

## LANGUAGE AND LEARNING SKILLS AND SYMPTOMS IN CHILDREN WITH AUTISTIC SPECTRUM DISORDERS

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### **ABSTRACT**

*While assessment is the key to an intervention programme, it may not generate information precise enough to identify specific behaviours to teach children with autism. The authors studied the clinical presentation of autistic symptoms and the development of language and learning skills in 20 children with autism and compared it to 20 matched controls. Given the nature of the disorder, a global score does not clarify the areas of individual difficulties. Therefore, each item was analysed to see the variation in symptoms and skill development of children with autism. Findings indicate that the manifestation of autistic symptoms varies with each child with autism. The development of language and learning skills was found to be significantly below that of the typically developing children. The results are uniform in showing that children with autism follow individual patterns of skill development and have their unique areas of relative strengths and weaknesses. The findings have implications for assessment and evaluation practices as well as designing intervention programmes for children with autism.*

### **INTRODUCTION**

The autistic spectrum disorders are a heterogeneous group of neuro-behavioural syndromes characterised by major impairments in basic social relationships, abnormal language development, limited or non-existent imagination and extremely rigid patterns of behaviour. The term 'spectrum' implies a range of severity from mild, allowing close to normal function in many areas, to the most severe in which social function appears to be impossible, but along with restricted behaviour the whole spectrum is defined by the presence of impairments affecting social interaction, communication and imagination, known as the 'triad of impairments' (1). Autism may also result in severe cognitive disabilities that adversely affect individuals'

global development. Individuals with autism display behaviours that are either excessive or in deficit, compared to the general population.

As a spectrum disorder, the level of developmental delay is unique to the individual. Although autism is defined by a certain set of behaviours, children and adults can exhibit any combination of the behaviours in any degree of severity. Children with autistic spectrum disorders differ from one another in the way the core symptoms are presented, in individual characteristics and cognitive abilities, in severity of the disorder and in the coexistence of other medical conditions as well as environmental influences. Two children, both with the same diagnosis, can act very differently from one another and have varying skills (1).

These diverse expressions of autism within and across individuals, present particular challenges for assessment and treatment. The important goals of assessment include a refined documentation of the child's functioning in various developmental domains (2) including intellectual abilities, both verbal and performance, social competence, receptive and expressive language skills, social use of language, motor performance, imitation skills, self-care and other abilities of daily living to place an individual in a broader developmental framework.

Development of language and the communicative competence of children with autism has been an important focus of interventions for children with autism and a number of language training interventions have been developed over the years. Whereas in the past, the communicative means were the main focus, at present the tendency is also to emphasise the communicative functions (3). The question of which means an individual has at his or her disposal to pass on a message is really relevant, but the ultimate question to answer is what the intention of the individual is at that moment. For instance, assessment concerns not only whether someone is pointing, but also whether he or she is doing so to get something or to comment on what is happening in his or her environment.

Although a number of efficient standardised skill assessments are available for children with autism, these assessments typically do not generate information that is precise enough to identify specific behaviours to teach. Educational research has increasingly focused on the value of matching instructional strategies to the student's current skill level. In lieu of standardised assessments, it is recommended that informal assessments be conducted for children with autism by evaluating the child's performance on tasks drawn from a pre-established curriculum (4).

The present research aims to study the clinical presentation of the symptoms of autism and the development of language and learning skills in children with autism and compare it with the profile of the typically developing children. Given the nature of the disorder, a global score for the measures does not clarify the areas of individual difficulties. Therefore, each item was analysed to see the variation in autistic symptoms and skill development of children on the autistic spectrum.

## **METHOD**

### **Participants**

Twenty children (mean age, 4.16 years (0.86)) diagnosed with autism according to DSM-IV–TR (5) criteria, 0–6 months prior to the study, living at home with biological parents and not attending any autism-specific programme, were recruited from out-patient services in New Delhi. Fourteen children (70%) were males. Children with autism were compared to 20 controls (mean age, 3.67 years (0.38)) of which 12 children (60%) were males. The two groups did not differ significantly in age, sex, parental age, parental education, family religion and family income. Families with parents having any psychiatric, neurological or physical disability were excluded.

### **Measures**

**Autism Behavior Checklist (ABC):** The ABC (6) was presented to parents in the simple Yes/No format to obtain a symptomatic profile of the child. The 57 items on this checklist are differentially weighted to reflect the centrality of problem behaviour to the diagnosis of autism and assess five symptom areas of autism.

**Assessment of Language and Learning Skills (ALLS):** Skill areas were assessed on a total of 15 dimensions chosen from two tools: **The Behavioural Language Assessment (7)** and **The Assessment of Basic Language and Learning Skills (8)**. Skinner's (9) analysis of verbal behaviour serves as the conceptual basis. A number of follow-up projects have been done (10) on this. The tools have strong components of language and provide strategies to develop an effective Individualised Education Programme (IEP) for a child.

## PROCEDURE

The researcher contacted each family on the telephone and presented the intent of the research. If the parents met the criteria for the study and gave informed consent, the researcher scheduled a meeting for an assessment of the child. The assessments conducted in the presence of both the parents, were based upon independent observation of the child and information obtained from the parents. Testing time was up to three hours for each child and the researcher completed the measures in the same order over two meetings.

## Statistical Analysis

Analysis was completed using SPSS 10. Groups were compared using an independent sample t-test. The effect sizes were calculated using Cohen *d* to estimate the practical significance of the differences. For interpretation, Cohen's scale of magnitude of effect size was used with values associated with small, medium and large effect sizes as .2, .5 and .8 respectively (11).

## RESULTS

As compared to the controls, children with autism were found to show significantly more difficulties in responding to the sensory stimuli in the environment, relating with people and development of self-help skills. Children with autism also exhibited significantly more stereotypical body movements, preference for routines and self-injurious behaviours as compared to the controls. Language and learning skills (ALLS) were found to be significantly poorer in children with autism than in controls (Table 1).

**Table 1. Group means and differences on autistic symptoms and language and learning skills**

Subscale	Autism (n=20)			Control (n=20)			t(38)	p	ES
	M	SD	Range	M	SD	Range			
ABC									
Total Score	79.00	12.43	58-106	3.10	1.68	0-6	27.07	0.000	8.56
Sensory	13.35	5.71	4-23	0.20	0.62	0-2	10.23	0.000	3.24

Relating	20.45	8.08	4-35	0.30	0.92	0-3	11.09	0.000	3.50
Body/Object Use	15.90	6.40	6-30	1.15	1.09	0-3	10.16	0.000	3.21
Language/Social	14.15	3.83	8-21	0.25	0.55	0-2	15.24	0.000	5.04
Self - Help	14.75	5.35	5-23	1.20	0.77	0-3	11.19	0.000	3.55
ALLS									
CWA	2.35	0.81	1-4	4.60	0.50	4-5	10.53	0.000	3.34
Manding	3.25	0.85	1-4	4.95	0.22	4-5	8.64	0.000	2.74
Motor Imitation	2.65	1.31	1-4	4.85	0.37	4-5	7.24	0.000	2.15
Vocal Play	3.55	0.76	2-5	4.90	0.31	4-5	7.37	0.000	2.33
Echoic	2.70	1.03	1-4	4.95	0.22	4-5	9.54	0.000	3.02
Match to Sample	2.15	0.93	1-5	4.90	0.31	4-5	12.51	0.000	3.46
Receptive	2.95	0.83	1-4	4.95	0.22	4-5	10.46	0.000	3.29
Tacting	2.60	0.75	1-4	4.90	0.31	4-5	12.63	0.000	4.01
RFFC	1.25	0.44	1-2	4.90	0.31	4-5	30.20	0.000	8.86
Intraverbals	1.75	0.64	1-3	4.95	0.22	4-5	21.15	0.000	6.69
Letters/ Numbers	1.90	0.97	1-4	4.95	0.22	4-5	13.73	0.000	4.34
Social Interaction	2.95	0.39	2-4	4.95	0.22	4-5	16.65	0.000	4.64
Gross Motor	11.20	3.56	3-16	26.15	1.09	25-28	17.95	0.000	5.68
Fine Motor	11.95	3.10	8-19	26.95	0.89	26-28	20.79	0.000	6.58
Writing	5.20	1.85	2-8	29.90	1.48	28-32	46.59	0.000	14.74

Note: ABC = Autism Behaviour Checklist; ALLS = Assessment of Language and Learning Skills; CWA = Cooperation with Adult; RFFC = Receptive by function, feature or class.

Given that autism is a spectrum disorder and the clinical manifestation of behaviours varies among children with autism, the authors examined the individual items of ABC and the frequency of occurrence of autistic behaviours among children with autism. Fifty-six of a total of 57 symptoms of ABC were present amongst the children with autism in the present sample. While some symptoms occurred more frequently and were present in 100% of the

children, other behaviours were seen in only 5% of the children diagnosed with autism (Table 2).

**Table 2. Percentage of children showing symptoms on Autism Behaviour Checklist**

Item No	Description	Autism (n=20)	
		n	%
	<i>Sensory</i>		
6	Poor use of visual discrimination	8	40
10	Seems not to hear	9	45
21	Sometimes show no “startle response”	14	70
26	Sometimes no reaction to painful stimuli	2	10
34	Often will not blink when a bright light is directed	14	70
39	Covers ears at many sounds	13	65
44	Squint or cover eyes in natural light	3	15
52	Frequently has no visual reaction to a “new” person	12	60
57	Stares into space for long periods of times	16	80
	<i>Relating</i>		
3	Not attend to social/environmental stimuli	13	65
7	Has no social smile	14	70
13	Does not reach out when reached for	8	40
17	Not responsive to facial expressions/feelings	8	40
24	Avoids eye contact	19	95
25	Resists being touched or held	9	45
27	Stiff and hard to hold	0	0
28	Is flaccid when held in arms	4	20
33	Not imitate other children at play	14	70
38	Not developed any friendships	14	70

43	Often frightened or very anxious	1	5
47	Looks through people	18	90
	<b><i>Body/Object Use</i></b>		
1	Whirls self for long periods of time	9	45
5	Does not use toys appropriately	15	75
9	Insists on keeping certain objects	13	65
12	Rocks self for long periods of time	2	10
16	Lunging, darting, spinning, toe walking, flapping	12	60
22	Flaps hands	4	20
30	Walks on toes	11	55
35	Hurts self by banging head, biting head	12	60
40	Twirls, spins and bangs objects	3	15
51	Will feel, smell and/or taste objects in the environment	6	30
53	Involved in complicated "rituals"	10	50
54	Is very destructive	13	65
	<b><i>Language/Social</i></b>		
4	Does not follow simple commands given once	5	25
8	Has pronoun reversal	2	10
11	Atonal and arrhythmic speech	4	20
15	No response to own name when called out among two others	15	75
18	Seldom uses "yes" or "I"	15	75
20	Not follow simple commands involving prepositions	17	85
29	Gets desired objects by gesturing	9	45
32	Repeats phrases over and over	7	35
37	Cannot point to more than five named objects	9	45

42	0-5 spontaneous words daily to express wants/needs	5	25
46	Repeats sounds or words over and over	14	70
48	Echoes questions or statements made by others	15	75
56	15 - 30 spontaneous phrases daily to communicate	4	20
	<b><i>Self-Help</i></b>		
2	Learns a simple task but “forgets” quickly	12	60
14	Strong reactions to changed routine/environment	10	50
19	Has “special abilities” in one area of development.	3	15
23	Severe temper tantrums and/or frequent minor tantrums	15	75
31	Hurts others by biting, hitting, kicking, etc.	8	40
36	Does not wait for needs to be met	15	75
41	Difficulties with toilet training	18	90
45	Does not dress self without frequent help	15	75
49	Oblivious to dangerous situation	20	100
50	Manipulates/ occupied with inanimate things	16	80
55	Identified developmental delay before 30 months of age	1	5

On the sensory subscale which measures the nonresponsiveness or heightened responsiveness to sensory stimuli, five of nine symptoms were reported present in at least 60% of children with autism. Staring into space for long periods (80%) was the most common symptom followed by a lack of startle response (70%), no blinking to bright lights (70%), covering ears at many sounds (65%) and no visual reaction to ‘new’ person (60%).

On the subscale that measures the relatedness of a child with his environment, 6 of 12 symptoms were reported for at least 60% of participants in the autism group. Most children with autism were found to avoid eye contact with others (95%), look through people (90%), have no social smile (70%), do not imitate other children at play (70%), have not developed any friendships (70%) and do not attend to social and environmental issues (65%). Body/ Object Use measures the presence of stereotyped body movements, preference for routines,

and self-injury. Five of 12 symptoms reported present in at least 60% of the children with autism included the lack of ability to use toys appropriately (75%), insistence on keeping certain objects with him/her (65%), running around the house (60%), self-injurious behaviours (60%) and destroying household objects (65%).

The Language/Social subscale measures the achievements on typical developmental milestones in language and the use of language in socially inappropriate ways. The results reveal that 6 of 13 symptoms were reported present in at least 60% of children. The most common symptoms present amongst children with autism include an inability to follow simple commands involving prepositions (85%), inability to respond to name (75%), minimal use of 'yes' or 'I' (75%); echolalia (75%) and repetitive speech (70%). It was found that even if the children were unable to reproduce exact words, they would be echoing the sounds of questions or statements that they heard.

The Self-Help subscale measures the acquisition of adaptive as well as destructive and aggressive behaviour and 7 of 11 symptoms were reported as present in at least 60% of children. All the children with autism in the present sample seemed unaware of their surroundings and danger (100%). This was closely followed by difficulties in toilet training (90%) and a preference towards inanimate objects (80%). Most children with autism also showed severe tantrums (75%) and had difficulties with waiting (75%).

Results also show a wide spectrum in the abilities of children with autism. All the dimensions of ALLS for children with autism were examined (Table 3). The results show that skill development varied in children with autism. While some of the children with autism were at the beginner's level, others in the same group had more developed skills.

**Table 3. Percentage of children at different skill levels on various dimensions of language and learning skills**

Dimensions	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
CWA	3	15	8	40	8	40	1	5	0	0
Manding	1	5	2	10	8	40	9	45	0	0
Motor Imitation	5	25	6	30	0	0	9	45	0	0

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Vocal Play	0	0	2	10	6	30	11	55	1	5
Echoic	2	10	8	40	4	20	6	30	0	0
Match to Sample	4	20	11	55	4	20	0	0	1	5
Receptive	1	5	4	20	10	50	5	25	0	0
Tacting	1	5	8	40	9	45	2	10	0	0
RFFC	15	75	5	25	0	0	0	0	0	0
Intraverbals	7	35	11	55	2	10	0	0	0	0
Letters/ Numbers	9	45	5	25	5	25	1	5	0	0
Social Interaction	0	0	2	10	17	85	1	5	0	0

Note: CWA = Cooperation with Adult; RFFC = Receptive by function, feature or class; Higher score means better skills

Cooperation with Adult identifies the degree to which a child will work with adults. The results reveal that the children with autism cooperated less with adults and had more disruptive behaviours. Amongst the children with autism, three children (15%) were found to be always uncooperative, avoided work and engaged in negative behaviours, eight children (40%) engaged in disruptive behaviours and gave only a single, easy response for a powerful reinforcer, eight children (40%) were able to give up to five responses without any disruptive behaviour and only one child (5%) worked for five minutes without a disruptive behaviour.

On Manding or the ability of the child to get his/her needs and wants known, the results reveal that while one child (5%) was unable to ask for reinforcers and engaged in negative behaviours; two children (10%) pulled people, pointed or stood by the object of their desire. Eight children (40%) indicated their needs using up to five words, signs or pictures and only nine children (45%) indicated their needs using up to 10 words, signs or pictures.

On Motor Imitation, which determines if the child can physically imitate motor movements modeled by another person, five children (25%) could not imitate any motor movements and six children (30%) were able to imitate only a few gross motor movements. Nine children with autism (45%) were able to imitate several fine and gross movements on request.

Vocal Play measures the amount of the spontaneous random sounds produced by a child. The results show that two children (10%) were found to make few spontaneous speech sounds at a low rate; six children (30%) babbled speech sounds with varied intonations, eleven children (55%) were found to babble frequently with varied intonations and say a few words and only one child (5%) was able to vocalize many words with varied intonations.

Echoic measures the ability to repeat sounds and words. The results reveal that amongst the present sample of children with autism, three children (15%) were unable to repeat any words, 13 children (65%) were able to repeat specific sounds or words, two children (10%) were able to repeat close approximations of many words and the rest (10%) were able to repeat some words and short phrases.

On Matching to Sample, the ability to match pictures, designs and shapes to identical samples, four children (20%) were unable to match any pictures, 11 children (55%) were able to match only 1-2 objects to a sample, four children (20%) were able to match 5-10 colours, shapes or designs to a sample and one child (5%) with autism was able to match most items and 2-4 block designs.

Receptive Skills measure the ability to understand and act upon specific words and phrases. The results reveal that while one child appeared to not understand any word, four children (20%) were able to follow few instructions related to daily routines, ten children (50%) were able to follow many instructions and even touch few items, and five children (25%) were able to follow many instructions and touch at least 25 items.

On Tacting, the ability to verbally identify and name items or objects, it was found that one child with autism (5%) seemed unable to verbally identify any object, item or action, eight children (40%) were able to verbally identify 1-5 objects, nine children (45%) were able to name up to 15 items and two children (10%) were able to verbally identify up to 50 items or actions.

Receptive by function, feature and class (RFFC) is the ability to be able to react to an object when told something about the object or when given a verbal instruction that varies from the specifically trained instruction. The results reveal that 15 children with autism (75%) were unable to identify items based on the information about them and five children (25%) identified a few items when given synonyms of common functions.

Intraverbals measures the child's ability of the rudimentary skills necessary for engaging in conversations. While seven children with autism (35%) were unable to fill in any missing words, 11 children (55%) were able to fill in parts of songs. The remaining two children (10%) were able to answer about 10 questions or complete simple phrases.

The results on Letters and Numbers identification show that nine children with autism (45%) were unable to identify any letters or numbers; five children (25%) identified at least three letters or numbers; five children (25%) could identify at least 15 letters or numbers and one child (5%) could read at least 5 words and identified 5 numbers.

On social interactions, two children (10%) were found to physically approach others to initiate an interaction; 17 children (85%) readily asked adults for reinforcers and only one child (5%) was found to attempt verbal interactions with peers with the help of prompts from adults.

Analysis of individual items on gross motor skills (Table 4) shows that while all children with autism in the present sample were able to successfully complete certain activities, other activities could be performed by only some of the children with autism. Few children were found to be able to walk backwards (25%), and skip (25%). No child with autism was able to walk sideways, gallop, jump from a raised platform or balance on one foot. Some children were able to manipulate an 8-inch ball in different ways. It was found that only nine children (45%) were able to kick a ball to a person 6 feet away but most children were able to throw a ball from chest or over hand (90%); underhand (85%) and were able to catch a ball using their arms and chest (80%) at least half of the times. However, none of the children were able to catch a ball using only their hands or bounce a ball at least three consecutive times. None of the children were able to ride a tricycle or a bicycle while pedaling to move the cycle forward, do jumping jacks, climb a 5 feet ladder using reciprocal motion; walk across a narrow board for 8 feet without falling; or hang from a bar. Only five children (25%) were able to pump their legs while on a swing.

**Table 4. Percentage of children on various items measuring gross motor skill**

Item	Autism (n=20)	
	n	%
Creep on stomach	20	100
Kneel	18	90
Walk forward with appropriate gait	20	100
Walk backwards	5	25
Walk sideways	0	0
Run smoothly	18	90
Squat	18	90
Roll sideways	8	40
Hop on two feet	11	55
Skip	5	25
Gallop	0	0
Jump forward	17	85
Jump down	0	0
Balance on one foot for 3 seconds	0	0
Kick 8-inch ball 6 feet to target	9	45
Throw (chest/overhand) 8-inch ball 4 feet to target	18	90
Throw (underhand) 8-inch ball 4 feet to target	17	85
Catch 8-inch ball from 4 feet using chest with arms	16	80
Catch 8-inch ball from 4 feet with hands only	0	0
Bounce ball at least three times	0	0
Roll ball 6 feet to another person	19	95
Ride tricycle while peddling for 20 feet	0	0

Ride and stop a bicycle	0	0
Jumping jacks	0	0
Climb ladder 5 feet in reciprocal motion	0	0
Walk balance beam for 8 ft without falling	0	0
Pump legs while swinging	5	25
Hang from bar	0	0

Analysis of individual items assessing the fine motor skills (Table 5) reveals that some areas of fine motor difficulties were common for most children with autism. Among the children with autism, 10 children (50%) were able to place an object in a form box. All children with autism were able to put a single-piece inset puzzle piece into frames, but only two of them (10%) were able to manipulate multiple puzzle pieces into a frame. All children with autism were able to stack blocks, but none of them were able to place blocks on design cards without prompts. Another area of chief difficulty for children with autism was manipulating a spring-type clothespin which was successfully performed by only two children with autism (10%). All children with autism were able to remove jar lids, but only two of them (10%) were able to replace the jar lids. Even with a powerful edible reinforcer inside, none of them were able to open Ziploc type bags and only five children (25%) were able to snip a paper with a pair of scissors. None of the children with autism were able to cut across paper with the help of scissors, cut out shapes, paste shapes on outline picture or make a picture according to a sample, use a pincer grip and copy shapes and line patterns. Only four of them (20%) were found to be able to fold paper and squeeze a glue bottle.

**Table 5. Percentage of children on various items measuring fine motor skill**

Item	Autism (n=20)	
	n	%
Place object in form box	10	50
Place pegs on board	19	95

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Put single puzzle piece into frames	20	100
Manipulate multiple puzzle pieces into frames	2	10
Stack blocks	20	100
Place blocks on design cards	0	0
Put rings on pegs	20	100
Transfer objects to opposite hands	14	70
Put spring type clothespin on line	2	10
String beads with 1/8 inch hole	14	70
Remove jar lids	20	100
Replace jar lids	2	10
Remove wrappers to get to food items	19	95
Open 'Ziploc' type bags to get to food items	0	0
Snip paper with scissor	5	25
Use pincer grip to pick small items	0	0
Mark on paper with a crayon	20	100
Color within boundaries	14	70
Roughly copy shapes and line patterns	0	0
Accurately copy shapes, patterns with orientation and size	0	0
Cut on a line across a sheet of paper with scissors	0	0
Cut out shapes with scissors	0	0
Independently paste shapes in outlined picture	0	0
Independently paste shapes to match sample	0	0
Trace a line with finger	19	95
Turns one page of a book at a time	11	55
Imitatively fold paper in half	4	20
Squeeze glue from a bottle	4	20

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As shown in Table 6, analysis of items measuring the writing skills shows that 11 children with autism (55%) were able to mark on paper using the writing grip, 12 children (60%) were able to colour between lines and 18 children (90%) were able to trace only straight lines. Children with autism needed physical prompts to copy straight lines (60%) and curved lines (70%) Most children were unable to copy letters (75%) and numbers (90%) and even the rest were able to make rough approximations of a maximum of five letters or numbers. Only two children with autism (10%) were able to independently write at least five letters without a model but none of them was able to print at least five numbers.

**Table 6. Percentage of children at different skill levels on various items measuring writing skills**

Item	Autism (n=20)									
	0		1		2		3		4	
	n	%	n	%	n	%	n	%	n	%
Make marks on paper	0	0	9	45	11	55				
Color within lined areas	8	40	12	60	0	0				
Trace lines, letters and numbers	1	5	18	90	1	5	0	0	0	0
Copy straight line	5	25	12	60	3	15	0	0	0	0
Copy curved line	6	30	14	70	0	0	0	0	0	0
Copy letters from a sample	15	75	5	25	0	0	0	0	0	0
Copy numbers from a sample	18	90	2	10	0	0	0	0	0	0
Print letter without a model	18	90	2	10	0	0	0	0	0	0
Print number without a model	20	100	0	0	0	0	0	0	0	0

Note: Higher score means better skills

## **DISCUSSION**

The authors studied the clinical presentation of symptoms of autism and the development of language and learning skills in children with autism and compared it with the profile of the typically developing children. The total score on ABC shows that the children with autism

scored significantly higher on all the five symptom areas of autism. Since a global score does not clarify the areas of individual difficulties, all the items have been analysed individually to see the variation in autistic symptoms and skill development of children on the autistic spectrum.

Children with autism had significant difficulties in responding to the sensory stimuli in the environment and multisensory processing appear to be affected among children with autism. This is consistent with other studies which suggest that sensory processing dysfunction in autism is global in nature and sensory processing problems need to be considered part of the disorder (12) and they hinder their daily functioning (13). Leekam et al. (14) also found that only 6% of children with autism in their study were not affected by a sensory symptom and found differences across multiple sensory domains in the frequency and patterns of abnormalities. Children with autism may have hyper (over), hypo (under) or a combination of hypo or hyper arousal sensitivities to sensory stimuli and the same can be seen in the present sample. While most of the children with autism showed no startle response, many of the same children also covered their ears at other sounds.

Results show children with autism have impairment in relating with others indicating a failure to engage with or react to other people. This is consistent with some of the previous findings which indicate that some of the earliest symptoms observed in young children with autism include a lack of orientation to social situations (15). Individuals with autism have none or few friends, and deficits in relating maybe one of the reasons (16).

Children with autism showed significant impairment in body/object use. This is seen in stereotyped body movements and a preference for routines. Deficits in imaginative activities, an important criteria characterising autism is most obvious in a child's play behaviours (1). Most children with autism in the present sample were observed to engage in less elaborate functional play, fewer imaginative activities and showed an impairment in symbolic play, creativity and imagination. They were found to follow some complicated rituals and exhibited self-stimulatory behaviours. Though significantly less, similar behaviour was present in some controls as well. Honey et al. (17) suggest that although repetitive behaviours are characteristic of autistic spectrum disorders, they are also seen in typically developing young children, although their parents may not notice the behaviours. Some repetitive behaviours such as motor mannerisms and stereotyped behaviours can be observed directly; but rituals and routines are more difficult to observe and are often seen at bedtime and mealtimes. As they

are identifying features of autism, parents of children diagnosed with autism are likely to be aware of the repetitive behaviours and activities of their child.

Social interaction is an important deficit especially in children with autism and needs to be a part of the training programme. Children with autism in the present sample have significantly impaired ability to sustain social interactions. In a yet unpublished study, T. Daley found that many Indian families recognise / notice social difficulties in their children first. Indians largely emphasise conformity to social norms and value social relatedness and the mothers being indulgent and protective may be more sensitive to the unusual aloofness of their child and might recognise social symptoms earlier (18). Given that much of social behaviour involves language, it is an important component of an assessment. The results here are consistent with many other similar studies (e.g. 1; 19). Most children with autism in the present sample were found to be able to physically approach others to initiate an interaction, but had an impaired ability to initiate and sustain verbal interactions.

Children with autism failed to achieve typical developmental milestones in language and showed use of language in socially inappropriate ways. The difficulties noted among children with autism in the present sample varied from failure to develop language at all, to a range of language abnormalities. In children with autism, grasping does not spontaneously pass into pointing, and if pointing develops, it is usually pointing to get (protoimperative), rather than the social goal of sharing (protodeclarative) experiences (20). The same was seen true for the present sample of children with autism. The findings indicate that while some children were able to point to objects upon request, the spontaneous interactions initiated by children themselves were purely need-based. While most of the children with autism in the present sample made little use of spoken language, amongst the few children, who did speak, repetitive and stereotypical speech was prominent. Pronoun reversal was also seen amongst the children with adequate speech.

**Vocal plays an important** role in language development because such behaviours not only strengthen the vocal chords, but allows for the random mixture of sounds that often accidentally produces words that parents may react to or reinforce. The existence of substantial vocal play for a nonverbal child can be a good predictor for the easy development of vocal imitation. Children with autism in the present sample showed significant delay on vocal play and a significant majority of them were found to make only few spontaneous speech sounds at a

low rate. This is consistent with other studies which show that approximately 50% of the individuals with autism do not develop sufficient speech to meet their daily communication needs (21).

The present sample of children with autism showed a lower capability of manding. In autism, protosymbolic behaviours take longer to develop, or they may disappear having once emerged. Children with autism often use primitive presymbolic gestures, such as taking someone's hand (13). Establishing a repertoire of mands that are not directly trained is important, because children with autism frequently lack the behavioral flexibility demonstrated in normally developing children (22). For example, while many children with autism in the present sample were able to correctly tact in response to the question "What is this?" they were unable to mand for the same item. Ability to be able to express their needs is also likely to reduce inappropriate behaviors.

Children with autism showed significant impairment in the receptive language, which is the ability to understand and act upon specific words and phrases and is a key indicator of a child's ability to acquire other types of language. Deficits in comprehension strongly differentiate autism from non-autism (23). In children with autism who have functional speech, understanding is frequently more limited than what would be expected on the basis of the expressive vocabulary (21). Schuler et al. (24), suggest that the extent to which people with autism understand speech is usually overestimated. They postulate that language is often only understood in highly familiar contexts and the individual may not really respond to the speech, but to the routine or to other cues such as the location in space.

Children with autism also show lower ability to tact. Tacting involves the child doing the talking rather than the adult and is a more difficult skill because the child must not only come up with the correct word, but also have the vocal control to independently pronounce the word. Vogindroukas et al. (25) found a trend for children with autism to name one part of the picture they were shown. For example, children with autism named a detail from the picture, ignoring the rest of it, which indicated their focused visual attention to detail, whilst missing the whole picture. Thus, they might give the name of 'cable' to the antenna or of 'hazel-nut' to the snail. The analogues of children with autism were found to be based upon the shape of the object and some details. Building a large repertoire of tacts also lays the foundation for building on the intraverbal skills of an individual.

Intraverbals are very important for social interactions as well as for acquisition of academic skills and determine if the child has some of the rudimentary skills necessary for engaging in conversations. Children with autism in the present sample showed significantly impaired intraverbal skills. An important aspect of this skill is that the child has to respond to the spoken words and not to the objects in view. Most children with autism in the present sample were only at the level of filling in missing words of popular rhymes or providing sounds of animals like a dog and a cat. This seems to be a reflection more of their rote memory and reinforcing items than their conversational skills. Part of the difficulty in utilising language appropriately in social interactions may be due to difficulties in taking the perspectives of others. A significant number of children have problems understanding and processing interpersonal cues and planning appropriate responses to these cues (26).

The present sample of children with autism showed significant impairment in the ability to receptively identify items by function, feature and class. RFFC is the ability to be able to react to an object when told something about the object or when given a verbal instruction that varies from the specifically trained instruction. (e. g. touch the thing that daddy drives). Children with autism also show significant impairment in the ability to match objects, pictures and designs to sample, indicating difficulties in creating categories of concepts and understanding the link among objects. A child who is successful at these tasks is often able to attend to visual stimuli, discriminate between differing stimuli and emit specific motor behaviours to complete a task. According to Quill (27), children with autism do not develop the stage of over-generalisation during the process of the acquisition of a concept. This stage is characterised by over-extension of the concepts they are aware of, which helps them to categorise meanings, through the finding of the common characteristics and their similar functions. The absence of an over-generalisation stage in children with autism results in the absence of an established relevance between objects and the category to which these objects belong. As a result, they do not use an object in order to give a name to the whole category, a fact that excludes them from the possibility of using under-extension as a vocabulary error. Nonverbal conceptual weaknesses in autism have been demonstrated in abstract reasoning, and concept formation abilities (27; 28). Bernstein and Tiegerman (29) suggest disabilities in creating categories of concepts and understanding the link among objects among children with autism. They also suggest that children with autism use different strategies of recalling

meanings and tend to define the meaning they do not know, by giving the definition of a relevant object (e.g. pin instead of nail), or a definition out of the same semantic category (e.g. bird instead of chicken).

Children with autism have significantly less knowledge of letters and numbers. It was observed that most children with autism in the present sample were familiar with brand logos of common favourite eatables like chocolates and chips. Though there was a variation in their knowledge of letters and numbers, most children with autism had limited knowledge of the same. Previous studies of academic achievement in individuals with autism (30) show low-average to average mean academic achievement test scores in reading, math, and spelling.

Children with autism showed significantly impaired gross motor, fine motor and writing skills. Studies that have examined prevalence of motor deficits in children on the spectrum have suggested that motor impairments are found in at least 80% or possibly in all children diagnosed with this disorder (31). Motor impairments can lead to great difficulties for individuals with autism in negotiating their physical environment, fine motor control (i.e. writing, tying shoes), and social play (i.e. riding a bike, throwing a ball, and participating in team sports). It has been suggested that children with autism have less practiced motor skills because of less social interaction. For instance, poor ball-throwing skills are possibly because of reduced reciprocal play (32).

The present sample of children with autism showed significant impairment on motor and vocal imitations. While excessive and stereotyped pattern of vocal expressions including echolalia often exists in children with autism, individuals with autism may have a global impairment in novel motor imitation but not familiar imitation (10). Another consistent finding is that this pattern of performance stands in contrast to that of typically-developing children who can copy a broad range of novel and familiar actions from a very early age (33). It is proposed that children with autism have greater difficulty in imitating actions without objects than with objects (10) which may hinder learning conventional gestures, and objects may provide a scaffold for learning conventional actions in play (34).

Children with autism showed less acquisition of adaptive self-help skills and more destructive and aggressive behaviours. Learning self-help skill such as eating, dressing, toileting, and personal hygiene that are essential for independence can be challenging for people with

autism. The authors' findings are different from some of the other studies that found no significant differences between the autistic and non-autistic children on their self help skills (19). One of the reasons for the inconsistency could be the severity of autism amongst the children in the present sample and the fact that the children were not receiving any autism specific training.

Cooperation with Adult identifies the degree to which a child will cooperate with adults and provides information such as the potential need to include behavioural management procedures in the language training programme. Children with autism showed lower ability to cooperate with adults and needed intervention using behavioural management procedures. Barrett et al. (35), demonstrate that as compared to children with a learning disorder, children with autism responded less to compliance of requests. This seems particularly true in the case of the present sample given the young age of the children and lack of adequate teaching techniques.

## **CONCLUSION**

Children with autism show significant deficits in social functioning, language/communication skills, self-help skills, and sensory areas. The manifestation of these symptoms varies with each child. The use of receptive and expressive language; imitation skills; motor skills and knowledge of letters and numbers was found to be significantly below that of the typically developing children. Further, children with autism need training to comply with instructions given by an adult. The results are uniform in showing that children with autism follow individual patterns of skill development and have their individual areas of relative strengths and weaknesses.

These findings have implications for assessment and evaluation practices as well as designing intervention programmes for children with autism and their parents. Taking into account the age of children; the limited knowledge of autism and teaching techniques amongst the parents; and the dimensions of the tools used in the present study, the findings have significant implications towards designing an early intervention programme for newly diagnosed children. Since all children with autism show different sets of symptoms and skills, a detailed analysis provides child-specific information which is helpful in educating parents and professionals on the specific nature of the difficulties of their child. The mode of service delivery has moved away from being child-centered, provider-based, and expert driven towards family centered

and encouraging active participation of parents of children with autism themselves. Parents and professionals both realise the importance of a collaborative approach with a formal focus on family context (36). It is crucial therefore to perform detailed assessments and break them into easily observable and measurable tasks. The parents and professionals can then mutually decide the goals for a child and monitor the developmental and behavioural progress of a child through evaluation of target achievements in IEP.

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