists these 10 most commonly reported measures, in order of frequency of use. Published psychometric information on the reliability and validity statistics for each of these measures is also presented.

Table 4.2

Reported Psychometric Properties for 10 Most Commonly Used Early Social Communication Measures

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
1	Autism Diagnostic Observation Scale (ADOS)	Lord et al. (1989)	Inter-rater reliability: 0.80 – 1.00 Intra-class correlation: 0.73-0.87 Cohen's kappa coefficient : 0.75	Concurrent validity – The ADOS correlated with The Developmental, Dimensional and Diagnostic Interview (3Di) in investigating the validity of PDDNOS diagnosis.	Internal consistency reliability ranged from .91 to .94 for social and communication items. For modules 3 and 4, mean inter-rater agreement was .88 Inter-rater reliability on all item domains ranged from .82 (restricted and repetitive behaviours) to .93 (social behaviours). Inter-rater agreement in diagnostic classification based on the ADOS algorithm exceeded 90%. Test-retest reliability ranged from .59 (repetitive behaviours) to .78 (social behaviours) (Lord et al., 2000).	Concurrent validity between the ADOS and the ADI-R and between the ADOS and SCQ is good, rs = .57 and .55 respectively, ps= .001 (Rutter et al., 2003).	
2	Social Communication Questionnaire (SCQ)	Rutter et al. (2003)	Internal consistency: 0.47 – 0.80	Concurrent validity – The SCQ correlated with Social Responsiveness Scale (SRS) and Children's Communication Checklist (CCC). The SCQ was compared with DSM-Q. Convergent validity with ADOS, ADI-R and SCQ was examined. Content validity – SCQ was used to identify "autism spectrum" disorders with other genetic conditions, in comparison with ADOS and ADI-R. Discriminatory validity – Diagnostic discrimination of ASD, PDDNOS and non-ASD was investigated using the SCQ alone and with ADOS. Using SCQ with ADOS improved specificity. The SCQ was found to discriminate between ASD and ADHD, but not ASD and mixed ASD+ADHD.	Internal consistency for the Total scale is high (Cronbach's alpha = .90). Receiver operating curve analysis suggests an optimal cut-off score of 15 yielding a sensitivity of .85 and a specificity of .75 (Granader et al., 2010). The SCQ's reliability is established with good internal consistency across age bands and diagnostic groups (alpha = .81 – .93) and concurrent validity demonstrated by strong correlation with ADI-R total and domain scores (Corsello et al., 2007).	A principal component analysis with Varimax rotation identified 4 components that accounted for 42.4% of the item variance. The authors labelled these social interaction, communication, abnormal language, and stereotyped behaviour (Rutter et al., 2003). Rutter et al. (2003) also found excellent concurrent validity of the SCQ when compared to the ADI-R for the RSI domain, the Pearson inter-correlation coefficient was .92, for the Communication domain it was .73 and for the RRBI domain, it was .89 The SCQ Total score shows strong relations with the ADI-R (r = .71) (Granader et al., 2010). The SCQ has good discriminative validity (.88) for the separation of autism spectrum diagnoses (autism/Asperger's/PDD-NOS) from other diagnoses and specificity (.75), although the tool may have some difficulty distinguishing between autism diagnoses (i.e. autism vs. PDD-NOS) and is considered conservative for not picking up some high-functioning individuals on the spectrum (Berument, Rutter, Lord, Pickles, & Bailey, 1999).	Only 15 or 46% of the items distinguished between children with and without ASD in a much younger sample mean age 5 yrs. Raised the question of "best" cut-off for younger children (Eaves, Wingert, Ho, & Mickelson, 2006).

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
3	Autism Diagnostic Interview-Revised (ADI-R)	Lord et al. (1994)	Greater than .90 (criterion for trained assessors)	Concurrent validity – The ADI-R was compared with the SCQ.	Moderate inter-rater reliability .52 – .97 in different studies; test-retest reliability Cronbach's alpha = .82 - .97 (Landa, 2005).	The factor structure of the ADI-R algorithm items was examined using the exploratory (EFA) and confirmatory factor analyses (CFA) factor methods. The ADI-R was completed for 1170 youths and adults (ages 2-46). Results of the EFAs indicated strong support for a two-factor structure, with social communication and stereotyped behaviour factors. CFAs indicated roughly equal support for the above-described two-factor model and a three factor model separating peer relationships and play from other social and communicative behaviours. Multi group EFAs and CFAs suggested that both two and three factor models showed good stability across age, with only slight changes in factor relationships (Frazier, Youngstrom, Kubu, Sinclair, & Rezai, 2008).	
4	Early Social Communication Scales (ESCS)	Mundy et al. (2003)	Inter-rater reliability: 0.68 – 0.99	Not reported by the 33 studies in the current review.	Inter-rater reliability for 14-17-month-old children (n=14): .76 - .94, except for Responds to Behavioral Requests = .61 (Mundy et al., 2003).	Construct validity: A longitudinal study of 14- to 17-month-olds supported the hypothesis that individual differences in one type of joint attention skill, the tendency to follow the gaze and pointing of a tester, as measured using the ESCS, would be a significant predictor of receptive language development. The results provided strong support for this primary hypothesis, and also equivocal support for the assumption that different types of joint attention skill using the ESCS reflect the development of a single common cognitive process. The results suggested that different types of joint attention skills may reflect partially distinct processes associated with comprehension and expression factors in early social-communication development (Mundy & Gomes, 1998).	
5	Vineland Adaptive Behavior Scales (VABS)	Sparrow et al. (1984)	Not reported by the 24 studies in the current review.	Construct validity: Correlated VABS Communication with other language tests	The VABS-Communication was reported to have strong internal consistency (.86-.89) for children aged between 3 and 7 years (Sparrow et al., 1984).	The concurrent validity of the VABS-Communication was checked by correlating the VABS-Communication score of 15 young children with ASD with the Total Language Score of the Preschool Language Scale (Zimmerman et al., 2011) revealing a strong	

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
						association (r=.95, p<.01) between the two measures (Poon et al., 2012).	
6	Mullen Scales of Early Learning (MSEL)	Mullen (1995)	Not reported by the 20 studies in the current review.	Not reported by the 20 studies in the current review.	The split-half internal consistency coefficients of the composite and domain scores are acceptable, with the composite having an internal reliability value of .91, and the individual domains ranging in value from .71 to .79 (Luyster, Kadlec, Carter, & Tager-Flusberg, 2008). Reliabilities for the instrument were obtained with the original version of the MSEL with a younger age group (0 to 2 years of age) and an older group (2 to 5 years of age). The younger age group had good median stability coefficients for the cognitive scales (.82–.85); however, the older age group was less reliable (.71–.79) by comparison. Gross motor scores were high at .96 for the younger age group, demonstrating a high degree of reliability. Inter-rater reliability was reportedly high and fell in the ranges of .91 to .99. (Mullen, 1995).	The MSEL has been shown to demonstrate good construct and criterion validity in a normative population. Three types of construct validity were presented, including developmental progression of scores, intercorrelations of the scales, and a principal-axis factor analysis. The exploratory factor analysis for the sample lent support for the construct validity of the MSEL composite as a measure of general intelligence. Efforts to demonstrate concurrent validity of the MSEL across four subtests were performed via correlation with the Bayley Scales of Infant Development Mental Development Index yielding a score of .53–.59 (Mullen, 1995).	
7	MacArthur Communication Development Inventory (MCDI)	Fenson et al. (1993)	Not reported by the 18 studies in the current review.	Not reported by the 18 studies in the current review.	The internal consistency reliability for the MCDI composite score was reported to be .95 (Hwa-Froelich & Matsuoh, 2008).	The CDI Infant Form-Words and Gestures is highly reliable and well validated with complete standardization data for infants. It is designed for 8 to 16 months old, but has also been used to map the developmental trajectories of older children with ASD (Mitchell et al., 2006). Norms were developed for a wide range of children and the MCDI have been found to have excellent validity and reliability for both normal and autistic populations (Charman et al., 2003).	
8	Communication and Symbolic Behavior Scales- Developmental Profile	Wetherby and Prizant (2002)	Internal consistency: .74 Inter-rater reliability: .70 – 1.00	Content validity – Confirmatory factor analysis provide support for at least three factors, broadly representing Social, Speech and Symbolic communication skills, with some evidence that the speech factor could be further split into sub-factors	Adequate levels of reliability (internal consistency coefficient was .91, median inter-rater reliability coefficient was .90) and high levels of validity (content, criterion, and construct) were reported in the normed edition of the CSBS manual (Wetherby, Goldstein, Cleary, Allen, & Kublin, 2003).	The manual reported that the CSBS correctly classified 85% of children with pervasive developmental disorders and 60% of children with speech-language impairment (Wetherby et al., 2003).	

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
	(CSBS-DP)			representing Sounds and Words.	Internal consistency reliability for the CSBS-DP composite scores ranges from .86 to .93. Test-retest reliability was demonstrated to be stronger with shorter test intervals (< two months) than with longer test intervals (> 2 months) (Wetherby & Prizant, 1993).		
9	Children's Communication Checklist (CCC)	Bishop (1998)	Internal consistency: Split-half Cronbach's alpha: .82 for CCC-Pragmatics, .80 for CCC-Autism Test-retest reliability: .80 Internal consistency: .71 – .79	Construct validity – CCC pragmatic composite was correlated with language and IQ test scores.	Inter-rater reliability is around .80 when comparing ratings between speech and language therapists and teachers (Bishop, 1998). Parental completion of the CCC has been shown to be a reliable method of gaining information about a child's pragmatic competence, inter-rater reliability for parental report was .70 (Bishop & Baird, 2001). The composite pragmatic scale formed of seven of the subscales (C-G) had an inter-rater reliability of .80 (Bishop, 1998).	Construct validity: Validation data on the CCC-2 were retrieved from clinical samples of children with a diagnosis of Autistic Disorder, Asperger's Syndrome, and children identified primarily with communication difficulties (further subdivided into (a) typical SLI, (b) PLI, and (c) PLI with features of autism (PLI+). For each of the CCC-2 subscales, an ANOVA revealed an effect of p< .001, and Scheffé's tests revealed significant differences (.05) between the control group and all five of the identified clinical groups (Bishop, 2003).	Inter-rater reliability for two professionals rating the same child on the pragmatic composite was estimated at .80 by Bishop (1998), although inter-rater agreement between a parent and professional was only .47, for a heterogeneous clinical sample (Bishop & Baird, 2001).
10	Social Responsiveness Scale (SRS)	Constantino et al. (2003)	Test-retest reliability: .84 – .97	Concurrent validity – The SRS was compared with Social Communication Disorders Checklist (SCDC). Sensitivity: .74 – .80 Specificity: .69 – 1.00	Internal consistency is high for both male and female participants (Cronbach's alpha > .90) and the instrument has shown temporal stability (test-retest) reliability at 17 months: r = .85 for males and r = .77 for females. Inter-rater reliability is also high between mothers and fathers at 0.91 (Granader et al., 2010). Moderate inter-rater reliability (r= 0.51-0.67) (Landa, 2005). Acceptable levels of internal consistency (.93-.97) and test-retest reliability (.77-.85) (Solomon et al., 2011).	The SRS discriminates well between children with ASDs and other psychiatric conditions. Moreover, moderately strong associations were found between the SRS and the ADI-R, with correlation coefficients exceeding .52 across all subscales." (Granader et al., 2010).	Compared with eventual diagnostic outcome – sensitivity was high (91% for parents, 84% for teachers), however specificity was low (8% for parents, 41% for teachers). Recommended only for screening purpose. Limitation on its use with younger children: Reliability and validity studies have not been conducted for the preverbal version (Cunningham, 2012).

4.3   Types of Measures

Even though ASD was not included in the search terms, 20 out of 46 measures (43.5%) target the ASD population, mainly for screening or diagnostic purposes. The Autism Diagnostic Observation Scale (Lord et al., 2000), Social Communication Questionnaire (Rutter et al., 2003) and Autism Diagnostic Interview – Revised (Lord et al., 1994), all ASD screening and diagnostic instruments, topped the list with between 40 to 55 citations each.

The non-ASD-specific measures varied widely in terms of contents and purpose, assessing various domains of child development, such as language, play, adaptive behaviour, social skills, general ability and broader development. A few measures are dedicated to specific special populations such as the Visual Impairment and Social Communication Schedule (Absoud et al., 2011), for assessing early social communication difficulties and clinical ASD in preschoolers with visual impairment. The Checklist for Early Signs of Developmental Disabilities (Dereu et al., 2012) on the other hand, is a screening instrument designed to be used by child care workers who are potential resource personnel for early identification of ASD.

The 46 measures were categorised according to their primary assessment domain. The following four broad categories were used, with a fifth category of "others":

1. Autism screening and diagnostic instruments – 20/46 = 43.5%

2. Social communication and play – 5/46 = 10.9%

3. Language – 3/46 = 6.5%

4. Broader development – 13/46 = 28.3%

5. Others, including social skills, mobility, problem behaviours and for visually impaired population – 5/46 = 10.9%

4.4   Developmental Continuum

These measures serve specific target age ranges. **Figure 4.1** illustrates a sample of 14 different measures found from the systematic review. These measures are categorised accordingly in the above four categories on a developmental timeline based on age ranges covered by the respective measures.
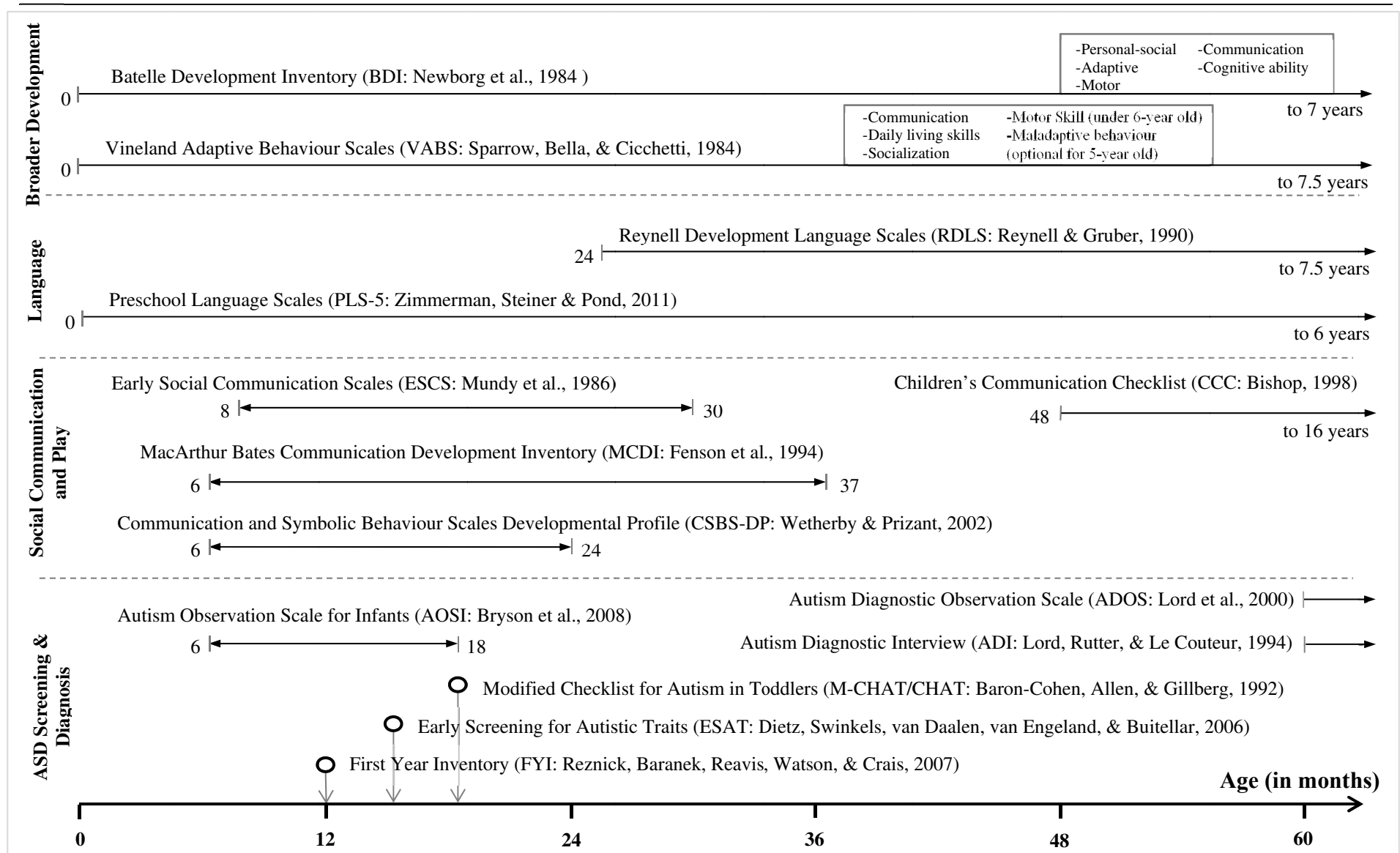
Figure 4.1: Measures for Early Social Communication on a Developmental Timeline

4.5 Discussion

The findings of this study serve to inform practitioners and researchers on the range and choice of measures available when assessing early social communication skills in young children. The systematic search identified a total of 46 different measures which were reported to be used from Year 2000. Of these 46 measures, 22 were used in only one study identified in this review. This does not include 22 individual coding systems reportedly used by authors for their respective studies. These numbers suggest that there is much heterogeneity in researchers' and practitioners' employment of measures for assessing early social communication skills in young children.

The child development domains covered by these 46 measures were wide-ranging, with some measures targeting specific domains of development such as social communication and play, and others targeting broader domains of development, from language to adaptive behaviour to general development.

The diversity of measures begs the question of whether the different authors were referring to the same domain of early social communication skills. This wide range of measures and methods used suggests a lack of consistency in our conceptualisation of early social communication skills. Authors need not necessarily be referring to the same construct when the term "early social communication" is used. Authors may be referring to referential communication skills for example gestural, linguistic or pictorial communication. Or perhaps, authors may be referring to early social-cognitive skills that underpin communication, such as gaze following, joint attention and imitation. While this diversity in conceptualisation is in itself not an issue, it can lead to misinterpretations in our discourse development of early social communication skills.

In addition, the heterogeneity of measures used provides some support to an earlier recommendation that instead of creating new measures, researchers and

practitioners can take concrete steps in improving measures that have already been developed and used for measuring change in social interaction skills in young children with ASD (Cunningham, 2012).

Given the diverse disciplines represented in this review, the findings suggest potential advantages in considering a range of measures not just from a single field of study but a number of related fields including psychology, education, speech and language pathology and paediatrics in the identification of measures for use. A transdisciplinary approach is necessary as the different fields add to our understanding of how we can best use available knowledge and tools for the purposes of early identification, intervention planning and evaluation of the impact of intervention.

Early social communication skills unfold as a child develops. The assessment instruments all have specific target age ranges, some being relatively restricted (refer to **Figure 4.1**). The findings highlight the importance of developmental considerations when selecting measures for assessing early social communication, both in terms of chronological and developmental ages.

A large proportion of the measures used for assessing early social communication skills in young children were specifically designed for the purpose of ASD screening and diagnosis, reflecting the prominence of this research field in recent years.

The reliability and validity of assessment procedures continue to deserve attention. A reliable measure is stable and does not change based on who administers the test or when it is administered (Crais, 2011). A valid instrument measures what it claims to measure, in this case social communication skills and not something else, such as the fine motor skills needed for a pointing response. A wide range of reliability statistics including inter-rater, internal consistency, split-half consistency and test-retest reliabilities were reported for these measures. The ten most frequently reported measures used for assessing

early social communication in **Table 4.2** appear to have acceptable reliabilities, above .70 for all reported reliabilities with the exception of Early Social Communication Scales (Mundy et al., 2003). The ESCS however, is one of few structured behavioural assessment for infants and young children. For the Children's Communication Checklist (Bishop, 1998), there was one report of low inter-rater agreement involving reliability of parent raters (Bishop & Baird, 2001). Reported psychometric properties for this instrument remain acceptable otherwise. Similarly, a wide range of validity statistics was reported supporting the use for each of these 10 measures. There were however, limitations to the use of the Social Responsiveness Scale (Constantino et al., 2003) with younger children because reliability and validity studies have yet to be conducted for the preverbal version (Cunningham, 2012).

This report provides data on the range of assessment instruments for early social communication skills and the respective psychometric information. It highlights the importance of developmental considerations in the choice of assessment instruments and the availability of specific tools for specific age groups and target populations. It also highlights to researchers and practitioners that diagnostic tools are not to be automatically dismissed in selecting measures of early social communication. This has direct implications for individualised education planning and early intervention practitioners as these early social communications are often targets for intervention. At a more macro-systemic level, these measures can have an impact on access to funding for early intervention and educational services for children with ASD and other developmental disabilities.

CHAPTER 5 – MEASURES FOR ASSESSING SYMBOLIC PLAY

5.1   Methodology

A systematic literature review was conducted using PsychINFO database (American Psychological Association). A search was conducted for measures of symbolic play. Search terms used included "symbolic play" and "measure*", together with their respective synonyms and alternatives. Please see **Appendix F** for a full list of search terms. In order to obtain more recent trends, articles published before Year 2000 were excluded. Non-English articles were excluded. Articles in the "birth to 12 years" age group were included. While this study focuses on children of preschool age, this upper age limit was chosen to ensure that studies with children who were 6 years of age but which might only be listed in the "6 to 12 years" category in the database were included. This decision was made to over-capture, rather than under-capture, journal articles in this initial search process.

From the results of the electronic searches, the author selected articles involving measures of symbolic play by reading the titles and abstracts. Target articles were those, which reported on a measure itself or where the measures were used as independent variables, dependent variables, and in some cases, for child profiling within a study. Articles judged relevant were retained whilst the rest were eliminated from the search process. When a decision could not be reached by reading the title and abstract, the reviewer read the article with emphasis on the Method section to determine the relevance of the article to this review.

The initial electronic search generated 2061 hits of which 507 articles remained after the English only, from Year 2000 and up to 12 years limits were applied. Of these 507 articles, 119 were deemed to be relevant and were retained for this review. An inter-

rater reliability check on the selection process was conducted with an experienced play-based researcher and practitioner in the area of early interventions for children with ASD. Slightly over 20% of the articles (105 articles) were randomly selected for this check and the second rater was provided with written instructions on the procedure (refer to **Appendix G**). An inter-rater reliability of .90 was achieved for the selection of articles. For instances where decision differed, the author's decision was deemed final based on an assumption that the author had greater familiarity with literature in this field.

The following phase of the review involved the identification of measures used in the 119 articles for measuring symbolic play skills. A list of measures used was developed and the frequency counts of citations of the respective measures were obtained. Information on each of these measures, such as the target age ranges, whether the tests were standardised and had norms, test formats and test contents were extracted. A data extraction protocol (**Appendix G**) was used to extract information on the list of measures including the authors and test properties. Primary publications on these measures were obtained where possible. From these publications, further information on the measures was extracted using the same protocol.

5.2   Review Outcome

The 119 journal articles retained for this review came from various disciplines including Psychology and Psychiatry, Occupational Therapy, Play Therapy, Education, Speech and Language Pathology, Psycholinguistics and Early Intervention.

Of the 119 articles, 30 (25.2%) employed individual coding systems devised by the respective authors. These were mainly behavioural observational measures specific the particular study. These individualized coding systems were excluded from further analyses.

Across the 119 target articles 26 different named measures for assessing symbolic play in young children were identified. Please refer to **Table 5.1** for the complete list of these 26 measures, listed in order from the most to least frequently reported in the literature.

Table 5.1

List of 26 Measures for Symbolic Play Skills

No.	Name of Test	Author(s)	No. of Articles
1	Test of Playfulness (ToP)	Bundy and Skard (1997)	15
2	Affect in Play Scale (Preschool) (APS-P)	Russ (2004)	8
3	Child-Initiated Pretend Play Assessment (ChIPPA)	Stagnitti (2007)	8
4	Symbolic Play Test (SPT)	Lowe and Costello (1976)	7
5	Test of Pretend Play (ToPP)	Lewis and Boucher (1997)	7
6	Structured Play Assessment (SPA)	Ungerer and Sigman (1981)	6
7	Revised Knox Preschool Play Scale (RKPPS)	Bledsoe and Shepherd (1982)	4
8	Children's Playfulness Scale (CPS)	Barnett (1991)	3
9	Communication and Symbolic Behavior Scales Developmental Profile (CSBS-DP)	Wetherby and Prizant (2002)	3
10	Developmental Play Assessment (DPA)	Lifter et al. (1988)	3
11	Revised Peer Play Scale (RPPS)	Howes and Matheson (1992)	3
12	Fewell Play Assessment Scale (PAS)	Fewell and Rich (1987)	2
13	MacArthur-Bates Communication Development Inventory (MCDI)	Fenson et al. (1993)	2
14	Penn Interactive Peer Play Scale (PIPPS)	Fantuzzo and Hampton (2000)	2
15	Play in Early Childhood Evaluation System (PIECES)	Kelly-Vance and Ryalls (2005)	2
16	Children's Play Questionnaire (CPQ)	Knickmeyer et al. (2005)	1
17	Childhood Autism Rating Scale (CARS)	Schopler et al. (1986)	1
18	Early Social Communication Scales (ESCS)	Mundy et al. (2003)	1
19	Observed Peer Play in Unfamiliar Settings (OPPUS)	Brotman, Gouley, and Chesir-Teran (2005)	1
20	Pervasive Developmental Disorder Behavior Inventory (PDDBI)	I. L. Cohen, Schmidt-Lackner, Romanczyk, and Sudhalter (2003)	1
21	Play Behaviour Questionnaire (PBQ)	Carrick and Quas (2006)	1
22	Play Observation Scale (POS)	Rubin (2001)	1

No.	Name of Test	Author(s)	No. of Articles
23	Pretend Action Tasks (PAT)	Carrick and Quas (2006)	1
24	Pretend Play Observation Scale (PPOS)	Brown, Donelan-McCall, and Dunn (1996)	1
25	Social Cognitive Performance (SCP)	Wetherby and Prizant (2000)	1
26	Social Skills Rating System (SSRS)	Gresham and Elliott (1990)	1

Of these 26 measures, 11 (42.3%) had a frequency count of one. Thus, since 2000 each of these measures has been reported once in the published literature for assessing symbolic play skills.

Only one measure of these 26 had more than 10 citations reporting their use for the purpose of assessing symbolic play skills, which is Test of Playfulness (Bundy & Skard, 1997). **Table 5.2** lists the 10 most commonly reported measures, also in order of frequency of use. Information on targeted age ranges, test format, whether the measure is standardised, whether norms are available and descriptions of the test contents for each of these measures are tabulated.

The measures differed widely on their target age ranges. There were measures targeting children from birth and infancy, some target primarily toddlers and several others for childhood ages up to ten years. There was also one Test of Playfulness (Bundy & Skard, 1997) for a broad age range from six months to 18 years.

Table 5.3 lists the same 10 most commonly reported measures, with the respective published psychometric information on the reliability and validity statistics for each of these measures.

Table 5.2

Descriptions of 10 Most Frequently Used Measures for Symbolic Play

Rank	Name of Measure	Author(s)	Targeted Age	Format	Standardised?	Norms Available?	Test Contents
1	Test of Playfulness (ToP)	Bundy and Skard (1997)	6mos to 18yrs	Direct observation	Yes	Yes	Assesses three elements of play: intrinsic motivation, suspension of reality, and internal locus of control.
2	Affect in Play Scale (APS)	Russ (2004)	4 to 10yrs	Direct observation	Yes	Yes	Assesses both cognitive and affective processes in play, fantasy and affect (Cordiano, Russ, & Short, 2008).
3	Child-Initiated Pretend Play Assessment (ChIPPA)	Stagnitti (2007)	3 to 7yrs	Direct observation	Yes	Yes	Assesses imaginative or pretend play skills, examines both number of play acts and variety of play.
4	Symbolic Play Test (SPT)	Lowe and Costello (1976)	1 to 3yrs	Direct observation	Yes	Yes	Measures the level of development of symbolic play.
5	Test of Pretend Play (ToPP)	Lewis and Boucher (1997)	18mos to 6yrs	Direct observation	Yes	Yes	Measures three different types of symbolic play, viz. 'substituting one object for another', reference to an absent object as if it were present and attributing an imaginary property to an object.
6	Structured Play Assessment (SPA)	Ungerer and Sigman (1981)	1 to 3yrs	Direct observation	Yes	No	A procedure for assessing the sophistication of spontaneous play in 1- to 3-year-old children.
7	Revised Knox Preschool Play Scale (RKPPS)	Bledsoe and Shepherd (1982)	Birth to 6yrs	Direct observation	Yes	No	Consists of four dimensions: (i) space management, (ii) material management, (iii) pretence/symbolic, and (iv) participation. There are 12 categories of play behaviours within these four dimensions.
8	Children's Playfulness Scale (CPS)	Barnett (1991)	4 to 6yrs	Parent/Caregiver questionnaire	Yes	No	Consists of 5 domains: (i) physical spontaneity, (ii) social spontaneity, (iii) cognitive spontaneity, (iv) manifest joy, and (v) sense of humour.

Rank	Name of Measure	Author(s)	Targeted Age	Format	Standardised?	Norms Available?	Test Contents
9	Communication and Symbolic Behavior Scales Developmental Profile (CSBS-DP)	Wetherby and Prizant (2002)	6mos to 2yrs, or up to 6yrs if developmental age is less than 2yrs	Parent/Care-giver questionnaire	Yes	Yes	Measures a broad range of early social and communication behaviours including emotion and eye gaze, gestures and pointing, words and sounds, and object use and play.
10	Developmental Play Assessment (DPA)	Lifter et al. (1988)	Not stated	Direct observation	Yes	No	Assesses play activities of children with developmental delays and disabilities, from functional to symbolic play, in order to determine what they know and what they are ready to learn.

Table 5.3

Reported Psychometric Properties for 10 Most Commonly Used Symbolic Play Measures

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
1	Test of Playfulness (ToP)	Bundy and Skard (1997)	Results suggested that the ToP is both reliable and valid when applied to children, with and without disabilities, between 15 months and 10 years. It shows evidence of excellent inter-rater reliability (data from 96% of raters fit the expectations of the Rasch model) and construct validity (data from 93% of items and 98% of people fit Rasch expectations (Bundy, Nelson, Metzger, & Bingaman, 2001). The ToP is both reliable and valid and may provide clinicians and researchers with a practical means of measuring the construct of playfulness (Hamm, 2006). Rasch analysis revealed evidence that 100% of the raters scored the ToP reliably and data from 88% of the children with disabilities conformed to the pattern of playfulness typical of most of the children represented in the test's normative data set (Harkness & Bundy, 2001). Data from 100% of the participants conformed to the expectations of the Rasch measurement model for ToP (version 3). The authors concluded that the instrument is reliable and valid to test playfulness in young children (Okimoto, Bundy, & Hanzlik, 2000).	Pearson product moment correlation coefficients for a sample of children with disabilities were compared with coefficients with a sample of typically developing children. The coefficient for ToP and Test of Environmental Supportiveness (TOES) for the typically developing children was .682 (df=49; p, .01), while the coefficient for the sample of children with disabilities was .304 (df=107, p, .01). The percentages of shared variance between ToP and TOES scores for these two groups were 46% and 9% respectively (Bronson & Bundy, 2001). The clinical utility of the ToP was examined with fourteen paediatric occupational therapists. The results suggest that the ToP is a useful tool for assessing playfulness (Cameron et al., 2001).	Reed, Dunbar, and Bundy (2000) analysed the reliability of the ToP (version 2) data from approximately 450 participants observed by approximately 100 raters. The results revealed that the data from 95% of the items, 96% of the children and 100% of the raters conformed to the expectations of the Rasch model.	It has been found that 95% of items described a unidimensional construct of playfulness that applied to 98% of the participants and that there was 100% rater consistency (Leipold & Bundy, 2000).	Magnitude of relationship between ToP and TOES was greater for typically developing kids than for kids with disabilities. More research is needed to monitor the validity of ToP and potential differences in patterns of playfulness in children who have physical disabilities (Harkness & Bundy, 2001). Test-retest reliability of 30-minute scores (intraclass correlation = .03, p = .44) was less than that of either the first or last 15-minute scores (intraclass correlation = .67, p< .01; intraclass correlation = .41, p = .03 respectively) (Brentnall, Bundy, & Kay, 2008).
2	Affect in Play Scale (-Preschool) (APS(-P))	Russ (2004)	Inter-observer reliability: In a random sample of 18 children, the author obtained the following inter-rater reliabilities using mean point-by-point reliability: frequency of affective expression, 82% (78 – 94); tone of affective expression, 80% (74 – 89); and imagination, 87% (81 – 94) (Hsieh, 2012). Intraclass correlations (ICCs) were high for the primary APS-P scores and play categories: frequency of affect = .95, variety of affect expression = .91, imagination = .97, organization = .96, elaboration = .92, comfort = .94, number of no play intervals = .95, number of functional play intervals = .99, and number of pretend play intervals = .95. To evaluate the	Not reported in the eight studies in the current review.	Past studies have reported the inter-rater reliability of the APS to be high, consistently in the .80s and .90s using Cohen's kappa. Internal consistency on the APS using the Spearman-Brown split-half reliability is also high at .85 (Seja & Russ, 1999).	The APS has a large body of construct validity studies demonstrating associations with theoretically relevant criteria such as creativity and coping, and negatively related to pain reports in nonclinical populations (Russ, 2004). Most studies tap the age range six to ten years for which the APS was developed.	Cordiano et al. (2008) developed and validated a brief rating version of APS-BR. Scores on the APS-BR related strongly to those on the APS, and the pattern of correlations for each scale and relevant criterion measures was similar in strength and direction, supporting the APS-BR as an alternate form of the APS. APS-BR is a

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
			internal consistency of the APS-P, the Spearman-Brown split-half reliability formula was used to compare the frequency of affect in the second and fourth minutes with the frequency of affect in the third and fifth minutes (r = .88) (Kaugars & Russ, 2009). Pearson product moment correlations for the six major scores ranged from r(20) = .82 and r(20) = .89 for APS and APS-P respectively (Mazzeschi et al, 2008). ICCs ranged from a high of .98 (frequency of positive affect) to .91 (variety of affect) (Moore & Russ, 2008).				promising brief measure of children's pretend play that can be substituted for the APS in clinical and research settings.
3	Child-Initiated Pretend Play Assessment (ChIPPA)	Stagnitti (2007)	Test-retest ICCs calculated for each of the three elaborate play measures ranged from .73 to .84. A test-retest ICC of .56 was obtained for object substitution with unstructured play materials. The test-retest ICC obtained for the combined score for unstructured and conventional play materials was .57. These results provide evidence that the ChIPPA produces a stable measure for play behaviour that can guide therapists when planning intervention strategies for children (Stagnitti & Unsworth, 2004).	Concurrent validity of the ChIPPA was investigated with social peer play. The results suggest that children's social competence can be inferred from their play scores on the ChIPPA (McAloney & Stagnitti, 2009). The ChIPPA was found to be able to discriminate between children who were typically developing and children who experienced pre-academic problems (Stagnitti, Unsworth, & Rodger, 2000). A child's social skills and ability to engage in school activities as assessed by teachers can be inferred from their scores on the ChIPPA, providing concurrent validity support to the ChIPPA (Uren & Stagnitti, 2009).	The ChIPPA has shown good to moderate test-retest reliability (Stagnitti & Unsworth, 2004).	The ChIPPA is valid and reliable in discriminating between children with pre-academic issues and typically developing children (Stagnitti et al., 2000).	Cross-cultural adaptation and reliability of ChIPPA indicated that the Brazilian version of the ChIPPA is potentially useful for Brazilian children (Pfeifer, Queiroz, Santos, & Stagnitti, 2011).
4	Symbolic Play Test (SPT)	Lowe and Costello (1976)	Intraclass correlation between two scorers was very high (.99) (Lewis, Norgate, Collis, & Reynolds, 2000). Two independent persons coded the same randomly selected cases with an inter-coder agreement of 80% (Lyytinen, Poikkeus, Laakso, Eklund, & Lyytinen,	There is a significant positive correlation of language age using SPT with the chronological age of Chinese children in Hong Kong, demonstrating predictive validity of the SPT with this population (Au et	Split half reliabilities using Spearman-Brown formula ranged from .52 to .92 for the different ages. According to the authors, the correlations are reasonably high given the	The validity of the test derives from the face value of its content, and the fact that the score shows a steady progression with age. The SPT showed some correlation with	

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
			2001).	al., 2004). The SPT discriminated between socially impaired and sociable children (Gould, 1986).	short test length. Test-retest reliabilities ranged from .64 to .81 for different time intervals (Lowe & Costello, 1988).	concurrent language ability. Evidence for predictive validity was also provided in that the SPT predicted language ability at a later date (Lowe & Costello, 1988).	
5	Test of Pretend Play (ToPP)	Lewis and Boucher (1997)	All correlations of the ToPP assessments were highly observable: the correlation was .877 (p = .004) between observers from the team and .923 (p = .001) between external observers. Finally, correlation between external and internal observers was .838 (p = .009) (Herrera et al., 2008).	Not reported in the seven studies in the current review.	Test-retest reliability was .868 (p<.001), indicating a high degree of agreement between test scores obtained on two test days. In addition, the authors examined the extent to which items within a section correlated with each other and found that the correlations ranged from .57 to .99, indicative that these test items were reliable (Lewis & Boucher, 1997).	ToPP scores were significantly correlated with age and language scores. A classification analysis found that ToPP successfully identified 75.8% of children as either "normal" or having "developmental problems", and detected 80% of those with "developmental problems". These results suggest that the ToPP has the potential to be a useful screening test in the identification of children with developmental delay (Clift, Stagnitti, & DeMello, 1998).	
6	Structured Play Assessment (SPA)	Ungerer and Sigman (1981)	Reliability using Pearson product moment correlations yielded .99 for functional play and .99 for symbolic play (Ingersoll & Meyer, 2011a). Reliability was calculated by two independent observers using exact agreement [(smaller number/larger number) x 100]. Agreement for functional play was 83% (range: 65-100%). Agreement for symbolic play was 91% (range: 86-100%) (Ingersoll & Meyer, 2011b). Intraclass correlation coefficients between two independent coders ranged from .94 to 1.00, mean .97 for types and 1.00 for mastery (Kasari et al., 2006). Inter-rater reliability of blinded coders (ICC) was .97 for functional play types, .99 for symbolic play types and 1.00 for play level (Kasari et al., 2012; Kasari, Paparella, Freeman, & Jahromi, 2008).	Not reported in the six studies in the current review.	Not reported.	Not reported.	

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
7	Revised Knox Preschool Play Scale (RKPPS)	Bledsoe and Shepherd (1982)	For overall play age, scores of two raters were within 8 months of each other 86.8% of the time; for the four dimension scores, they were within 12 months of each other 91.7% to 100% of the time; and for the 12 category scores, they were within one age level of each other 81.8% to 100% of the time. Construct validity results showed a general match between the children's chronological ages and their overall play age scores (Jankovich, Mullen, Rinear, Tanta, & Deitz, 2008).		A study demonstrated reliability and repeatability of the Brazilian version of the RKPPS (Pacciulio, Pfeifer, & Santos, 2010).		
8	Children's Playfulness Scale (CPS)	Barnett (1991)	Not reported in the three studies in the current review.	Concurrent validity was established by comparing children's CPS scores with scores on the Test of Playfulness (Bundy & Skard, 1997). Results suggested that the ToP is both valid and reliable when applied to children, with or without disabilities, between 15 months and 10 years (Bundy et al., 2001). Trevlas, Grammatikopoulos, Tsigilis, and Zachopoulou (2003) evaluated the CPS for its underlying structure. A one-factor model was postulated and supported. According to the model, five variables measuring children's playfulness loaded on one factor. Good cross-generalizability of the CPS appears to support its validity.	The CPS demonstrated strong internal consistency across raters for each scale component and the scale as a whole (α = .70 to .88) when scores from various day care samples were compared. The author reported adequate test-retest reliability in a study involving 338 typically developing children. (Barnett, 1991).	Barnett (1991) used factor analyses, descriptive statistics, and Cronbach's alpha reliability estimates of internal consistency in studies to determine validity.	
9	Communication and Symbolic Behavior Scales Developmental Profile (CSBS-DP)	Wetherby and Prizant (2002)	Reliability was computed for each of the categories in each communicative act for six of the study children. Intercoder reliability using intraclass correlation coefficient was .74 (Roberts, Mirrett, Anderson, Burchinal, & Neebe, 2002). Intraclass correlation coefficients were computed for all frequency codes: range, .710 – 1.000 for 14-month videotapes, .700 - .945 for 18-month videotapes, and .705 - .990 for 24-month videotapes (Landa, Holman, & Garrett-Mayer, 2007).	Not reported in the three studies in the current review.	The norming sample of the CSBS was 282 typically developing children from eight to 24 months and 30 children with developmental disabilities from 18 to 30 months. Adequate levels of reliability (internal consistency coefficient was .91, median inter-rater reliability coefficient was .90) and high levels of validity (content, criterion, and construct) were reported in the normed edition of the CSBS manual. Additionally, the manual reported that the CSBS correctly classified 85% of children with pervasive developmental disorders and 60% of children with speech-language impairment (Wetherby & Prizant, 2002).		

Rank	Name of Measure	Authors	Reliability Statistics	Validity Statistics	Reliability Statistics (from other empirical studies)	Validity Statistics (from other empirical studies)	Potential Issues Reported
10	Developmental Play Assessment (DPA)	Lifter et al. (1988)	Mean interobserver agreement was .91 (range .84 – 1.00) in the sample of children with PDD and .91 (range .82 – 1.00) in the sample of children without disabilities (Lifter, Ellis, Cannon, & Anderson, 2005). 80% reliability was achieved for the number of differentiated, anticipated play actions (diversity of play) (Rodman et al., 2010). Average inter-rater reliability was 88.3% (range 67 – 100%) (Thiemann-Bourque, Brady, & Fleming, 2012).	Not reported in the three studies in the current review.	Not reported.	Not reported.	

5.3   Measures Used for Assessing Early Social Communication and Symbolic Play

There was some degree of overlap in the measures, with eight being used for assessing both early social communication and symbolic play. **Table 5.4** lists these eight measures in alphabetical order.

Table 5.4

List of Eight Measures for Early Social Communication and Symbolic Play

No.	Measure	Author
1	Childhood Autism Rating Scale (CARS)	Schopler et al. (1986)
2	Communication and Symbolic Behavior Scales - Developmental Profile (CSBS-DP)	Wetherby and Prizant (2002)
3	Developmental Play Assessment (DPA)	Lifter et al. (1988)
4	Early Social Communication Scales (ESCS)	Mundy et al. (2003)
5	Fewell Play Assessment Scale (PAS)	Fewell and Rich (1987)
6	MacArthur Communication Development Inventory (MCDI)	Fenson et al. (1993)
7	Social Skills Rating System (SSRS)	Gresham and Elliott (1990)
8	Structured Play Assessment (SPA)	Ungerer and Sigman (1981)

5.4   Discussion

Recent evidence shows that children with ASD spent more of their time unengaged and less time engaged in symbolic play and joint attention behaviours as compared to children with other developmental delays (Wong & Kasari, 2012). In addition, the authors found that teachers seldom focused directly on symbolic play and joint attention in their teaching. These findings suggest the importance of targeting play and joint attention skills in preschool special education classes for children with ASD. Such findings highlight the need to be able to assess early social communication and symbolic play skills. Our systematic search strategy identified a total of 26 different measures for assessing symbolic play reported since Year 2000. Of these, 11 were used in

only one study identified in this review. This does not include 30 individual coding systems reportedly developed and used by authors for their respective studies. These numbers suggest that there is much heterogeneity in researchers' and practitioners' employment of measures for assessing symbolic play skills in young children. It also suggests that creation of more new original measures of symbolic play may not be necessary in view of currently available measures. The use of individually developed measures can potentially hamper efforts to compare results of interventions across practices and research studies. It was suggested that Occupational Therapists have been hampered in their attempts to evaluate, promote, and examine play from their own perspective by the lack of a commonly held definition (Bundy, 1987). It was further suggested that Occupational Therapists' abilities to address play have been hampered by a paucity of valid and reliable play assessments.

Given the diverse disciplines represented in this review, the findings suggest potential advantages in considering a range of measures not just from a single field of study but a number of related fields including psychology and psychiatry, education, occupational therapy and speech and language pathology in the identification of measures for use. A trans-disciplinary approach may be beneficial as the different fields add to our understanding of how we can best use available knowledge and tools for the dual purposes of identification and intervention.

Similar to early social communication, symbolic play skills unfold as a child develops. The assessment instruments all have specific target age ranges. The findings highlight the importance of developmental considerations when selecting measures for assessing symbolic play, both in terms of chronological and developmental ages.

While the value of play has been acknowledged universally, a common definition has eluded play theorists (Bundy et al., 2001). From this review, it was noted that two

terms "symbolic play" and "pretend play" have been used interchangeably. No systematic differences were observed in choice of terminology with regards to how symbolic or pretend play was operationalised across the 26 measures. The play dimensions reportedly assessed by these measures can be broadly classified into the following three categories:

1. Observable play skills such as what a child did to a set of toys including frequency counts;

2. Cognitive processes such as locus of control, level of fantasy and amount of planning; and

3. Emotional processes such as level of motivation, participation and expressions of joy.

In an attempt to move play research forward, Bundy and colleagues had put forth a definition of play (Bundy et al., 2001). According to these authors, play is a transaction between the child and the environment that is intrinsically motivated, internally controlled, and not bound by objective reality, acknowledging that it is not always possible for children to be in complete control of their environments or to determine their own reality fully (Bundy et al., 2001). Bundy and colleagues argued that play assessments cannot develop outside of a definition of play.

The disadvantage of such a definition however, is that it may be hard to operationalise given the employment of unobservable qualities such as "intrinsic" and "internally controlled". Further research is needed to unpack the definitions of symbolic play and the operationalisation of the concept of "symbolic play" by the respective measures to add clarity to the dimensions of play assessed through using these measures.

This report provides data on the range of assessment instruments for symbolic play skills and information on each of these measures. It highlights the importance of developmental considerations in the choice of assessment instruments. This has direct

implications for individualised education planning and early intervention practitioners as play skills are now deemed to be worthy outcomes of early intervention. At a more macro-systemic level, these measures can have an impact on access to funding for early intervention and educational services for children with developmental disabilities.

PART III:

DIRECT DEVELOPMENTAL STUDIES

CHAPTER 6 – TARGETED SYMBOLIC PLAY INTERVENTION

6.1   Introduction

This chapter describes an intervention study using a single case research design and targeting symbolic play for a three-year-old girl who was diagnosed with PDD-NOS. It is a partial systematic replication of Kasari's and her colleagues' (2006) study on the teaching of symbolic play to children with ASD. In the current study, a single case design approach is used instead of a randomised controlled trial design which was reported by the original authors. The aim of this replication was to explicate the teaching and learning processes involved in a targeted symbolic play intervention for a child diagnosed with PDD-NOS. A single case design will be useful in evaluating the effect of the play intervention in this applied research (Cooper et al., 2006). This chapter also aims to report findings on possible collateral gains in communication and language skills associated with this targeted symbolic play intervention.

6.2   Method

Research design. A single case multiple baseline design across teaching targets was used in this study.

Participant. The participant for this study is named KK in this report. She was three years and ten months when the pre-intervention assessments were conducted, referred to as Time 1. She received a diagnosis of PDD-NOS at two-years-old. KK lived with her parents and an elder brother. She was attending a mainstream preschool four days a week. Although she was supposed to be placed in the three-year-old group based on her chronological age, she was placed in the four-year-old group instead. According to her teachers and parents, the reason for the older group placement was for her to have

more understanding and supportive peers in her classroom. She attended a social skills playgroup once a week. In addition to the social skills playgroup, she was seeing a Speech and Language Pathologist twice a month and a Psychologist monthly.

Settings. The assessment and intervention sessions for KK took place at playrooms in a university and at her preschool.

Materials. In order to provide information on communication, language and play functioning, two assessments were used: the Preschool Language Scales, Fifth Edition (Zimmerman et al., 2011) and the Developmental Play Assessment (Lifter et al., 1988).

The Preschool Language Scales, Fifth Edition (Zimmerman et al., 2011) is an interactive, play-based assessment. It is a standardised and normed instrument. The Australian and New Zealand adapted version was used. It requires pointing or verbal responses to pictures and objects (**Figure 3.1**). It takes 45 to 60 minutes to complete in a one-to-one administration. It provides auditory comprehension and expressive communication standard scores, growth scores, percentile ranks, and language age equivalents. The summation of the auditory comprehension and expressive communication scores provides the total language scores. These scores have a mean of 100 and a standard deviation of 15 standard score points.

The Developmental Play Assessment (DPA) includes a video recorded 30-minute sample of unstructured play, in which the child plays sequentially with four groups of toys, in the presence of a tester (Lifter et al., 1988). **Figure 3.2** shows the full set of DPA toys used in the current study. It is noted that a basic premise of the DPA is that children of different developmental levels play differently with the same group of toys (Lifter et al., 1988). The emphasis is on what the children do with the toys and not on the characteristics of the toys.

The video recording of every play session was manually transcribed into behavioural actions using an Excel spreadsheet (refer to **Appendix H** for an example). These behavioural actions were then coded according to the developmental play categories in the DPA, following the same categorisation as employed in the study by Kasari et al. (2006). In Kasari et al.'s study, substitutions with and without objects were combined into a single play category, leaving a total of 15 DPA play categories. The total number of actions for each play category was counted. Within each play category, the number of different behavioural actions was counted and these different play actions are referred to as play types. Hence, the DPA measures the number of behavioural play actions (tokens) for each of the developmentally sequenced play categories in the DPA (refer to **Table 2.3**) as well as the number of different play types (types) in these respective categories (Lifter et al., 1988). These measures are called: Number of Play Tokens and Number of Play Types. A higher number of play tokens means more active play while a higher number of play types means more variety in the child's play.

Play scores were then tabulated for each play session recording. **Appendix H** shows an example of the tabulated play scores for the respective play categories in a single play session.

The DPA was chosen because it was the only developmental play assessment instrument that lent itself directly to the teaching of play targets. From the initial assessment, play targets were selected. The same toys in the DPA were used for the play intervention.

A treatment manual on the teaching of symbolic play for early interventions for children with ASD obtained from the original authors was utilised (Kasari et al., 2006). **Appendix E** shows an intervention session record form template adapted for the current study.

A social validity questionnaire was designed for completion by a parent of the child receiving targeted symbolic play intervention (refer to **Appendix I**). This questionnaire comprises five-point Likert scale items as well as open-ended questions to assess validity of the assessment and intervention from a parental perspective.

Procedures. Chapter 3 reported on the procedures for the symbolic play intervention, mastery criterion, target selection and a least to most prompt hierarchy. Each intervention session comprises of a five to eight minutes of discrete trial training or table top play, followed by 12 minutes of floor play with opportunities to generalise learnt play targets in a more spontaneous and natural play environment. The intervention was carried out by the author who was a Chartered Educational and Developmental Psychologist.

Communication, language and play functioning data were collected at three time-points: pre-intervention at Time 1, post-intervention at Time 2 and at a three-month maintenance follow up at Time 3.

Independent and dependent variables. The play intervention was the independent variable, with each of the ten sets of play targets (**Table 3.2**) serving as an experimental condition. In the discrete trials, the dependent variable was whether the child displayed the targeted play activities. The level of prompting employed was recorded for each trial. On the floor play, the dependent variable was unprompted spontaneous occurrences of the target activities.

Inter-rater agreement. Reliability was calculated between two independent coders, the author and an early intervention behavioural therapist. Slightly over 20% of the intervention sessions or a total of six videos were coded. . The videos were presented in random order to the second rater so the second rater was blind to the condition of the study. Intraclass correlation coefficients were .99 for table top play and .98 for floor play

respectively. For instances of disagreements, both coders had a discussion and came to an agreement on the final codes.

6.3   Results

Pre-intervention (Time 1) assessments. KK's language skills were assessed using the Preschool Language Scales- Fifth Edition (Zimmerman et al., 2011). She completed the assessment in one session. The following table shows her Auditory Comprehension (AC), Expressive Communication (EC) as well as her Total Language Score (TLS), which is derived from a summation of her AC, and EC component scores.

Table 6.1

KK's Time 1 PLS-5 Scores

Component	Raw Scores	Standard Scores	Percentile Rank [Confidence Intervals]	Age Equivalent
Auditory Comprehension (AC)	41	94	34 [21 – 53]	3 years 11 months
Expressive Communication (EC)	37	88	21 [12 – 37]	3 years 1 month
Total Language Score (TLS)	78	90	25 [14 – 42]	3 years 4 months

On the Developmental Play Assessment (Lifter et al., 1988), KK's play session was video-recorded and then scored. The videos were transcribed into play actions. Reliability statistics for this assessment will be included in the next chapter, Chapter 7, as this assessment forms part of the broader developmental trajectory study to be reported in the next chapter.

During the pre-intervention play assessment, it was noted that KK spent some time lining up toys on two occasions. She also engaged in behaviours such as rocking in her chair, picking her skin and twirling her hair. The following two graphs show the distribution of play tokens and number of play types for KK along the DPA continuum of developmentally sequenced play categories (**Figures 6.1** and **6.2**). The level of difficulty

or complexity of play categories increases on the DPA continuum from left to right on the

x-axis, with the right-end most category being the most advanced play category of

"Thematic fantasy play". The list of play categories and their respective definitions were

presented in **Table 2.3** of Chapter 2.
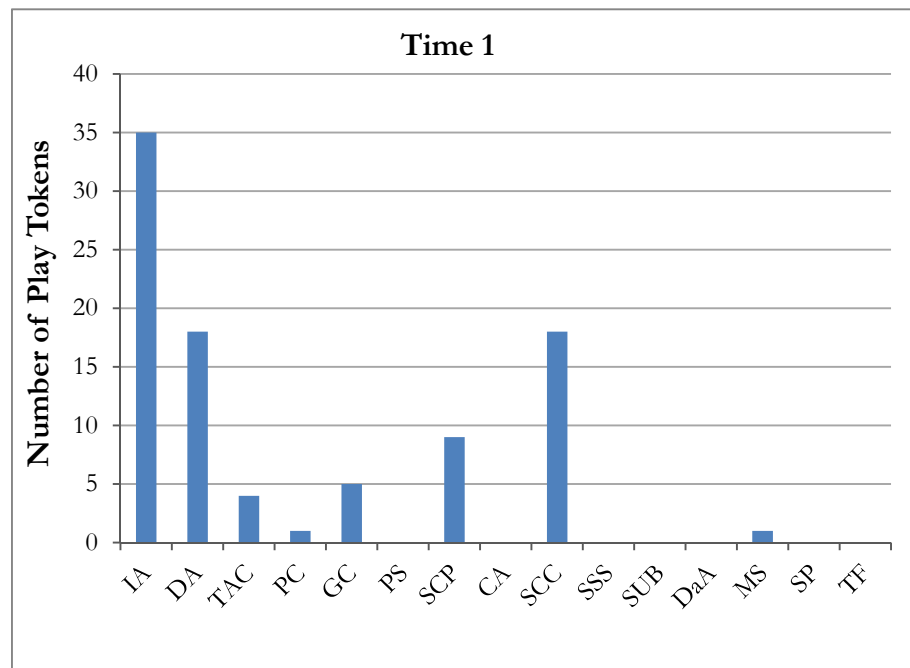
Figure 6.1: KK's Number of Play Tokens along the DPA Continuum
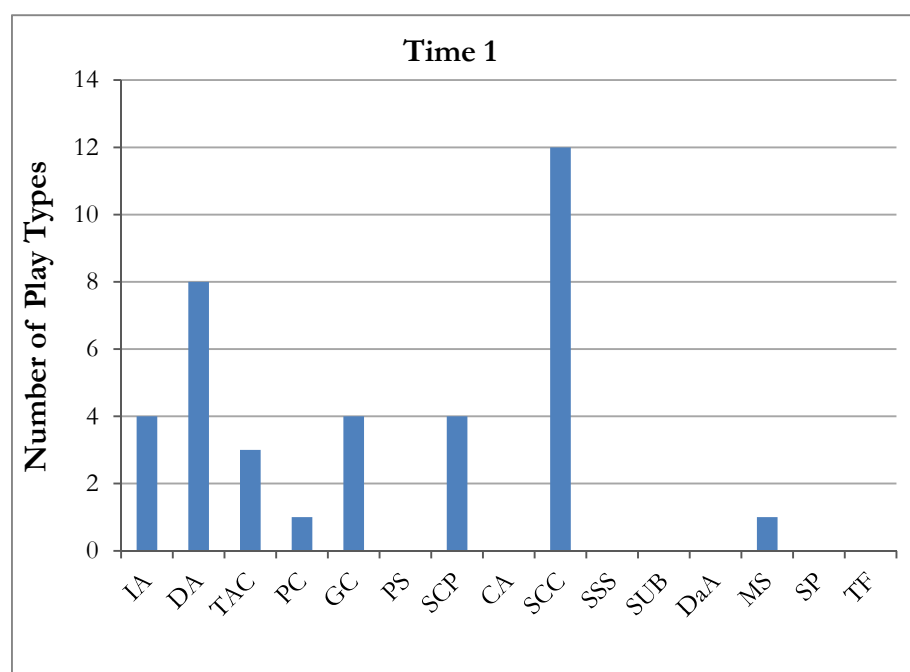
Figure 6.2: KK's Number of Play Types along the DPA Continuum

For clarity of communication, the author decided to present the results of this study by collapsing the 15 DPA categories into four broader play categories. This was done to make it easier for readers to observe patterns in scores. The four collapsed categories are called: Indiscriminate Actions (IA), Discriminative Actions (DA),

Combinations (COM) and Higher Order Play (HI) (refer to **Table 6.2**). This categorisation approach assumes that the developmental sequencing of the 15 play categories in DPA is valid, for which the author found supporting evidence. The supporting evidence for the validity of this categorisation will be reported in the later sections in the current chapter and again in the following chapter.

The percentages of observed play tokens distributed across the four play categories were derived. This measure is called: Percentage of Play Tokens (%). For indiscriminate actions (IA):

Percentage of IA Play Tokens (%) = Number of IA play tokens/Total number of play tokens by child x 100

Similarly, the percentages of an individual child's play types across the four play categories were derived. For indiscriminate actions (IA),

Percentage of IA Play Types (%) = Number of IA play types/Total number of play types by child x 100

For KK, Time 1 distribution of her play tokens and play types on the four play categories are presented in the following two graphs (**Figures 6.3** and **6.4**).

Table 6.2

Four Broader Play Categories (Kasari et al., 2006; Lifter et al., 1993)

Symbolic Play Level	Category	Definitions	Newly Created Play Category
I	Indiscriminate actions (IA)	All objects are treated alike (e.g., all objects are mouthed)	Indiscriminate Actions (IA)
II a	Discriminative actions on single objects (DA)	Differentiates among objects, preserving their physical conventional characteristics (e.g., rolls round beads, squeezes stuffed animal)	Discriminative Actions (DA)
II b	Takes apart combinations (TAC)	Separates configurations of objects (e.g., takes all pieces out of puzzle)	Combinations (COM)
III a	Presentation combinations (PC)	Recreates combinations of objects according to their presentation configuration (e.g., puts puzzle pieces into puzzles; nests nesting cups)	
III b	General combinations (GC)	Creates combinations of objects that result in simple, nonspecific configurations such as containers/contained relations (e.g., puts beads & puzzle pieces in cups)	
III c	Pretend self (PS)	Relates objects to self, indicating a pretend quality to the action (e.g., brings empty cup to mouth to drink)	
IV	Specific combinations (physical attributes) (SCPA)	Preserves unique physical characteristics of objects in the configuration (e.g., stacks nesting cups, strings beads)	
V a	Child as agent (CAA)	Extends familiar actions to doll figures, with child as agent of the activity (e.g., extends cup to doll's mouth)	
V b	Specific combinations (conventional attributes) (SCCA)	Preserves unique conventional characteristics of objects in the configuration (e.g., places cup on a saucer; places string of beads on self)	
VI a	Single scheme sequences (SSS)	Extends same familiar action to two or more figures (e.g., extends cup to baby doll, to stuffed lamb, to interactant)	Higher Order Play (HI)
VI b	Substitutions (SUB)	Uses one object to stand in place for another (e.g., puts bowl on head for hat)	
VI c	Substitutions without object (SUB)	Pretends to use something that is not there (e.g., shakes an imaginary salt shaker)	
VII a	Doll as agent (DAA)	Moves doll figures as if they are capable of action (e.g., moves figure to load blocks in a truck; puts mirror into doll's hand as if to see itself)	
VII b	Multischeme sequences (MS)	Extends different actions to same figure (e.g., feeds doll with spoon, wipes it with cloth, then puts to bed)	
VIII a	Sociodramatic play (SP)	Adopts various familiar roles in play themes (e.g., plays house, assigning the various roles)	
VIII b	Thematic fantasy play (TF)	Adopts roles of fantasy characteristics (e.g., plays "Superman" or "Wonderwoman", assigning the various roles)	

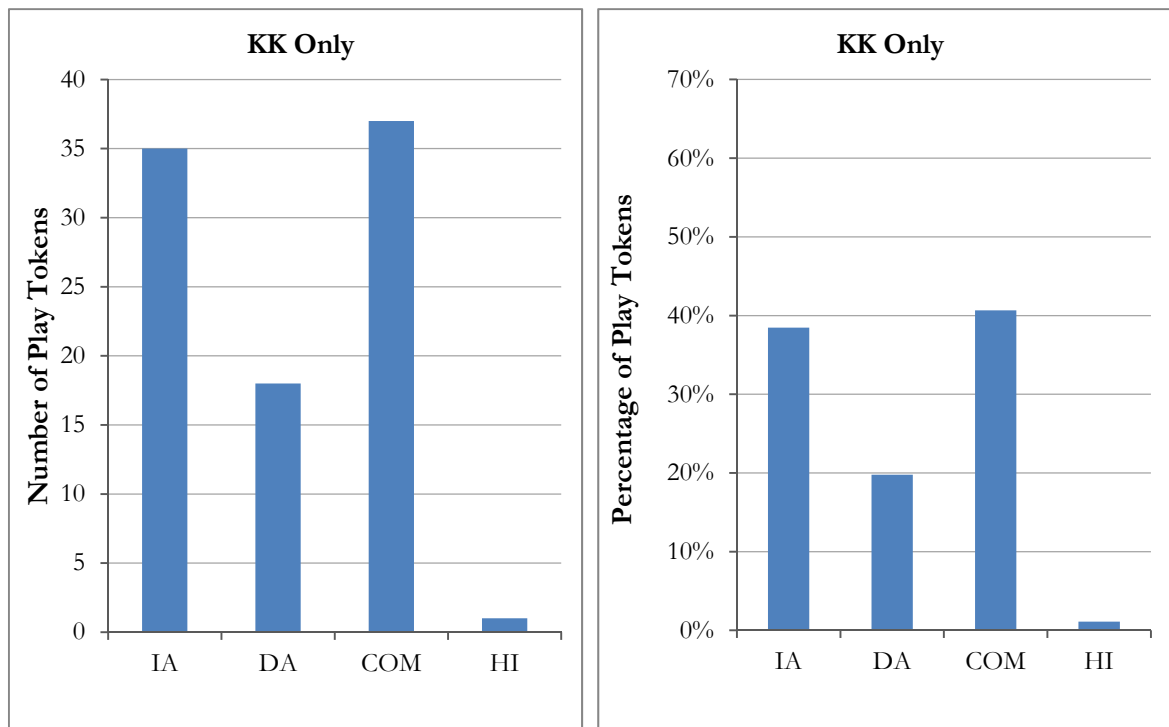*Note: VI b and VI c are combined in the present study due to low frequency counts*

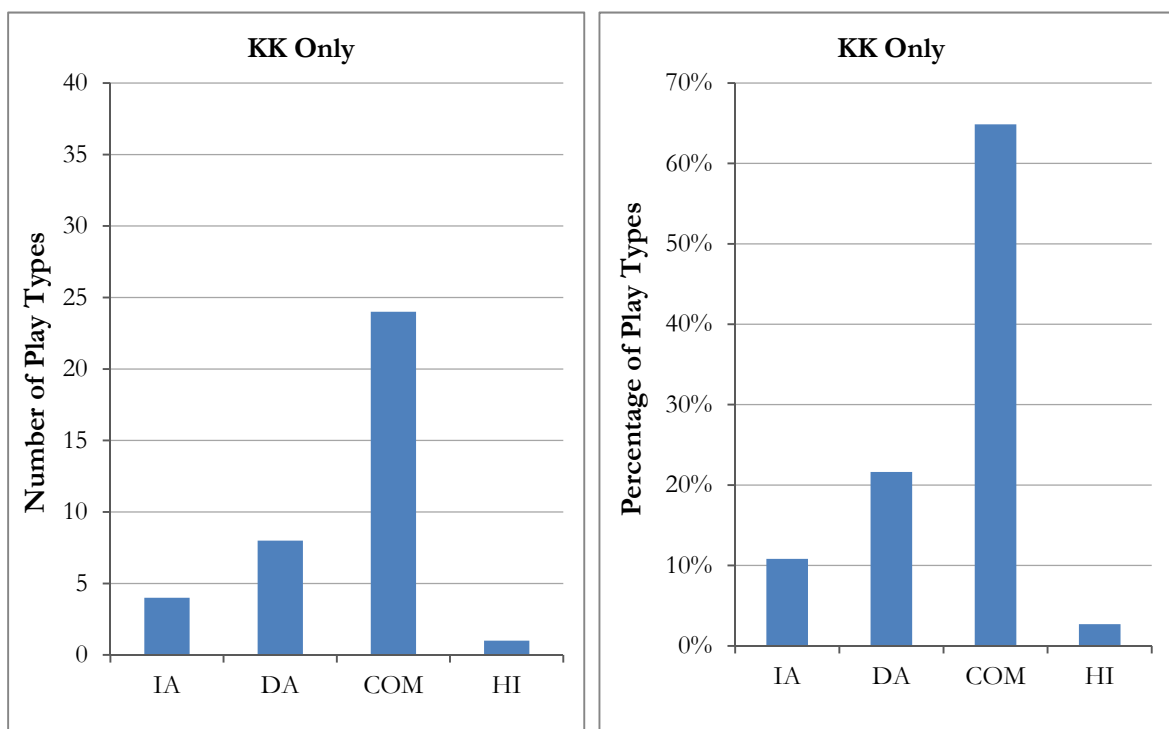**Figure 6.3: Distribution of KK's Play Tokens in Time 1**

Figure 6.4: Distribution of KK's Play Types in Time 1

At Time 1, 38.5% of KK's total play tokens were indiscriminate actions. 19.8%

were Discriminative actions, 40.7% were combinations and 1.1% were higher order play.

In terms of play types, KK had the highest percentage 64.9% of her total play types from the combinations category, followed by 21.6% discriminative actions play types, 10.8% indiscriminate actions play types and finally, 2.7% higher order play types.

Results of targeted symbolic play interventions. KK participated in a total of 27 daily intervention sessions. The target play activities of the respective sessions are presented in **Table 3.2**.

For the first session, simple target play activities such as lifting a teapot lid and pressing phone buttons were selected primarily for KK to learn the structure of each session and emphasis was on building rapport between the interventionist and KK. The simple and enjoyable play activities were aimed at helping to build KK's confidence in her learning of play skills.

As described in Chapter 3, targeted play skills were shaped using techniques of systematic prompting and reinforcement on the table-top play. This was followed by floor play where KK continued to have opportunities to display the taught play skills but in a more natural context with greater choice of play materials.

The least to most prompt hierarchy as described in Chapter 3 was adopted for use. However, it was noted that KK disliked physical prompting. When the interventionist attempted to hold her hand and guide her physically, she reacted strongly by withdrawing her hands and refusing to cooperate. The prompt hierarchy was therefore adapted to exclude the "most prompt" which was physical prompting. KK seemed to enjoy claps, praises, pats and hugs.

Once engaged with the interventionist, she was generally compliant. On a couple of occasions KK had difficulties at the beginning of sessions. This was due to her being upset by incidents that happened prior to the start of the intervention sessions. For

example, she might appear sulky and teary because she did not get her way in class. She usually required coaxing and encouragement for five to 10 minutes on such instances.

During the intervention sessions, there were a few occasions when she started engaging in self-stimulatory behaviours such as spinning herself on the floor. During these instances, the interventionist was able to redirect her attention to the play sessions. This was usually done with the use of some of her preferred toys and with physical guidance, for example by leading her by her hands or gently guiding her by pushing her shoulders. There was one session when KK refused to engage with the interventionist altogether. She was already upset and appeared sulky when the interventionist arrived at her preschool for the session. The interventionist attempted to coax her for about 20 minutes, and waited for another 10 minutes for her to be engaged with the session. The attempt was unsuccessful and the interventionist left the preschool as it was decided that her non-engagement should not have been rewarded with further attention. That session was excluded from analysis, leaving a total of 27 one-to-one targeted symbolic play intervention sessions for KK.

The following 10 panel multiple-baseline graph (**Figure 6.5**) shows the results of the intervention sessions. Due to the more natural context and changes in the choice of toys presented at floor play, KK did not have the same opportunities to display all the learnt play skills at every follow up play session. For clarity, the floor play data presented in **Figure 6.5** only shows sessions where KK had opportunities to display learnt target skills. The green data points and green line graphs show KK's scores on the table top trials in percentages, using the left-hand side y-axis. A mastery criterion of 85% was adopted for the table top trials. Once achieved, a new play target was selected. The blue data points and blue line graphs show the number of times KK spontaneously displayed the specific targeted play behaviour on the floor play. The occurrence counts are

presented on the right-hand y-axis. These blue scores reflect generalisation of play skills learnt from the table-top discrete trials to the more natural free play context on the floor.

The x-axis shows her performances over the 27 sessions, as well as her scores pre-intervention (Time 1), post-intervention (Time 2) and at the three-month maintenance probe (Time 3).
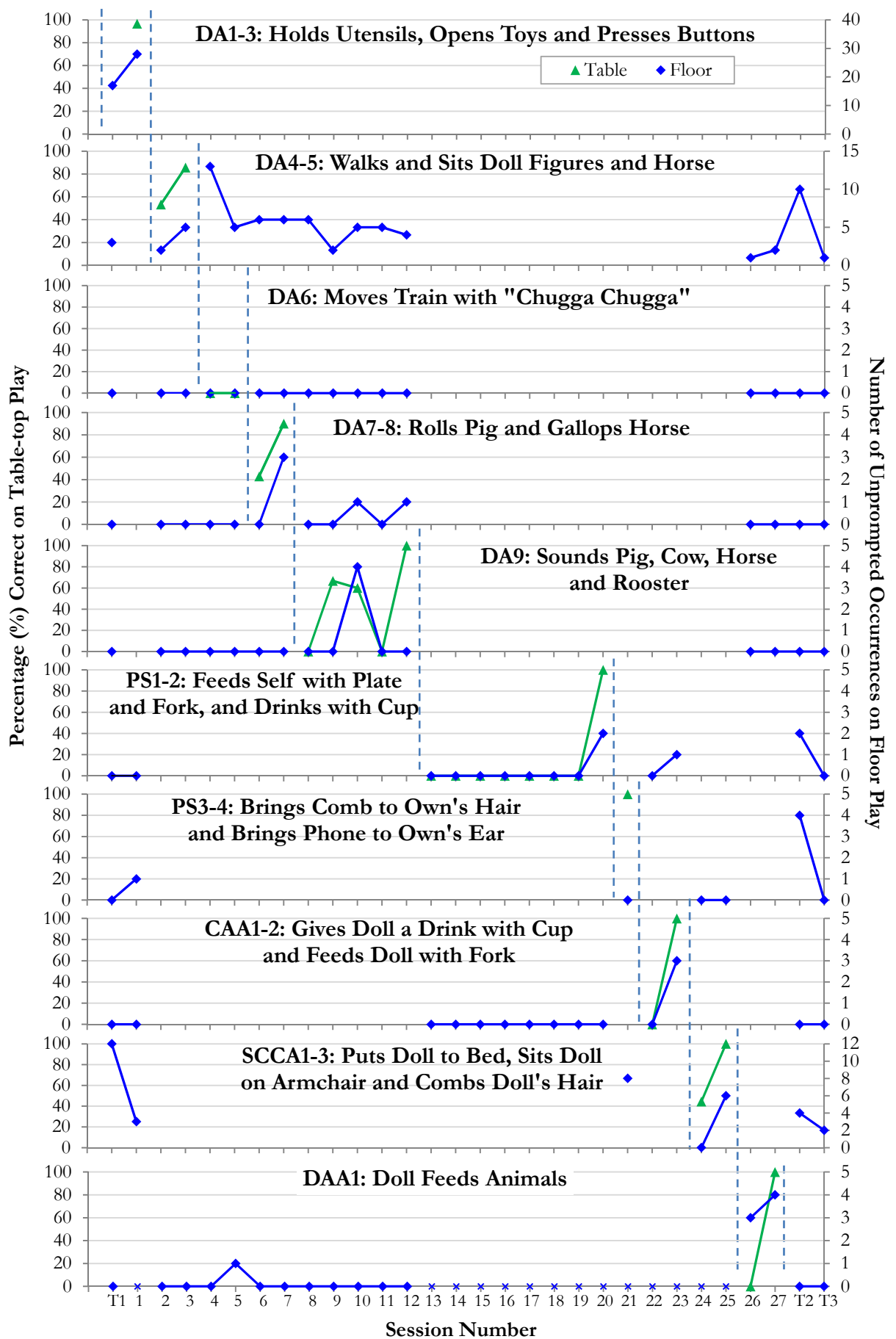
Figure 6.5: Results of Intervention Sessions

Apart from the target "saying 'chugga chugga/choo choo' when moving trains", KK was able to attain mastery criterion levels for all targeted play skills. The following table shows the number of sessions required for KK to achieve mastery levels for the respective play targets.

Table 6.3

Number of Sessions Required for KK to Achieve Mastery Levels

Session	Target Play Category	Target Play Activity	Play Toys/ Examples	No. of Sessions Taken
1	Discriminative Actions	1. To hold utensils 2. To open toys	Forks, knives, cups, plates Pot with lid, flip-phone	1
		3 To press buttons for effects	Phone – sounds Comb - light	
2-3	Discriminative Actions	1. Walks figures	Farmer doll, horse, cow	2
		2. Sits figures	Farmer doll, horse, cow	
4-5	Discriminative Actions	1. Says "chugga chugga/ choo choo" when moving a train	3-part train set	2*
6-7	Discriminative Actions	1. Rolls pig (in mud)	Pig	2
		2. Gallops horse	Horse	
8-12	Discriminative Actions	1. Makes animal sounds	Pig "oink oink" Cow "moo" Horse "neigh" Rooster "Cockadoodle doo"	5
13-20	Pretend Self	1. Drinks from cup 2. Eats with fork from plate	Cup, plate and fork	8
21	Pretend Self	1. Holds phone to ear 2. Brings comb to hair	Phone, comb	1
22-23	Child as Agent	1. Gives a doll a drink with a cup		2
		2. Feeds doll with a fork		
24-25	Specific Combination (Conventional Attributes)	1. Puts doll to bed	Doll and bed	2
		2. Sits doll on armchair	Doll and armchair	
		3. Combs doll's hair	Doll and comb	
26-27	Doll as Agent	1. Uses doll's hand to feed animals	Doll, cow, pig, horse and rooster	2

* Note: Target was abandoned

All new play targets with the exception of "saying 'chugga chugga/choo choo' when moving trains" were mastered within a maximum of eight sessions. The mode was two sessions.

It was evident from the data that newly acquired skills from the table-top play could be observed in subsequent floor play for same-day sessions. In addition, there were also occurrences of earlier learned targeted behaviours spontaneously enacted by KK in subsequent floor play sessions.

KK did not master "saying 'chugga chugga/ choo choo' when moving trains" which required vocalisation. This target was introduced on the fifth day of the play intervention, towards the end of the author's first week of daily work with the child. However, she mastered the making of different animal sounds, which similarly required vocalisation. This target however, was introduced in the second and third weeks of intervention. This target was mastered after five intervention sessions.

Pretend play activities seemed hardest to learn initially, with KK requiring eight sessions to pretend to drink and self-feed. Over these eight sessions, the interventionist not only repeated the trial instructions, for example "Pretend to drink from the cup" but provided verbal narrations of a breakdown of composite skills required to perform the pretend act. For example, instead of saying "Pretend to drink from the cup", the instructions comprised of step-by-step behavioural description of the requested play act: "First, bring the cup close to your mouth. Then hold it in front of your mouth. Tip the cup towards your mouth and tilt you head backwards".

Post-intervention (Time 2) assessments and maintenance probe (Time 3). Both the Preschool Language Scales, Fifth Edition (Zimmerman et al., 2011) and the Developmental Play Assessment (Lifter et al., 1988) were repeated post-interventions (Time 2) and at a 3-month follow up (Time 3).

The following graphs show KK's PLS-5 results over the three time-points, Time 1 (T1), Time 2 (T2) and Time 3 (T3). The PLS-5 scores are normed with a standard score of 100 and a standard deviation of 15 standard points. KK's scores were calculated based on her ages at the respective time points.
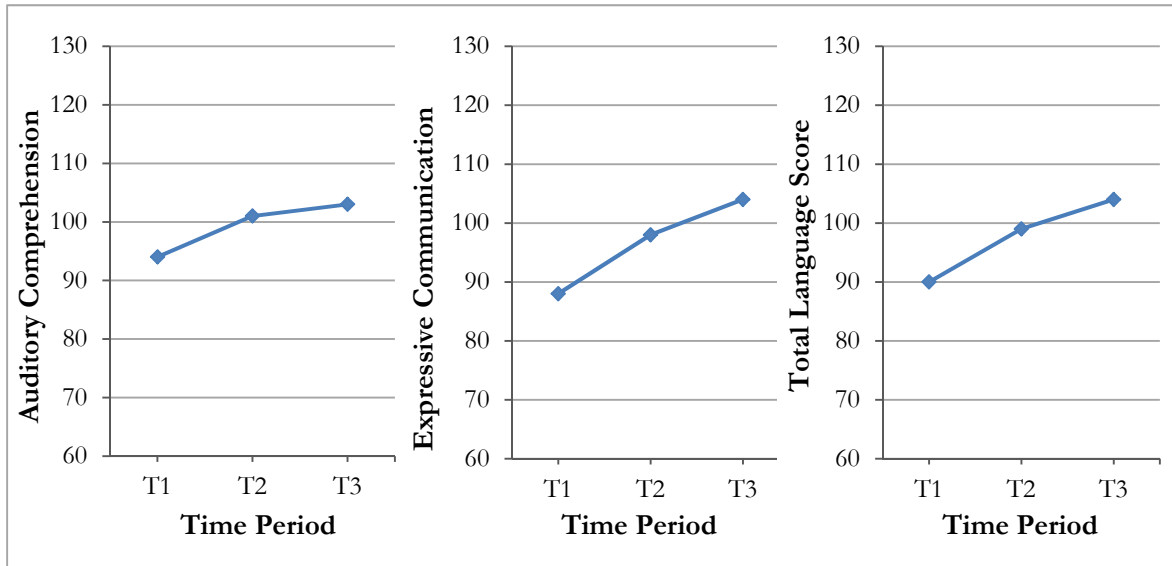
Figure 6.6: KK's PLS-5 Results over Three Time-Points

KK's standard scores on the language assessment PLS-5 improved post-intervention and the upward trend continued into Time 3, which was the maintenance probe. Her Auditory Comprehension scores increased from 94 (34th percentile rank) at Time 1 to 101 (53rd percentile rank) at Time 2, and to 103 (58th percentile rank) at Time 3. Her Expressive Communication scores saw a larger increase from 88 (21st percentile rank) at Time 1 to 98 (45th percentile rank) at Time 2, and to 104 (61st percentile rank) at Time 3 (refer to Fig. 6.7). Her Total Language scores, which was a summation of the two component scores increased from 90 (25th percentile rank) at Time 1 to 99 (47th percentile rank) at Time 2, and 104 (61st percentile rank) at Time 3.

The following graphs and charts show KK's distribution of play tokens and play types over the four play categories and over the three time-points.
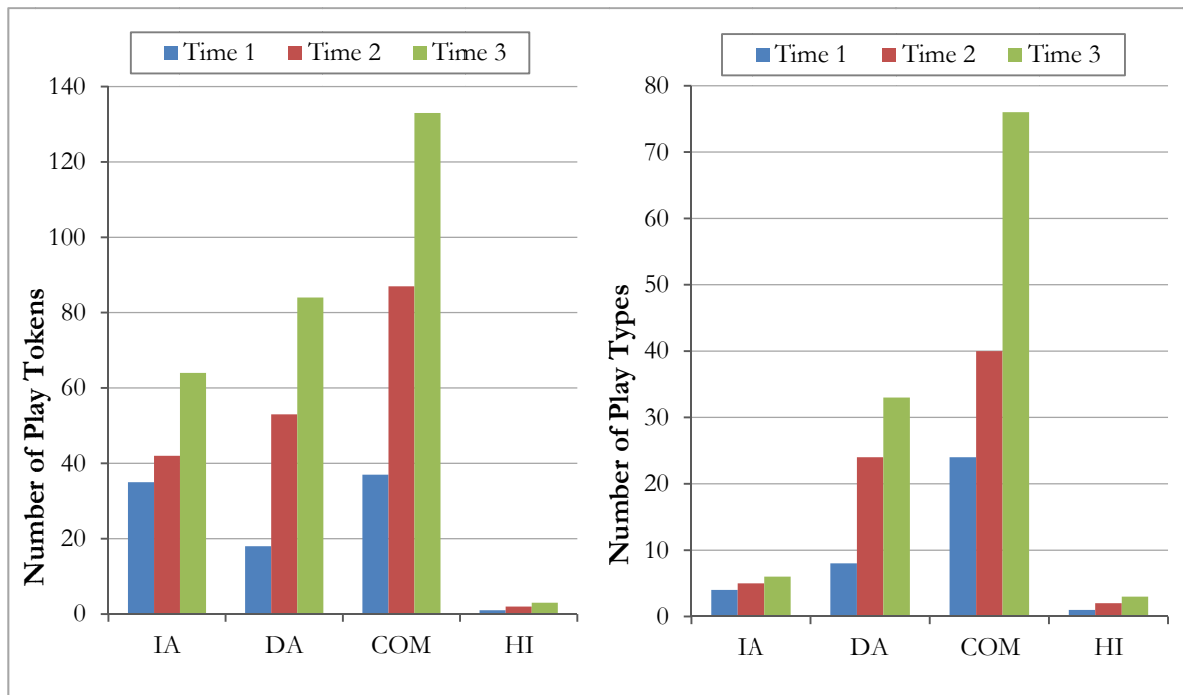
Figure 6.7: Breakdown of KK's Play Types and Tokens

Figure 6.8: Breakdown of KK's Play Tokens over 3 Time-Points (by Percentage)

KK's indiscriminate play acts included smelling and mouthing the toys or throwing or pushing the toys away. From Time 1 to Time 2, KK's proportion of time spent on indiscriminate actions fell from 38.5% to 22.8%. This represented a decrease of 15.7% of her play acts spent on indiscriminate toy play, which is the developmentally

least advanced level of interactions a child can have with the toys and materials presented to them.

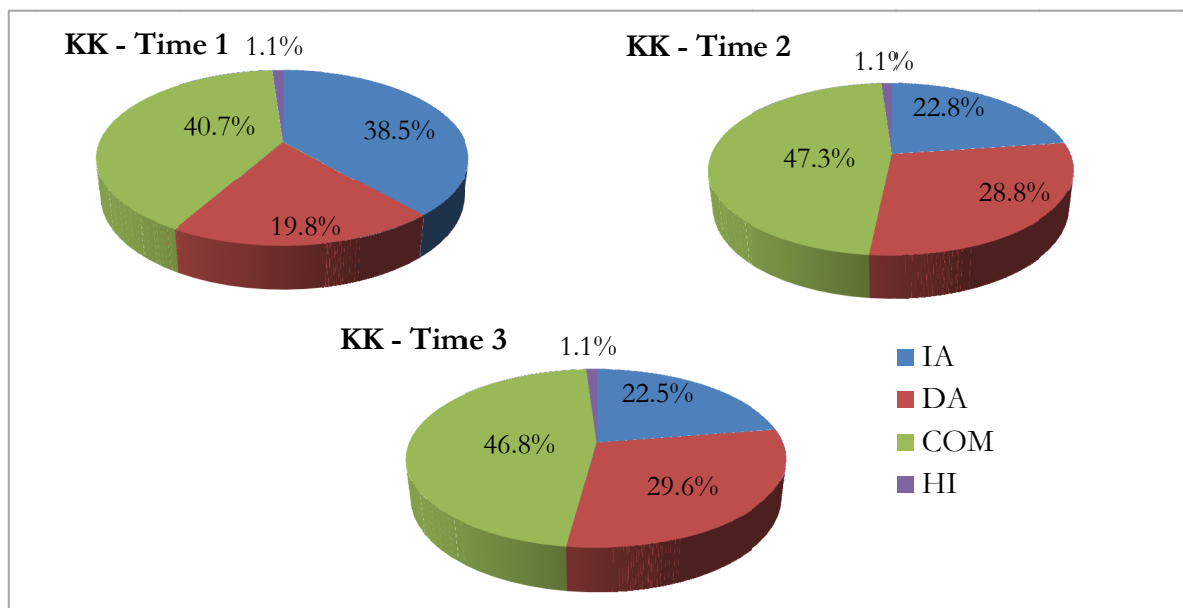KK's number of discriminative play tokens increased from 18 at Time 1 to 53 at Time 2, and finally to 84 at Time 3. This is an increase of 4.7 times in absolute numbers of meaningful play actions on single objects over a six-month period.

She was also engaging in more combinations and pretend self play. Her number of combinations play tokens increased from 37 in Time 1 to 87 in Time 2, and finally to 133 in Time 3. This is an increase of 3.6 times in absolute numbers of meaningful combinatorial and pretend self play actions.

KK had one count of higher order play in Time 1. She increased her higher order play by one count at Time 2 and another one count to a total of three counts at Time 3.

In terms of KK's individual play profile, her proportion of play tokens on discriminative actions and combinations play increased by 9.0% and 6.6% respectively at Time 2. These changes were maintained at Time 3, which was conducted three months after the intervention period ended. Her proportion of time spent on the higher order play however, remained unchanged at 1.1% over the three time points.

The following table shows some examples of different play types exhibited by KK during the intervention period.

Table 6.4

Examples of Different Play Types Exhibited by KK

DPA Play Category	Examples of Different Play Types
Discriminative actions	Walks doll
	Stands horse
	Presses button on phone
Pretend self	Brings empty cup to mouth to drink
	Brings empty fork to mouth to eat
Specific combinations (conventional attributes)	Sits doll on horse
	Puts cup on saucer
	Moves pig into an enclosure

Overall, both KK's number of play tokens and play types increased in each of all four play categories over the three time-points. She did not line up toys at the post-intervention assessment and at the three-month maintenance probe.

Social validation. KK's mother completed a social validity questionnaire. **Appendix J** shows a copy of her responses. On the five-point Likert scale questions, KK's mother circled "Strongly Agree" on the appropriateness of using the DPA in identifying relevant intervention goals for KK. She was also of the view that KK had made progress in her social communication behaviours through the play interventions. When asked about behavioural changes in KK through the intervention period, KK's mother wrote that "collaboration is easier" and " (she is) able to communicate needs and wants with less verbal prompting (from her parents)". When asked "What changes would you suggest on the interventions program?", KK's mother wrote that " (she would) be happy to be part of it on an ongoing basis to see long-term results". In conclusion, KK's mother was pleased with the interventions, noted behavioural improvements in KK, and expressed interest for continued participation in the intervention if the intervention period could be extended.

6.4   Discussion

Throughout the 27 daily intervention sessions, KK progressed from simple discriminative actions on single objects such as pressing toy phone buttons and lifting teapot lid to more advanced play skills such as pretending to feed self and feeding a doll. The floor play component of the targeted symbolic play intervention was more child-driven than adult-driven. The floor play approach adopted was such that the interventionist facilitated the child initiations and supported the child's own ideas of play as described under the methodology section for the symbolic play intervention procedures

(p.52). These more advanced play skills required the child to engage in pretend or symbolic play. Symbolic play is often defined as children's deliberate distortion of reality in play when they act "as if something is the case when it is not" (Leslie, 1987). Symbolic play is typically a weakness in children with ASD. For KK, she took eight sessions to master this first pretend play target, to pretend feed herself with a plate and fork and to pretend to drink with an empty toy cup. This was the most number of sessions she required to master a newly introduced play target throughout this intervention. After she gained success with this set of play skills however, she took fewer sessions to learn the subsequent pretend play targets. For example, she took two intervention sessions to learn to give a drink to the doll. Such a pattern could be illustrating the operation of a generalised response system or a functional response class (Baer, Peterson, & Sherman, 1967; Peterson, 1968).

Two important processes in this intervention were that of systematic prompting and breaking down a complex task into smaller steps. The relatively more adult-driven scaffolding and breaking down of play sequences was undertaken in order to elicit initial responses from KK. These two processes worked hand in hand towards successful play skills attainments for KK. The verbal narration of a breakdown of composite skills required to perform the pretend play acts were provided for KK to acquire these more complex play skills. These step-by-step behavioural descriptions of the requested play act for example, "First, bring the cup close to your mouth. Then hold it in front of your mouth. Tip the cup towards your mouth and tilt you head backwards", might have contributed to KK's acquisition of the new play skills. The interventionist persisted and repeated the trials over the eight sessions in spite of little behavioural and verbal feedback obtained from KK. KK would be quiet, often presented with non-compliant body language such as hair twirling, body turning away to the side and lack of eye contact. The

interventionist continued with the trials in spite of such a non-responsive physical stance from KK. This persistence was eventually rewarded on the eighth session when KK demonstrated that she had acquired the new play skills.

According to KK's parents, articulating in the presence of others seemed challenging for KK. It might have been anxiety provoking for her even though she had the linguistic ability to say those words. KK did not master the target "saying 'chugga chugga/ choo choo' when moving trains". However, KK mastered the making of animal sounds which also required verbal articulations. This was achieved over five sessions. One possibility to account for the different outcomes for these two targets, both requiring verbal articulations, was perhaps due to the timing of introduction of these targets. "Saying 'chugga chugga/ choo choo' was introduced early on in the intervention, which was during the first week of intervention. Whereas "making animal noises" on the other hand, was introduced towards the end of the second week of intervention. The better rapport built over the two weeks' time might have contributed to KK's readiness to make verbal articulations in play. On hindsight, it would have been interesting to re-visit the earlier abandoned target of "saying 'chugga chugga/ choo choo' when moving trains" at a later part of the intervention to test this hypothesis.

From Time 1 to Time 2, the proportion of KK's play acts comprising indiscriminate actions fell while the proportion of discriminative actions and combinations play increased by 9% and 6.6% respectively at Time 2. These changes were maintained in Time 3 three months after the intervention period ended. Her proportion of time spent on the higher order play remained unchanged at 1.1% over the three time points, in spite of an increase in the absolute number of higher order play tokens.

This pattern of results provides validity support for the four newly created, collapsed play categories on the DPA. It appears that with the targeted symbolic play

intervention, some of KK's indiscriminate actions were replaced with more meaningful discriminative actions and combinations play. These categories included pretend self play. However, only a slight increase was seen in higher order play perhaps due to insufficient intervention period of only three months. This pattern of gains provides validity support to the developmental sequence of play skills used in this study.

Overall, KK's amount of play as reflected in her play tokens increased in each of all four play categories over the three time-points. Her number of play types also increased. In other words, she was becoming a more active player as denoted by the number of play tokens and she was playing more flexibly as reflected by the higher number of play types. It is interesting to note that this upward trend continued into Time 3, which was three months after intervention ended.

There was also a corresponding increase in the number of play types KK displayed over the three time-points. This meant that KK was not only increasing the number of play acts but there was greater variety in the ways in which she was using the toys. The increase in the number of play types was beyond those that were taught in the intervention. For example, in addition to combining a plate and a fork which she was taught to do, KK was making many different combinations such as fork and spoon on a plate, spoon in a pot and a teacup on a saucer. It appeared that she was playing more creatively over time.

In introducing new play targets to KK, there seemed to be a repeated pattern whereby she would appear "shut down" at the introductory phase. During such sessions, she appeared behaviourally and verbally unresponsive and had minimal or no observable engagement with the interventionist. Often, she would turn her body to one side. She might be engaged in self-stimulatory tactile behaviours such as twirling her hair or picking her eyelid. These unresponsive periods would end somewhat abruptly and often

to the interventionist's surprise, she would start to display her newly acquired skills in the discrete table-top trials. When she started displaying the target play skills, her scores would go step-like, from zero percent to 100% or close thereto. It seemed then that while KK might have appeared to be in a "shut down" mode, she might in fact have been listening and trying to understand the instructions given by the interventionist in spite of her seemingly unengaged behavioural presentation.

The interventionist shared this observation with KK's mother. KK's mother reported that this pattern of behaviours was typical of her. She noticed that KK might appear not to be listening and even seemed uncooperative when she was given instructions. However, she would perform the required behaviours after some time. It seemed that she was taking a period of time to take in the information before she displayed the required behavioural topography correctly. These "shut down" times might actually be periods of time for KK to process new information before she was able to display them.

Apart from gains in symbolic play skills which were the intervention targets for KK, she made collateral gains in auditory comprehension and expressive communication skills as assessed by the Preschool Language Scales, Fifth Edition (Zimmerman et al., 2011). These upward trends in her scores were maintained at Time 3 which was conducted three months after the intervention had ended. At Time 3, she scored 103 standard score points (58th percentile rank) on Auditory Comprehension, 104 (61st percentile rank) on Expressive Communication and 104 (61st percentile rank) on the Total Language Score which is derived from the Auditory Comprehension and Expressive Communication scores. While she had made gains in her auditory comprehension and expressive communication, the gains made in expressive communication were more pronounced than her gains made in auditory comprehension. Expressive communication

skills were not systematically targeted in the intervention, so any gains in expressive communication are considered collateral gains.

Some behavioural skills are related such that acquiring one can lead to acquiring other related skills with little or no further interventions as denoted by the concept of a behavioural cusp (Rosales-Ruiz & Baer, 1997). This concept is important in designing and monitoring teaching curricula in early interventions for children with developmental disabilities. In conclusion, this intervention study systematically and successfully replicated the symbolic play intervention as reported by Kasari and her colleagues (Kasari et al., 2006) using a single case behavioural paradigm. It provided evidence that play skills, and in particular, symbolic play, can be taught using a developmental and behavioural framework. This study lent support to the validity of the Developmental Play Assessment (Lifter et al., 1988) by showing that the developmental progression of gains made in this play intervention mirrored the developmental sequencing of play skills in DPA. This is also a first study to show evidence of collateral gains in auditory comprehension and expressive communications from a targeted symbolic play intervention.

6.5   Limitations

Further systematic replications are required for the findings from this single case design to be generalised to general populations of children with PDD-NOS and ASD.

This study did not include an observation of KK's play behaviours in a more natural setting such as her home or her preschool. Data recorded in these settings would allow for further assessment of generalisation of newly acquired skills to the child's natural contexts. There is also much potential if the intervention programme can be

integrated in her home and preschool contexts with participation from her parents and teachers.

A key limitation in this study is that the author is the interventionist as well as the person who conducted the assessments pre- and post-intervention. It would have been better to have an assessor who was blind to the condition of this study.

CHAPTER 7 – DEVELOPMENTAL PLAY TRAJECTORIES IN CHILDREN WITH AND WITHOUT ASD

7.1   Introduction

This chapter presents the results from a developmental trajectory study. A developmental trajectory approach combines both a cross-sectional design and a longitudinal design tracking the development of groups of individuals over time (Thomas et al., 2009). In the current study, the author examined communication, language and play skills of children with and without ASD over three time-points. This study would investigate if developmental trajectories for a participant could improve with intensive targeted symbolic play intervention.

7.2   Method

Research design. This research utilises a developmental trajectory approach, combining both cross-sectional and longitudinal design tracking child development over three time-points.

Participants. The participants were three groups of children, children with ASD (ASD) (n=3), the child with PDD-NOS who received targeted symbolic play interventions as reported in Chapter 6 (KK) (n=1) and a third group of neurotypical children (NT) (n=3). Chapter 3 described the participant recruitment process. Details on the participants were presented in **Table 3.1**.

Materials. The participants were administered the Preschool Language Scale, Fifth Edition (Zimmerman et al., 2011) and the Developmental Play Assessment (Lifter et al., 1988). Both assessments were repeated over the three time-points, Time 1 (T1), Time

2 (T2) and Time 3 (T3). The materials required for these assessments were the same as those reported in the previous chapter for participant KK.

All play assessment sessions were video recorded using a video camera on a tripod stand.

Procedures. The author conducted both assessments for each child using one-to-one administration. Most children were able to complete both assessments in a single session although there were a few occasions when the participants needed two separate-day sessions to complete both assessments. These two assessments were repeated at Time 2 and again, at Time 3. The time-points were three months apart, and were the same as those reported in the previous chapter for participant KK, who received daily targeted symbolic play interventions between Time 1 and Time 2.

7.3   Inter-Rater Agreement

Reliability was calculated between two independent coders, the author and an early intervention behavioural therapist, for about 20% of the DPA assessment sessions or four videos. Intraclass correlation coefficients were .75 and .92 for number of play tokens and number of play types respectively. These coefficients indicate "substantial" to "almost perfect" agreement respectively (King's College London, 2014; Landis & Koch, 1977). The magnitude of this agreement will be further discussed in the following chapter.

7.4   Results

Preschool Language Scale, Fifth Edition (PLS-5) results. The following graphs (**Figure 7.1**) show the participants' scores on the PLS-5. The three graphs show the standard scores of the three groups of children on Auditory Comprehension (AC),

Expressive Communication (EC) and Total Language Score (TLS) which is a summation

of the AC and EC scores.
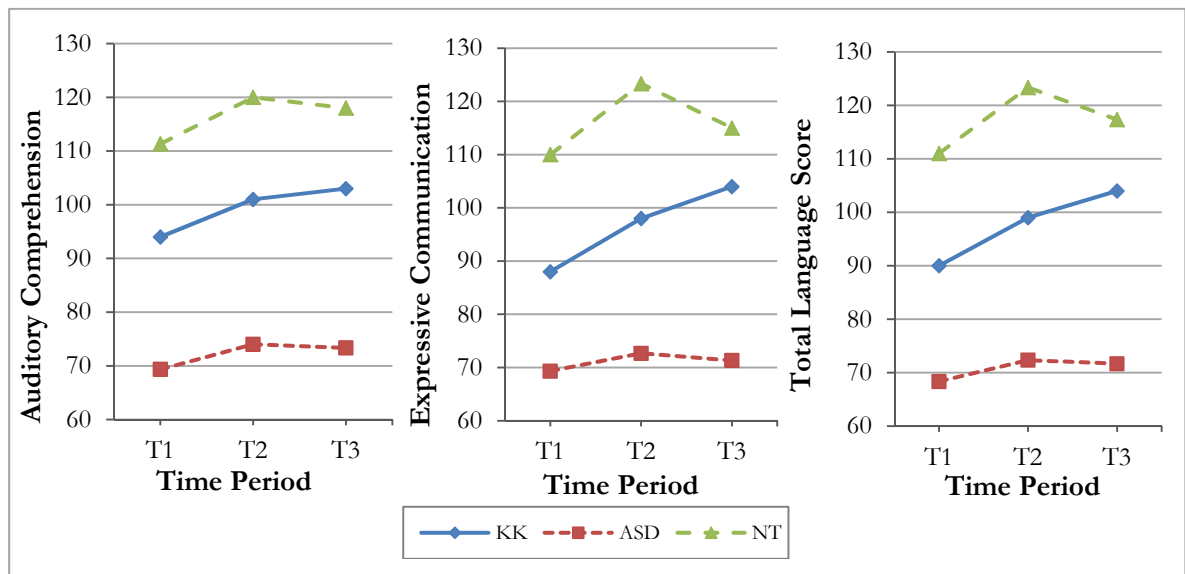
Figure 7.1: Scores of Three Groups of Children on Auditory Comprehension, Expressive Communication and Total Language Scores

Auditory comprehension. The ASD group started the study with the lowest

average Auditory Comprehension standard score (mean = 69, range = 50 - 83) as

compared with the NT group (mean=111, range = 99 - 125). KK started the experiment

with an Auditory Comprehension standard score of 94. By Time 2, the Auditory

Comprehension scores of all three groups increased, with KK making the greatest

improvement of seven standard score points to 101. By Time 3, KK's scores continued to

improve by a further two standard points to 103. For both the ASD and NT groups, the

Time 3 Auditory Comprehension scores remained relatively stable compared to Time 2

Auditory Comprehension scores.

Expressive communication. The ASD group started the experiment with the

lowest Expressive Communication standard scores (mean = 69, range = 50 - 80) as

compared with the NT group (mean= 110, range = 95 - 125). KK started the experiment

with an Expressive Communication standard score of 88. By Time 2, the Expressive

Communication scores of all three groups increased, with KK making the greatest improvement of 10 standard score points 98. By Time 3, KK's scores continued to improve by a further eight standard points to reach an Expressive Communication standard score of 104. The Time 3 Expressive Communication score for the ASD group remained stable compared to Time 2 Expressive Communication score. For the NT group however, there was a dip in their Expressive Communication scores by eight standard score points. It was noted that the NT participants seemed to have lost interest in the assessment at Time 3 as it was their third time undergoing the same assessment procedures with the same toys and materials.

Total Language Scores. As the Total Language Scores were derived from the Auditory Comprehension and Expressive Communication scores, they reflect a similar pattern to the above reported trends. The ASD group started the experiment with the lowest Total Language Scores (mean = 68, range = 50 - 80). The NT group had the highest Total Language Scores (mean= 111, range = 99 - 125) at Time 1. KK started the experiment with a Total Language Score of 90. At Time 2, the Total Language Scores of all three groups increased, with KK making the greatest improvement of nine standard score points to 99. At Time 3, KK's scores continued to improve by a further five standard points to reach a Total Language Score of 104. Time 3 Total Language Score for the ASD group was stable at 72, no change from Time 2. For the NT group, there was a dip in the Total Language Score by six standard score points to reach an average Total Language Score of 117.

Developmental Play Assessment (DPA) results. This section reports findings from the DPA for the three groups of children (KK, ASD and NT) over the three time-points (T1, T2 and T3). The four composite play categories as reported in Chapter 6 were used in this chapter instead of the original 16 play categories for ease of communication

and reader understanding. The four play categories are indiscriminate actions (IA), discriminative actions (DA), combinations (COM) and higher order play (HI). Two measures were obtained for each of these categories, the number of play tokens and the number of play types. The percentages of individual child's play in each of the four play categories were calculated for both play tokens and play types. The ASD and NT group data represents the average scores of participants in the respective groups.

Indiscriminate actions. In this section on indiscriminate actions, percentages of participants' indiscriminate actions are reported to reflect the amount of indiscriminate actions in relation to an individual's overall profile of play. For the ASD and NT groups, group level percentages are reported.

Indiscriminate actions displayed by the participants included sensory behaviours such as touching, feeling and smelling the toys, as well as pushing away, dropping toys off the play table and throwing toys. The following pairs of line graphs (**Figure 7.2**) report data on the percentage of indiscriminate play tokens and the percentage of indiscriminate play types.

IA Play Tokens Percentages. At Time 1, KK had 38.5% of her play tokens on indiscriminate actions which were the highest amongst the three groups of participants. KK's percentage of IA play tokens decreased 16% to 22.8% at Time 2. This reduction was maintained at 22.5% at Time 3.

The ASD group had 28.0% of IA play tokens at Time 1, and 27.7% at Time 2. By Time 3, the ASD group's percentage of IA play tokens increased to 33.8%.
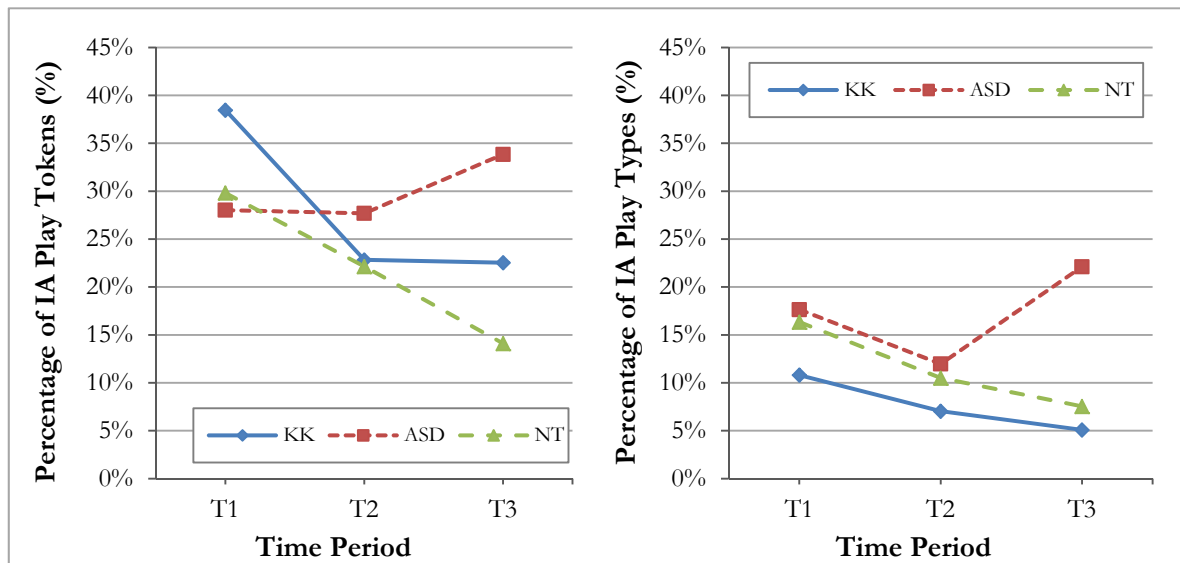
Figure 7.2: Percentage of IA Play Tokens and Types

The NT group showed a decrease in their percentage of IA play tokens across the three time-points. At Time 1, the NT group registered 29.8% of their play on IA play tokens, followed by a drop to 22.1% at Time 2 and a further drop to 14.1% at Time 3.

IA Play Type Percentages. For KK, there is a general downward trend in the percentage IA play types. Her percentage of IA play types was down from 10.8% at Time 1, to 7.0% at Time 2 and with a further reduction to 5.1% at Time 3.

For the ASD group, the percentage of IA play types fell from 17.6% at Time 1 to 12.0% at Time 2, before rising to 22.1% at Time 3.

The NT group showed a downward trend in their percentage of IA play types over the three time-points. The NT group's percentage of IA play types was down from 16.3% at Time 1, to 10.5% at Time 2 and with a further reduction to 7.5% at Time 3.

Discriminative actions. Discriminative actions are single play actions on single objects. Play behaviours such as moving a train, standing a doll, pressing toy phone buttons give a score each in this category. Unlike indiscriminate play actions, this category of play actions comprises meaningful play behaviours in relation to the toy materials presented. The following pairs of line graphs (**Figure 7.3**) report data on the

number of play tokens and the number of play types in the discriminative actions play category.

Figure 7.3: Number of DA Play Tokens and Types

DA Play Tokens: KK's number of discriminative actions play tokens increased from 18 at Time 1 to 53 at Time 2 and finally to 84 at Time 3.

The ASD group's number of discriminative actions play tokens increased from 21 at Time 1 to 47 at Time 2. However, this was followed by a drop at Time 3 to 22.

The NT group's discriminative actions play tokens increased from 19 at Time 1 to 79 at Time 2. However, this was followed by a drop at Time 3 to 65.

DA Play Types: Between Time 1 and Time 2, there was a general increase in the number of play types for all three groups of participants.

KK showed an increase in her number of discriminative actions play types between Time 1 and Time 2, and a further increase again between Time 2 and Time 3. KK's number of discriminative actions play types increased from 8 at Time 1 to 24 at Time 2 and finally to 33 at Time 3.

The ASD group's number of discriminative actions play types increased from 13 at Time 1 to 20 at Time 2. However, this was followed by a drop at Time 3 to 14.

The NT group's number of discriminative actions play types increased from 10 at Time 1 to 23 at Time 2 and finally to 26 at Time 3.

Combinations. Combinations combined seven of Lifter et al.'s (1993) original play categories. These included putting together and taking apart toys and materials such as combining a fork and a plate, relating objects to self with a pretend quality such as bringing an empty toy cup to one's mouth, and child as an agent extending familiar actions to doll figures such as giving a doll a drink. The following pairs of line graphs (**Figure 7.4**) report data on the number of play tokens and the number of play types in combinations play category.
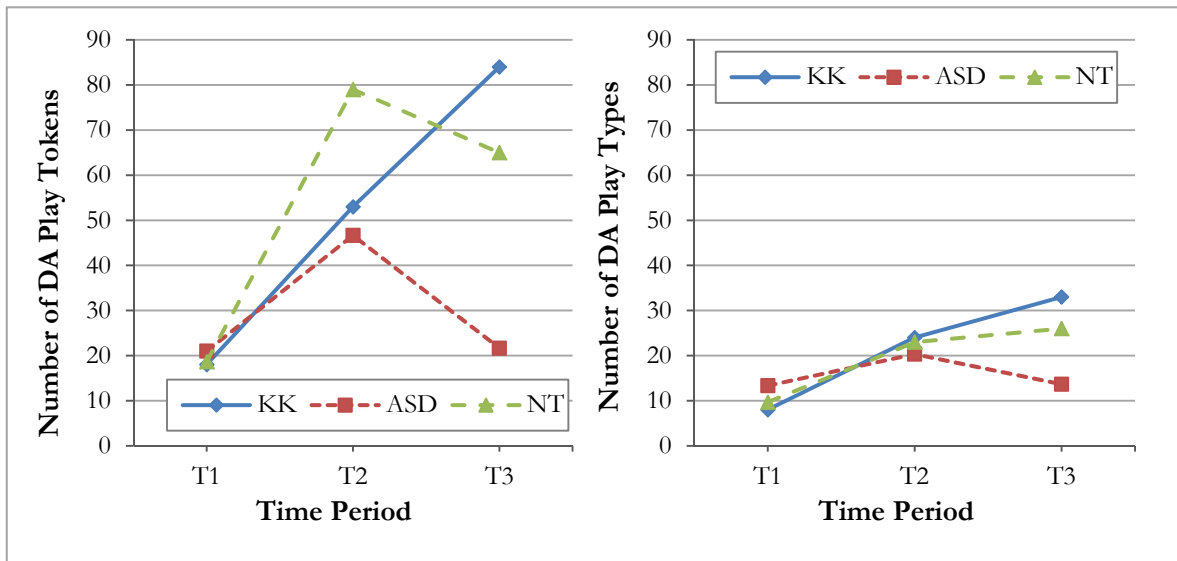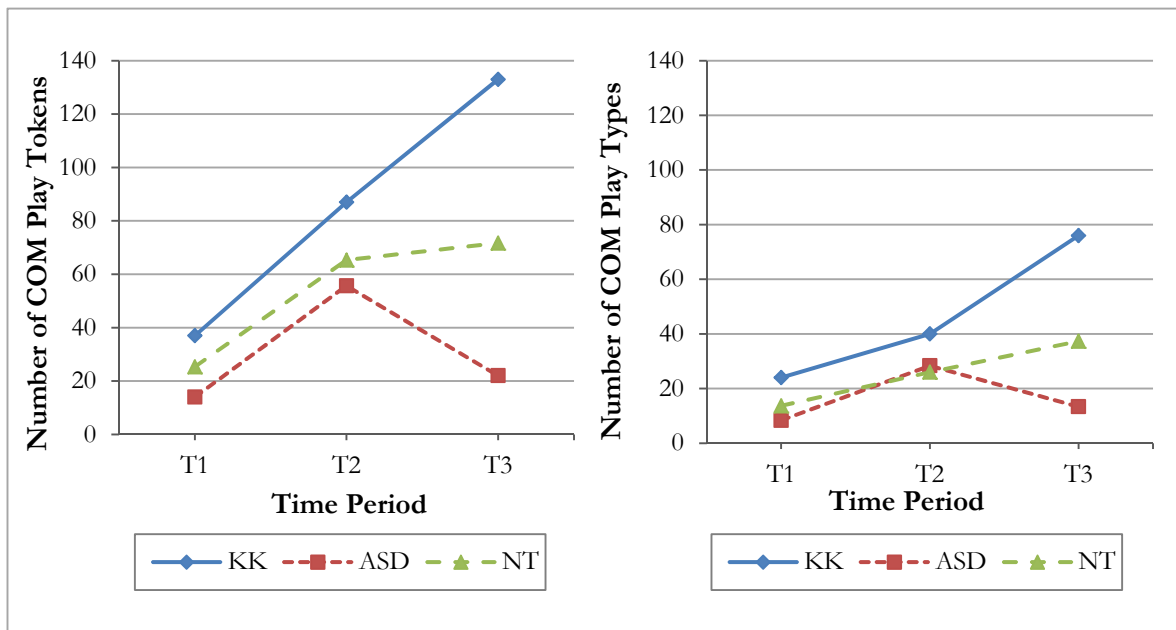

Figure 7.4: Number of COM Play Tokens and Types

COM Play Tokens. KK's number of combinations play tokens increased from 37 at Time 1 to 89 at Time 2 and finally to 133 at Time 3.

The ASD group's number of combinations play tokens increased from 14 at Time 1 to 56 at Time 2. However, this was followed by a drop at Time 3 to 22 combinations play tokens.

All three groups showed an increase in the number of combinations play tokens between Time 1 and Time 2. At Time 3 however, only KK continued to show a similar rate of increase in the number of combinations play tokens. The NT group showed a gentler upward trend, whilst the ASD group showed a drop in the number of combinations play tokens to a level closer to that at Time 1.

COM Play Types. KK's number of combinations play types increased from 24 at Time 1 to 40 at Time 2 and finally to 79 at Time 3.

The NT group's number of combinations play tokens increased from 14 at Time 1 to 26 at Time 2 and finally to 37 at Time 3.

Both KK and the NT group showed an upward trend in the number of combinations play types, with KK registering a greater rate of increase across the three time-points. KK's number of combinations play types increased 42 points from 24 to 76 between Time 1 and Time 3, as compared with an increase of 23 points from 14 to 37 by the NT group over the same 6-month period.

The ASD group showed an increase in the number of combinations play types at Time 2 but this was followed by a decrease at Time 3 to 13 combinations play types, which was close to its Time 1 level of 14 combinations play types.

Higher order play. Higher order play combined the last seven categories of Lifter et al.'s (1993) original play continuum. These were the developmentally most advanced play skills on the continuum. They included substitutions such as putting a bowl on the head for a hat, moving the doll as an agent as if they are capable of action, and sociodramatic play with different characters assigned various roles in play themes such as playing house with mum and dad roles. The following pairs of line graphs (**Figure 7.5**) report data on the number of play tokens and the number of play types in the higher order play category.
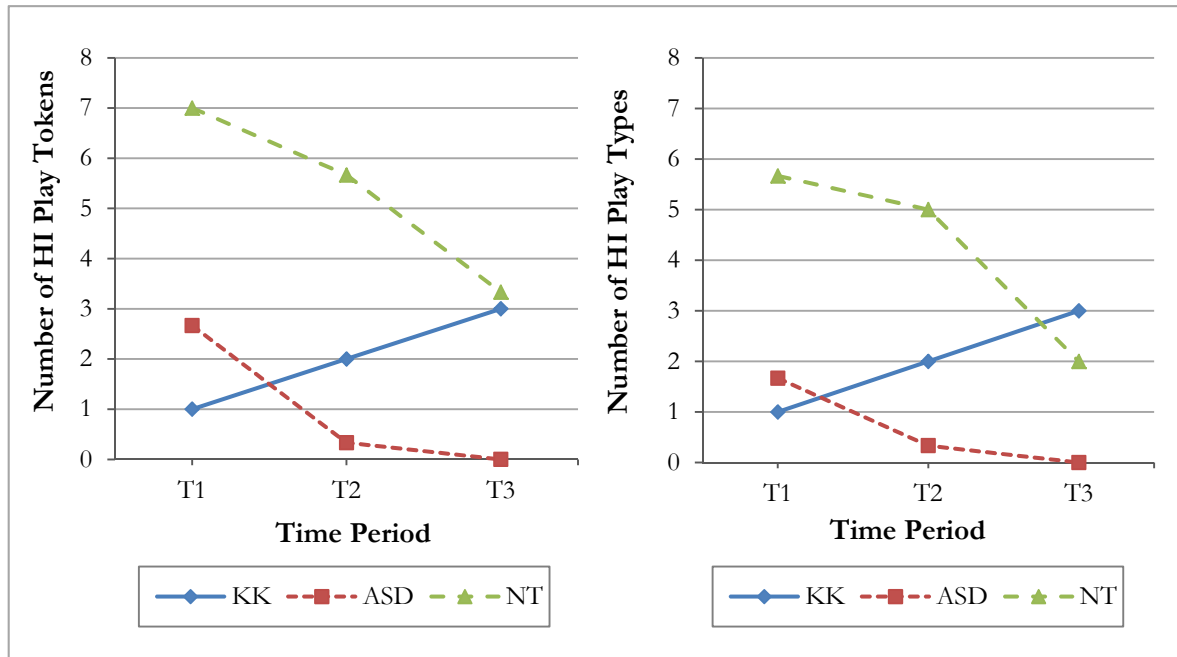
Figure 7.5: Number of HI Play Tokens and Types

HI Play Tokens: KK's number of higher order play tokens increased from one at Time 1 to two at Time 2 and finally to three at Time 3.

The ASD group had a count of three higher order play tokens at Time 1 but zero higher order play tokens were recorded at Time 2 and 3. These numbers are rounded off to the nearest whole numbers while the graph plots the actual figures.

The NT group had a count of seven higher order play tokens at Time 1, six at Time 2 and three higher order play tokens was recorded at Time 3.

KK showed a steady upward trend across the three time points whereas the ASD and NT groups both showed a downward trend on the number of higher order play tokens. By Time 3, both KK and the NT group showed three counts of higher order play tokens.

HI Play Types: KK's number of HI play types increased from one at Time 1 to two at Time 2 and finally to three at Time 3.

The ASD group had a count of two higher order play types at Time 1, but zero higher order play types were recorded at Time 2 and 3. These numbers are rounded off to the nearest whole numbers while the graph plots the actual figures.

The NT group had a count of six higher order play types at Time 1, five at Time 2 and two higher order play types was recorded at Time 3.

As the number of play tokens and play types in the higher order play category are relatively small, these findings need to be interpreted with caution.

7.5   Summary of Play Data

The following paragraphs summarises data from all three groups of participants over the three time-points.

Figure 7.6 shows the chart on the participants' number of play tokens in indiscriminate actions, discriminative actions, combinations and higher order play categories.

Figure 7.6: Number of Play Tokens by KK, ASD and NT Groups over Time

Amongst the three groups, KK's total number of play tokens increased by the largest amount between Time 1 and Time 3. Post-intervention at Time 2, KK displayed more play tokens in three of the play categories compared with the NT group: indiscriminate actions, discriminative actions and combinations play categories. However, the NT group had more higher order play that included substitutions, multischeme sequences and sociodramatic play. At the maintenance probe at Time 3, KK had more play tokens in the same three play categories compared with the NT group: indiscriminate actions, discriminative actions and combinations play categories. Both KK and the NT group had the same number of higher order play tokens at Time 3.

On the three time-points, the ASD group displayed the most number of play tokens at Time 2 over the three time-points. This was followed by a drop in the number of play tokens at Time 3 for all four play categories: indiscriminate actions, discriminative actions, combinations play categories, and higher order play.

The NT group showed a decrease in the number of play tokens between Time 2 and Time 3 for indiscriminate actions, discriminative actions and for higher order play. There was a slight increase in the number of combinations play tokens during this period.

Figure 7.7 shows the chart on the participants' number of play types in indiscriminate actions, discriminative actions, combinations and higher order play categories.
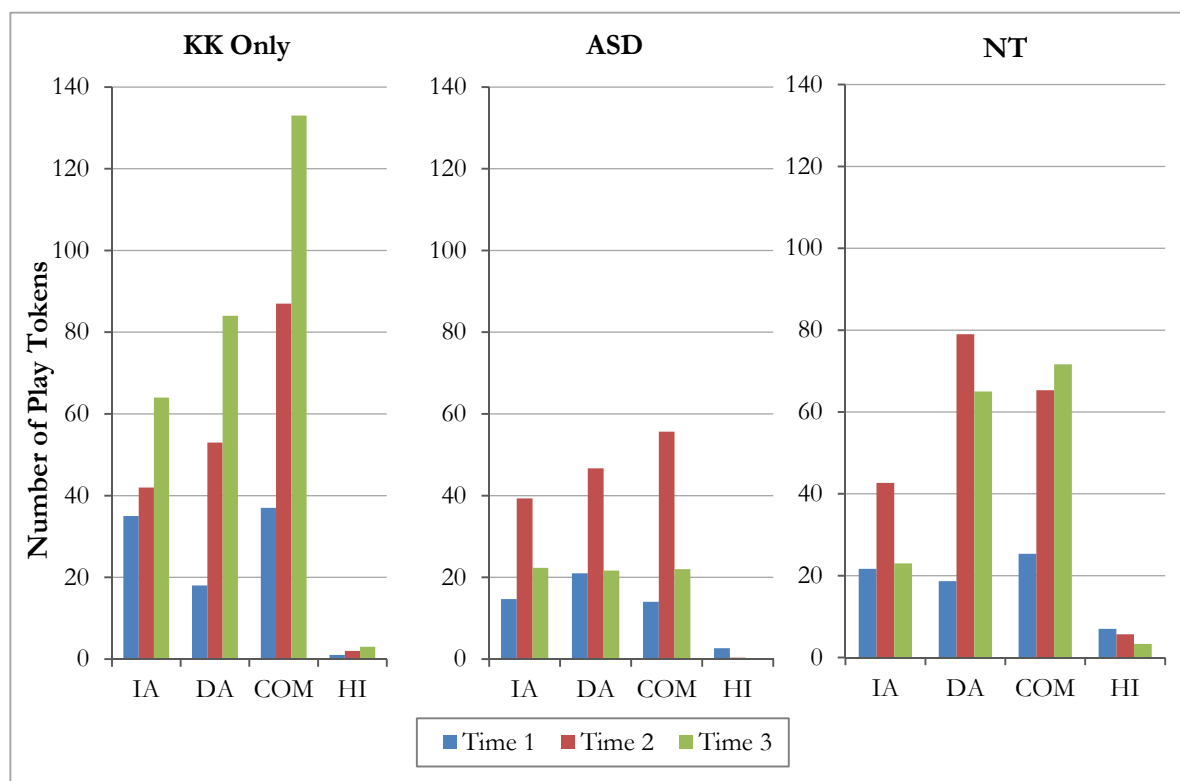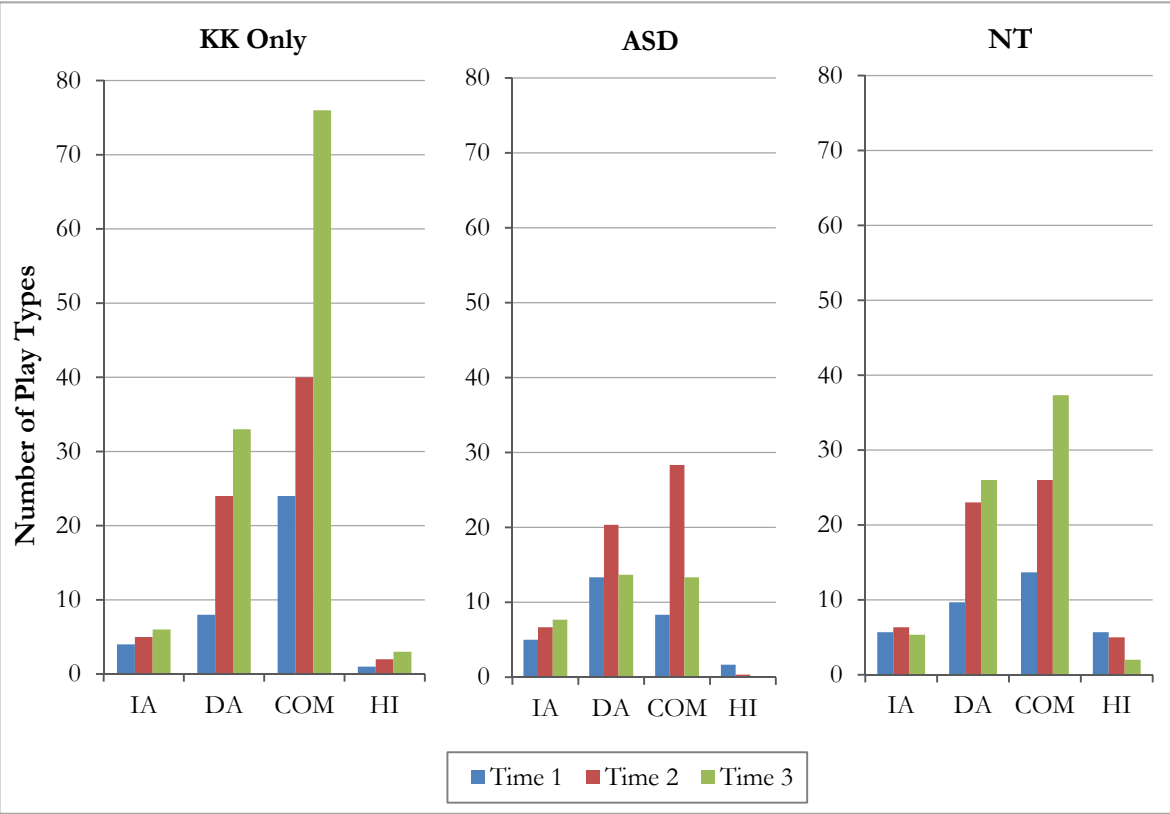
Figure 7.7: Number of Play Types by KK, ASD and NT Groups over Time

KK's number of play types increased over time in all four play categories. The NT group displayed increases in the number of discriminative and combinations play types consistently over the three time-points but showed a drop in the number of higher order play types at Time 2, and then again at Time 3. Amongst the three groups, KK's overall number of play types increased by the largest amount between Time 1 and Time 3, especially for combinations play types. The ASD group displayed more discriminative and combinations play types at Time 2 but the numbers fell at Time 3. The ASD group displayed three counts of higher order play types in Time 1 but none at Time 2 and 3.

7.6   Case Example of MO

This paragraph reports on observations made of MO, a child in the ASD group not receiving the targeted symbolic play intervention. MO had an expressive communication age equivalent of five-month-old at the start of the study. At that time, MO had not

spoken his first word yet at a chronological age of 4 years 8 months. During the three play assessment sessions at Time 1, 2 and 3, his mother was present and noted MO interacting with the different play materials in the presence of the assessor. His mother made the following observations concerning MO's play: MO showed interest in a doll for the first time, he played throwing and catching ball with a partner for the first time and he made mouth movements as if he was speaking while on the toy phone also for the first time. After each play assessment session, his mother conducted some of the play activities at home. For example, the family bought him a ball and started playing throwing and catching the ball with him. By the third language assessment session which is six months after the first session, MO's expressive communication age equivalent was at seven-months-old, an increase of two months on the standardised assessment. This was achieved without a formal intervention programme.

7.7 Discussion

The three groups of children took the same language and play assessments, and these same assessments were repeated over three time-points. This combination of cross-sectional (ASD, ASD with Early Intervention and Neurotypical groups) and longitudinal (Time 1, Time 2 and Time 3) research design provided some insights to their respective play and language profiles.

The ASD group presented with much larger ranges in their language scores and play profiles. This heterogeneity in skill profiles is consistent with general findings within the ASD population. Overall, the ASD group performed poorer in the language assessments as compared to the Neurotypical group. At Time 1 pre-interventions, KK had better language scores than the ASD group and had weaker scores than the Neurotypical group.

With the targeted symbolic play intervention, KK made improvements in her play and language skills over the six-month period. Her language performances improved to slightly above 100 standard score points, which are comparable to the mean scores in the normative sample. This pattern is not seen in the ASD group. This is in spite of the ASD group children attending specialised services including access to social skills playgroup, psychologist, occupational therapist and speech and language pathologist interventions.

There is an overall upward trend in the language scores for the Neurotypical group but the scores for the ASD group remained relatively stable. The pattern of results suggests a higher rate of growth for the typically developing children, which was expected and provides validity support for the assessments used in this study.

Play skills of the ASD group remained relatively low over the three time-points and they had a larger proportion of behavioural actions spent on indiscriminate play actions such as sniffing of toys, rubbing the toys on their skin and pushing or throwing the toys away.

At Time 2, there appeared to be a spike in play performances by the ASD and NT groups of children in indiscriminate, discriminative and combinations play. This was followed by a drop in the numbers of play tokens in Time 3. The Neurotypical group performed more poorly in Time 3 compared to Time 2, which was counter-intuitive as growth and development was expected in typical development.

One possible explanation for this is a seasonal effect. Time 3 took place on hot summer days and during the summer school holidays. The author noted that the children appeared more lethargic and the absence of school routines perhaps contributed to their unwillingness to perform at their best on sit-down tasks and on verbal expression.

A second possible explanation was that the children in the neurotypical group were bored with the same assessment procedures and the same toys by the third repeated

test administration. They scored especially poorly on Expressive Communication at Time 3 and they appeared more impatient for the formal assessment to be over. The auditory comprehension questions required less effort on their part as most questions required either a pointing response or a single-word response. The decrease in their auditory comprehension component score was less pronounced than the decrease in their expressive communication component score. Similarly for the Developmental Play Assessment, the neurotypical children seemed bored with the same set of procedures and toys by Time 3. This was the most likely explanation for the drop in scores in both spontaneous toy play and in the structured language assessment, particularly the expressive communication component of the language assessment.

Other possible explanations for better scores at Time 2 are practise effects and familiarity with tester (Sattler, 2002). It may be useful to consider these effects in administering play assessments, especially if high-stakes decisions are to be made based on these assessment findings.

It was interesting to note that for one child in the ASD group, MO, the Developmental Play Assessment which is a play assessment instrument seemed to have brought positive therapeutic outcomes by itself. MO's case example illustrates the potential of using play in eliciting early language skills in children with ASD who have yet to develop language. MO's mother gained ideas on possible play activities from observing the play assessment conducted as part of the developmental trajectory research. She continued to conduct these play activities and practise play skills with MO at home. This case example also illustrated the potential of parents as teachers, as advocated by Ellis and colleagues (Ellis, Cannon, Woodward, McCaffrey, & Lifter, 1996).

PART IV:

SYNTHESIS AND CONCLUSIONS

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CHAPTER 8 – DISCUSSION AND RECOMMENTATIONS

8.1   Key Findings and Contribution

The primary aim of this thesis was to investigate the importance of teaching symbolic play as target behaviour to a young child with ASD, and the impact of this on communication and language development. Prior to an intervention research study on the teaching and learning of symbolic play skills, the author embarked on two parallel but separate systematic reviews to find out what existing measures were available for assessing early social communication and symbolic play, and the reported psychometric properties of these measures. From the systematic reviews, assessment instruments were selected for the intervention study. This chapter highlights key findings from the systematic reviews of measures for assessing early social communication, and for symbolic play, and highlight key contributions of this series of studies. Last but not least, the author puts forth an argument for the notion that symbolic play is a cusp behaviour in early childhood development.

8.2   Operationalisation of Early Social Communication and Symbolic Play

The systematic literature reviews identified 46 measures for assessing early social communication and 26 measures for assessing symbolic play as reported in journal articles since 2000. Test contents varied widely for these measures. Given the diverse range of disciplines represented in both, systematic reviews of measures for assessing early social communication and symbolic play, the findings suggest potential advantages in considering a range of measures not just from a single field of study but a number of related fields including psychology, education, occupational therapy, speech and language pathology and paediatrics in the identification of measures for use.

There was a great variation in target ages as specified by the different instruments. These instruments have specific target age ranges, some being relatively restricted (refer to **Figure 4.1**). The findings highlight the importance of developmental considerations when selecting measures for assessing early social communication, both in terms of chronological and developmental ages. This finding reiterates an earlier point made on the importance of developmental considerations in selecting instructional objectives for teaching play (Lifter et al., 1993).

This variety of measures may suit different purposes and different target audiences and hence, this diversity of measures in itself is not problematic. However, different authors had differing ways of operationalising the terms "early social communication" and "symbolic play" across these measures. This observation suggests that authors in the field have different interpretations of what constitutes early social communication and symbolic play skills. It is therefore paramount that users of measures examine the test contents to determine the suitability of measures.

From the review on symbolic play measures, it was noted that two terms "symbolic play" and "pretend play" have been used interchangeably. No systematic differences were observed in choice of terminology with regards to how symbolic or pretend play was operationalised across the 26 measures. The play dimensions reportedly assessed by these 26 measures can be broadly classified into the following three categories:

1. Observable play skills such as what a child did to a set of toys including frequency counts;

2. Cognitive processes such as locus of control, level of fantasy and amount of planning; and

3. Emotional processes such as level of motivation, participation and expressions of joy.

Further research is needed to unpack the definitions of symbolic play and the operationalisation of the concept "symbolic play" by the respective measures to add clarity to the dimensions of play assessed by using these measures.

Eight measures were reportedly used for assessing both early social communication and symbolic play. **Table 5.4** lists these eight measures in alphabetical order. This overlap suggests that the two constructs of early social communication and symbolic play seems to go hand in hand in early childhood development. Eight of the most recently employed measures are used for assessing both these constructs. This suggests that these two constructs are likely to be closely related, a key proposition in this thesis. If they are closely linked, teaching symbolic play skills should have an effect on a child's early social communication skills.

8.3   Developmental Play Assessment (DPA)

In the single case design intervention study and the developmental trajectory study, the Developmental Play Assessment (Lifter et al., 1988) was selected for assessing play levels and for guiding targeted play intervention. The Developmental Play Assessment was selected because it was the only measurement instrument that lent itself directly to the teaching of play targets. Intraclass correlation coefficients were .75 and .92 for number of play tokens and number of play types respectively between two independent coders. These coefficients indicate "substantial" to "almost perfect" agreement respectively (King's College London, 2014; Landis & Koch, 1977). In the field of play research, this coefficient of .75 is considered acceptable. See for example, Stagnitti and Unsworth's (2004) study on the Child-Initiated Pretend Play Assessment

(ChIPPA) which utilises a similar approach in counting play behaviours. Even though the inter-rater reliability statistics obtained in the current study are deemed acceptable, the author noted that the coding process was laborious and time consuming. The recording of individual play tokens was challenging as the coders had to decide whether actions were discrete. Categorising play types was more reliable across coders.

In the systematic review of measures, it was noted that data on psychometric properties on the Developmental Play Assessment was relatively lacking. More research will need to be conducted on the reliability and validity of this measure. It will be worthwhile for research to address the clinical relevance of this tool for practitioners, especially if the scoring procedures can be simplified without too much compromise on the psychometric rigour of the instrument.

In the single case design research and the developmental trajectory study, the author grouped the 16 original DPA play categories into four broader play categories: indiscriminate actions, discriminative actions, combinations and higher order play. Although the original developmental play continuum remains meaningful, especially for the purpose of teaching play, this consolidation of developmental play categories has the potential of facilitating future play research for children with ASD and other developmental disabilities. In the intervention study, participant KK improved significantly in her discriminative actions and combinations play. She showed an increase in both the number of higher order play tokens and types though these numbers are relatively small. This profile of gains over a six-month period suggests that she had mastered more of the discriminative actions and combinations play skills but fewer higher order play skills, a more sophisticated level of play. First, this pattern of gains provides validity support for the developmental sequencing of play categories in the DPA. Second,

such a pattern also lends preliminary support to the four clusters of DPA categories used in the current thesis (Lifter et al., 1988).

Play skills are measurable. The choice of measures to be used is to be determined by a child's age, both chronological and developmental, as well as by the specific contents of the assessment. It is important that these skills are measured for the following reasons: for individual child progress monitoring, intervention or programme evaluation and to account for funding directed towards early intervention.

While the measurement of play can be a tedious and time-consuming process, it remains a critical area of research in the field of childhood development. The author believes that the difficulty in reliably assessing play might have contributed to the dearth of more recent research in this field.

8.4   Implications on Teaching Play for Children with ASD

This thesis presents a successful partial systematic replication of Kasari et al.'s (2006) study of symbolic play intervention using a single case design. In this study, the author provided evidence that play skills could be taught and learnt using a combined behavioural and developmental psychology paradigm. Play targets could be systematically selected and designed using a developmental play continuum. Using an applied behaviour analysis approach, these play skills could be taught to a preschooler of three to four-years-old. New play targets were generally learnt over two intervention sessions, with some targets requiring up to eight sessions to reach mastery criterion level. The following are possible implications on teaching play for children with ASD drawn from the single case design.

It was noted that the participant typically appeared uncooperative whenever a new teaching target was introduced. She typically did not respond to task behaviours, instead

displayed behaviours such as looking away, turning her body to the side, twirling her hair and pouting her mouth during these sessions. However, as the sessions progressed and the same learning targets were delivered, she would start to engage with the tasks, often performing very well to reach mastery criterion level very quickly. In Piagetian terms, it appeared that KK needed a period of time to "assimilate" new learning into existing schemas (Anthony, 1956). KK's parents confirmed that they have noticed a similar pattern of behaviours at home. Often, KK might appear to be uninterested and uncooperative when given instructions but would subsequently surprise them by displaying the required task actions. This suggested that KK was listening and processing the information without the regular eye contact and physical disposition that we have come to assume in communicating with neurotypical individuals. In working with individuals with ASD, it may be worthwhile to discard some of these assumptions we may have.

KK responded well to claps, praises, pats and hugs. She did not allow any form of physical prompting. Initially, when the author attempted physical prompting, she showed a strong dislike for physical prompting by withdrawing her hands and folding her arms. She also appeared anxious. After a few attempts, the author decided to remove physical prompting from her prompt hierarchy. The prompt hierarchy had to be adapted to meet the specific needs of this child. While it is necessary to make plans in the intervention programme including reinforcement system and prompting procedures, this case study also showed the importance of considering individual profiles and preferences (Iovannone, Dunlap, Huber, & Kincaid, 2003).

KK did not master a play target to "say 'chugga chugga (or choo choo)' when moving trains" and the interventionist decided to discard this target. While KK had age-appropriate language skills, expressing herself aloud in social settings continued to be

highly challenging for her. It was possible that this target was introduced too early in the intervention programme when the author had yet to build a strong rapport with KK. A second target also requiring verbal articulation "making animal sounds" was introduced to KK in the third week of daily work with the child. Although KK took up to five sessions, she succeeded in the mastery of this play target. The successful mastery of this target could be attributed to the timing of introduction of new play targets, particularly for anxiety provoking tasks. This is particularly relevant as anxiety disorders are common in children and adolescents with ASD (White, Oswald, Ollendick, & Scahill, 2009). Such challenging tasks may have a higher success rate if introduced after a period of familiarity and rapport with the interventionist, so as to assuage the level of anxiety before a child can learn in an environment of greater perceived safety.

In working with individuals with ASD, a key challenge is to gain compliance. The employment of play targets and the presence of toys can be motivating operations, providing a boost in motivating the children and in promoting engagement. With better engagement on the tasks and task materials, there should be a proportionate reduction in non-compliant behaviours (Carr & Durand, 1985). For KK, it was noted that the amount of time she spent lining up toys, rocking in her chair, spinning, picking her skin and twirling her hair reduced over time as she played more actively with the toys. Stereotypies and repetitive behaviours are common in individuals with ASD (Bodfish, Symons, Parker, & Lewis, 2000) and can be self-injurious for some. Play interventions may be promising in the treatment of a variety of stereotypies as play behaviours have the potential of replacing these stereotypic behaviours.

8.5   Symbolic Play as a Cusp Behaviour

The following section attempts to illustrate the relationship between symbolic play and early development of communication skills. During the period of targeted symbolic intervention, participant KK's play increased both in the number of her play tokens and of play types. Her play was becoming more active and she showed several more combinations and sequences. Her play combinations went beyond those that were explicitly taught in the intervention sessions, suggesting that she was creating new play combinations and sequences. The proportion of her play actions spent on indiscriminate actions which were non-meaningful play decreased appreciably. These findings suggest that as KK was taught the play skills, she not only learnt these specific play skills but continued to gain more related meaningful play skills. This increase was met with a reduction in meaningless toy play, suggesting that the meaningful toy play was replacing some of her non-specific, non-directed manipulations with the toys and materials provided to her such as picking up toys randomly, sniffing and rubbing the objects against her skin.

It was interesting and noteworthy that this pattern of gains continued into Time 3, which was three months post-intervention. Not only did KK maintain the gains in her play behaviours, she continued to make further gains in her play skills, in the absence of ongoing daily play interventions. Her new gains in play skills seemed to have spurred further gains in play activity and complexity, suggesting that the play behaviours met naturally occurring reinforcing contingencies.

While the daily interventions specifically targeted play skills, it was interesting to note that KK made gains not only in play but in her language skills too. KK made collateral gains in auditory comprehension and expressive communication skills as assessed by the Preschool Language Scale, Fifth Edition (Zimmerman et al., 2011). The

gains were most evident in her expressive communication component scores on the PLS-5. As if in alignment with new gains in her play skills, her expressive communication skills improved steadily over the three time-points.

A plausible explanation is that the newly acquired play skills had both a direct and an indirect effect on her language skills. For young children, the strands of development in social play and cognitive play are so intertwined (Jordan, 2003), that these domains of development are not separable. Changes made to any skill of these areas are likely to be reflected more broadly in the development of the whole child, including language development.

The other indirect explanation is that through her more sophisticated play, the child increased her Zone of Proximal Development (Vygotsky, 1978). The play skills have perhaps allowed her to partake in more play activities with her peers and other adults. The social interaction skills that she gained through interacting reinforced her newly acquired play skills while simultaneously promoted social communication with others. These social interactions within her Zone of Proximal Development continued to have a spiralling effect on her play and language skills by continuously widening her Zone of Proximal Development.

Both these possibilities would support the notion that symbolic play was a cusp behaviour in that it leads the organism to "come into contact with new reinforcers" (Rosales-Ruiz & Baer, 1997, pp. 534). These naturally occurring reinforcers then promote a new learning cycle which continued to spur further learning.

Both in the literature and in professional practice, the use of play to teach various targets, ranging from literacy, to conceptual skills to motoric skills is common. The evidence from the case of MO points towards the potential of teaching play targets for promoting early social communication and early language skills. Play skills by

themselves can bring about a range of other critical developmental skills, that include more complex symbolic play skills, social communication and spoken language skills.

This study supports the teaching of play in early interventions, and not just using play as a context in which to teach something else. The current thesis also provides support for viewing play as a developmental continuum and this continuum can provide guidance on selection of play targets to be taught. Play targets, especially symbolic play targets, can be part of early intervention services that can prevent secondary complications or reduce the extent of a child's disability (Guralnick, 2005; Paul & Roth, 2011).

In conclusion, this study has provided evidence that targeted symbolic play may be a cusp to early development of communication skills, with collateral gains in language skills. The use of the term "behavioural cusps" is behavioural psychology terminology and should not be taken to underestimate developmental processes. Developmental and behavioural orientations are both critical in understanding the development of early social communication skills, each bringing a unique dimension to the discourse. Both these psychological orientations need not and should not be exclusive of each other.

8.6   Future Research Direction

More research is needed to further establish the psychometric properties of the Developmental Play Assessment (Lifter et al., 1988). In particular, it may be worthy to pursue investigations into aspects of the DPA that relates directly to clinical relevance and its utility as a teaching and progress monitoring assessment instrument. In the current study, the author employed four broader play categories based on the original continuum of 16 play categories. Further research using cluster analysis methods will provide validity support to the grouping approach employed in the current study.

The number of participants in the current study is small, with a total of four children with ASD and four neurotypical children. The developmental trajectory study needs to be replicated with a larger sample, and over a longer period of time, for more robust findings across groups and for monitoring longer term maintenance of gains made. The single case research design on targeted symbolic play needs further replication. Assessors in such studies should be blind to the experimental condition to reduce the possibility of experimenter bias.

It will be meaningful to pursue an extension of the current study targeting specifically children with ASD without oral language skills, such as in the case of the child MO. The current thesis provides evidence that symbolic play is closely linked to early social communication and is potentially a cusp behaviour in early childhood development. With language gains also associated with play interventions, it is time for researchers to systematically study the impact of teaching play targets to individuals without language skills in their early years. Acquiring spoken language by entry into school at five years of age has been heralded as the single most important goal in early intervention leading to the best outcomes in children with ASD (Billstedt, Gillberg, & Gillberg, 2005; Tomasello & Farrar, 1986; Venter, Lord, & Schopler, 1992). With growing evidence that the presence of language skills before five years of age predicts better prognosis in children with ASD, there is urgency for research in this direction.

APPENDIX A – ETHICS APPROVAL LETTER

MONASH University

Monash University Human Research Ethics Committee (MUHREC)
Research Office

Human Ethics Certificate of Approval

Date:	4 July 2013
Project Number:	CF13/1239 - 2013000593
Project Title:	Early social communication and symbolic play development in young children
Chief Investigator:	Prof Dennis Moore
Approved:	From 4 July 2013 to 4 July 2018

Terms of approval

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, and a copy forwarded to MUHREC before any data collection can occur at the specified organisation. **Failure to provide permission letters to MUHREC before data collection commences is in breach of the National Statement on Ethical Conduct in Human Research and the Australian Code for the Responsible Conduct of Research.**
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must contain your project number.
6. **Amendments to the approved project (including changes in personnel):** Requires the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.
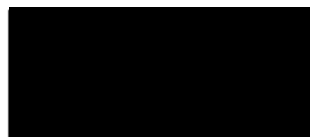
Professor Nip Thomson
Chair, MUHREC

cc: Dr Angelika Anderson; Ms Soo Wee Ho

APPENDIX B – EXPLANATORY STATEMENTS AND CONSENT FORMS (PARENTS OF ASD CHILDREN)

10 July 2013

Explanatory Statement – Parents of Children at Preschool

Title: Early Social Communication and Symbolic Play Development in Young Children

This information sheet is a duplicate copy, for you to sign and return to the Researcher if you agree to participate in this research.

My name is Soo Wee Ho and I am conducting a research project with Professor Dennis Moore, the Director of the Krongold Centre, and Dr Angelika Anderson, a Senior Lecturer, towards a PhD at Monash University. This means that I will be writing a thesis which is the equivalent of a short book.

You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

I am seeking the participation of ten children aged between three and four years. I am inviting you and your child to participate as a control group in this project.

The aim of this study is to refine measures of early social communication and symbolic play skills and to examine the importance of targeting these skills in early interventions for young children with Autism Spectrum disorder (ASD). I am conducting this research to find out the effects of learning these skills on broader social communication skills and how best to measure these skills.

Participating in this research will mean that your child will be observed over three sessions at your preschool. This will take place on three occasions over a nine-month period, about 30 minutes per session per child. Your child may be presented with additional play materials. Permission will be sought from you for these sessions to be videotaped for the purpose of scoring and reliability checks. Every effort will be made to minimise disruption to lesson time.

We are also asking parents to complete a questionnaire that will take about 15 to 25 minutes to complete. This questionnaire will be repeated twice over a 9-month period to assess for changes in child development over time.

If your child has ASD or other developmental disabilities he/she should not participate in this research.

We have obtained ethical approval from Monash University CF13/1239 - 2013000593.

Your participation will help researchers as well as parents and teachers in the future to better understand the development of early social communication and play skills in young children and in children with ASD.

Being in this study is voluntary and you are under no obligation to consent to participation. We also kindly request that you explain to your child what his or her participation this

project involves should you consent to participation. If you and your child do consent to participate, you or your child may withdraw at any time. You will not be penalized in any way. If you wish to withdraw, please contact me via ████████████████████████) or ████████████████████████ Your child may also indicate their preference to withdraw their participation during the research at any time.

Confidentiality

Data collected would be treated with utmost confidentiality. Pseudonyms and codes will be used in any publication or report. Any identifiable information will be removed.

Video recordings will only be accessible by the research team and one other inter-rater for the purpose of ensuring research rigour.

Data collected including video recordings will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years after which they will be destroyed. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

If you would like to be informed of the aggregate research finding, please contact me via ████ ████████████████████████ or ████████ ████████████ The findings are accessible for up to two years.

If you would like to participate in the project, kindly reply with a consent form and the additional explanatory statement, both with your signatures, please. Thank you.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research CF13/1239 - 2013000593 is being conducted, please contact:
Professor Dennis Moore Director, Krongold Centre Building 5 Monash University VIC 3800 ██████████████████████ ████████████████	Executive Officer Monash University Human Research Ethics Committee (MUHREC) Building 3e Room 111 Research Office Monash University VIC 3800 ██████████████ ██████████████ ██████████████

Soo Wee Ho

APPENDIX C – EXPLANATORY STATEMENTS AND CONSENT FORMS (PARENTS OF NEUROTYPICAL CHILDREN)

10 July 2013

Explanatory Statement – Parents of Children at Early Intervention Centre

Title: Early Social Communication and Symbolic Play Development in Young Children

This information sheet is a duplicate copy, for you to sign and return to the Researcher if you agree to participate in this research.

My name is Soo Wee Ho and I am conducting a research project with Professor Dennis Moore, a Director in Krongold Centre, and Dr Angelika Anderson, a Senior Lecturer, towards a PhD at Monash University. This means that I will be writing a thesis which is the equivalent of a short book.

You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

I am seeking the participation of ten children aged between three and four years, diagnosed with Autism Spectrum Disorder (ASD) who present with early social communication difficulties. I am inviting you and your child to participate in this project because your child has a diagnosis of an ASD and may benefit from an assessment and intervention of social communication and developmental play skills.

The aim of this study is to refine measures of early social communication and symbolic play skills and to examine the importance of targeting these skills in early interventions for young children with ASD. I am conducting this research to find out the effects of learning these skills on broader social communication skills and how best to measure these skills.

Participating in this research will mean that your child will be observed over three sessions at the Early Intervention Centre. This will take place on three occasions over a nine-month period, about 30 minutes per session per child. Your child may be presented with additional play materials. Permission will be sought from you for these sessions to be videotaped for the purpose of scoring and reliability checks. Every effort will be made to minimise disruption to lesson time.

A second part of this project requires some children to participate in ten weeks of one-to-one 20-minutes daily intervention sessions (Mondays to Fridays). These interventions will be customised to your child's developmental level of play, targeting emerging play skills. These intervention sessions are based on developmental and behavioural principles. These sessions will be conducted at your child's Centre or one of the play rooms at Krongold Centre. Participation for this second part of the study requires time commitment for the family and is entirely by parental choice. Should there be an oversubscription of interest from families, I will continue to provide the intervention sessions to all interested parties at a later date on a staggered schedule.

We are also asking parents to complete a questionnaire that will take about 15 to 25 minutes to complete. This questionnaire will be repeated twice over a 9-month period to assess for changes in child development over time. For parents whose child participates

in the interventions, there is a once-off questionnaire that will take 10 minutes to complete post-interventions.

If your child has seizures or other medical conditions he/she should not participate in this research.

We have obtained ethical approval from Monash University CF13/1239 - 2013000593.

It is expected that you and your child will derive direct benefit from participating in this project by addressing an important domain of development. In addition, the information gained will help researchers as well as parents and teachers in the future to better understand the development of early social communication and play skills in young children with ASD.

Being in this study is voluntary and you are under no obligation to consent to participation. Should you consent to participate and if possible, please explain to your child what his or her participation in this project involves. If you and your child do consent to participate, you or your child may withdraw at any time. You will not be penalized in any way. If you wish to withdraw, please contact me via ███████████████████████ or █████████).Your child may also indicate their preference to withdraw their participation during the research by being unhappy to participate or showing distress. In this case I will stop his or her involvement in this project.

Confidentiality

Data collected will be treated with utmost confidentiality. Pseudonyms and codes will be used in any publications or reports. Any identifiable information will be removed.

Video recordings will only be accessible by the research team and one other inter-rater for the purpose of ensuring research rigour.

Data collected including video recordings will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years after which they will be destroyed. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

If you would like to be informed of the aggregate research finding, please contact me via ███████ ████████████████████████ or █████████ ████████████).   The findings are accessible for up to two years.

If you would like to participate in the project, kindly reply with a consent form and the additional explanatory statement, both with your signatures, please. Thank you.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research CF13/1239 - 2013000593 is being conducted, please contact:
Professor Dennis Moore Director, Krongold Centre Building 5 Monash University VIC 3800 ████████████████████████ ███████████████	Executive Officer Monash University Human Research Ethics Committee (MUHREC) Building 3e Room 111 Research Office Monash University VIC 3800 ██████████████ ██████████████████████ ████████████████

Soo Wee Ho

APPENDIX D – CHILD INFORMATION SHEET

Child Information

Name: _____

Date of Birth: _____

Diagnosis, if any: _____

Kinder/ Childcare Arrangements

☐ Not attending

☐ Attending a Kindergarten/ Childcare/ ELC. Please indicate the days and number of hours of attendance each day:

Monday - _ hours

Tuesday - _ hours

Wednesday - _ hours

Thursday - _ hours

Friday - _ hours

Kindly outline any other interventions if applicable, thank you.

APPENDIX E – INTERVENTION SESSION RECORD FORM

Child's Name: _____ Date: _____

Session Number: _____ Target Play Category: _____

Target Play Activity	3 Play Actions / Examples
Play Activity 1:	
Play Activity 2 (opt):	
Play Activity 3 (opt):	

Limited/ Table Top (8 mins)	+/-/NR	Expanded/ Rug (12 mins)	+/-/NR
Trial 1	U V M P	Trial 1	U V M P
Trial 2	U V M P	Trial 2	U V M P
Trial 3	U V M P	Trial 3	U V M P
Trial 4	U V M P	Trial 4	U V M P
Trial 5	U V M P	Trial 5 (min.)	U V M P
Trial 6	U V M P	Trial 6	U V M P
Trial 7	U V M P	Trial 7	U V M P
Trial 8	U V M P	Trial 8	U V M P
Trial 9	U V M P	Trial 9	U V M P
Trial 10	U V M P	Trial 10	U V M P
Trial 11	U V M P	Trial 11	U V M P
Trial 12 (max.)	U V M P	Trial 12	U V M P

Time taken: Time taken:

Criteria for Mastery

Every third session.

Part 1: Limited/ Table top	Frequency Count
Unprompted spontaneous occurrence of the target activities (can be up to 4)	
Prompted occurrence of the target activities (can be up to 4)	
Part 2: Floor	
Unprompted spontaneous occurrences of the target activities (same activities as in Part 1)	
Occurrences of the target activities after the presentation of the complimentary object	
Occurrences of the target activities after the prompt	
Part 2: Floor - Generalized activities *Special Note:* Ensure that the child is NOT using the same toys for every generalization!	
Unprompted spontaneous occurrences of a target activity generalized to other toys Note: Any use of a non-target toy is coded as a generalization under the appropriate activity.	
Occurrences of the target activities after the presentation of a complimentary object with non-target toys Note: Any use of a non-target toy before or after the complimentary object is a generalization.	
Occurrences of incidental generalisation Any use of a non-target toy in a non-target activity is coded as a generalization in the incidental category.	

APPENDIX F – SEARCH TERMS USED IN SYSTEMATIC REVIEWS OF MEASURES FOR EARLY SOCIAL COMMUNICATION AND SYMBOLIC PLAY

<u>Keys Words and Synonyms</u>

Group	Systematic Review of Measures for	
	Early Social Communication	**Symbolic Play**
1	Measure*	Measure*
	Assessment*	Assessment*
	Test*	Test*
	Psychometric Propert*	Psychometric Propert*
	Reliability	Reliability
	Validity	Validity
2	"Early Social Communication"	"Symbolic Play"
	"Early Communication"	"Pretend Play"
	"Social Communication"	"Play Development"
		"Play Behav*"
		"Play Skill*"

Note: "OR" function was used for terms within Groups 1 and 2, while "AND" function was used for

APPENDIX G – INSTRUCTIONS FOR INTER-CODER AND DATA EXTRACTION PROTOCOL

(A) Instructions for Inter-Coder

(A1) Early Social Communication

✓ Keep articles involving measures of early social communication skills. Eliminate the rest;

✓ Read the title and abstract of the article first to decide if the article is relevant for retention. Retain the article if it is and eliminate if it is not. If a decision cannot be reached, read the article;

✓ Exclude screening tools, except if tool is highly likely to include early social communications such as ASD screening measure for first two years of life.

✓ Exclude reviews or commentaries;

<u>Description of concept of early social communication</u>

Early social communication skills include a range of behaviours infants, toddlers and young children display to support their daily physical and social needs. These include joint attention, social referencing, babbling turn-taking, gestural communication and requests making (manding). These can be vocal and non-vocal behaviours. They represent skills on a continuum from prelinguistic, first meaningful words to two-word stage of language acquisition (also known as phrase or telegraphic speech).

(A2) Symbolic Play

- ✓ Retain articles involving measures of symbolic play in early childhood development. Eliminate the rest;

- ✓ Read the title and abstract of the article first to decide if the article is relevant for retention. Retain the article if it is and eliminate if it is not. If a decision cannot be reached, read the article;

- ✓ Retain articles reporting on a standardised measure of play (without symbolic play being stated), if (i) the measure is targeted for infancy or early childhood, or (ii) the measure is targeted for children with developmental disabilities;

- ✓ Eliminate articles:
  - ➢ specifically on free / object / social / peer / outdoor play
  - ➢ on symbolic play of children in middle childhood and above (aged 7 and above).
  - ➢ with pretend play solely as a static context.

- ✓ Exclude reviews or commentaries.

Description of concept of symbolic play

Symbolic play is often defined as children's deliberate distortion of reality in play when they act 'as if something is the case when it is not' (Leslie, 1987). Symbolic play typically emerges in the second year of life. Its frequency appears to be greatest during the late preschool years and begins to decline around age six years (Fein, 1981). Symbolic play can also be known as pretend play. It is also referred to as sociodramatic or fantasy play at more sophisticated levels. Children may engage in symbolic play in solitary play (alone), parallel play (separate but close to others or mimicking) or in cooperative play (with others) (Parten, 1932).

(B) Data Extraction Protocol for Early Social Communication and Symbolic Play Measures

Author

Title of Work

Year

Publisher

City

Institution

Tester requirements

Target age range

Standardised / Non-standardised

Settings – Testing room / natural (home or school)

Type of assessment: Direct observation / Parent and teacher report

Normed / Un-normed

If normed, size of norming sample

Description of norming sample

Length of assessment

Equivalent alternative forms

Definition of ESC / PP

Materials required

Extent of usage

Psychometric properties

APPENDIX H – TABULATION OF PLAY SCORES

Participant: **xx**

Date: **xxx**

No.	Time	Action	Level	Category
1	0:32	Pours tea from teapot into cup	5B	Specific Combinations (Conventional)
2	0:43	Opens and closes teapot lid	2A	Discriminative actions on single objects
3	1:03	Touches teapot to nose	1	Indiscriminate actions
4	1:07	Opens and closes teapot lid	2A	Discriminative actions on single objects
5	1:18	Empties pot into cup	5B	Specific Combinations (Conventional)
6	1:20	Mouths teapot	1	Indiscriminate actions
7	1:37	Pours tea from teapot into cup	5B	Specific Combinations (Conventional)
8	1:41	Drinks tea from cup	3C	Pretend Self
9	1:52	Hits plate with spatula	2A	Discriminative actions on single objects
10	2:02	Scoops and eat "food" from plate	3C	Pretend Self
11	2:05	Eats from spatula	3C	Pretend Self
12	2:17	Mouths teapot	1	Indiscriminate actions
13	2:32	Removes lid from pot	2B	Takes-apart combinations
14	2:34	Empties plate into pot	5B	Specific Combinations (Conventional)
15	2:40	Places lid on pot	3A	Presentation combinations
16	2:42	Lifts pot up to head level	1	Indiscriminate actions
17	2:47	Removes lid from pot	2B	Takes-apart combinations
18	2:49	Touches knife	1	Indiscriminate actions
19	3:01	Scoops and eats from spatula	3C	Pretend Self
20	3:14	Says "Food very very hot"	6B	Substitutions
21	3:48	Blows "food" on plate	6B	Substitutions
22	3:51	Says "Cool down" food	6B	Substitutions
23	4:00	Mouths spatula	1	Indiscriminate actions
24	4:05	Says "Very hot, ouch"	6B	Substitutions
25	4:40	Touches doll's hair	2A	Discriminative actions on single objects
26	4:47	Stands doll	2A	Discriminative actions on single objects
27	4:50	Hugs doll	2A	Discriminative actions on single objects
28	5:13	Stands doll	2A	Discriminative actions on single objects
29	5:29	Mouths spatula	1	Indiscriminate actions
30	5:50	Says "Cool down"	6B	Substitutions
31	6:15	Bites spatula	1	Indiscriminate actions
32	6:30	Carries doll in arm	3C	Pretend Self
33	6:38	Says "bye bye" to doll	2A	Discriminative actions on single objects
34	7:11	Says "hello" to animals	2A	Discriminative actions on single objects
35	7:15	Sounds horse	2A	Discriminative actions on single objects
36	7:20	Sounds rooster	2A	Discriminative actions on single objects
37	7:29	Erects fence	2A	Discriminative actions on single objects
38	7:31	Moves train	2A	Discriminative actions on single objects
39	7:50	Says "no more track"	-	
40	9:17	Uses fence as train track	6B	Substitutions
41	9:23	Joins fences to form track	4	Specific Combinations (Physical)
42	9:53	Erects fence	2A	Discriminative actions on single objects

No.	Time	Action	Level	Category
43	9:48	Walks rooster	2A	Discriminative actions on single objects
44	10:00	Erects fence	2A	Discriminative actions on single objects
45	10:09	Walks farmers	2A	Discriminative actions on single objects
46	10:25	Walks cow	2A	Discriminative actions on single objects
47	10:36	Moves train	2A	Discriminative actions on single objects
48	10:40	Stands farmers	2A	Discriminative actions on single objects
49	10:46	Says "people"	-	
50	11:07	Stands pig	2A	Discriminative actions on single objects
51	11:30	Stands horse	2A	Discriminative actions on single objects
52	11:59	Extends cows legs and stand it	2A	Discriminative actions on single objects
53	12:05	Says "stand up"	-	
54	12:15	Sounds rooster	2A	Discriminative actions on single objects
55	12:30	Straighten rooster's legs and stands it	2A	Discriminative actions on single objects
56	12:49	Says "bye bye" to farmers	2A	Discriminative actions on single objects
57	13:30	Opens handphone	2A	Discriminative actions on single objects
58	13:35	Pushes buttons on handphone	2A	Discriminative actions on single objects
59	13:36	Puts handphone to ear	3C	Pretend Self
60	13:52	Talks on handphone	3C	Pretend Self
61	14:02	Sits doll on chair	5B	Specific Combinations (Conventional)
62	14:19	Joins chair to bed	3B	General combinations
63	14:38	Sits doll on chair	5B	Specific Combinations (Conventional)
64	14:45	Pushes buttons on handphone	2A	Discriminative actions on single objects
65	15:24	Says "bye bye" to doll	2A	Discriminative actions on single objects
66	16:09	Using doll to greet assessor	7A	Doll-as-Agent
67	16:29	Using doll to greet assessor	7A	Doll-as-Agent
68	16:40	Puts toys in puppet	3B	General combinations
69	17:15	Stacks blocks to form house	4	Specific Combinations (Physical)
70	17:32	Says "making a house"	-	
71	17:45	Says "mummy house"	-	
72	19:41	Knocks house down	2B	Takes-apart combinations

Summary of Scores (by Category)

No.	Level	Category	Type	Token
1	1	Indiscriminate actions	4	8
2	2A	Discriminative actions on single objects	23	30
3	2B	Takes-apart combinations	2	3
4	3A	Presentation combinations	1	1
5	3B	General combinations	2	2
6	3C	Pretend Self	5	7
7	4	Specific Combinations (Physical)	2	2
8	5A	Child-as-Agent	0	0
9	5B	Specific Combinations (Conventional)	4	6
10	6A	Single-Scheme Sequences	0	0
11	6B	Substitutions	4	4
12	7A	Doll-as-Agent	1	2
13	7B	Multischeme Sequences	0	0
14	8A	Sociodramatic Play	0	0
15	8B	Thematic Fantasy Play	0	0

APPENDIX I – SOCIAL VALIDITY QUESTIONNAIRE

Social Validity Questionnaire (Parent Form)

Child's name: _____   Date of completion: _____

Parent's name: _____

INSTRUCTIONS: This questionnaire consists of 14 items. For items 1 through 10, you need to indicate the extent to which you agree or disagree with each statement. Please indicate your response to each item by circling one of the five responses to the right. For items 11 through 14, please share any additional responses you might have.

Questions	Responses				
1. Before participating in this study, I felt that my child needed some behavioral support in his play skills.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. Before participating in this study, I felt that my child needed some behavioral support in his social communication skills.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. Before participating in this study, I felt that my child needed some behavioral support in his language skills.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4. This play-based assessment (Developmental Play Assessment) identified relevant intervention goals for my child.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. The time taken for the play-based assessment (Developmental Play Assessment) was a worthy investment.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. The questionnaire on communication and symbolic behavior (Communication and Symbolic Behavior Scale Developmental Profile) helped to highlight a key area of my child's development.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7. The time taken for the questionnaire on communication and symbolic behavior (Communication and Symbolic Behavior Scale Developmental Profile) was a worthy investment.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8. My child made progress in his/her play behaviors through the play-based interventions.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9. I would like my child to continue using play to improve his social communication skills.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10. I am glad my child participated in the play-based interventions.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

(continued)

Social Validity Questionnaire (Parent Form)
Page 2

11. What behavioral changes did you see on your child for the past few months (May-September 2013)?

12. What changes would you suggest on the program (i.e., social skill teaching and self-monitoring)?

13. How has this experience influenced the way you interact with your child if any?

14. Additional comments:

Social Validity Questionnaire (Parent Form)

APPENDIX J – SOCIAL VALIDITY QUESTIONNAIRE COMPLETED BY PARENT

Social Validity Questionnaire (Parent Form)

Child's name: ▨▨▨▨   Date of completion: 01 / 02 / 2014

Parent's name: ▨▨▨▨

INSTRUCTIONS: This questionnaire consists of 14 items. For items 1 through 10, you need to indicate the extent to which you agree or disagree with each statement. Please indicate your response to each item by circling one of the five responses to the right. For items 11 through 14, please share any additional responses you might have.

	Questions	Responses				
1.	Before participating in this study, I felt that my child needed some behavioral support in her play skills.	Strongly Agree	(Agree)	Neutral	Disagree	Strongly Disagree
2.	Before participating in this study, I felt that my child needed some behavioral support in her social communication skills.	Strongly Agree	(Agree)	Neutral	Disagree	Strongly Disagree
3.	Before participating in this study, I felt that my child needed some behavioral support in her language skills.	Strongly Agree	(Agree)	Neutral	Disagree	Strongly Disagree
4.	This play-based Developmental Play Assessment identified relevant intervention goals for my child.	Strongly Agree	(Agree)	Neutral	Disagree	Strongly Disagree
5.	The time taken for the play-based Developmental Play Assessment was a worthy investment.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree
6.	The play-based Preschool Language Scales Fifth Edition helped to highlight a key area of my child's development.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree
7.	The time taken for the play-based Preschool Language Scales Fifth Edition was a worthy investment.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree
8.	My child made progress in her social communication behaviors through the play-based interventions.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree
9.	I would like my child to continue using play to improve her social communication skills.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree
10.	I am glad my child participated in the play-based interventions.	(Strongly Agree)	Agree	Neutral	Disagree	Strongly Disagree

(please turn over)

Social Validity Questionnaire (Parent Form)
Page 2

11. What behavioral changes did you see on your child for the past few months (July to September 2013)?

– Collaboration is easier
– able to communicate needs & wants with less verbal prompting

12. What changes would you suggest on the interventions program?

– be happy to be part of it on an ongoing basis to see long-term results

13. How has this experience influenced the way you interact with your child if any?

– N/A

14. Additional comments:

Thank you!

Thank you for you kind participation.

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