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Theory of Mind Ability in Bengali Children with Autism

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Abstract: Theory of mind refers to an understanding of mental states such as belief, desire, and knowledge that enables us to explain and predict others' behaviour. One of the primary diagnostic criteria for the autism spectrum disorders (ASD) is the presence of a theory of mind deficiency. In the light of the above theoretical background this research investigates whether Bengali children with autism can express theory of mind in describing short narratives. Primary data were collected from two experiments where the participants answers to the questions of false belief test (FBT) and completed task of identifying some emotional pictures based on Emotional Picture Cues (EPC). The result states that high-functioning autistic (HFA) children performed relatively well in both false belief test (FBT) and emotional picture cues (EPC) task in comparison with low functioning autistic children (LFA). Furthermore, as per as task is concerned both with HFA and LFA demonstrated more impairments in false belief test (FBT) than emotional picture cues (EPC). The result is consistent with some previous research experiments conducted on the issue of identical topics.

1. Introduction

Autism is a collection of neuro-developmental disorders that affects a person's everyday behaviours, ability to communicate with others and appropriately respond to the external world (Quinn, 2006). Characteristically, the severity of these impairments varies from individual to individual (Hill & Frith, 2003). Wing (1988) speaks of the *autistic spectrum*, also called the *a-spectrum*, within which there are various autistic spectrum disorders (ASDs). In this spectrum the behaviours go from strong to weak in the fields of social interaction,

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social communication in verbal and non-verbal behaviour, imaginary ability, repetitive characteristics of activities, language, response to sensory stimuli, and specific skills (Wing, 1997). Wing (1981) finds three characteristic areas for autism, called the triad. These are problems in the fields of social contact, communication and imagination.

Although over half of the autistic population is affected by some sort of language impairments, in many cases these impairments involve all aspects of language problem like phonological and phonetic, morphological, lexical, syntactic and pragmatic (Baron-Cohen, 1995; Tager-Flusberg, 1992). The Mind-blindness theory, a deficit of the cognitive function of metalizing capacity is also found in autism.

2. Theory of Mind

Theory of mind, sometimes referred to as ToM, is the ability to represent one's own or mental states others such as intentions, beliefs, wants, desires, and knowledge. While for some thought processes, metalizing is used for introspection, it is mainly used to socialize with others (Brothers, 1997). A theory of mind is essential for successful communication or an appreciation of others' thoughts, feelings, knowledge, and wishes (Premack and Woodruff, 1978). Lack of theory of mind, on the other hand, refers to the difficulties not only to express his/her feelings, thoughts, wants, desires but also to get understand the feelings of others.

Table 1. Approximate developmental timeline of some aspects of theory of mind, with illustrative references (Miller, 2006:3)

Age	Aspects of theory of mind
6–12 months	• Joint attention, including gaze and point following, and alternation of gaze between person and object (Bruinsma et al., 2004; Carpenter et al., 1998) • First words (Tomasello, 1995)
13–24 months	• Recognize intentionality in others as demonstrated in word use (Tomasello, 1995) • Recognize that others have desires different from one's own (Repacholi & Gopnik, 1997) • Early pretend play (Leslie, 1987)

Age	Aspects of theory of mind
30–36 months	• Begin to use mental state terms with truly mentalistic functions (Bartsch & Wellman, 1995) • Increasingly sophisticated pretend play (Youngblade & Dunn, 1995)
37–48 months	• Increasing ability to understand how things look from another's perspective (Flavell et al., 1981) • Begin to understand sentence complements (de Villiers & Pyers, 2002)
49–60 months	• Consistently pass false belief and appearance-reality tasks (Wellman et al., 2001)

The foundation of theory of mind ability in children is usually formed through their preschool stage. This ability is acquired by children around 4 years of age and continues to develop until around 11 years of age (Baron-Cohen et al. 1999).

Important developmental changes in theory of mind ability take place in the years of 3 to 5. For example during this period children begin to understand that mind does not simply mirror the reality but that construct the representations of it which is reflected in the above table *(See Table 1)*.

3. Development of Language, Communication and Theory of Mind

Throughout the first few years of life, the development of language, communication and theory of mind are amalgamated in complex ways. This process can also be visualized in the above table *(See table 1)*. Put elaborately, in this stage infants engage in joint attention and demonstrate appreciation of others' intentions within the context of communicative acts. Young children listen to and participate in conversations in which people predict and explain behaviour in terms of desires, beliefs, and feelings. As both language and theory of mind undergo a rapid and dramatic developmental changes during the first 5 years of life, lack of theory of mind (ToM) in children may lead to multiple deficits including social interaction, social communication, restrictive behaviour etc. The whole process in relation to the above aspect can be schematize in the following figure *(See Fig 1)*.

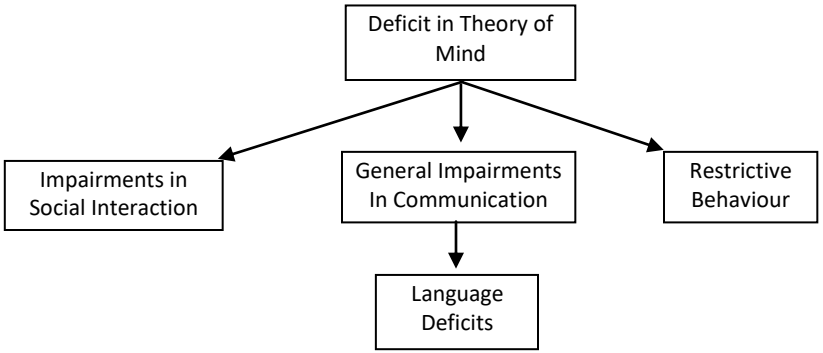

Figure 1. Mind-blindness's account of impairments found in ASD (Belkadi, 2006:4)

Since successful communication includes an appreciation of the mental states of the interlocutor, Theory of mind is necessary for communication through language, and language may in turn offer a way to learn about theory of mind.

4. Theory of Mind and Autism

One of the key diagnostic features of autism includes *"*qualitative impairments in communication'' (APA, 2013 : 50). It indicates that children with autism show delays and deficits in the acquisition of language, which range from complete absence of functional communication to adequate linguistic knowledge. Again, autism is considered by most researchers primary impairments in pragmatic aspects of language which relates the ability to use language in order to effectively communicate in a range of social contexts by using mental states or ToM (Lord & Paul, 1997; Tager-Flusberg, 1981 & 1996; Wilkinson, 1998).

In their research paper *"Does the autistic child have "theory of mind"*? Baron Cohen et al (1985) set out to discover if TOM was deficient in cases of autism and found that it was a phenomenon that was specific to autism and independent of mental retardation (MR). The authors also identified children with autism who lacked the ability to create and use secondary representations which was a deficit due to mental retardation, but to an as yet undetermined deficit in a tom mechanism unique to autism. Accordingly, Frith et. al. (1991) also found the identical result by examining autism at four different levels. So, it is generally stated that there is a core deficit in ToM in autism whether it is classical and Asperger Syndrome.

5. The background of the Present study

There is no preceding study on Theory of mind abilities of children with autism in the context of Bangla language yet. But Autism and theory of mind has been studied across different countries, cultures and different fields, for example -Specific Language Impairment (SLI), Down syndrome, language delay, Attention Deficit Hyperactive Disorder (ADHD) (Loveland et al; 1990). Some of these studies show that people with autism did not yield Theory of mind performance hence they display significant lacking of cognitive ability, emotion and context base language use (Pragmatics) during conversation (Baron-Cohen; 1985). It also affirms that autism, theory of mind and language ability are highly associated. In other study Tager-Flusberg (1992) explicated a group of autistic children who exhibited impairment to describe characters of story, mental state words and emotions in case of repetition as a result of lack of theory of mind. Sylvie (2008) conducted a comparative study combining 13 autistic children, 13 mental retarded and 13 typically developed children. This author found a deficit of theory of mind of the groups of children with autism and mentally retarded, especially when they tried to narrate or retell a story. So, from the above findings it can easy be assumed that Bengali autistic children also lack theory of mind in different narrative aspects. In the light of this hypothetical ground the present study aims at extracting the pattern of ToM deficits exhibited by Bengali children with autism.

6. Method

6.1 Participants

Ten Bengali autistic children (five Asperger syndrome or high-functioning autistic children and five classical or low-Functioning autistic children) participated in this study. The participants were recruited from three following institutes situated in Dhaka.

a. Institute of Pediatric Neurodisorders and Autism (IPNA), BSMMU,

b. Society for Welfare of Autistic Children (SWAC) and

c. Jatio Protibondhi Unnyan Foundation (JPUF).

These Children received a prior diagnosis of autism based on current DSM (Diagnostic and statistical manual of mental disorders)-5. The age range of high-functioning and low-functioning autistic children was 13-

22 and 7-20 years respectively. Details of the participants are shown in the following table *(See Table 2)*.

Table 2: Group Profile of the participants

Diagnostic groups	*N*	Sex (Boy/Girl)	Mean	Median	SD
High-functioning autism	05	3:2	17	16	3.31
Low-functioning autism	05	3:2	12.6	12	4.87

6.2 Procedure to collect data

Data collection procedure of this experiment incorporates following two procedures. These are:

Interview *:* A set of questions were provided to the participants after describing the False Belief Test (FBT). Besides, they were also shown some basic emotion expressing pictures *(See Annex 2)*, and asked them to recognize those emotions.

Observation *:* To overcome the shortcomings of interview, close observation was done to identify the following areas of human communication-Language ability, Socialization, Memory ability, joint attention, emotional understanding and emotion expression, cognitive ability, conversation with friends etc.

Performances of the participants of the above two procedures were recorded using digital Camera and audio recorder.

6.3 Number of experiments

To find out primary data on the nature of ToM deficit of the participants this study executed two different experiments, These are as follows:

a. Experiment-1: False Belief Test (FBT): In the field of Psychology and Clinical Linguistics, false belief test (FBT) has been considered an effective method to evaluate the TOM abilities of autistic children. In 1985 Barron Cohen first introduced the experiment called "*Shally Anne False Belief Task*" to assess the TOM ability of autistic children.

In this research work, an episode similar to Barron-Cohen's '*Shally Anne False Belif Task*' was reintroduced where a Bengali girl Shreya played

the role of 'Shally' and another girl Shopno acted as 'Anne'. Shreya had a basket and Shopno had a box. Shreya put a ball into the basket and left the room. Then Shopno came and changed the location of the ball by simply putting it in the adjacent box. Shreya came to the room again to look for the ball. In this experiment some questions were asked to the participants. Such as:

1. Identifying Shreya, Shopno, basket, box and ball (naming question).
2. Where should Shreya search the ball (memory question)?
3. Why Shreya would search the ball in the basket (IQ question)?
4. Where did Shopno put the ball (memory question)?

Later, the level of efficiency rate and its respective percentage for each variable was recorded by evaluating the responses of the autistic children.

b. Experiment-2: Emotional Picture Cues (EPC) : Autistic children are very much inclined to learn things by visualization because in the school they learn activities of daily living (ADL) with the help of picture cues. Considering such a reality, a total number of 6 (six) emotional picture cues (EPC) were presented to the participants to assess their TOM abilities. Then they were asked to recognize the emotions visualized in the EPCs. Later the level of efficiency rate and its respective percentage for each variable was also recorded by evaluating the responses of the autistic children.

6.4 Data Presentation and Analysis

FBT and EPC were counted to obtain the desired outcome of the participants. The TOM ability of autistic children was marked with tick (√) sign, whereas their inability was identified by cross (X) sign on the sheet. Later these data were presented with various statistical charts and tables. Throughout the research, some symbolic names were used to hide the real identity of the participants. But true age and sex of each participant were recorded unchanged. Autistic children use minimal words and short sentences to communicate with others. So, the inadequate but pointedly correct responses were also considered accurate, whereas the record cell was kept empty when the participants couldn't respond at all *(See Annex 3 & 4)*.

7. Result

7.1 ToM ability of Bengali children with autism

The overall result of the study exhibits that in showing ToM ability high-functioning autistic (HFC) children were better in both EPC and FBT test than their low-functioning autistic (LFA) counterpart (See Table 3).

Table-3: Comparison of the groups

Sl	Name of Experiments	High -functioning autism		Low-functioning autism	
		Able (%)	Unable (%)	Able (%)	Unable (%)
1	Theory of mind and false belief test (FBT)	40%	60%	25%	75%
2	Theory of mind and emotion picture cues (EPC)	53.33%	46.66%	33.33%	66.66%

Now the result of each this category can be isolated individually in the following. These are as follows.

7.2 Theory of mind ability: False Belief test (FBT)

In the experiment of FBT task Bengali high-functioning autistic (HFA) children showed better ability than low-functioning autistic (LFA) children. In the first question all children from each group were able to recognize the FBT character (All subjects passed the Naming Question). The second question (memory question) and the third one (IQ question) were really tough to answer by the participants. This is because, in the second section only one child from HFA group were able to give correct answer of the FBT, none of LFA children were able to describe the correct answer. Accordingly, in the third question all HFA and LFA children were unable to give the correct answer. Finally, identical result was performed by both HFA and LFA children in the fourth question to give correct answer of the FBT and to narrate the correct answer *(See Annex 3)*.

Research result shows that HFA children were able to answer 16 (53.33%) questions (out of 30) correctly and failed to reply 14 (46.66%) questions (out of 30). Conversely, LFA children were able to answer only 10 (33.33%) questions (out of 30) correctly and unable to answer 20 (66.66%) questions (out of 30). We assume that the participants

who were unable to answer questions accordingly had deficit in understanding the image cues.

In this research, total 10 (HFA = 5, LFA = 5) participants were distributed in two groups while each group contained five members. We asked each participant a total number of four questions (4 × 5 = total 20 Question). In group performance HFA children were able to answer 8 (40%) questions (out of 20) correctly and failed to reply 12 (60%) questions (out of 20). Instead, LFA children were able to answer only 5 (25%) questions (out of 20) correctly and unable to answer 15 (75%) questions (out of 20). This result is visualized in the following Fig use *(See Fig 2)*.

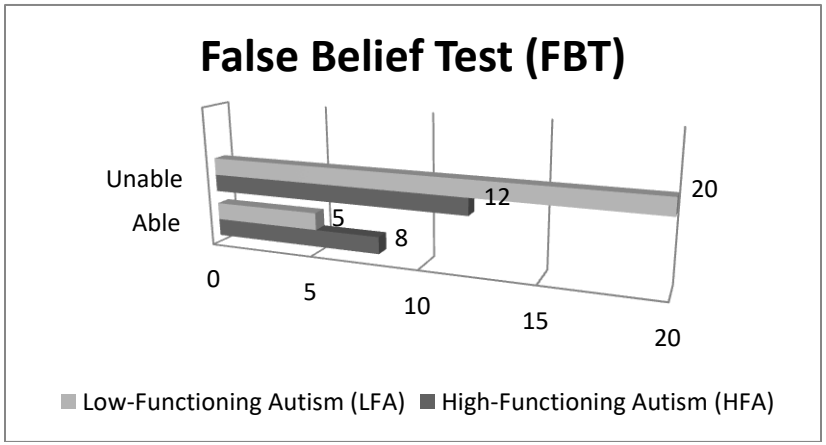

Figure 2. Theory of mind and FBT

7.3 Theory of mind ability: Emotional Picture Cues (EPC)

In the experiment of EPC (recognizing images) HFA children showed better efficiency in ToM than LFA children. In this aspect, individual responses of the questions from these children showed the following results. For example, only three of them from both group were able to recognize the very first EPC of TOM. Concerning identifying second EPC two of the children from HFA group and only one child of LFA group was able to recognize this. In the third EPC, three from HFA group and two LFA group were able to recognize the image. In the fourth EPC three children from HFA group were able to recognize the image, and one child in LFA group recognized this. In the fifth EPC two children from HFA

group were able to recognize the image and only one child from LFA group identified the emotional cues. Finally, in the six EPC two children from HFA group were able to recognize the image *(see Annex-4)*.

We asked each of the participants a total number of six questions (5X6= 30 Question). The result shows that HFA children were able to answer correctly 16 (53.33%) questions (out of 30) and unable to reply 14 (46.66%) questions (out of 30). In contrast, LFA children were able to answer only 10 (33.33%) questions (out of 30) correctly and failed to answer 20 (66.66%) questions (out of 30). We assume that the participants who were unable to answer those 20 and 14 questions accordingly had deficit in understanding the image cues.

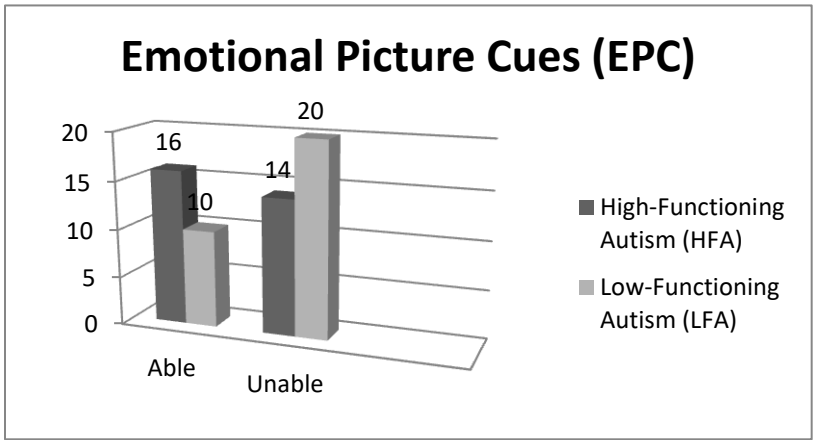

Figure 3. Theory of mind and EPC

7.4 Essential findings

In this study we have found some of the core deficits in autistic children in the milieu of TOM. These are :

1. Although participants recognized the character of FBT, they were unable to understand this.
2. HFA and LFA children faced severe memory impairment in answering the memory and IQ question of FBT, such as- a. Where should Shreya search the ball (memory question)? b. Why would Shreya search the ball in the basket (IQ questions)? c. Where did Shopno put the ball (memory)?

3. Both HFA and LFA children couldn't recognize all the basic emotions like happiness, anger, sadness, surprise, disgust and fear.

4. Both the groups of children with HFA and LFA demonstrated more impairments of ToM in False Belief Test (FBT) than Emotional Picture Cues (EPC) contexts.

8. Discussion

The study shows several key findings that shed light on the underpinnings of the communicative strengths and weaknesses of individuals with autism. Though the result indicates a strong affiliation between autism and theory of mind, we found a less Theory of Mind ability in Bengali LFA children compared to their HFA counterparts. From the data we have observed both ability and inability to identify ToM by the both groups. However, in an average, both groups have the deficit in TOM. In the experiments of FBT and picture cues task, low functioning children show more deficit than high functioning autistic children. In EPC recognitions task *happy* and *sad* variables were recognized by both groups of autistic children. But in other EPCs there was significant differences we have noticed in the context of both the groups.

Now what are the underlying causes of TOM deficit of Bengali autistic children? Although there is no strong research evidence in this regard yet, it can be explained from the aspect of association between communicative intentions and brain damage. According to Cummings (2008), there are four focal processes of communication that are essential to the production (expression) of an utterance. These are: (1) thought genesis, (2) language encoding, (3) motor programming and (4) motor execution *(See Fig 4)*. In the context of autistic children these four steps do not work together for the purpose of producing speech sound. Due to this reason they are not able to express language like normal children. At the same time, with the lacking of communicative intentions, autistic children cannot process and produce speech sound.

In addition, Communication can only be said to occur when a hearer is able to retrieve the intention motivating the speaker's utterance (Cummings, 2008). Our four productive processes mentioned above now must be matched to four receptive processes - the combined

function which will determine this intention on the basis of an input linguistic utterance. For example, in the first of these receptive processes (sensory processing) sound waves are converted into mechanical vibrations via the actions of the tympanic membrane (ear drum) and ossicles. These vibrations trigger a series of neurochemical reactions within the cochlea of the inner ear. From this part nerve impulses make their way along auditory nerves to the auditory cortex of the brain. These cortical regions, located in the temporal lobes, are integral to our second main receptive process, speech perception (Cummings, 2008).

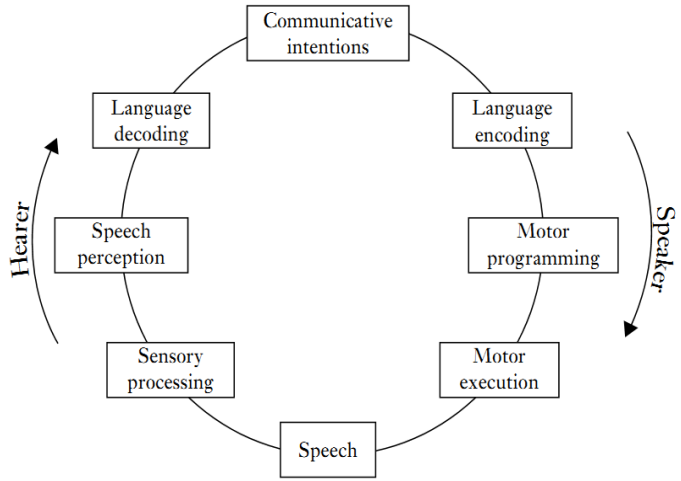

Figure 4. The process of communication (Cummings, 2008)

Although the exact mechanism by means of which hearers perceive speech sounds is still uncertain, it seems clear that top-down processes and contextual influences play a significant role (Massaro, 2001). Speech perception is vital to the eventual recovery of a speaker's communicative intention. However, it is by no means the only form of perception that plays a role in this process. One needs only to consider how often visual information serves to disambiguate a speaker's utterance to appreciate the significance of visual perception in this process too. Complete disambiguation can occur, but the product of perception must undergo a third receptive process — language decoding. In decoding, structural (syntactic) relations within sentences are determined together with the semantic features of constituent

lexemes. Decoding arrives at a propositional meaning of the sentence which is not yet the full intended meaning of the speaker's utterance. This latter meaning can only be obtained by establishing the speaker's communicative intention in producing the utterance, a process that leads us back to the domain of thoughts. In the context of autistic children to receive speech sound those, four steps are not working with proper coordination. As a result, when a person tells an emotional event to the autistic children, their understanding processes do not work like normal children. Hence due to the deficit of communication intention, language encoding and decoding process, they are not able to understand emotional activities and false belief along with other communicative activities.

In addition, human brain is divided into four lobes: Frontal lobe, Parietal lobe, Temporal lobe and Occipital lobe. Among those, frontal, parietal and temporal lobes are completely or partially involved to control our TOM activities. If those lobes are damaged in any means, normal emotional activity may awkward. Likewise limbic system which includes amygdala, hippocampus, hypothalamus, and thalamus is responsible for emotional understanding. Thus, limbic system sometimes is called emotional brain. More specifically, amygdala of limbic system controls our emotional behaviour, social behaviour, social pressure, smile, cry, fear, anxiety, depression, anger and mental emotion. But some previous studies indicate that amygdala is more awkward of autistic children. As a result autistic children cannot properly perform different emotional behaviour and social activities. In addition, hippocampus directs our emotional activity too. Though autistic children's long-term memory is intact, there short-term memory is obstinate. And due to the clumsiness of short-term memory, autistic children are not able to repeat heard sound. Besides, thalamus and hypothalamus control our anger, bother, sad, spontaneity, thinking, judgment, IQ etc. Since there deficit in thalamus and hypothalamus, autistic children are not able to express their emotional needs properly.

9. Conclusion

From the above discussion we conclude that communicative intention and brain development of autistic children are not identical to those of normal children. Hence, due to having limited brain ability as well as

unintended communicative process, children with autism develop a very tiny linguistic ability which ultimately prevents to perform both emotional aspects and social communication. And for this reasons, they exhibit the deficit in theory of mind along with narrative description.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed)*. Washington, DC: APA.

Baron-Cohen S, Leslie, AM, & Frith U. (1985). Does the autistic child have a theory of mind? *Cognition*, 21, 37-46.

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT press

Baron-Cohen S., M. O'Riordan, V. Stone, R. Jones, K. Plaisted, (1999). Recognition of faux pas by normally developing children with asperger syndrome or high-functioning autism, *J. Autism Dev. Disord*. 29 407-418.

Belkadi, Aïcha. (2006). Language impairments in autism: evidence against mind-blindness. *SOAS Working Papers in Linguistics*. 14, 3-13.

Bruinsma, Y., Koegel, R. L., & Koegel, L. K. (2004). Joint attention and children with autism: A review of the literature. *Mental Retardation and Developmental Disabilities*, 10, 169–175.

Cummings, Louise. (2008). *Clinical Linguistics*. Edinburgh: Edinburgh University Press Ltd.

Frith, U., Morton, J., & Leslie, A. M. (1991). The cognitive basis of a biological disorder: Autism. *Trends in Neurosciences*, 10, 433-438.

Hill, E., & Frith, U. (2003). Understanding autism: insights from mind and brain. *Philosophical Transactions of the Royal Society of London* B, 358, 281-289.

L. Brothers, (1997). *Friday's Footprint: How Society Shapes the Human Mind*, Oxford: Oxford University Press.

Lord, C. & Paul, R. (1997). Language and communication in autism. In D. J. Cohen & F. R. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (2nd Edition). New York: John Wiley & Sons. p: 8-12

Loveland, K., McEvoy, R., Tunali, B., & Kelley, M. L. (1990). Narrative story telling in autism and Down's syndrome. *British Journal of Developmental Psychology*, 8, 9-23.

Miller, C. A. (2006). Developmental Relationships Between Language and Theory of Mind. *American Journal of Speech-Language Pathology.* Vol. 15. 142-154.

Premack, D., & Woodruff, G. (1978c). *Does the Chimpanzee Have a Theory of Mind.* Behavioral and Brain Sciences, 1(4), 515-526.

Quinn, Campion. (2006). *100 Questions & Answers About Autism: Expert Advice from a Physician/Parent Caregiver*. London: Jones and Bartlett.

Sylvie Goldman. (2008). Brief Report: Narratives of Personal Events in Children with Autism and Developmental Language Disorders: Unshared Memories. *Journal of Autism and Developmental Disorders* 38(10): 1982-8.

Tager-Flusberg, H. (1981). On the nature of linguistic functioning in early infantile autism. *Journal of Autism and Developmental Disorders*, 11, 45-56.

Tager-Flusberg, H. (1992). Autistic children's talk about psychological states: Deficits in the early acquisition of a theory of mind. *Child Development*, 63, 161-172.

Tager-Flusberg, H. (1996). Current theory and research on language and communication in autism. *Journal of Autism and Developmental Disorders*, 26, 169-172.

Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. *Child Development*, 57, 1454-1463.

Wilkinson, K. (1998). Profiles of language and communication skills in autism. *Mental Retardation and Developmental Disabilities Research Reviews*, 4, 73-79.

Wing, L. (1981) 'The continuum of autistic characteristics.' In E. Schopler and G.B. Mesibov (eds) *Diagnoses and Assessment in Autism*. New York: Plenum Press. p: 22

Wing, L. (1988) 'The continuum of autistic characteristics.' In E. Schopler and G.B. Mesibov (eds) *Diagnoses and Assessment in Autism*. New York: Plenum Press. p: 16

Wing, L. (1997) 'The relation between Asperger's syndrome and Kanner's autism.' In U. Frith (ed.) *Autism and Asperger Syndrome*. Cambridge: Cambridge University Press. p: 35

Annex

Annex 1. Description of Assessment Instruments (*False belief Test Scenario*)

False Belief

To test theory of mind skills, children were presented with a story (There were two doll protagonists, Shreya and Shopno) in which Shreya has a basket and Shopno has a box; Shreya puts her ball in the basket; Shreya leaves; Shopno take the ball from the basket and puts in the box; and Shreya returns to look for the ball. Subjects are then asked following questions.

Test Question: Identifying Shreya, Shopno, basket, box and ball (Naming questions). Where should Shreya search the ball (Memory questions)? Why Shreya search the ball in the basket (IQ questions)? Where did Shopno put the ball (Memory questions)?

Annex 2. Picture cues (Six Basic emotional pictures used in the research)

Happiness

Anger

Sadness

Surprise

Disgust

Fear

Annex 3. Theory of mind and false belief test (FBT)

Annex 4. Theory of mind and emotional picture cues (EPC)

Sl	Picture Name	High-functioning Autistic Children			Sample Answer in eXIPA	Aptitude		Low-functioning Autistic Children			Sample Answer in eXIPA	Aptitude	
		Name	Sex	Age		Able	Unable	Name	Sex	Age		Able	Unable
1	Happiness	F	Boy	22+	[haʃc^{h}e]	√	x	K	Boy	10+	[haʃe]	√	x
		G	Boy	18+	-	x	√	L	Girl	14+	-	x	√
		H	Boy	16+	[haʃi]	√	x	M	Boy	7+	[haʃc^{h}e]	√	x
		I	Boy	16+	[haʃc^{h}e]	√	x	N	Boy	12+	[haʃi]	√	x
		J	Girl	13+	-	x	√	O	Girl	20+	-	x	√
2	Anger	F	Boy	22+	[rag]	√	x	K	Boy	10+	-	x	√
		G	Boy	18+	-	x	√	L	Girl	14+	-	x	√
		H	Boy	16+	[rag kore ac^{h}e]	√	x	M	Boy	7+	φαχιαλε ξπρσσιον	√	x
		I	Boy	16+	-	x	√	N	Boy	12+	-	x	√
		J	Girl	13+	-	x	√	O	Girl	20+	-	x	√
3	Sadness	F	Boy	22+	[ka˜dc^{h}e]	√	x	K	Boy	10+	-	x	√
		G	Boy	18+	[kanna korc^{h}e]	√	x	L	Girl	14+	[kan..na]	√	x
		H	Boy	16+	-	x	√	M	Boy	7+	-	x	√
		I	Boy	16+	[kanna kor̪ec^{h}e]	√	x	N	Boy	12+	-	√	x
		J	Girl	13+	-	x	√	O	Girl	20+	-	x	√
4	Surprise	F	Boy	22+	facial expression	√	x	K	Boy	10+	facial expression	√	x
		G	Boy	18+	-	x	√	L	Girl	14+	-	x	√
		H	Boy	16+	facial expression	√	x	M	Boy	7+	-	x	√
		I	Boy	16+	-	x	√	N	Boy	12+	-	x	√
		J	Girl	13+	facial expression	√	x	O	Girl	20+	-	x	√
5	Disgust	F	Boy	22+	[rag kore ac^{h}e]	√	x	K	Boy	10+	-	x	√
		G	Boy	18+	-	x	√	L	Girl	14+	facial expression	√	x
		H	Boy	16+	[rag]	√	x	M	Boy	7+	-	x	√
		I	Boy	16+	facial expression	√	x	N	Boy	12+	-	x	√
		J	Girl	13+	-	x	√	O	Girl	20+	-	x	√
6	Fear	F	Boy	22+	-	x	√	K	Boy	10+	-	x	√
		G	Boy	18+	[b^{h}ɔye korc^{h}e]	√	x	L	Girl	14+	[hu, hu, b^{h}ye]	√	x
		H	Boy	16+	-	x	√	M	Boy	7+		x	√
		I	Boy	16+	facial expression	√	x	N	Boy	12+	facial expression	√	x
		J	Girl	13+	-	x	√	O	Girl	20+	-	x	√
Grand Total						16	14					10	20