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## Performance of Verbal Autistic Children Relating to Semantic Intentions and Relations

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### Introduction

Communication is the process by which individuals exchange information and convey ideas (Owens, 1990). This communication is any verbal, non-verbal, or physical way of transmitting information (Gillette, 2009). All creatures do communicate but the code that is most used by human beings to convey this information is called language.

According to Verma & Krishnaswamy (1992) language is an arbitrary system of articulated sounds made use of by human beings for communication and expression. Language has sounds, words, sentences and meaning. Bloom and Lahey (1978) have stated

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that language is the code whereby ideas about the world are represented through a conventional system of arbitrary signals for communication. They have mentioned the 3 elements of language as being: form, content and use (Stephenson, 2006).

## **Communication Disorder**

A communication disorder can be a speech and language disorder which refers to problems in communication and in related areas such as oral motor function. The delays and disorders can range from simple sound substitution to the inability to understand or use one's native language.

## **Autism in Children**

A major cause of communication disorders is the condition of autism in children. The term autism typically conjures up images of children who are withdrawn into their own egocentric worlds, children who appear to have rejected reality in favour of a fantasy place that other people cannot reach, children who engage in a wide range of abnormal and socially unacceptable behaviours, children whose language is severely impaired (Hulit & Howard, 2006).

## **DSM V Criteria**

Recently, the DSM V has been published and the diagnostic criteria for autism received a few changes made to it. As per the DSM V criteria for autism spectrum disorder

A. Persistent deficits in social communication and social interaction across contexts, not accounted for by general developmental delays, and manifest by all 3 of the following:

1. Deficits in social- emotional reciprocity; ranging from abnormal social approach and failure of normal back and forth conversation through reduced sharing of interests, emotions, and affect and response to total lack of initiation of social interaction.

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2. Deficits in nonverbal communicative behaviours used for social interaction; ranging from poorly integrated-verbal and nonverbal communication, through abnormalities in eye contact and body-language, or deficits in understanding and use of nonverbal communication, to total lack of facial expression or gestures.

3. Deficits in developing and maintaining relationships, appropriate to developmental level (beyond those with caregivers); ranging from difficulties adjusting behaviour to suit different social contexts through difficulties in sharing imaginative play and in making friends to an apparent absence of interest in people.

B. Restricted, repetitive patterns of behaviour, interests, or activities as manifested by at least two of the following:

1. Stereotyped or repetitive speech, motor movements, or use of objects (such as simple motor stereotypies, echolalia, repetitive use of objects, or idiosyncratic phrases).

2. Excessive adherence to routines, ritualized patterns of verbal or nonverbal behaviour, or excessive resistance to change; (such as motoric rituals, insistence on same route or food, repetitive questioning or extreme distress at small changes).

3. Highly restricted, fixated interests that are abnormal in intensity or focus (such as strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).

4. Hyper-or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment (such as apparent indifference to pain/heat/cold, adverse response to specific sounds or textures, excessive smelling or touching of objects, fascination with lights or spinning objects); APA 2011

C. Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities)

D. Symptoms together limit and impair everyday functioning.

(Aspiewriter, 2012); (Granpeesheh, 2013)

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In the past 30 years the prevalence of autism in India and the world has increased drastically. This is due to the increasing awareness of autism spectrum disorders and a lot of research work conducted on behaviours related to autism. However, very few studies have taken into consideration the language aspects as a cohesive unit and the differences seen in the language aspects of autism. Some recent research on autism and language are briefly considered below.

### **Recent Research on Autism**

Kamio, Robins, Kelley, Swainson, and Fein (2007) examined whether the automatic lexical/semantic aspect of language was impaired or intact in high-functioning pervasive developmental disorders (HFPDD). Eleven individuals with Asperger Disorder (AS) or HFPDD – Not Otherwise Specified (NOS) with age, IQ and gender matched typically developing (TD) children performed a semantic decision task in four conditions using an indirect priming paradigm. The results showed that semantic priming effects were found for near-semantically related word pairs in the typically developing group and was not found in the AS or HFPDDNOS group.

Whyte, Nelson and Scherf (2013) in their comparative study examined children with ASD and compared them with typically developing children based on idiom, syntax and advanced theory of mind (TOM) abilities. The study showed that the children with ASD performed worse on idiom comprehension compared to the age matched group of typically developing children and they also exhibited comparable idiom performance to the syntax-matched group with typically developing group. The advanced TOM abilities were related to idiom comprehension for children with ASD but not for the group of typically developing children, above the contributions of basic language abilities.

### **Semantic Problems**

Semantic problems have been noted in children with autism at the earliest stages of language acquisition. There are conflicting views regarding the nature of the semantic deficits

demonstrated by children with autism. Studies of Tager-Flusberg, 1985 and Ungerer & Sigman, 1987 suggest that these deficits are not unique in nature.

An atypical lexical organization in children with autism is bound to inhibit access to more prototypical exemplars.

Recent research has shown that the children with autism demonstrate unique deficits in semantic development and lexical processing. However, behavioural and electrophysiological research is essential to the specific aspects of the deficits.

Henderson, Clarke, and Snowling (2011) studied individuals with autism spectrum disorder (ASD) on their ability to access and select word meaning. The study tested four hypotheses regarding the nature of their comprehension difficulties: semantic deficit, weak central coherence, reduced top-down control and inhibition deficit. The results showed that children with ASD showed intact access to semantic information early in the time course of processing but they showed impairments in the selection of semantic representations later in processing.

Anjana (1999) compared pragmatic abilities of children with autism spectrum disorders (ASD's) with typically developing children matched for age range between 3-6 years. The results indicated that children with ASD used language predominantly for non-social or quasi social purpose in comparison to typically developing children who had utilized language for a social purpose. The children with ASD also exhibited higher turn-taking behaviours during the parent-child interaction when compared to clinician-child interactions. They had used more of off topic utterances, and the linguistic content of the repair attempts were found to be at a much lower level than typically developing children.

Shilpashri (2010) observed pragmatic skills in children with autism spectrum disorders. The study included 14 pragmatic skills that were initiated by the caregiver. Among the 14 skills the response for labelling was mastered only in a few children with ASD. It also showed that the percentage of response from the children with ASD to a caregiver's initiation of pragmatic skills and on self-initiation was not linear or constant for all the pragmatic skills with respect to age, as compared to the performance of typically developing children.

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Jahan (2010) studied the grammatical aspects in Malayalam speaking children with ASDs across different age groups in comparison with typically developing children. Speech samples of 30 Malayalam speaking subjects (of both typically developing children and children with ASD) in the age range of 4-7 years were analysed grammatically. Children with ASD had poor scores in the Malayalam language test (MLT) compared to typically developing children in all the age groups for both expression and comprehension.

Sen (2011) observed the similarities and differences in linguistic characteristics between bilingual children with autism. In this study, 15 children in the age range of 4-10 years with a diagnosis of mild to moderate autism as reported by the Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner, 1986) and along with the diagnostic statistical manual of mental disorders - 4<sup>th</sup> edition (APA, 2000) were taken. The study concluded that bilingualism did not affect the language skills of children with autism.

Following international trend in research, in India too, the research attempts to establish diagnostic criteria (e.g. adaptation of CARS in different Indian languages) and management practices (e.g. COMM DEALL-Karanth, 2001) have taken place. However, the accessibility of such data to practicing SLPs remains a problem. Sporadic attempts to describe echolalic behaviour and the theory of mind have also taken place. The focus of research is usually nonverbal aspects of autism. A severe dearth of studies on verbal aspects of autism is observed.

### **Verbal Language and Autism**

The interest in the verbal language of autism can be clearly considered a trend in international research. In Indian contexts too, noteworthy efforts to study syntax and pragmatics can be seen. However, many questions on phonology, syntax, semantics and pragmatics in subjects with autism need to be answered with in depth data. The present study attempts to fill this gap.

### **Focus of the Present Study**

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The present study attempts to report on the semantic aspects namely intentions and relations in a group of verbal autistic children.

Following are the aims of the study.

## **AIMS**

The study aimed at obtaining language data in autistic children with the objectives of

1. Describing the semantic intentions and relations in a group 4-5 year old typically developing children.
2. Describing the semantic intentions and relations in a group of 4-5 year old mental age children with autism.
3. Comparison of the performance of the above two groups.

## **METHOD USED**

In the present study all the subjects were engaged in play/ interactive contexts with the researcher. The 20-30 minutes of interaction was videotaped and later transcribed. The transcription method closely followed the methodology adopted by (Subbarao, 1995), which itself followed guidelines provided by the Language Assessment Remediation and Screening Procedure (LARSP), (Crystal et al, 1976, 1989). The transcribed sample was subjected to analysis for scans in the areas of semantics- semantic intentions and relations.

## **Subjects**

The subjects taken for the study were 10 normal subjects referred to as the reference group and 30 subjects with verbal autism referred to as the clinical group.

Thirty children diagnosed as having autism from in and around Mangalore and Bangalore, were taken in the clinical group. These children were observed to have been diagnosed with verbal autism based on the tests conducted by speech language pathologists and were confirmed from school records. Psychological assessment conducted by a school psychologist indicated the mental age as between 4 and 5 years of age for all subjects.

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Moreover the children with mental age range of 4-5 years are frequently found in special schools and programmes for autistic children. All subjects selected for the study expressed at least occasionally in phrases and simple sentences according to records. The age range was 8 to 14 years. For the present study all the subjects had an expression of a minimum of phrase level and were considered as verbal autistic.

Ten typically developing (normal) school going children in the age range of 4-5 years were selected. The subjects were attending Kannada medium schools in and around Mangalore and Bangalore cities. They had no associated handicaps and illnesses and had Kannada as their major tongue of communication. It was noted that code mixing and switching of English words were seen occasionally. All 10 subjects belonged to middle socio-economic status, living in semi urban and urban areas. They were 5 male and 5 female subjects. The mean age was 4.5 years.

### **Data Collection and Analysis**

The data was collected by using toys and pictures. Sample collection was done based on the study done by (Subbarao, 1995). The children were observed during play sessions with the caregiver/clinician. The duration of each session was about 20-30 minutes. During data collection, care was taken to ensure that the children were comfortable in their surroundings, be it with the caregiver or the clinician. This was done so that appropriate elicitation of responses could take place. The initial 15 minutes comprised of spontaneous speech or free conversation. In the next 15 minutes elicited responses were obtained.

The subjects were all given the same activity materials. The session was video recorded using a standard Sony video camera. The environment in which the recording took place was to a great extent quiet but the collection and recording were conducted in the institutions that specialised in dealing with children who had speech and language disorders. The sample thus obtained was further analysed and a detailed transcription of the conversation was done. This was subjected to semantic analysis.

### **Semantic Intentions**

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Meaning intentions in one word responses were analysed. The intentions selected were 13 ranging from nomination to attribution. The selection of presence or absence of response was based on the context in which the subjects responded. The context was determined by the preceding and following therapist's (T's) sentences and notes on the recording situation.

As noted earlier the intentions were selected from discussions by Coupe, Barton and Walker (1988) and Carrow-Woolfolk and Lynch (1982). A brief description of each intention with examples is provided below.

**Existence:** Children expressed the presence of an object by naming it in response to a question stimuli. E.g.

T. /idu e:nu?/                      'What is this?'  
P. /bassu/                              'Bus'

**Non-existence:** Expressing that an object or a person is not present, when queried. E.g.

T. (while pointing to a picture of a person walking)  
/ivn sku:terelli/                      'Where is his scooter?'  
P. /illa/                                  'Not present'

**Recurrence:** Child wants the object back. E.g.

T. (keeps the toy away.)  
P. /inna: be:ku/                      'I need (it) still.'

**Negation:** Child negates the statement of others. Eg.

T. /ninge hasivu a:gutte/              'You feel hungry.'  
P. /a:gtilla/                              'no'

**Location:** Indication of place of action or object, in response to stimuli. E.g.

T. /ni:nu ellidde?/                      'Where were you?'  
P. /mane:li/                              'At home.'

**Notice:** Child indicates the sudden appearance of an object, by naming it or commenting on it. E.g.

P. (notices that a boy has appeared at the door.) /frendu/ 'friend'

**Cessation:** Child indicates stoppage of an activity. E.g.

P. (recites a few lines of a rhyme and says) /aste/ 'That's all.'

**Possession:** Child indicates the relationship between an object or a person with the action or another object. E.g.

T. /i: sartu ya:rdu?/ 'Whose shirt is this?'

P. /nandu/ 'mine'

**Question:** Child asks for some information from others or wants clarification of an issue. E.g.

T. (is naming certain toys.)

P. (intruding) /e:nu?/ 'What is it (again)?'

**Action:** Child informs about the action in a context. E.g.

T. (is building a toy house) /na:n e:n ma:dde?/ 'What did I do?'

P. /kattiddu/ 'built'

**Attribution:** Child indicates some characteristic of an object, person or action. E.g.

T. /i: mane he:gide?/ 'How is this house?'

P. /cikkadu/ 'Small one'

**Object:** Here in an action, the affected or the object is named. E.g.

T. /illi enide he:lu/ (While pointing to a picture of a boy kicking a ball) 'What is happening here?'

P. /ba:lu/ 'ball'

**Agent:** Here the person/object doing the action is named. E.g.

T. (while pointing to the toy house built by the child)

/iduy a:ru kattiddu?/ 'Who built this one?'

P. /na:nu/ 'I'

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### ***Action + Locative***

/u:rali ma:diddu/	‘done in town’
/bassalli kalkonde/	‘(I) lost in the bus’

### ***Entity + Locative***

/Kaialli ga:ya/	‘wound in the hand’
/na:yi mane:li/	‘dog at house’

### ***Possessor + Possession***

/nanna pustaka/	‘my book’
/amman si:re/	‘mother’s saree’

### ***Attribute + Entity:***

/bili: batte/	‘white cloth’
/dodda mara/	‘big tree’

A proforma indicating the structures was used to mark the results of analysis for each subject. The proportional percentage measures considered for analysis were also recorded. The data obtained is described in the following section.

Data obtained from each subject in an individual capacity allows us to understand the performance. The type of response with semantic analysis enables us to obtain a baseline of language skills in verbal autistic children.

This also helps us to plan an intervention programme on an individual basis or a client oriented plan, since every child displays varied responses.

## **RESULTS**

Children with autism are a new significant group of children who present varied communication deficits. It is only recently that research attention is focused on autism particularly verbal autism in the Indian context.

The study of several areas of language pathology – syntax, semantics and pragmatics has generally supported a delay in developmental hypothesis. However, reports of differences

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between mental age matched normal and handicapped groups are reported. In fact such deviances either tend to get extra attention (e.g.: pronominal reversal) or very little attention is paid (e.g.: poor presence of PNG markers). The results of the present study support these views. Although there is an overall limitation in the communication attempt in conversational tasks there is a difference among the mental age matched normal and verbal autistic children.

As described in the previous section all the normal and verbal autistic subjects were engaged in interaction during play to obtain a natural conversational language sample. The transcription of these samples has been subjected to a detailed analysis, both qualitative and quantitative analysis across phonological, syntactic, semantic and pragmatic components. The analysis is based on overall guidelines of Subbarao (1995) which were developed under the guidelines of LARSP as described by Crystal et.al, (1976 and 1989).

## **SEMANTIC INTENTIONS**

Table 1, indicates the number of subjects showing evidence of various meaning intentions in normal subjects. The reference group subjects showed the presence of all types of semantic intentions. Recurrence (request for repetition) and cessation (request to stop) were the least used intentions (70% and 80% respectively). Otherwise, children used their sentences to name, to indicate non-existence, location, possession, to question, identify action, object, agent and attributes of the objects or actions. The results indicate that by 4-5 years, children are able to make a variety of meaning intentions known.

Similar observations are supported by other studies. Vaidyanathan (1988), while studying language acquisition within a pragmatic framework, noted that interrogatives serve multiple communicative functions like request, identification, verbalization, labelling, description, testing knowledge, etc. This was supported by Uma (1993), who evaluated language behaviour of normal children and hearing impaired children. The present data is also supported by Subbarao (1995) who studied normal subjects and mental retarded subjects. Verbal autistic subjects exhibit intentions of existence, possession, location, action, object and agent in their samples. Negation, non-existence, notice, question and attribution are found in 60% or more subjects.

It can be observed that on the tasks of expressing intentions of existence, negation, location, possession, action, object and agent, both normal subjects and autistic subjects show similar percentage of response. These intentions appear to be most commonly used intentions by all the subjects (more than 80%). Recurrence and cessation intentions appear to be the most difficult. Less number of the reference group subjects and none of the verbal autistic subjects exhibit them.

Sl. No	Parameters	Reference group N=10 (4-5yrs)		Verbal autistic group N=30 (MA 4-5yrs)	
			% age		% age
1	EXISTENCE	10	100%	30	100.00%
2	NON EXISTENCE	10	100%	19	63.00%
3	RECURRENCE	7	70%	0	0.00%
4	NEGATION,REJECTION	10	100%	28	93.33%
5	LOCATION	10	100%	30	100.00%
6	NOTICE	10	100%	20	66.66%
7	CESSATION	8	80%	0	0.00%
8	POSSESSION	10	100%	30	100.00%
9	QUESTION	9	90%	18	60.00%
10	ACTION	10	100%	30	100.00%
11	ATTRIBUTION	10	100%	21	70.00%
12	OBJECT	9	90%	30	100.00%
13	AGENT	9	90%	30	100.00%

**TABLE 1: SHOWING THE PRESENCE OF SEMANTIC INTENTIONS IN REFERENCE GROUP AND VERBAL AUTISTIC SUBJECTS (CLINICAL GROUP)**

Some of the examples from the samples of the verbal autistic subjects are

*Existence*            T. /nim tande hesru e:nu?/    (what is your father's name)  
                                  P. /aruna:calam/

<b>Non-existence</b>	P. /fo:n illavalla: illi/	(There is no phone here)
	P. /na:nge friendse: illa/	(I don't have friends)
<b>Negation/denial</b>	T. /cakra ilde: idre e:n a:gatte?/	(What happens if wheels are not present)
	P. /o:dalla ga:di/	(vehicle won't move)
<b>Location</b>	T. /elide nimmane/	(where is your house?)
	P. /du:ra/	(faraway)
<b>Notice</b>	P. (looks at a new toy) /idu:/	(this one....)
<b>Possession</b>	T. (Pointing to the toy built by P)	
	/ya:r mane: anbo:didanna?/	(Whose house shall we say?)
	P. /nammane: cennagida: ?/	(ours, is it nice)
<b>Question</b>	P. /ya:ru: illva idarolga:de?/	(is nobody present inside?)
		While looking at the toy house.
<b>Action</b>	T. /draivar e:n ma:dta:ne?/	(what does driver do?)
	P. /o:dsta:ne/	(drives)
<b>Attribution</b>	T. /ya:v kalar ji:pu?/	(which colour is the jeep?)
	P. /blu: kalar/	(blue colour)
<b>Object</b>	T. /e:n tinde ivattu?/	(what did you eat today?)
	P. /breddu/	(bread)
<b>Agent</b>	T. /dina: ni:ne: ba:ckotiya: ?/	(Do you yourself comb daily?)
	P. /nammamma/	(mother)

Results on the whole indicate that, barring requests for repeated action and stopping of an action, verbal autistic and reference group subjects perform equally. Easiest intentions

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for both the groups are naming, negation, indicating the place, indicating possession and expressing actions.

## SEMANTIC RELATIONS

All subjects in the reference group showed the presence of all semantic relations at 2-word phrase level, as shown in Table 2. The sole exception is the reduced presence of recurrence. This corresponds with the results on semantic intentions, wherein also recurrence was used by very few subjects.

The responses of verbal autistic subjects on expression of semantic relations showed 80% or more responses, to expression of existence, agent + action, possessor + possession, action + object types. Expression of non-existence, entity + location, attribute + entity, were used by less number of subjects. Recurrence and action + location were least used.

Generally speaking, the verbal autistic subjects have performed poorly than the reference group subjects, but the difference is not significant in many semantic relations, except in recurrence, non-existence and entity+location. Only about 50% verbal autistic subjects used the structures relating to these aspects.

Sl. No	Parameters	Reference group N=10 (4-5 yrs)		Verbal autistic group N=30 (MA 4-5yrs)	
			% age		% age
1	EXISTENCE (X+N)	10	100%	28	93.33%
2	RECURRENCE (MORE+X)	8	80%	0	0.00%
3	NON EXISTENCE	10	100%	15	50.00%
4	AGENT+ ACTION	10	100%	29	96.66%
5	ACTION +OBJECT	10	100%	26	86.66%
6	AGENT +OBJECT	10	100%	25	83.33%
7	ACTION + LOCATION	10	100%	10	33.33%
8	ENTITY +LOCATIVE	10	100%	18	60.00%



9	POSSESSOR +POSSESSION	10	100%	27	90.00%
10	ATTRIBUTE +ENTITY	10	100%	23	76.66%

**TABLE 2: SHOWING THE PRESENCE OF SEMANTIC RELATIONS IN REFERENCE GROUP AND VERBAL AUTISTIC SUBJECTS (CLINICAL GROUP)**

Some semantic relations typically used by the verbal autistic subjects are given below.

<i>Existence</i>	/idu ba:co:du/ /baccala mane idu/	(this is for combing) (this is bathroom)
<i>Agent + Action</i>	/Po:li:s barta:re/	(police will come)
<i>Non Existence</i>	/ya:ru ho:gilla/	(no one has gone)
<i>Action + Object</i>	/cakra o: datte/ /ni:ru hidkolla:ke/	(wheel runs) (water(for) fetching)
<i>Agent + Object</i>	/i:y amma ka:ru/ /ivanu saikal/	(this lady (is driving) car) (he bicycle riding))
<i>Action + Locative</i>	/tale ba:ckollodu/ /u:ta ille/	(combing (hair)) (meals here only)
<i>Attribute + Entity</i>	/cikka ple:tu/ /dodda tatte/	(small plate) (big plate)
<i>Possessor + Possession</i>	/namm anna mane/ /nam sku:lu/	(our brother house) (our school)

The phrases expressing intentions appear to be similar to reference group subjects.

The nominal and action words are generally not inflected and used in their root form. For

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example: /namm anna sku:lu/ (my brother school) instead of /nammannan sku:lu/ (my brother's school).

The decreased presence of recurrence and cessation at both word level and phrase level does reflect the nature of sampling the language data in the present study, in which children mainly responded rather than initiate communication. This could also reflect cultural values of our society, where questioning elders and telling them to do something (like stopping an activity) are not encouraged. The present study supports the view that meaning intentions both at word and phrase level are present in the conversational samples of 4-5 year mental aged verbal autistic children. The challenge for SLP's is to provide aspects of morphology and syntax, to use the semantic aspects and also to expand the nature of social communication of pragmatic skills.

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