Chapter II

REVIEW OF LITERATURE
For designing the present study the available empirical literature on Autism was also explored using both printed and electronic media. An examination of the nature and theme of studies reveal that (1) a large volume of studies has focused on one or two cognitive, communicative, social skills in autism. (2) Intervention studies though voluminous, were conducted mostly focusing on the affected child. (3) Since 1990’s the focus has been extended to neuropsychological aspects also. (4) Very few studies have explored the feasibility of parental intervention for enhancing the development of autistic children. There is a dearth of Indian studies on parental intervention in this area.

The collected studies are presented in this chapter in four sections as follows:

(a) Language and Communication studies,
(b) Social behaviour studies,
(c) Neuropsychological studies, and
(d) Intervention studies.

LANGUAGE AND COMMUNICATION STUDIES

This section briefly explores the characteristics of the development of language in children with autism. Several studies have found that, as early as one year of age, very young children with autism are less responsive to their names or to someone speaking compared to other children (Lord, 1995;
Osterling & Dawson, 1994), and they are less responsive to the sound of their mother’s voices (Klin, 1991).

In one study, Lord, Pickles, DiLavore, and Shulman (1996) found that two year-old children judged very likely to have autism had mean expressive and receptive language ages of less than 9 months, in contrast to other skills falling between 16 and 21 months. Not only was their expressive skills continued to develop at a slower rate through age five compared to nonautistic children with developmental delays at similar nonverbal levels.

Chan, Cheung, Leung and Cheung (2004) examined the verbal expression-comprehension abilities of 46 Chinese children with autism at age’s five to six. Results showed that 63% of the children with autism demonstrated language impairment. Specifically, 42% were impaired in both verbal expression and comprehension abilities, and 21% demonstrated impaired expression skills.

Some other studies mainly focused on language regression in autism. Kurita (1985) found that about 25% of children with autism are described by their parent as having some words at 12 to 18 months and then losing them. A large-scale systematic longitudinal study of toddlers by Lord, Shulman, and DiLavore (2004) found that language regression after a pattern of normal language onset was unique to autism and not found among children with other developmental delays. Lord and her colleagues found that children who experienced loss of words also lost some social skills, supporting the findings from Goldberg and her colleagues (Goldberg et al., 2003), and that similar losses of social skills occurred in a smaller group of children with autism who had not yet used words at time of loss (Luyster et al., 2005).
Bernabei and Camaioni (2001) presented the developmental profile of a child with autism during the first 3 years of life presented. Clinical material obtained from different sources like, home videos from birth to 3 years, and cognitive and communicative evaluations at 24, 34, and 38 months. The videos showed that how the child appeared to make progress up to 12 months, but from 12 to 18 months some abilities that had been previously acquired were lost, and a decrease in social interaction, communication and language was observed. From 18 to 38 months communicative and linguistic abilities remained unchanged, but social interactive behaviours continued to decrease. In another study, Richler et al. (2005) demonstrated that only a minimal relationship between language regression in autism and later prognosis or outcome, with children who had regressions having, on average, slightly lower verbal IQ scores at school age than children with no history of loss.

Lord et al. (2004) found that both within and across categories of children with ASDs, there is significant variability in the rate at which language progresses among those children who does acquire some functional language. In one study, Kjelgaard and Tager-Flusberg (2004) investigated language functioning in a group of 89 children diagnosed with autism. The children, who were between four and fourteen years old, were administered a battery of standardized language tests tapping phonological, lexical, and higher-order language abilities. The main findings were that among the children with autism there was significant heterogeneity in their language skills, although across all the children, articulation skills were spared. Different subgroups of children with autism were identified on the basis of
their performance on the language measures. Some children with autism have normal language skills; for other children, their language skills are significantly below age expectations.

Charman et al. (2003) observed that in the preschool period and beyond, certain nonverbal skills, especially the frequency of initiating joint attention, and imitation, are strong predictors of language acquisition for children with autism. Recently, Thurm, Lord, Lee, and Newschaffer (2006) studied in fifty nine children with autism, twenty four children with PDD-NOS and thirty five children with non-spectrum developmental disabilities followed from age two to five. The age two and three scores of non-verbal ability, receptive communication, expressive communication and socialization were as predictors of receptive and expressive language at age five. The result revealed, early joint attention as well as vocal and motor imitation skills were more impaired in children who did not develop language by age five than in children who did develop language by five.

In another study, Toth, Munson, Meltzoff, and Dawson (2006) investigated the unique contributions of joint attention, imitation, and toy play to language ability and rate of development of communication skills in young children with autism spectrum disorder. Sixty preschool-aged children with ASD were assessed using measures of joint attention, imitation, toy play, language, and communication ability. Results showed that two skills, initiating protodeclarative joint attention and immediate imitation, were most strongly associated with language ability at age 3-4 years, whereas toy play and deferred imitation were the best predictors of rate of communication development from age 4 to 6.5 years.
Howlin, Goode, Hutton, and Rutter (2004) demonstrated that there is also a significant correlation between IQ and language outcomes, although higher levels of nonverbal language skills.

Joseph, McGrath and Tager-Flusberg (2006) examined executive dysfunction and its relation to language ability in 37 verbal school-age children with autism and 31 nonautistic comparison participants who were matched on age and on verbal and nonverbal IQ but not on language ability, which was lower in the autism group. Finding showed that children with autism exhibited deficits compared to the comparison group across all three domains of executive function that were assessed including working memory, working memory and inhibitory control, and planning. Children with autism were less developed than the comparison group in their language skills, but correlational analyses revealed no specific association between language ability and executive performance in the autism group. In contrast, executive performance was positively correlated with language ability in the comparison group. This pattern of findings suggest that executive dysfunction in autism is not directly related to language impairment per se but rather involves an executive failure to use of language for self-regulation.

Bartak, Rutter, and Cox (1975) found articulation development to be somewhat slower in children with autism than normal. Contrary to above mentioned study, Kjelgaard and Tager-Flusberg (2001) found that among children with autism who speak, articulation is often normal or even precocious. Shriberg et al. (2001) reported that one-third of speakers with high-functioning autism (HFA) and with AS retained residual speech distortion errors on sounds such as /r/, /l/, and /s/ into adulthood, whereas the rate of these errors in the general population is 1%.
Word use in autism can be observed in several studies. Minshew and Goldstein (1993) shown that verbal children with autism use semantic groupings in very similar ways to normal people who categorize and to retrieve words. Jarrold, Boucher, and Russell (1997) found that high-functioning children and adolescents with autism can score well on standardized vocabulary tests, indicating an unusually rich knowledge of words. At the same time, Tager-Flusberg (1991) found that children with autism often fail to use their knowledge of words in a normal way to facilitate performance on retrieval or organizational tasks.

Abnormal use of words and phrases has been described in autism for many years. Mayes, Volkmar, Hooks, and Cicchetti (1993) found that the presence of peculiar language pattern was one of the best discriminators of pervasive developmental disorder from language disability. Recent study by Perkins, Dobbins, Boucher, Bol, and Bloom (2006) investigated anomalous vocabulary use in a 70,000-word corpus of conversational autistic language and examine evidence that concept formation, and hence vocabulary, is abnormal in autism. Little evidence is found of anomalous use of artifact terms, though errors with temporal and also spatial expressions are relatively common.

Kamio, Robins, Kelley, Swainson, and Fein (2006) examined whether the automatic lexical/semantic aspect of language is impaired or intact in eleven children with high-functioning autism or AS without a history of early language delay and age-, IQ-, and gender-matched typically developing individuals. Semantic priming effects were found for near-semantically related word pairs in the controls, whereas this was not the case in the AS
Eigsti, Bennetto and Dadlani (2006) investigated of syntactic and higher-level discourse abilities in verbal children with autism, age 5 years. Findings indicated clear language difficulties that go beyond what would be expected based on developmental level; specifically, syntactic delays, impairments in discourse management and increased production of non-meaningful words (jargon). The result indicated that a highly specific pattern of language impairments, and importantly, syntactic delays, in a group of children with autism carefully matched on lexical level and non-verbal mental age with children with developmental delays and typical development.

Relatively few studies have systematically investigated grammatical aspects of language acquisition in autism. Roberts, Rice, and Tager-Flusberg (2004) investigated sixty children with autism who were given tasks to elicit both the past and the third person present tense. The sample was divided into those who had scores on within the normal range on standardized language tests and those who were significantly below the mean. Results indicated that only those with impaired language score performed poorly on the tense tasks.

The most systematic direct investigation of prosodic features in AS was conducted by Shriberg et al. (2001). They analyzed speech samples collected during a diagnostic interview, which was conducted with the adolescent adult participant with autism or AS. The main findings were that about one-third of the participants with AS had distorted speech and articulation problems, and two-thirds expressed prosodic abnormalities at grammatical, pragmatic, or affective levels.

Koning and Magill-Evans (2001) investigated whether adolescents
with AS were able to use nonverbal cues, including facial expression, body gestures, prosody, to interpret the feelings of people acting in videotaped scenes. They found that the adolescents with AS were significantly worse than controls in interpreting emotions and relied least on prosodic information.

Sheinkopf and colleagues conducted a detailed examination of the vocal behaviour of young preverbal children with autism and a group of comparison children with developmental delays. Although the children with autism did not have difficulty with the expression of well-formed syllables, they did display significant impairments in vocal quality (Sheinkopf, Mundy, Oller, & Steffens, 2000).

Some research on the language of individuals with autism focused on their comprehension skills. Charman and his colleagues collected data on early language development from a large group of preschool-age children with autism using a parent report measure: the Mac Arthur Communicative Development Inventory (Charman, Drew, Baird, & Baird, 2003). They found that comprehension of words was delayed relative to production, though, like typically developing children, in absolute terms the children with autism understood more words than they produced.

Studies of very young children (Paul, Chawarska, Klin, & Volkmar, 2004) suggests that comprehension skills are depressed relative to production in the second year of life, while the gap tends to narrow, with receptive skills moving closer to expressive levels, in the third to fourth year. Kjelgaard and Tager-Flusberg (2001) studied that receptive and expressive language skills among somewhat older children with autism using standardized tests have
found that receptive skills as measured by standard scores tend to be comparable to expressive on vocabulary tests as well as tests of higher order language processing.

Language use or the pragmatic aspects of language in autism has been studied from a variety of perspectives. Stone and Caro-Martinez (1990), in an observational study of spontaneous communication of children with autism of varying abilities placed in special classrooms, found differences in the functions about which the children communicated. These differences were related to chronological age, nonverbal IQ, and whether the child’s primary mode of communication was through speech or motor acts. Results showed that children who did not talk engaged in more social routines than verbal children and children with speech were more likely to use language to offer new information. They communicated to a greater number of different people and were more likely to address communications to peers as well as adults than children without speech.

Dennis, Lazenby, and Lockyer (2001) explored that the ability of 8 high-functioning children with autism and typically developing children to use and understand of the pragmatic inferences necessary for successful communication, even when they have the ability to perform noninferential language tasks. The results showed that high-functioning children with autism could define words and identify multiple meanings for ambiguous words. In understanding words for mental states, they made inferences from mental state verbs to given or presupposed knowledge. However, they failed to infer what mental state verbs implied in context; to make inferences about social scripts; to understand metaphor; and to produce speech acts, all of
which are inferences that are the basis of successful social communication because they elaborate meaning or convey intentions.

Lewis, Woodyatt, and Murdoch (2007) reported on the linguistic and pragmatic language skills of seventeen adults with a diagnosis of autism spectrum disorder. They were assessed by using the Western Aphasia Battery (WAB), the Right Hemisphere Language Battery (RHLB) and the Test of Nonverbal Intelligence-Second Edition (TONI-2). Performance by the ASD participants was compared to 13 peers with no disability. The findings showed that there were significant differences between the ASD group and the control group on a number of the WAB and the RHLB subtests, but no significant difference between the two groups on nonverbal cognitive ability.

Lewis, Murdoch, and Woodyatt (2007) investigated communicative competence and metalinguistic ability of children and adults with autism spectrum disorder by using Test of Language Competence-Expanded Edition (TLC-E). The results revealed that relative to controls, those with ASD were less competent on a range of TLC-E tasks. No differences were found for either child or adult ASD groups on any of the TLC-E measures when re-classified as Asperger syndrome and high functioning autism using DSM-IV language criterion. Hierarchical cluster analyses of individuals with ASD identified subgroups within the spectrum.

Freitag, Kleser, and Gontardf (2006) compared fifteen male adolescents with ASD, 16 male and 13 female controls regarding imitation abilities of upper and lower facial movements, and language skills as assessed by the pragmatic rating scale and the Aachen Aphasia test (AAT). The findings showed reduced imitation abilities of facial movements and non-meaningful
combined hand-and-finger gestures in Autism Spectrum Disorder subjects. Regarding language, ASD subjects showed difficulties in AAT spontaneous speech measures and reduced pragmatic language abilities. Correlations of imitation and language measures differed between ASD, male and female controls. The weak and differential correlations of imitation and language measures in the three comparison groups might imply a differential organization of language and imitation networks in the three comparison groups. Pragmatic abilities, which are a central feature in ASD, were not related to imitation abilities.

Studies of children with autism find that they rarely use language for comments, showing off, acknowledging the listener, initiating social interaction, or requesting information. Even among older higher functioning children, language is rarely used to explain or describe events in a conversational context (Ziatas, Durkin, & Pratt, 2003).

Chuba, Paul, Miles, Klin, and Volkmar (2003) reported on conversational behaviours in 30 adolescents with either HFA and AS who were engaged in semi structured conversational interviews with clinicians. Findings revealed that for both diagnoses, conversational errors were inconsistent, rather than constant. Nonetheless, it was possible to distinguish teenagers with ASD from those with typically development (TD) in terms of the quantity of conversational errors. No TD subjects made more than five errors within a 30-minute sample, whereas all subjects with HFA and AS made more than eight errors. The most robust difference observed was in the areas of gaze and intonation, while remaining differences centered on ability to share topics and infer others’ informational state.
Volden (2006) investigated nine school-aged, high-functioning children with ASD and matched to nine control group children based on language level responded to a stacked series of requests for clarification (RQCLs). During conversation, an unfamiliar examiner engineered ten episodes of communicative breakdown. Each consisted of a stacked series of three RQCLs ('What?', 'I don't understand', 'Tell me another way'). Verbal and non-verbal responses to each RQCL were coded. The finding revealed that children with ASD were similar to language age-matched control children in responding to RQCLs and employing a variety of repair strategies. In addition, their pattern of responding over the series of RQCLs was very similar to the controls in varying the repair strategy by adding increasingly more information as the breakdown persisted, i.e., as the sequence of RQCLs progressed. Children with ASD, however, were significantly more likely than language age-matched controls to respond to an RQCL with an inappropriate response.

Few studies have been reported the ability of individual with autism to produce narrative discourse. Norbury and Bishop (2003) found few differences between narrative skills of children with ASD and those with specific language impairment, suggesting that difficulties with stories may be common to children with communication impairments.

Seung (2007) examined the linguistic characteristics of high functioning individuals with autism and Asperger syndrome. Each group consisted of 10 participants who were matched on sex, chronological age, and intelligence scores. Participants generated a narrative after watching a brief video segment of the Social Attribution Task video. Each participant was then asked 10
questions related to the stimulus video. The narrative samples and responses to the questions were analysed linguistically. Individuals with high functioning autism and Asperger syndrome performed similarly on most measures of language function; however, results suggest there may be pragmatically-based differences between the groups in the use of verb tense marker.

Loveland and Tunali-Kotoski (1997) observed that many children with autism have an early interest in letters and numbers, and some learn to read words without any direct instruction. In a study, O'Connor and Klein (2004) demonstrated the effects of three kinds of facilitation on reading comprehension in twenty adolescent students with autism spectrum disorders. In a within-subjects design, each student read passages under four conditions: answering pre reading questions, completing cloze sentences embedded in the text, resolving anaphora by identifying relevant antecedents, and control (reading only). A repeated measures analysis of variance indicated that conditions differed significantly in their effects on reading comprehension. Post hoc contrasts showed that the effects of anaphoric cuing were statistically significant and medium in size; the effects of pre reading questions and cloze completion were small and not statistically significant.

Nation, Clarke, Wright, and Williams (2006) investigated reading skills in 41 children with autism spectrum disorder. Four components of reading skill were assessed: word recognition, nonword decoding, text reading accuracy and text comprehension. The results showed that levels of word and nonword reading and text reading accuracy fell within average range although reading comprehension was impaired. However, there was
considerable variability across the sample with performance on most tests ranging from floor to ceiling levels. Some children read accurately but showed very poor comprehension, consistent with a hyperlexia reading profile; some children were poor at reading words and nonwords whereas others were unable to decode nonwords, despite a reasonable level of word reading skill. These findings demonstrate the heterogeneous nature of reading skills in children with ASD.

Functional magnetic resonance imaging (fMRI) is beginning to be used, as well, to investigate language processing in autism. Just, Cherkassy, Keller, and Minshew (2004) investigated brain activation during sentence comprehension. Reliable differences were found between subjects with HFA and TD in activation in the areas of the cortex. Subject with HFA showed higher activation in Wernicke’s region and lower activation in Broca’s area. Functional connectivity between cortical regions also appeared lower in subjects with HFA.

Kana, Keller, Cherkassky, Minshew, and Just (2006) examined functional MRI of brain activation in 12 participants with autism and 13 age- and IQ-matched control participants while they processed sentences with either high- or low-imagery content. The analysis of functional connectivity among cortical regions showed that the language and spatial centres in the participants with autism were not as well synchronized as in controls. In addition to the functional connectivity differences, there was also a group difference in activation. In the processing of low-imagery sentences like, addition, subtraction and multiplication are all math skills, the use of imagery is not essential to comprehension. Nevertheless, the autism group activated
parietal and occipital brain regions associated with imagery for comprehending both the low and high-imagery sentences, suggesting that they were using mental imagery in both conditions. In contrast, the control group showed imagery-related activation primarily in the high-imagery condition. The findings provide further evidence of underintegration of language and imagery in autism but also shows that people with autism are more reliant on visualization to support language comprehension.

Gaffrey et al. (2007) studied activation associated with semantic category decision in ten high-functioning men with autism spectrum disorder and ten healthy control subjects matched for gender, handedness, age, and nonverbal IQ by functional MRI. Participants indicated via button press response whether visually presented words belonged to a target category (tools, colors, feelings). The control condition required target letter detection in unpronounceable letter strings. Significant activation for semantic decision in the left inferior frontal gyrus was found in the control group. Corresponding activation in the autism group was more limited, with smaller clusters in left inferior frontal areas 45 and 47. Autistic participants, however, showed significantly greater activation compared to controls in extrastriate visual cortex bilaterally, which correlated with greater number of errors on the semantic task.

SOCIAL BEHAVIOUR STUDIES

Children with autism exhibit deficits in multiple aspects of social processing. They are gaze behaviour, social speech, joint attention, imitation, play, attachment, peer relations, and affective development. In autism,
studies of gaze behaviour are much discussed recently. In a study of 2-year olds with autism, Chawarska and colleagues (2003) demonstrated that in naturalistic setting toddlers with autism do not follow the gaze of others; they are sensitive to directional cues inherent in eye movement. In another study, Senju, Tojo, Dairoku, and Hasegawa (2004), observed that children with autism did not evidence the expected preferential gaze shifting in response to a social cue. In addition, more general pattern of difficulty shifting controlled attention was also observed.

Spezio, Adolphs, Hurley and Piven (2007) investigated the relationship between gaze onto the eye and mouth regions of faces, and the visual information that was present within those regions. The result showed that compared to ten IQ- and age-matched healthy controls, eight participants with autism showed less fixation specificity to the eyes and mouth, a greater tendency to saccade away from the eyes when information was present in those regions, and abnormal directionality of saccades.

One study in the area of speech showed that even very young children appear to lack a preference for speech sounds over other kind of sounds (Oterling & Dawson, 1994). In another experimental study in toddlers Paul, Chawarska, Klin, and Volkmar, (2004) suggests that a general decrease in interest in listening to speech and a lack of preference for typical language patterns.

The social communication profiles from behavior samples videotaped between 18 and 24 months of age in three groups of children: 50 with autism spectrum disorders, 23 with developmental delays, and 50 with typical development. The ASD group scored significantly lower than the DD group
on five social communication measures and the TD group on all 14 measures, indicating distinct profiles late in the second year (Wetherby, Watt, Morgan. & Shumway 2006).

Various studies have suggested problems in joint attention behaviours. For example, Osterling and Dawson (1994) reviewed videotapes of first birthday parties of 22 children with autism. Data were collected on social, affective, communicative, and joint attention behaviours as well as for symptoms suggestive of autism. The children with autism exhibited fewer social and joint attention behaviours and more autistic symptoms. Osterling et al. (2002) studied the same phenomena among 20 children later diagnosed with autism spectrum disorder, 14 later diagnosed with mental retardation, and 20 typically developing children. This study demonstrating that the children with autism exhibited fewer social and joint attention behaviours and more atypical autism specific behaviours than both the typically developing and developmentally delayed groups.

Children with autism display serious deficits across different types of imitation tasks. Various studies have documented deficits across different types of imitation tasks. For example in an early study, Roeyers, Oost, and Bothuyne (1998) investigated two candidate precursors, imitation and joint attention, in young children with autism and a control group of nonautistic children with a developmental delay. Children with autism were found to be impaired or delayed in imitation and joint attention abilities. Although the evidence for autism-specific deficit appears to be stronger in the domain of joint-attention behaviors than it is in the domain of imitation, it seems premature to reject imitation as a possible precursor to the development of
mind reading skills.

The adolescents with autism would have specific limitations in imitating the “style” of another person's actions. In a series of original tasks that tested the delayed imitation of novel nonsymbolic actions, 16 participants with autism and 16 nonautistic participants group-matched for age and verbal ability were proficient in copying goal-directed actions, but in 3 out of 4 tasks, strikingly fewer participants with autism imitated with style with which the demonstrator executed the actions. An additional finding was that on two conditions that involved copying self-orientated actions, only five of the participants with autism but 15 of the 16 nonautistic participants spontaneously adopted the orientation-to-self on at least one occasion (Hobson & Lee 1999). In another study by Rogers, Hepburn, Stackhouse, and Wehner (2003) demonstrated that toddlers with autism evidenced delays relative to developmentally delayed and typically developing children in specific types of imitation skills including oral-facial imitation of actions on objects.

Beadle-Brown (2004) tested if there were distinctions between different types of actions, such as symbolic versus non-symbolic, one-handed versus two-handed or symmetrical versus asymmetrical actions, on a test of elicited imitation. In this study, a large battery of tasks was used to elicit imitation from three groups of autistic children and adults, two groups of typically developing children, and a group of children with mild-to-moderate intellectual disabilities. The results showed that majority of children and adults with autism had little impairment relative to the controls, although certain actions like symbolic and asymmetrical did seem more difficult, especially for the youngest children.
The influence of developmental level on interaction and imitation in infants and young children with autism on the basis of family videos and filmed consultation was investigated by Receveur et al. (2005). The sample comprised 18 children with autism divided into two groups according to their developmental quotient. The findings showed that, at a very early age, infants later diagnosed as having autistic disorder show different intensities of interaction and imitation deficits according to developmental level.

Ham, Corley, Rajendran, Carletta, and Swanson (2007) tested on imitation of two types of meaningless gesture: hand postures and finger positions in nineteen people with High-Functioning Autism. The individuals with HFA achieved lower scores in the imitation of both hand and finger positions relative to a matched typical group. The between-group difference was primarily accounted for by performance on a test of visual motor integration, together with a hand imitation deficit which was specifically due to errors in body part orientation.

Studies have consistently revealed that children with autism have problems in the play skills. For example, Jarrold (2003) reviewed the empirical evidence of difficulties in pretend play in autism, and focuses in particular on individuals’ ability to engage in pretence in free play conditions, to produce pretence in more structured situations, and to make sense of pretend actions carried out by another person. These data suggest that individuals with autism have a marked difficulty in producing pretend play, but one that is reduced by providing substantial structure to the play situation or by testing comprehension of pretence.
Rutherford and Rogers (2003) studied development of pretended play skills in 28 young children with autism, 24 children with other developmental disorders, and 26 typical children. Result did show that children with autism were significantly delayed on pretend play. Later, Rutherford and his colleagues (2006) tested the hypothesis that developmental change in pretend play performance can be predicted by earlier measures of executive function, intersubjectivity, imitation, or general development. Participants at the time of follow-up testing were 28 children with autistic disorder, 18 children with other developmental disorders, and 27 typically developing children. Children with autism were profoundly delayed given both competence measures as well as performance measures.

Holmes and Willoughby (2005) investigated the play behaviours of children with autism. Cognitive and social levels of play engaged in by 4- to 8-years-old children with autism spectrum disorders were examined in naturalistic classroom settings. In addition, play at home was compared with play at school via mother and educator questionnaires. Seventeen school-aged children, their educators, and their mothers participated in the study. Each participant was observed for one free play session on 5 separate days. The most frequently observed play behaviours included parallel-functional play, adult interactions, and solitary-functional play.

Spontaneous symbolic play, declarative joint attention, social referencing and imitation of symbolic play in 3- to 6-year-old children with an autism spectrum disorder during interaction with their mothers was examined by Warreyn, Roeyers, and Groote (2005). Compared to a control group matched on age and IQ, the children with ASD initiated less joint
attention with their mothers when confronted with a pleasant event and they showed a tendency to play less symbolically and more non-functionally. Children with ASD showed no social referencing or imitation deficits.

In a meta-analytic study employing the Strange Situation, Rutgers, Berckmans-Kranenburg van Ijzendooran, and van Berckelaer-Onnes (2004) demonstrated that autism is compatible with a secure attachment organization. Moreover, Rutgers and his colleagues revealed that, although children with autism were more likely to have insecure attachment organization than their typically developing peers, higher functioning individuals with autism were no more likely to be insecurely attached than their typically developing peers.

Nadel et al. (2000) studied eight low-functioning and non-verbal children with autism. They were presented with a modified version of the ‘still face’ paradigm performed by a stranger. The children’s reactions illustrate the development of expectancies concerning human social behaviour. While they ignored the stranger and did not show any concern about her odd behaviour during the first still episode, they all focused on the adult during the second still episode. In this episode, they exhibited a mixed social pattern of positive overtures and negative emotional expressions which resembles the still face effect found in normally developing infants. These findings suggest that low-functioning children with autism are able to integrate their previous experience with a partner and detect social contingency.

Dissanayake and Crosseley (1997) examined separations and reunions in naturalistic settings. They found that children with autism (and children with Down syndrome) showed fundamentally similar attachment behaviours.
but greater variability in behaviours across three observation sessions.

Among individuals with autism limited interest in social interaction and reduced initiation of social contact with peers remain apparent overtime. In one study by Koning and Magill-Evans (2001) found that in older children, there is typically a failure to engage in social interchange with peers, and cooperative play is usually absent; they make far fewer approaches to peers than other children.

Orsmond, Krauss, and Seltzer (2004) investigated peer relationships and participation in social and recreational activities among 235 adolescents and adults with autism who live at home. Both individual and environmental factors were investigated as predictors of having peer relationships and participation in social and recreational activities. Greater participation in social and recreational activities was predicted by characteristics of the individual with autism (greater functional independence, less impairment in social interaction skills, higher levels of internalizing behaviors) and characteristics of the environment (greater maternal participation in social and recreational activities, greater number of services received, and inclusion in integrated settings while in school).

Observational study by Jackson et al. (2003), highlight deficits in social initiations to peers relatives to both typically developing and cognitively impaired peers. In another study, Bauminger and Kasari, (2000) found that direct interviews of higher functioning children and adolescents revealed greater difficulty defining central elements of what determines friendship relationships as well as greater feelings of loneliness.

Ruble (2001) studied the complexity of social interactions of 16
children with autism or Down syndrome. Statistical analyses revealed similar social contexts and opportunities to receive bids from others for both groups. Study also showed that differences in the frequencies and complexities of children's behaviors depended on behavioral intent. Socially intended behaviors were less frequent, less self-initiated, and less complex in children with autism.

In one study, Bauminger, Shulman, and Agam (2003) examined social interaction with peers and the understanding and feelings of loneliness in 18 high-functioning children with autism and 17 typically developing children matched for IQ, chronological age, gender, and maternal education. They observed on children's spontaneous social initiations and responses to their peers in natural settings. Children with autism revealed a good understanding of both social interaction and loneliness, and they demonstrated a high level of social initiation. Children with autism also reported higher degrees of loneliness than their typical age-mates, as well as a lower association between social interaction and loneliness, suggesting their poorer understanding of the relations between loneliness and social interaction.

Macintosh and Dissanayake (2006) compared the social skills and problem behaviours of children with high-functioning autism and Asperger’s Disorder by using parent and teacher reports on the Social Skills Rating System. The participants were 20 children with high-functioning autism, 19 children with Asperger’s Disorder, and 17 typically developing children, matched on chronological and overall mental age. The findings revealed that the children with autism and Asperger’s Disorder were not differentiated on any social skill or problem behaviour based either on teacher or parent report.
NEUROPSYCHOLOGICAL STUDIES

Studies related to neuropsychological factors in autism include current psychological models like, theory of mind, central coherence, and executive functions, with related research findings interpreted and integrated into these specific constructs. Studies on social-cognitive mechanisms and language development also within the domain of neuropsychological function, but each are mentioned in earlier. In this section, focus is placed on studies related to specific cognitive mechanisms such as sensory perception, attention, memory, and executive functions.

Several studies are well documented on sensory disturbances and viewed as a primary area of deficit in autism. Ornitz and Ritvo (1968) observed that the range of hypo- and hypersensitivity affecting each of the senses in over 150 cases of autism. In the studies of early behavioural characteristics in autism by Adrien (1992); Osterling and Dawson, (1994) consistently found that abnormal responses to sensory stimulation to differentiate between children with autism and developmentally matched controls. They also found that a cluster of behaviours include: empty gaze; visual fascination with patterns and movements; failure to react sound/appearing deaf; hyposensitivity to pain, cold, or heat; hypersensitivity to taste; and inappropriate use of objects, such as licking/mouthing, peering, or interest in texture.

Studies of Watling, Deitz, and White, (2001); and Dunn, Myles, and Orr (2002) by using parent questionnaire also report more severe or more frequent sensory symptoms in three through six years of age young and school age children with autism as well as children with Aspergers syndrome.
with the need for external validation using clinical assessment methods. A significant association was not found when the relationship between sensory symptoms severity and severity of autism symptomatology was examined (Kientz & Dunn, 1997), but degree of abnormal sensory responsivity and impairments in adaptive behaviour were related (Rogers et al., 2003).

In one study, Laurent and Rubin (2004) found that the presence of sensory disturbances in autism has been connected with the levels of arousal, attention, emotional regulation, action or adaptive goal-directed behaviour. Researchers like Courchesne, Townsend et al. (1994) found that attention is a central deficit in autism and that the neocerebellum is an important structure in the coordination of attention and arousal systems, presenting evidence for its development in autism.

Goldstein, Johnson, and Minshew (2001) found that sustained attention for simple repetitive visual information is generally intact in individuals with autism compared to developmentally matched controls, as measured by continues performance tasks. In another study by Schatz, Weimer, and Trauner (2002) conducted a preliminary study of attention in Aspergers syndrome was suggestive of an attention deficit, specifically manifest in an inconsistent or variable response pattern to stimuli in a sustained visual attention task.

Deficits in attention in autism are typically reported for more complex tasks requiring filtering, selective attention, and shifts in attentional focus. One study by Burack (1994) on a target discrimination task, low-functioning individuals with autism were found to benefit from the presentation of a target location cue, but were more susceptible to nontarget distracters than
their developmentally matched counterparts. Plaisted, Swettenham and Rees (1999) investigated the selective attention task; children were instructed to attend to either the local or global level. The results showed that children with autism and normally developing children were quicker to respond to the global target than local target in the selective attention task.

Brian, Tipper, Weaver, and Bryson (2003) studied the inhibitory control mechanisms of selective attention in autism spectrum disorders. A negative priming task was used to examine selective spatial inhibition in participants with autism relative to matched non-clinical controls. The results indicated that inhibition of direct inhibition to task-relevant stimulus features. They also found that the irrelevant perceptual features of colour produced a facilitation effects in autism.

Mann and Walker (2003) examined if visual attention in autism is spatially over focused and if there is an associated deficits in broadening the spatial spread of attention. Result indicated that individual with autism are relatively less accurate and slower to respond in visual attention task.

The frequency and distribution of spontaneous attention shifts between social and non-social stimuli in autistic, typically developing, and non-autistic developmentally delayed infants investigated by Swettenham et al. (1998). The infant with autism showed a different pattern, shifting attention between an object and another object more than any other of shift. Further more, infants with autism showed fewer shifts of attention between an object and a person, and between person and person, than did the two control groups.
Sanders, Johnson, Garavan, Gill, and Gallagher (2007) reviewed the literature on four specific functions in ASD – sustained attention, orienting attention, response inhibition and set shifting. Based on the data there is evidence to suggest that deficits in orienting attention, response inhibition and set shifting exist in ASD, but sustained attention ability appears to be normal.

Ozonoff et al. (2004) found that speed and expectancy deficit in autism at a higher order level suggest that it is part of a more general difficulty with executive control originating from frontal lobe dysfunction, as evidenced by specific deficits on measures of attention that require cognitive flexibility or shifting between categories, sets, or rules.

Some other studies of Klin (2000) and Klin, Jones, Schultz, and Volkmar (2003) found that individuals with autism and AS shows deficiencies with regard to processing the most essential or salient information from stimulus-rich environments and attending to meaningful or shared aspects of a learning situation, namely, those not explicitly stated, both of which are of great relevance to the daily lives of individuals with autism.

It is consistently found that individuals with autism show intact digit span and intact immediate recall for semantically unrelated lists of words relative to ability-matched and, in some cases, normal controls (Bennetto, Pennington, & Rogers, 1996). There is also evidence to suggest well-developed associative learning mechanisms (Minshew & Goldstien, 2001).

Mottron, Morasse and Belleville (2001) administered memory tasks to
14 high-functioning individuals with autism and 14 typically developing individuals matched on chronological age and verbal intelligence. The tasks consisted of free and cued recall of 15 semantically unrelated words in 3 encoding conditions: phonological encoding, semantic encoding, and a no encoding orientation. The results indicated that in both groups, semantic orientation led to better free recall than did orientation toward syllabic encoding or absence of orientation. In contrast, semantic cues at retrieval led to better cued recall than phonological cues in typically developing individuals, whereas both types of cue had the same effect in prompting cued recall for individuals with autism.

Heaton, Ludlow and Roberson (2007) tested in two experiments on tasks of colour discrimination and memory in children with autism and two groups of controls matched for either chronological or non-verbal mental age. The results showed significantly poorer colour discrimination in children with autism in comparison to typically developing chronological age matched controls and children with autism, retained unlabelled perceptual colour information to a significantly higher level than either group of controls. The findings suggest that enhanced performance on perceptual tasks relate to a reduced tendency to encode verbal information in memory.

In a study (Russell, Jarrold, & Henry, 1996), when presented with working memory capacity tasks, both children with autism and children with moderate learning difficulties performed significantly more poorly than the normal controls on all three tasks. There was no difference, however, in the performance between the two comparison groups. Ozonoff and Strayer (2001) also reported no autism-specific impairments in working memory in
the context of a significant association between IQ, age, and performance on working memory tasks.

Joseph, Steele, Meyer, and Tager-Flusberg (2005) tested that twenty four high-functioning school-age children with autism and a comparison matched group were impaired in using verbal encoding and rehearsal strategies in the service of working memory. Working memory was assessed using verbal and non-verbal variants of a non-spatial, self-ordered pointing test. Participants were also administered a verbal span task to assess non-executive verbal rehearsal skills. Although the two groups were equivalent in verbal rehearsal skills, the autism group performed significantly less well in the verbal, but not the non-verbal, self-ordered pointing test. These findings suggested that children with autism are deficient in the use of verbal mediation strategies to maintain and monitor goal-related information in working memory.

Williams, Goldstein, and Minshew (2005) studied the auditory and visual memory of 29 high-functioning adults with autism and 34 group-matched normal controls. The individuals with autism performed as well as the controls on immediate and delayed memory for word pairs and stories and on a verbal working memory task. The autism group was impaired on immediate and delayed recall of faces and of family scenes and had impaired spatial working memory. The integrity of verbal working memory and impaired spatial working memory is consistent with the findings of other studies and may reflect the greater computational demands of the spatial task.

Williams, Goldstein, and Minshew (2006) administered a clinical memory test to 38 high-functioning children with autism and 38 individually
matched normal controls, 8-16 years of age. The resulting profile of memory abilities in the children with autism was characterized by relatively poor memory for complex visual and verbal information and spatial working memory with relatively intact associative learning ability, verbal working memory, and recognition memory.

Steele, Minshew, Luna, and Sweeney (2006) investigated working memory deficits in high-functioning children with autism by using the CANTAB computerized test of spatial working memory. Results showed that individuals with autism made more errors than a matched group of typically developing controls on this task, and were less likely to consistently use a specific organized search strategy to complete the task. Overall, these results demonstrate reduced spatial working memory abilities in autism.

Bowler and Colleagues examined episodic memory function in adults with AS in a series of studies and reported impairments in source memory as well as greater reliance on remembering relative to control (Bowler, Gardiner, & Grice, 2000; Gardiner, Bowler, & Grice, 2003).

Crane and Goddard (2007) examined the episodic and semantic autobiographical memories in a group of adults with autism spectrum disorders (ASD) and a control group matched for age, gender and IQ. Results demonstrated a personal episodic memory deficit in the ASD group in the absence of a personal semantic memory deficit, suggesting deficit dissociation between these two components of memory in ASD. Further analysis of memories across different lifetime periods revealed the adolescent and early adult lifetime periods to facilitate memory recall in the control group, but not in the ASD group.
When perceptual processing tasks have been used to examine implicit memory in autism and AS, no evidence of impairment has been found (Bowler et al., 1997; Renner et al., 2000). Whereas age and level of intellectual ability are more strongly associated with performance on explicit memory tasks, task complexity is likely to be a strong factor in both. Atypical patterns of results on list learning tasks (e.g., with manipulation to examine the effect of variables such as levels of processing, associative value, and redundancy) also suggest that it is the relation between semantic memory and episodic memory that explains impairment on explicit memory tasks (Beversdorf et al., 2000; Toichi & Kamio, 2002, 2003).

Kamio and Toichi (2000) compared the pictures and words with respect to access to semantic systems in autism using a semantic priming paradigm. The results showed that the autism group performed better on picture-word task than on word-word task. The finding suggests that the possible advantage of pictures over words in access to semantics in autism.

Kamio and Toichi (2006) investigated in 13 individuals with high-functioning autism, 15 individuals with Asperger’s disorder, and age-, and IQ-matched controls were presented a list of sentences auditorily. Participants then evaluated semantically related but new sentences and reported whether they were old or new. Results indicated that the total rates of false recognition for semantically related sentences were similar among the three groups. Nevertheless, memory illusion on some aspects was reduced in HFA participants. These results suggest that HFA have difficulties in semantic association.

Diehl, Bennetto and Young (2006) examined story recall and narrative
coherence in 17 children with high-functioning ASDs and 17 typically
developing children matched on age, gender, language abilities, and cognitive
abilities. The study revealed no group differences in story length or syntactic
complexity. Children with ASDs also did not differ from controls in their use
of the gist of a story to aid recall or in their sensitivity to the importance of
story events. Children with ASDs did, however, produce narratives that were
significantly less coherent than the narratives of controls. Children with
ASDs appeared less likely to use the gist of the story to organize their
narratives coherently.

From studies of traditional executive function tasks, such as the
Wisconsin Card Sorting Test, it is observed that for individuals with autism,
the capacity to deal with complex information or new situations is limited by
deficits in cognitive flexibility and/or understanding of novel/abstract
concepts (Minshew, Meyer, & Goldstein et al., 2002). Conceptual flexibility
versus perceptual or attentional flexibility appears to be the predominant
deficit in higher functioning individuals. Additionally, rule learning and
shifting within a rule or category are within the range of normal function
(Berger, Aerts, Van Spaendonck, Cools, & Tenunisse, 2003).

When children with HFA and ADHD were compared on a range of
tasks involving executive functions, the HFA group showed broad-based
deficits in inhibiting a prepotent responses and verbal fluency (Geurts, Verte,
Oosterlaan, Roeyers, & Sergent, 2004). Parent rating of the behaviour in
these groups of children also yield a range of elevations on executive function
scales although, again, the autism group is distinguishable by deficits in
flexibility whereas the ADHD (combined) group exhibits more severe
inhibitory deficits when compared (Gioia, Isquith, Kenworthy, & Barton, 2002).

Individuals with AS also show deficits in executive functioning and may perform equally poorly as individuals with HFA. The major difference between them was the overall higher IQ in Asperger syndrome, which was largely due to superior verbal abilities. (Manjiviona & Prior, 1999; Miller & Ozonoff, 2000). Indeed, a preliminary study of individuals with AS revealed a significant deficit in spatial working memory but no impairment in strategy formation on a spatial task (Morries et al., 1999).

The intellectual profiles of individuals with autism have been reviewed extensively, and it is typically found that visual and visual spatial processing are well preserved and frequently a strength relative to verbal abilities (Barnhill, Hagiwara, Myles, & Simpson, 2000).

Kuschner, Bennetto, and Yost (2006) studied patterns of nonverbal cognitive functioning in preschoolers with ASDs compared to groups with non-autism developmental delays and typical development. Profiles were examined using the Leiter International Performance Scale-Revised. Results indicated that the ASD group displayed clear relative strengths in visuospatial disembedding and detail-focused processing, with relative weaknesses in abstraction and concept formation. This contrasted with patterns of roughly equivalent abilities in both comparison groups.

Rinehart, Bradshaw, Moss, Brereton, and Tonge (2001) examined executive functioning, in particular, attentional set-shifting deficits in high-functioning autism and Asperger’s disorder. A large or global digit composed
of smaller or local digits was presented during each trial. The participants indicated the presence of ones or twos by pressing the appropriate button. These targets could appear globally or locally. Relative to IQ, sex and age matched controls; reaction time to global targets in individuals with autism was retarded when the previous target appeared locally. This deficiency in shifting from local to global processing, however, was not observed in individuals with Asperger’s disorder.

Iarocci, Burack, Shore, Mottron, and Enns (2005) examined the global-local processing in high-functioning children with autism and in groups of typically developing children. In experiment 1, the effects of structural bias were tested by comparing visual search that favored access to either local or global targets. The children with autism were not unusually sensitive to either level of visual structure. In experiment 2 a structural global bias was pitted against an implicit task bias favoring the local level. Children with autism were least sensitive to the structural global bias but showed greater sensitivity to the implicit task bias. This suggests that autism is associated with differences in the executive control processes used to guide attention to either the global or local level, and strategies may be more “data driven”.

Tsatsanis et al. (2003) found that in a group of children who presented with significant language limitations and obtained a Vineland Expressive Communication age equivalent score at or below 3 years nonverbal IQ scores with strengths on subtests drawing primarily on visualization skills and particularly spatial reasoning.

Using the WISC-III, Mayes and Calhoun (2003) found strengths in
lexical knowledge relative to verbal reasoning in both high-IQ and low-IQ groups of older children, but a selective strength in visual spatial ability in their low-IQ group. Within the younger age group, assessed using the Stanford-Binet, IV, relative strengths in visual processing were found for both IQ groups, as well as strength in rote memory. The disparity between verbal and nonverbal abilities observed in the younger group was not obtained in the group of older children, representing an increase in verbal IQ versus change in nonverbal ability. Ghaziuddin and Mountain-Kimchi (2004) also found no difference in WISC-III VIQ and performance IQ scores overall in their samples of subjects with HFA at the mean age 12.42 years.

**INTERVENTION STUDIES**

As mentioned earlier in this chapter applying intervention strategies as a mode of help to improve the behaviour of autistic children is the focus of many studies. Most of the studies are limited to small number of cases as they have been conducted as part of helping autistic children seeking help from clinicians. However the results are found to be quite increasing. For the present study a brief review of the available ones during the past years is attempted. An examination of these studies reveals that they fall mainly under five categories: intervention to improve behavioural skills; social skills; communication skills and parental intervention.

**Behavioural intervention**

Current behavioural interventions can trace their roots to studies conducted in the early 1960’s. Ferster and DeMyer (1961, 1962), were among the first to demonstrate that children with autism could indeed learn and would do so if the systematic application of operant discrimination learning
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techniques was employed. Lovaas and his colleagues (e.g., Lovaas, 1977; Lovaas, Berberich, Perloff, & Schaeffer, 1966; Lovaas, Freitag, Gold, & Kassorta, 1965; Lovaas, Koegal, Simmons, & Long, 1973) were the first to develop a comprehensive, systematic package of behaviour interventions that addressed a wide range of behaviours in children with autism (c.f. Schreibman & Ingersoll, 2004).

One often cited study found that 47% of preschool-age children with autism who had received intensive (40 hours per week), discrete trial intervention for 2 years achieved normal intellectual and educational functioning compared with 2% who received less intensive interaction (Lovaas, 1987).

In one important study by Ozonoff and Cathcart (1998) found that students who received home-based structured teaching significantly improved on developmental and cognitive tasks in the areas of imitation, fine motor skills compared to students who did not receive this type of intervention at home. In addition, the experimental group exceeded the control group on other developmental measures by two to three times and gained 9.6 months after 4 months of treatment.

In another intensive behaviourally oriented intervention study by Ben-Itzchak and Zachor (2007) found that significant progress in six developmental-behavioural domains including imitation, receptive language, expressive language, nonverbal communication skills, play skills and stereotyped behaviours after 1 year of intervention. Children with higher initial cognitive levels and children with fewer measured early social interaction deficits showed better acquisition of skills in three developmental
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areas, receptive language, expressive language and play skills.

Similar benefits from applied behaviour analysis were found by Green, Brennan and Fein (2002) a toddler to be high risk for autism at the age of about 1 year. Treatment was delivered in the child’s home and other settings. Intensive treatment continued for 3 years; by the 4th year, the child was spending most of her time in a regular preschool classroom. Direct observational data and results of norm-referenced tests documented large increases in language, social, cognitive, and daily living skills over the course of treatment.

There has been an interest in whether targeting early social-communicative behaviours that are theoretically linked to later emerging behaviours in typical development leads to increased development of these later emerging behaviours in autism. For example, Whalen (2001) used behavioural methodology to teach young children with autism to make joint attention initiations and found increases in language despite the fact that language was not directly targeted. Similarly, Ingersoll (2003) found increases in language, play, and joint attention after targeting reciprocal imitation.

Like the work of Ingersoll and Schreibman (2006) illustrated a multiple-baseline design across five young children with autism to assess the benefit of a naturalistic behavioral technique for teaching object imitation. Participants increased their imitation skills and generalized these skills to novel environments. In addition, participants exhibited increases in other social-communicative behaviors, including language; pretend play, and joint
attention. In another study by Ingersoll, Lewis, and Korman (2006) also found increases in spontaneous use of descriptive gestures by using reciprocal imitation training for five young children with autism.

In contrast, cognitive behavioural approaches have seldom been used or studied explicitly in intervention for autism. One study by Bauminger (2002) evaluated the effectiveness of a 7-month cognitive behavioural intervention for the facilitation of the social-emotional understanding and social interaction of 15 high-functioning children with autism. Results demonstrated progress in social interaction, problem solving and of emotion understanding. Children also obtained higher teacher-rated social skills scores in assertion and cooperation after treatment.

Koegal et al. (2001) reviewed many studies on pivotal response training showing the efficacy of the approach and long-term improvement in disruptive behaviour, language, social and academic skills as well as attitude toward learning and enthusiasm. PRT uses behavioural procedures such as self-recording, and self-reinforcement, to teach self-management and self-initiation.

Some of the studies explored whether the ‘intensity’ of service delivery and the age at which behavioural intervention was introduced influenced developmental rating scale assessments of progress. Children who were involved in service before and after 3 years of age all demonstrated significant changes on six developmental domains when assessed before and following intervention but there were no significant differences between these groups. Overall improvement in the areas of communication, cognitive
and social-emotional functioning was predicted by the duration of time that a child spent in home-based intervention (Luiselli, Cannon, Ellis, & Sisson, 2000).

In another attempt at an early behavioural intervention program may be influenced how conclusions about the progress of preschool children by the use of different cognitive assessment tools. As part of a longitudinal treatment outcome study, 24 children with autism aged between 27 and 58 months were each tested on the Bayley, Merrill-Palmer and Vineland scales. Their performance on each of these tests was compared. Results showed that, while scores on the different tests were highly correlated, actual test scores varied considerably, with the Bayley tending to produce the lowest IQ scores and the Merrill-Palmer the highest. These findings have important implications, as it is evident that judgements about the effects of therapy may be significantly influenced by the selection of the tests for pre-and post-treatment assessments (Magiati & Howlin, 2001).

Social intervention

Hwang and Hughes (2000) reviewed 16 empirical studies that investigated the effects of social interactive interventions designed to increase early social communicative skills of young children with autism by increasing their role as initiator of social interactions. Increases were found for social and affective behaviors, nonverbal and verbal communication, eye contact, joint attention, and imitative play. Limited generalization or maintenance of target behaviors was reported.

Smith (2001) noted several potential advantages to social stories,
including the likelihood that learned social skills would generalize to new settings. Several studies have reported that social stories can result in increases in social behaviour and reductions in problem behaviour. Lorimer, Simpson, Myles, and Ganz (2000) demonstrated that social stories reduced tantrums in a high-functioning 5-year old boy using an ABAB design, but Smith’s optimism about generalization was not confirmed. The frequency of tantrums increased when the social stories are not used.

Kuoch and Mirenda (2004) studied by presenting social stories using ABA design with three children 3 to 6 years old; social stories resulted in a reduction in problem behaviour that continued when social stories were not presented. In contrast, Barry and Burlew (2004) used social stories to teach new skills, rather than to reduce problem behaviour. They taught two lower functioning children with autism to make choices and to engage in appropriate play. The study did not have a phase in which the social stories were removed, so no findings on generalization could be demonstrated. Furthermore, Crozier and Tincani (2004) used a reversal design to compare the effectiveness of the modified social story with and without verbal prompts on the disruptive behaviour of a student with autism. The disruptive behaviour decreased during the intervention but to a greater degree when the story was paired with prompting.

The most widely used strategy for teaching play and other social skill to children with autism in inclusion setting is to enlist the aid of a typically developing peer. DiSalvo and Oswald (2002) reviewed the research on these peer-mediated strategies and noted that they have been generally effective in increasing social initiations or social responses but not both. In a recent
example, a study of a 4-year-old boy in an inclusion preschool found increases in initiations by peers and increases in initiation by the target child (McGrath, Bosch, Sullivan, & Fuqua, 2003). Peer-mediated instruction of social skills has also been a key element of the Learning Experiences, an Alternative Program for Preschoolers and Their parents (LEAP) preschool curriculum, which has shown impressive long-term benefits (Strain & Hoyson, 2000).

Another attempt at a simplified program is presented by Garfinkle and Schwartz (2002). Three children with ASD were taught to imitate peers during small group activities in an inclusionary preschool classroom. Results suggest that participants increased peer imitation behaviour in the training setting and generalized them to free play setting, as well. Increases in other social behaviours, such as proximity to peers and number of peer interactions, were also reported. In a recent study by McGrath, Bosch, Sullivant and Fuqua (2006) investigated the effectiveness of peer and individual social skills training for a preschooer diagnosed with autism. Results indicated that the frequency of appropriate initiations and responses did increase and that these changes were socially valid because as measured by expert ratings of change; and in comparison to typical peer-to-peer social behaviour.

More recently, Chung et al. (2007) evaluated the effectiveness of a peer-mediated social skills training (SST) program combined with video feedback, positive reinforcement and token system in increasing social communication skills in young children with high-functioning autism. Four boys with high-functioning autism, ages 6–7 years, participated in the study. Improvement was observed in three out of four children, although individual
differences among children were seen for changes in two global scales as well as subscales. These results suggest that the social skills training were effective in improving social communication skills for some children with high-functioning autism.

Attending to the correct social stimulus is a deficit in virtually every child with autism, so successful intervention must rely on more than exposure to a model. Jahr, Eldevik, and Eikeseth (2000) attempted to teach children with autism to engage in cooperative play using models but found that modeling alone was not effective. When the researcher also required the children with autism to give an oral description of the modeled activity, all six children learned to initiate and sustain episodes of cooperative play, vary their play, and transfer their skills to new play partners. In another study on preschool social communication intervention reveals that children with autism do show increase in social play when appropriate supports are provided (Rogers, 2000).

Communication intervention

As cited from Paul and Sutherland (2004) discrete trial instruction (DTI), the most basic method has been used extensively to teach receptive language in children with autism. Lovaas used this technique to the treatment of speech in autism, and outcomes appear to be limited to the elicitation of verbal production in the high functioning individuals. Nonetheless, a relatively large study has demonstrated the efficacy of this method in eliciting vocal imitation (Ross & Greer, 2003) and speech in nonverbal children (Yoder & Layton, 1988). To eliciting first word in children with autism is the rapid motor imitation (RMI) response approach presented by Tsiouri and
Greer (2003). This method make use of structured operant instruction in producing rapid motor imitation sequences of action the child can already do to get children in an imitation mode and result shows meaningful.

Milieu approaches like mand-modal, prompt-free and incidental teaching have been shown to be associated with increased ability to initiate communication in children who did not show this ability previously (Matson, Sevin, Box, Francis, & Sevin, 1993). Non-verbal children have developed speech using these methods and increases in the frequency, spontaneity, and elaboration of language have also been documented (Delprato, 2001; Goldstein, 2002; L.K. Koegel, 2000).

One area of common difficulty in the treatment of children with autism is teaching communication strategies to nonverbal children. The Picture Exchange Communication System (PECS) is the most widely used iconic system for nonverbal children (Bondy & Frost, 1998). Although the research on its effectiveness is limited, PECS has found wide acceptance in the school-based intervention programs. Charlop-Christy, Carpenter, Leblanc, and Kellet (2002) conducted a study to examine the use of PECS with three preschool children with autism and its effect on speech development. Results from this study indicated that all children met the learning criteria for PECS and showed increases in use of speech. The effect of PECS on the spontaneous communication skills of a 6-year old girl with autism was studied by Kravits, Kamps, Kemmerer, and Potucek (2002). Results indicated increased spontaneous expressive communication using a variety of modalities across all the environments in which PECS was trained.
Manual signs have also been used frequently as a communication modality for children with autism who do not speak. Goldstein (2002) reviewed a range of studies employing manual signs combined with speech and concluded that total communication (TC) approaches can be effective for teaching early vocabulary both receptively and expressively. Similar study by Martin, Drasgow, Halle, and Brucker (2005) used functional communication training to teach a 10-year-old student with autism and severe language delays, to reject items by touching an icon instead of pushing away by applying prompting, differential reinforcement, and error correction procedures. Results indicate that training was successful at replacing pushing away with touching an icon to reject items.

There is limited evidence that non-speaking individuals with autism can benefit from exposure to high-tech devices, as well. The youths with autism were among the participants in a study by Romski and Sevcik (1996), who showed increased both spoken language and a computerized voice output communication aids (VOCAs) device over course of a 2-year study, in which naturalistic teaching methods were employed to teach the use of device. This approach also resulted in an increased use of communicative behaviours to request objects, respond to questions, and make comments among four children with autism in another study (Schepis, Reid, Behrmann, & Sutton, 1998). A case study of one child with autism by Light, Roberts, DiMarco, and Greiner (1998) also reported positive language outcomes when a VOCA was included as a component of a comprehensive communicative system. Other components included gestures, natural speech, and a communication book.
Krantz and McClannanhan (1998) used script-fading procedures with preschoolers with minimal reading skills. The children were taught to use the written cues “Look” and “Watch me” to initiate conversation with adults who did not prompt but responded only to conversation directed to them. The scripts were faded by cutting away portions of the cue cards. Unscripted interactions were found to continue and generalize to new topics.

Keen, Rodger, Doussin, and Braithwaite (2007) investigated the effects of the Stronger Families Project, a social-pragmatic intervention, on the communication and symbolic abilities of 16 children aged 2–4 years with autism. Changes in some communication and symbolic behaviours occurred following the Stronger Families Project intervention according to parent report.

Joint attention is thought to be an important foundation for language development and has been shown to be a significant predictor of language outcome on children with autism (Mundy, 2003). Few studies have examined the efficacy of targeted intervention of joint attention and symbolic play in children with autism by Whalen and Schriebman, (2003); and Kasari, Freeman, and Paparella, (2006). Result indicated that joint attention behaviours are effectively trained and targeted behaviours generalized to others settings. The children also showed more diverse type of symbolic play in interaction with their mothers and higher play levels on both the play assessment and in interaction with their mothers.

Kalyva and Avramidis (2005) examined the efficacy of intervention in improving the communication skills of five pre-school aged children with autism- three in intervention group and two in control group. The ‘circle of
friends' was applied for 30 min on a weekly basis at a nursery setting for a period of 3 months with the active involvement of one teacher and five peers of each child with autism. The statistical analysis of the data revealed children in the intervention group had significantly higher successful response and initiation rates at post-intervention and follow-up than those in the control group.

Several studies have described efforts to teach theory of mind to children with autism. As a review by Charlop-Christy and Daneshvar (2003) indicated, attempts to teach theory of mind have been largely unsuccessful and have shown no evidence that the skills has generalized to new circumstances or to other cognitive and social behaviour. For instance, Chin and Bernard-Opitz (2000) taught conversation skills to three boys with autism ages of 5 to 7 but found that their conversation skills did not generalize to improved theory of mind performance on a standard task.

**Parental intervention**

During the recent years attention has been directed to intervention through parent and other caregivers in addition to the children with autism. Symon, (2005); and Seung, Ashwell, Elder, and Valcante (2006) have attempted parental training in the family set up. The results showed that parental training is efficient in improving parental skills for waiting for the child to verbally communicate, and in using verbal imitation for better interaction. The studies also showed that children with autism could improve in social skills behaviours and communication. The parental training also made the parents to be good trainers for other caregivers in the family.
Researchers such as Girolametto, Sussman, and Weitzman, (2006); Mahoney, and Perales (2006); Ingersoll, and Gergans (2007) tested the effectiveness of parental training in clinical setting using 11 to 56 sessions. They reported improvement in parent child interaction with better responsiveness and skills in reciprocal imitation training. The results also indicate improvement in language, social skills, better imitation skills and emotional functions. In another study Sim, Whiteside, Ditter and Mellon examined the effectiveness of a 12-session manualised social skills intervention involving parent participation in clinical setting. Findings suggest that parent rating of children’s social skills and self-control improved and aggressive behaviour decreased.

Aldred, Green, and Adams (2004) tested a new theoretically based social communication intervention targeting parental communication with their twenty eight children with autism in a randomised design against routine care alone. The intervention was given in addition to existing care and involved regular monthly therapist contact for 6 months with a further 6 months of 2-monthly consolidation sessions. It aimed to educate parents and train them in adapted communication tailored to their child's individual competencies. The active treatment group showed significant improvement compared with controls in reciprocal social interaction and expressive language, communicative initiation and parent-child interaction.

There are some other studies which do not give the exact situation under which training to parents and autistic children are given. Gillett and LeBlanc, (2007); Crockett, Fleming, Doepke, and Stevens, (2007) examined
effectiveness of parental training in NLP and DTT respectively. The results demonstrated better language training by NLP and initial control of the training program over parent responding and parents could extent the use of DTT across other skills in children.

In contrast, Drew et al. (2002) reported finding of pilot RCT for a parent training intervention with a focus on the development of joint attention skills and joint action routines. Twenty-four children with autism randomized to the parent training group or to local service only. A follow-up was conducted 12 months later. There was some evidence that the parent training group made more progress in language development than the local service group.

The study by Swallows and Graupner (2005) compared 24 children with autism who were randomly assigned to a clinic-directed group for intensive behavioural training, and to a parent-directed group received intensive hours by equally well trained supervisors. Outcome after four years of treatment, including cognitive, language, adaptive, social, and academic measures, was similar for both groups. After combining groups, they found that 48% of all children showed rapid learning, and were succeeding in regular education classrooms.

Smith, Buch and Gamby (2000) examined parent-directed, intensive early intervention for children with Pervasive Developmental Disorder. Parents and therapists received six one-day work shops over a five months period, with additional consultations for the next 2-3 years. Five of 6 children rapidly acquired skills when treatment began, but only 2 clearly improved on
standardized tests at the 2-3 year follow-up.

Mc Conachie, Randle, Hammal and Le Couter (2005) evaluated a training course for parents to facilitate social communication with their young children with suspected autism spectrum disorders. Controlled trial for 51 children aged 24 to 48 months, whose parents received either immediate intervention or delayed access to the course. Outcome was measured 7 months after recruitment in parents’ use of facilitative strategies, adaptation to the child, and in children’s vocabulary size, behaviour problems, and social communication skills. The results showed that a significant advantage was found for the intervention group in parents’ observed use of facilitative strategies and in children’s vocabulary size.

In addition to parent training, one study investigated combined effectiveness of parent and children. Goodlin-Jones and Anders, (2004) reported the findings of a 20 week social adjustment enhancement curriculum for children and parents attended a semi-structured concurrent psycho educational training during children’s sessions. The results shows that statistically significant improvements in facial expression recognition, and problem solving.

In a recent review by Mc Conachie and Diggle (2007) found very few studies that had adequate research design from which to draw conclusion about the effectiveness of parent-implemented early intervention. Both randomized and controlled studies tend to suggest that parent training leads to improved child communicative behaviour, increased maternal knowledge of autism and parent-child interaction.

Another trend has been the inclusion of family members and teachers
Review of Literature

in the planning and implementation of behavioural interventions, thereby promoting the maintenance and generalization of treatment effects across individuals and naturalistic environments (Horner, Carr, Strain, Todd, & Reed, 2002). In one study, contextualized behavioural support in early intervention for children with autism and their family enhanced the value of functional assessment techniques and promoted the stability and durability of functional communication training in addressing the challenging behaviour of several children with autism (Moes, & Frea, 2002). Although problem behaviours may be successfully handled by parent-managed behaviour procedures, developmental progress may not as robust as can be achieved by professionally directed program intervention (Biba, Eikeseth, Martin, Mudford, & Reeves, 2002).

THE PRESENT STUDY

Autism is an early onset and lifelong condition characterized by impairments in socialization, communication and repetitive and restricted pattern of interest that have a severe impact on a person’s ability to meet the demands of everyday life (American Psychiatric Association, 2000). Although early studies of outcome predicted a rather bleak future for those affected with the condition, a number of factors have led to a marked increase in the number of individuals who achieve higher levels of independence in adulthood (National Research Council, 2001). It is still the case that there is greater variability in outcome, which may be 12 % or so reaching a “very good outcome” and maybe 60% or so being described as having a “poor” or very “poor outcome” (Howlin, Goode, Hutton & Rutter, 2004).
Reviewers of this still limited literature have catalogued a number of measures and indicators used to study current functioning and outcome in individuals with autism. Quite often, standardized instruments testing cognitive and behavioural functioning and attainment are used to measure outcome, and yet, outcome studies of individuals in the higher end of the cognitive spectrum of autism as that by Howlin (2003) seem to indicate that higher intellectual potential and academic achievement cannot be seen as assurance of better outcome in adulthood.

From the practical standpoint, one critical indicator of children with autism is his/her current cognitive and behavioural functioning relating to real life. These include communication, daily living skills, socialization and behavioural problems of children with autism. Among these various skills, communication and social adaptive skills are of particular interest.

Knowledge of the developmental course and individual factors impacting on the acquisition of communication and social adaptive skills can be of great importance in planning more effective interventions. For example, information on spurts or lags in the acquisition of adaptive skills can inform interventionists of the need to intensify skill instruction at specific age transitions. Information on the relationship between IQ level and skill acquisition can help interventionists to further individualize and intensify level of skill instruction on the basis of the person’s developmental level. Similarly, one of the factors addressed in most educational and treatment programs are reduction of autistic symptomatology (National Research Council, 2001). In order to ascertain that this is a justified priority in such
programs, there is a need to systematically document a positive relationship between symptoms reduction and various skills improvement.

Once considered to be a very rare disorder, occurring in only around 3 or 4 children per 10,000, recent epidemiological research indicates that the rate for autistic disorder is around 19 per 10,000. This finding goes against claims of a current ‘epidemic’ of autism but rather suggests that recent increase in rates of diagnosis reflect greater awareness of autism spectrum disorders among professionals, together with widespread improvement in diagnostic practice (Howlin, 2006). At India’s current population, this means there is an estimated 1.7 million autism persons in the country, assuming that there are no significant variations in this rate world wide, which is a question that has yet been addressed by epidemiologist outside the west.

The cognitive and behavioural analyses focus on the following purposes. (1) To identify in each individual the unique profile of strengths and needs that characterize the form autism takes in this particular person, in order to plan an individualised education and habilitation program. (2) To move beyond global descriptions to more refined, precise documentation of an individuals functioning in various domains such as, global intellectual level and specific verbal and performance abilities, social competence, and social use of language; self-care and other abilities of living etc. (3) To document baseline functioning, against which post intervention status can be compared in each area of individual need. (4) To examine the efficacy of parent training intervention on children with autism.
Many treatments have been suggested as effective for children with autism, some even claiming to bring about cures or recovery from the condition. Such claims are rarely supported by experimental evidence and treatments such as facilitated communication, holding therapy, auditory integration therapy or secretion injections, although claimed to have almost ‘miraculous’ results, have been found to be no more effective than Placebo. On the whole, structured educational programmes combining developmental and behavioural approaches and focusing on visually based teaching strategies seem to have the most positive outcomes. The involvement of families in treatment, and the use of strategies that build on the children’s strengths rather than focusing on areas of weakness, also appear to be important.

Family members are the most stable, influential, and valuable people in the child’s development. By the beginning of the twenty-first century, the pragmatic and philosophical stance that parents can and should collaborate in the design and implementation of intervention services for their children with autism had achieved international acceptance (Schopler & Mesibow, 2000).

Research indicates that parent participation lead to a host of positive outcomes for children with autism, including greater generalization and maintenance of treatment gains, greater continuity, and more effective strategies for resolving problems. Frea and Hepburn (1999) taught two families, each having a 4-year-old child with autism, the functional assessment process. Koegal, Bimbela, and Schreibman (1996) compared two different parent training approaches and their effect on families’ global style of interactions during the unstructured home activities of 17 families’ lives.
Lorimer, Simpson, Myles, and Ganz (2002) used a social story as an antecedent intervention to prevent problem behaviours in the home settings.

All comprehensive programmes for young children with autism explicitly involve parents in implementing the strategies, to a greater or lesser extent (National Research Council, 2001). Other programmes are based in special education measures, with additional training to parents in specific skills (Ozonoff and Cathcart, 1998) and a range of supports offered to families (Prizent, Wetherby, Rubin, & Laurent, 2003). Finally, there are intervention approaches involving parents in behaviour management and promotion of communication skills which are non-intensive, utilizing teaching within everyday situations (Shields, 2001).

Parental intervention is also advantageous from other perspectives. The clinicians intervention is likely to be much more effective if parents have the opportunity to directly observe what takes place in the evaluations and then to discuss specific behaviours with the clinicians afterwards.

It is in the context of this understanding, as well as in the process of discussing a child’s strengths and weakness and the required interventions emerging from this profile, that parents are optimally prepared to become advocates and coordinators of the child’s intervention program.

Increasingly, autism has been recognised as a biologically based neurodevelopmental disorder with diverse aetiologies rather than as an emotional disturbance. Parallel to this, parents, once viewed as the cause of their child’s problems, have been recognised as able to play a key role in the effective treatment of their child.
Increased parental skills allows for continued opportunities for children’s learning in a range of situations. Training parents as ‘co-therapists’ allows consistent handling, and ensures that intervention is appropriate in enhancing children’s earliest social relationships. The potential benefits of parents training are increased skills, renewed confidence and reduced stress for parents as well as for children. Group training for parents in new skills has been demonstrated to facilitate mutual support (Baxendale, Frankham & Hesketh, 2001; and Symon, 2001).

Despite its needs and importance however, many parents have little or no involvement in children with autism education services, especially in Indian scenario. The present study is the first attempt in this direction in Kerala population to explore the basic aspects of cognitive and behaviour functioning of children with autism and the efficacy of parental training intervention.

**Objectives**

1. To assess the cognitive functions in relation to the different levels of autism.

2. To explore the behavioural pattern in relation to different levels of autism.

3. To explore the role of age and gender on the cognitive functions and behavioural pattern among children with autism.
4. To evaluate the usefulness and efficacy of parental training intervention on skill improvement and reduction of problem behaviour among selected children with autism.

**Hypotheses**

1. Cognitive skills differ with different levels of autism.
3. Behavioural pattern differ with different levels of autism.
7. Autism Quotient can be predicted by means of cognitive and behavioural patterns of children with autism
10. Parental training intervention significantly reduces the severity level of children with autism.