DEVELOPMENT OF PRAGMATIC SKILLS IN AUTISM SPECTRUM DISORDERS

Thesis submitted to University of Mysore for the degree of

DOCTOR OF PHILOSOPHY (Ph.D)

IN

SPEECH AND LANGUAGE PATHOLOGY

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CERTIFICATE

This is to certify that the thesis entitled **'Development of Pragmatic Skills in Autism Spectrum Disorders'** submitted by Ms. Shilpashri H. N. for the degree of Ph.D to the University of Mysore, was carried out at All India Institute of Speech and Hearing, Mysore.

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CERTIFICATE

This is to certify that the thesis entitled **'Development of Pragmatic Skills in Autism Spectrum Disorders'** submitted by Ms. Shilpashri H. N. for the degree of Ph.D in Speech and Language Pathology, in the university of Mysore, is the result of the work done by her at All India Institute of Speech and Hearing, Mysore, under my guidance. I further declare that the results of this work have not been previously submitted for any degree or diploma.

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DECLARATION

I declare that the thesis entitled **'Development of Pragmatic Skills in Autism Spectrum Disorders'** which is submitted herewith for the award of the degree of Doctor of Philosophy (Speech and Language Pathology) at the university of Mysore, is the result of work carried out by me at the All India Institute of Speech and Hearing, Mysore, under the guidance of Dr. Shyamala K. C., Professor of Language Pathology, Department of Speech-Language Pathology. AIISH, Mysore.

I further declare that the results of this work have not been previously submitted for any degree or diploma.

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Dedicated to

Lord Ganesha

And

My Family Members

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Vijayashree mam, Sujatha mam and *Suchitra mam*, *thank you all for your guidance, valuable suggestion and for teaching me the concepts of life.*

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INTRODUCTION

Communication is a key element in defining a human being as a social one. Successful communication is reported to depend on the motivation of the participants to share information, their competence in producing communicative acts to achieve specific goals, and their ability to recognize and rectify unsuccessful communicative attempts (Alexander, Wetherby, & Prizant, 1997).

Communication develops as a result of early social interaction between an infant and his or her caregiver (Alexander, Wetherby, & Prizant, 1997). With the emergence of language, children develop a variety of non verbal and verbal means to express a range of communicative functions. Language is a learned code, or system of rules. It involves five components namely; phonology, morphology, syntax, semantics and pragmatics (Owens, 2008).

The contemporary term, pragmatics, has its origin in the early Greek word πρᾶμα which meant action from which "practice" and "practical" are derived (Prutting, 1982). The term "pragmatics" has been introduced into the field of speech-language pathology by Elizabeth Bates. Bates (1976a) defined pragmatics as "rules governing the use of language in context". Berko-Gleason (2005) defined pragmatics as the linguistic domain concerned with the appropriate use of language across a variety of social contexts that provides for a listener's accurate interpretation of the speaker's intentions and references.

Earlier in 1960's and 1970's, studies were conducted extensively on children ability to use grammar, vocabulary and phonology. Pragmatics did not receive much attention till the late 1970's. Since the middle of 1970's and 1980's, there has been an

increasing impetus in studying the child's ability to use language (i.e. pragmatics). Prutting (1982) reports that, the focus of study on the pragmatic domain has broadened the view of communication towards the social dimension. This shift has been described as **"pragmatic revolution"** (Conti-Ramsden & Gunn, 1986). One of the major contributions of this revolution has been a re-emphasis on the importance of communication in the context of social interaction. The early stages of pragmatic development can be observed in the first year of life itself (Johnson, Johnson, & Weinrich, 1984). Pragmatic achievement, however, is reported to be both innate and socially conditioned (Kates, 1980).

A pragmatic disorder may be suspected if, problems in social language use occur often and seem inappropriate considering the child's age, or interfere with the normal course of conversation. Volden & Lord (1991) defined pragmatic language impairment as a mismatch between language and the situation in which it is used, so that the language employed is in some way inappropriate to the situational demands. Pragmatic difficulty is reported to arise as a secondary feature of any developmental language impairment due to limited communication ability (Prutting & Kirchner, 1987). Autism is one such language disorder characterized by very prominent pragmatic deficits.

The term 'Autism' was first used by Kanner (1943) to describe those children who display marked solitariness and an inability to relate to others, an obsessive desire for sameness and an insistence upon repetitive activities, and poor language development. Autism spectrum disorders (ASD's) also known as Pervasive developmental disorders (PDD's) is a developmental disorder caused by a central nervous system abnormality or injury that occurs during the period of brain growth

(Edwards & Bristol, 1991). It is chronic, evident in infancy or early childhood and results in lifelong impairments, including impairment of social interaction and communication, and restricted and repetitive patterns of behavior and interest (American Psychiatric Association, 1994).

Autism spectrum disorders (ASD's) are reported not only to be a quantitative impairment, but a qualitative deviance (Tager-Flusberg, 1996). Recent genetic studies have shown genetic factors to play a key role in the etiology of Autism (Szatmari, 2003). As per the information given by Centers for Disease Control and Prevention (2007) ASD occur in roughly 1 of every 150 individuals. An excess of prevalence in boys more than girls is reported consistently in Autistic spectrum disorders, with a ratio of four boys to one girl across the whole spectrum (Fombonne, 1999). There is great heterogeneity in this population, evident in a broad range of cognitive, social, communication, motor, and adaptive abilities.

Autism spectrum disorders have been identified as a group of language disorders that, at their core, involve pragmatic impairments (Baltaxe, 1977; Tager-Flusberg, 1981; Lord & Paul, 1997). Wetherby & Prutting (1984) have reported that children with Autism do not evidence the variability or flexibility in the use of the pragmatic functions of communication that typical children do. These children tend to employ communicative functions that serve instrumental as opposed to social purposes (Prizant & Schuler, 1987; Watson, 1987; Willard & Schuler, 1987).

Landa, Volkmar, & Klin (2000) reported that both nonlinguistic and linguistic pragmatic impairments are marked and pervasive in individuals with Autistic spectrum disorders, including the most gifted children. Investigations on pragmatic

skills in children with Autism spectrum disorders have reported several specific pragmatic difficulties, including, difficulty in maintaining the topic of conversation (Baltaxe & D'Angiola, 1992; Volden, 2002); Difficulty in using direction of eye gaze and in interpreting nonliteral intentional language such as jokes, sarcasm and irony (Happ, 1991; 1993); Impaired joint attention skills (Carpenter, Pennington, & Rogers, 2002); Deficits in the development of functional communication skills (Cantwell, Baker, & Rutter, 1978; Fay & Schuler, 1980); Deviant pattern of mutual or reciprocal gaze behavior (Volkmar & Mayes, 1990; Buitelaar, 1995); Inability to adapt topics to the listener and setting (Ricks & Wing, 1975; Simmons & Baltaxe, 1975); Failure in adding new information, incapable of maintaining and shifting the discourse topic (Tager-Flusberg & Anderson, 1991); Wetherby & Prutting (1984) have reported that children with Autism rarely use language for comments, showing off, acknowledging the listener, initiating social interaction, or requesting information. The review of literature on pragmatic skills in children with Autism spectrum disorders presents a strikingly consistent picture of severely impaired functioning on almost all aspects that have been tested.

Need for the study

With the growing recognition that impairment in pragmatic skills is the major area of deficits seen in children with Autism spectrum disorders (ASD's) a number of studies have been conducted in this area. Literature review gives information on studies on pragmatic deficits in children with Autism spectrum disorders for different age groups and on a few isolated aspects of pragmatics. However, there are hardly any reported studies on pragmatic abilities of children with ASD along a developmental continuum. Hence, there is a need for a detailed study probing into the developmental

changes of pragmatic skills. As professionals, it is important to be aware of the normal aspects of pragmatic development before we deal with the issues in clinical population, as it provides a basis for understanding delayed or deviant development (Adams 2002). Hence, the present cross sectional study was designed to address the developmental pattern of pragmatic skills in children with Autism spectrum disorders besides studying language age and social age matched Kannada speaking typically developing children as reference. Kannada is a language of the Dravidian family spoken largely in South India. Kannada language was chosen for this study as the investigator was a native speaker of Kannada.

Pragmatic skill development is also influenced by social cultural aspects. Hence, it is important to use test that has been developed with norms influencing socio cultural factors. "A developmental protocol for pragmatics" (Dheepa & Shyamala, 2008) is an Indian tool developed for assessment of pragmatic skills in typically developing Indian children. This protocol provides norms for developmental aspect of different pragmatic skills from birth to eight years. Hence, this protocol was used in this study. The present cross sectional study was undertaken with the following objectives:

1. To study the development of pragmatic skills in Kannada speaking typically developing children from birth to six years of age in the context of mother-child interactions.
2. To study the development of pragmatic skills in children with Autism spectrum disorders having language age and social age up to six years in the context of mother-child interactions.

3. To compare the developmental pattern of pragmatic skills between the two groups in the context of mother-child interactions.

Effective assessment of pragmatic skills requires situations that reflect social interaction. Hence, the present study utilized a semi instructed mother-child play interaction method. A standard group comparison research design was used. The performance of the group with Autism spectrum disorders was compared with that of the language age and social age matched typically developing children.

REVIEW OF LITERATURE

1.0 Communication

Communication is the process used to exchange information, ideas, needs and desires. The process is an active one that involves encoding, transmitting, and decoding the intended message (Owens, 2008). All creatures communicate, only humans exchange information using a code that is called language.

2.0 Language and its components

Language can be defined as a socially shared code or conventional system for representing concepts through the use of arbitrary symbols and rule-governed combination of those symbols (Owens, 2008). Language can be divided into three major components: form, content, and use (Bloom & Lahey, 1978). Form includes *syntax, morphology, and phonology,* the components that connect sounds and symbols in order. Content encompasses meaning or *semantics*, and use is termed as *pragmatics*. These five components are the basic rule systems found in language (Owens, 2008).

3.0 Communication development in typically developing children

Infants are able to communicate from an early age through eye contact and gestures (Nichols, Martin, & Fox, 2005). Efficiency in both linguistic and social abilities is necessary for contextually appropriate, meaningful, and effective interpersonal communication (Adams, 2005). The main channel of communication in prelinguistic children is nonverbal one. The nonverbal behaviors decrease with age as children use the verbal channel of communication (Poom & Butler, 1972). A three-

stage sequence in the development of early communication functions includes perlocutionary, illocutionary, and locutionary stage (Bates, Camaioni, & Volterra, 1975)

Perlocutionary stage: The perlocutionary stage begins at birth and continues into the second half-year of life. Throughout this stage, an infant fails to signal specific intentions beyond those behaviours that will sustain an interaction, such as cries, coos, and use of the face and body nonspecifically.

Illocutionary stage: The illocutionary stage of communication development begins at 8 to 9 months of age. Within this stage an infant uses conventional gestures, vocalizations, or both to communicate intentions.

Locutionary stage: The final stage of functional communication development is the locutionary stage, which begins with the first meaningful word. In this stage the child's intent becomes encoded in words that are used with or without gestures to accomplish the functions previously filled by gestures alone.

4.0 Pragmatics

Early social interactions provide the vehicle through which the child acquires the linguistic structures, the semantic content and the social uses of language. Since the middle of 1970's and 1980's emphasis began to shift from defining language in terms of syntax and semantics to defining language in terms of its use (i.e. pragmatics). Hymes (1971) define pragmatics as a speaker having knowledge of *when* to say *what* to *whom*, and *how much* to say. Pragmatics refers to both the verbal and nonverbal behaviors that contribute to the appropriate use, adaptation, and

interpretation of language in context (Gilmour, Hill, Place, & Skuse, 2004; Adams, 2005). To be pragmatically competent one requires skills and knowledge beyond those entailed in the acquisition of the linguistic system, including memory skills, deep and well organized knowledge about the social and physical worlds and about the communicative process itself, the ability to flexibly integrate multiple sources of information from different modalities, and the ability to plan and recognize goal-directed sequences of actions (Clark, 1996).

5.0 Development of pragmatic skills in typically developing children

Development of pragmatic ability can be defined as children's progressing ability to use context in language comprehension and expression (Leinonen, Letts, & Smith, 2000). With increase in age, children learn to utilize and connect various specific contextual factors for communication. The review of literature on development of pragmatic skills in typically developing children are presented below:

James & Seebach (1982) investigated the pragmatic function of question production by young preschool children. Participants were 24 typically developing children between the ages from 2 to 5 years. The spontaneous questions produced by children during natural communication at their day-care centers were recorded. Children were observed in three different types of activities; (a) group activities, such as painting or show and tell, organized by the teacher; (b) free play both inside and outside the building and (c) snack or lunchtime. Each child was observed for minimum of 1 hour and a maximum of 2 hours for each of the three types of activities. The questions produced were categorized as information seeking, directives function and conversational type. Results indicated that the number of questions

produced and the distribution of these questions among the three categories differed with age. The 2 and 3 year olds produced few questions i.e. 26 and 39, respectively and the major function of their questions was clearly information seeking. The 4 and 5 year olds produced many more questions i.e. 123 and 238, respectively than the younger children, and their questions were equally distributed among all three functions. The proportion of information seeking questions was found to be smaller and the proportion of directive questions was greater as the number of questions and the age of the children increased.

Klecan-Aker & Lopez (1984) investigated pragmatic language skills in 60 normal preschool children in the age range from 2 to 5 years. Participants were grouped into six groups, 2-2.5 years; 2.6-3 years; 3.1-3.5 years; 3.6-4 years; 4.1-4.5 years; 4.6-5 years. Each group consisted of 10 participants (5 male, 5 female). The assessment of pragmatic function such as greeting, labeling, description, turn taking, affirmation/negation, repetition/revision, requesting and personal was carried out in a structured clinical setting with 15 minutes of audio recording of examiner-child interaction. The materials used by the authors for elicitation of responses were several toys (dollhouse with furniture, a car, a dog, a man, and a ball). All the participants were asked a series of questions or were expected to respond to certain social acts shown by the examiner to elicit different pragmatic functions. The verbal and nonverbal responses were categorized and coded as correct response for functionally accurate response and incorrect response for functionally inaccurate response.

The results revealed that, participants in the age range from 2-2.5 & 2.6-3 years exhibited no change in the number of inappropriate responses. However, from 2.6-3 & 3.1-3.5 years, a decrement in inappropriate responses were seen for

description, turn taking, affirmation/negation and repetition/revision functions. Decrease in the use of inappropriate responses for description, turn taking and affirmation function was seen in participants in the age range from 4.1-4.5 years, compared with the 3.6-4 year olds. This trend of a decrease in inappropriate responses with an increase in age continued till the age range of 4.6-5 years. The functions that accounted for the inappropriate responses remain predominantly the same across age groups i.e., description, turn taking and affirmation/negation

Brinton, Fujiki, Loeb, & Winkler (1986) investigated the repair strategies employed in conversation by typically developing children at different ages. Participants were 40 children in the age range from 2.7 years to 9.10 years respectively. Participants were grouped into four groups, 2.7 to 3.10 years; 4.10 to 5.10 years; 6.10 7.10 years; and 8.10 to 9.10 years. The investigators presented with standard set of pictures to all participants in the same order. When each participant described an experimental picture, the investigator sitting in the other side of the testing room introduced a stacked sequence of repair. The sequence introduced were "Huh?", "What?", "I didn't understand that" and "Oh, I see". The responses from the participants were audio recorded and were categorized into one of five separate categories namely; Repetition, revision, addition, cues and inappropriate.

The results of the study indicated that children in all the age groups responded to the majority of the requests for clarification by providing some type of conversational repair. Repetition responses did not indicated significant differences across ages. Revision category indicated that children in the age of 7 and 9 years used more revisions than did younger children. Addition and cue responses increased

significantly with age level. Inappropriate response frequency decreased with increase in age level.

Klecan-Aker & Swank (1988) evaluated the effectiveness of the pragmatic language function protocol. The pragmatic functions assessed were description, personal, affirmation/negation, greeting, labeling, revision, turn taking, and requesting. Participants were 240 normal preschool children grouped into six groups, 2-2.5 years; 2.6-3 years; 3.1-3.5 years; 3.6-4 years; 4.1-4.5 years; 4.6-5 years. Each group involved 20 males and 20 females. Pragmatic functions were assessed in the structural clinical setting involving examiner-child interaction for the duration of 30 minute. The materials used by the examiner for elicitation of responses were several toys (dollhouse with furniture, stuffed animal, crayons, and paper) and picture book. The responses were audio recorded the verbal and nonverbal responses were categorized and coded as correct response for functionally accurate response and incorrect response for functionally inaccurate response.

The findings of the study indicated a general increase in correct responses with an increase in age up to age 3 years for all the pragmatic functions except revision was reported. The difficulty in the use of revision strategy was evident even in the 4.6-5 years. The examiner attributes this result to the error in framing questions to elicit revision function. With respect to gender, the study found both similarities and differences in the performance of males and females. The major similarity was in the pattern of responses. The differences were in performance, girls generally showed a superior performance.

Thankam (2002) developed the test for assessment of pragmatic skills in the Indian socio cultural context, to identify sequential pragmatic milestones in typically developing children. The test incorporated pragmatic skills like greeting, labeling, requesting, negation, affirmation, repair, stylistic variation, referential communication, turn taking, closing conversation, eye gaze and proximity. Participants were 25 typically developing children in the age range from 3.5 to 8.5 years. Participants were grouped into five subgroups with one year of age interval each, group A: 3.5-4.5 years; group B: 4.6-5.5 years; group C: 5.6-6.5 years; group D: 6.6-7.5 years and group E: 7.6-8.5 years. A structured method with standard set of materials namely ball, pencil, picture to colour, crayon book, building blocks, toys of animal and birds like cow, dog, cat, lion, parrot and crow were used by the examiner to elicit different aspects of pragmatic skills studied. The responses obtained were audio recorded and scored by the examiner using four point rating scale; 0-no response, 1-inappropriate response, 2-culturally and contextually appropriate nonverbal response, 3-culturally and contextually appropriate verbal response.

The result indicated a developmental trend in acquisition of pragmatic skills with greater accuracy in use of language function at the higher age. By 3.5-4.5 years culturally and contextually appropriate nonverbal responses were obtained for pragmatic skills like requesting & greeting. Culturally and contextually appropriate verbal responses were seen for skills like labeling, turn taking, proximity and repair by 3.5-4.5 years; eye gaze, negation, affirmation by 4.6-5.5 years of age; closing conversation by 6.6-7.5 years; referential communication, and stylistic variation was found to be the last to master i.e. at 7.6-8.5 years in the study.

Nishi (2004) developed norms for pragmatic skill acquisition in younger population aged 2.6 to 3.6 years. "The test of pragmatic skills" developed by Thankam (2002) was used for assessment of pragmatic skills. This test incorporated pragmatic skills namely, greeting, labeling, requesting, negation, affirmation, repair, stylistic variation, referential communication, turn taking, closing conversation, eye gaze and proximity. Thirty participants from urban background were grouped into two subgroups with six month of age interval each, group A: 2.6-3 years; group B: 3.1-3.6 years old (fifteen children in each subgroup) respectively. Each participant was tested individually through structured method. A standard set of materials namely; ball, pencil, picture to colour, crayon book, building blocks, toys of animal and birds like cow, dog, cat, lion, parrot and crow were used by the examiner to elicit different aspects of pragmatic skills in study. The responses obtained were audio recorded and scored by the examiner using four point rating scale; 0-no response, 1-inappropriate response, 2-culturally and contextually appropriate nonverbal response, 3-culturally and contextually appropriate verbal response.

Results indicated that pragmatic skills namely greeting, labeling, requesting, negation, affirmation, repair, turn taking, closing conversation, eye gaze and proximity were found to be above the base level at 2.6 years. Referential communication and stylistic variation were seen at 3.1 years of age respectively. With increase in age mean responses increased, indicating developmental changes in emergence of pragmatic skills in typically developing children. The author suggests that, the norms developed are to be used only for children from urban background as this study was carried out among children from urban background.

Nitta (2006) established norms for the development of pragmatic skills for children in the age range from 1.1 to 3 years. "The test of pragmatic skills" developed by Thankam (2002) was used for assessment of pragmatic skills. This test incorporated pragmatic skills like greeting, labeling, requesting, negation, affirmation, repair, stylistic variation, referential communication, turn taking, closing conversation, eye gaze and proximity. The sample size was 30 typically developing children. 15 children in the age range of 1.1 to 2 years and 15 children in the age range of 2.1 to 3 years. Each individual participant was tested by the examiner through structured method. Materials used for the study were; ball, pencil, picture to colour, crayon book, building blocks, toys of animal and birds like cow, dog, cat, lion, parrot and crow. The responses were audio recorded and scored by the examiner using four point rating scale; 0-no response, 1-inappropriate response, 2-culturally and contextually appropriate nonverbal response, 3-culturally and contextually appropriate verbal response.

The result revealed that, at the age of 1-2 years inappropriate response and nonverbal response were observed for pragmatic skills like greeting, labeling, eye gaze, proximity, requesting, negation, affirmation and closing conversation. For skills namely turn taking, referential communication and stylistic variation inappropriate response and nonverbal response were seen at 2-3 years of age. With increase in age mean responses increased, indicating developmental changes in emergence of pragmatic skills in typically developing children.

Dheepa & Shyamala (2008) developed a protocol to identify sequential development of pragmatic milestones in typically developing children in the age range from birth to eight years. The pragmatic skills incorporated in the protocol were

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physical proximity, communicative intent, eye contact, gaze exchange, body posture, smiling, attention, facial expression, joint attention, giving, pointing / visual gestures, nonverbal turn taking, requesting objects, action and information, refusal / denial, greeting, commenting on objects and actions, communicative games, informing, acknowledging, answering questions, topic initiation, topic maintenance, topic change, selection / choice making, continuation, adding new information, response, clarification, repair / revisions, pause time, interruption / overlap, feedback to listeners, adjacency, contingency, quantity / conciseness, presupposition, code switching, politeness, reciprocity, anticipation, proxemics, permission directives, indirect response, lexical selection and use, stylistic variation, narrative, perspective talking, opinion, referential communication and intelligibility. The group was divided in six months of age interval up to five years and one year of age intervals from five to eight years. The protocol was administered across 130 typically developing Tamil speaking children by means of parental interview. The responses obtained were rated using 4 point rating scale, 0-almost never/not present; 1-very rare/25% present; 2-sometimes/50% present; 3-often/75% present and 4-almost always/100% present.

The results revealed that, there was a linear increase in mean pragmatic quotient scores with increase in age, indicating a developmental trend in acquisition of pragmatic skills. Pragmatic skills emerged at birth to one year were physical proximity, eye contact, gaze exchange, body posture, smiling, attention, facial expression. At 1.1 year to 2 years, joint attention, giving, pointing / visual gestures, nonverbal turn taking, requesting, refusal / denial, greeting, commenting on objects and actions, communicative games, intelligibility. The pragmatic development reached plateau after 2 years of age, pragmatic skills emerged at 2.1 to 8 year of age

were communicative intent, informing, acknowledging, answering questions, topic initiation, topic maintenance, topic change, selection / Choice making, continuation, adding new information, response, clarification, repair / revisions, pause time, interruption / overlap, feedback to listeners, adjacency, contingency, quantity / conciseness, presupposition, code switching, politeness, reciprocity, anticipation, proxemics, permission directives, indirect response, lexical selection and use, stylistic variation, narrative, perspective talking, opinion, referential communication. The author reports that there was no gender difference within and across the age group in the acquisition of pragmatic skills.

The review of studies on emergence of pragmatic skills in typically developing children presents the view that, pragmatic skills develop at the first years of life and it follows a developmental continuum. There are also various research happened over a period of 1980's to date presenting stages of pragmatic skill development in typically developing children. Woolfolk and Lynch (1981) gave the following developmental stages of pragmatics in child language from 2months to high school age.

1. Children in the age range from 2 to 10 months develop eye contact and gaze exchange to regulate joint attention on an activity. Development of eye contact, smiling and attention indicates that the child takes notice of someone or something. Pointing plus vocalization suggest demand for someone or something.

2. Children between 10 and 16 months indicate strong regulatory functions of language. They develop gestures of giving, pointing and showing to draw attention to things wanted. Use nonverbal turn taking in play activity. Early

words are used to express instrumental (I want) regulatory (Do what I tell you) interactional (Hi) and several other functions.

3. At 18 and 30 months of age children use symbolic play, imaginative speech, beginning of discourse, answering questions, use of description, expressing feeling, deictic use of pronouns, and ability to change topic are seen.

4. Children from 3 to 4 years of age switch code during conversation. Maintain conversation beyond several turns.

5. Between 4 and 5 years of age children use antonym, synonym and rhyming words. Metalinguistic use of language and use of indirect requests emerges.

6. During grade school age children can use atleast three language codes. Narrate stories. Follow rules of discourse.

7. During High school age children use artistic language. Understand jokes, sarcasm and social etiquette, but not necessarily debate and parliamentary rules.

Dewart and Summers (1995) have summarized the development of pragmatic skills under three areas namely, Communicative functions; response to communication; and interaction & conversation of pragmatics for six age ranges i.e. from infants through to seven and beyond.

1. *Communicative functions*

From birth to nine months of age infants use signals such as eye-gaze, smiling, crying, and vocalizations without any specific communicative intention. *From nine to 18months* children are able to express a range of communicative intentions, first by gesture combined with vocalization and then by words. Attention-seeking behaviours,

requesting objects, action and / or information, rejecting or protesting, greeting, naming develops at this age.

Children at 18months to 3 years of age develop range of communicative intentions. Use single or multiword utterances to; comment, express feelings and assert independence. Begin to use imaginative language. *At 3 to 4 years* children use language to; talk about past and future events, give information. Modal form used for requests ('Would you' plus request). Retell simple stories.

At 4 to 7 years children learns to express intentions in a variety of forms to fit the communicative needs of the listener and politeness constraints. Begins to use indirect requests. Uses language to; gain and hold adults' attention, give information, seek information from other people, give instructions to peers, state rules, negotiate and bargain; express a range of feelings/emotions, state beliefs and opinions, taunt and threaten. Begins to tell jokes (punchline often misses the point). Uses narrative to report experiences, complain about others' actions and to tell simple stories.

Children at 7 years and beyond use more sophisticated functions of language like promising, hypothesizing, describing own and others' feelings and reactions. Children use language to develop ideas; planning, predicting and hypothesizing, reasoning and evaluation, explanation, expressing abstract ideas and opinions, argument and debate. They become flexible in use of indirect requests and other indirect forms. Skills in negotiation and persuasion develop further. Narratives become longer and more complex: can sequence and organize events in stories in time and space. Develop use of non-literal language, for example, idiom, simile, metaphor. Begin use of sarcasm and irony.

2. *Response to communication*

Infant at birth to nine months of age pay attention to human voice and human face. They respond to interaction by looking, smiling and laughing. Enjoy action games (such as 'Round and round the garden') and begins to smile in recognition of familiar words or in anticipation of tickling. *Children at nine to 18months* understand adult's gestures such as pointing (first for near objects, then more distant ones). Respond appropriately to simple directions.

At 18months to 3 years children recognize a range of adult communicative intentions and respond appropriately. Responds to speech with speech: make verbal responses that directly complement previous utterances (for example, 'yes' or 'no' to 'yes/no?' questions, or specific location as response to 'Where?' questions). At this age children realize that phrases as 'In a minute' mean he or she is being asked to wait. *Children at 3 to 4 years of age* understand adult communicative intentions. Notice changes in wording of familiar stories and rhymes.

Children from 4 to 7 years of age understand indirect requests. Begin to rely less on context for understanding. Requests clarification when hasn't understood. Takes instructions from peers and responds to their questions. Become able to treat language as an object of analysis and to use language to talk about language (metalinguistic awareness). Enjoys jokes but doesn't fully understand play on words/puns. Listens to extended stories from books and can read simple ones.

At 7 years and beyond children understand indirect forms. Cope with little non-verbal support for linguistic messages. Judge utterances as appropriate for a particular listener or setting. Can assess the adequacy of a communication and comment on where it has gone wrong. Respond appropriately to idiomatic language. Understand figurative and non-literal language. Develop awareness of the politeness of various forms of request. Shows awareness of how intentional cues affect meaning. Learn to make more subtle distinctions between communicative functions, Understand jokes based on play on words. Read and extract information from books.

3. *Interaction and conversation*

Infants at Birth to Nine months develop early interactions between infants and caregivers, involve in turn taking activity. Infants initiate temporally linked behaviours by looking at a caregiver's face and terminated by infant looking away. Perform ritualized and repetitive games ('peekaboo'), which also involve turn taking; involve joint attention between infant and caregiver, which expands to include external objects and events. *At Nine to 18 months* infants initiate interactions non-verbally and terminate by child moving away. Responds to questions by non-verbal vocalization or gesture. Interactions are limited to one or two turns per partner.

Children at 18 months to 3 years use speech in response to speech. Initiates interactions by using vocative (for example, 'Mummy!'). Responds to requests for clarification by repetition or by revision of the original form of the utterance. *At 3 to 4 years* children initiate conversation by verbal strategies. Children become more able to communicate with strangers. With peers, talk may alternate between private talk to self and talk to partner. Can participate in pretend conversations and switch from one

speech code to another when taking stereotypical roles in play. Will respond to things overheard in other people's conversations. Rapid change of conversational topics is noted. When child is not understood, tends to repeat without modification.

Children from 4 to 7 years become more efficient at initiating and terminating conversations and controlling the timing of conversational turns. The number and length of turns increases significantly. Learns to choose most appropriate timing for attempts to join in other people's conversations. When telling something, have difficulties in taking into account what the listener knows and needs to know in order to understand. Children may distinguish deictic terms, such as 'here' and 'there', ineffectively so that listener has to probe to find out what is being referred to. When child has not been understood, can repeat with some elaboration so that more information is conveyed to the listener. Uses contingent query to request clarification from others. Participates in games involving role play, negotiated through language. Gradually learns to adapt conversational style to a variety of conversational partners who differ in age, sex, status and familiarity. Shows some awareness of social conventions for language use.

During 7 years and beyond children gets better at setting the scene to take account of listeners' needs. They become more proficient at use of cohesive devices in discourse. When conversation break down occurs can repair by addressing the source of breakdown and elaborating appropriately. Topics of conversation extend into abstract ideas. Adapts style of speech to age, status and other variables related to listener. More proficient at using politeness as a strategy in communicating. Develops

appreciation and use of social conventions relating to facial expression, gesture, posture, distance, eye contact.

Marasco, O'Rourke, Riddle, Sepka, & Weaver. (2004) have summarized pragmatic language development from birth to six years. the stages are as follows:

1. Infants from birth to 3months look at people and follows moving person with eyes. Quiets in response to sound (responds more readily to speech rather than nonspeech) and when picked up. Responds through Smiling/cooing in response to another smile/voice (1-4 months). Excites when caregiver approaches (1-4 months). Awareness of strangers and unfamiliar situations (1-4 months) develops. Differential cry develops.

2. From 3 to 6months infants fix gaze on face. Responds to name by looking for voice (4-8 months). Localizes sound source/speaker. They occasionally vocalize in response to speech.

3. Infants at 6 to 9months initiate vocalizing to another person. They enjoy being played with (4-8 months). Differentiates vocalizations for different states: hunger, anger, contentment (4-8months). They recognize familiar people. Cry when parent leaves the room. Imitate familiar sounds and actions.

4. From 9 to 12 Months of age infants shout or cough to attract attention. Shakes head "no" and push undesired objects away. Waves "bye". Develop affectionate to familiar people. Begins directing others' behavior physically and through gestures (pats, pulls, tugs on adult). Uses pointing to learn new vocabulary (people in environment label things as child points). Extends arms to be picked up. They participate in games. Reaches to request an

object. Vary behavior according to emotional reactions of others; repeats actions that are laughed at by others. Participates in vocal play, using content and expression.

5. From 12 to 18months children ring objects to show an adult. Requests objects by pointing and vocalizing or using a word approximation. Solicits another's attention vocally, physically and with a word. Gesturally requests action/assistance (may give back wind-up toy to request reactivation). Says "bye" and a few other conversational ritual words such as "hi","thank you" and "please". Protests by saying "no", shaking head, moving away, frowning or pushing objects away. Comments on object/action by directing listener's attention to it with a point and vocalization or word approximation. Labels objects. Answers simple *wh* questions with vocal response (may be unintelligible). Acknowledges speech of another by giving eye contact, vocally responding or repeating word said. Teases, scolds, warns using gesture plus a vocalization or word approximation.

6. Children at 18 to 24months use simple words or short phrases to express the intentions listed at the 12-18month level. Names objects in front of others. Says, "What's that?" to elicit attention of others. Use single words and two-word phrases to a command (move), indicate possession (mine), and express problems (got boo boo). Much verbal turn-taking occurs.

7. Children at 2 to 3 years engage themselves in short dialogues. Verbally introduce and changes topic of discussion. Expresses emotions. Use language in imaginative ways. Provide descriptive details to facilitate comprehension. Uses attention-getting words such as, "hey". Clarifies and requests for clarification. Prenarrative development begins with heaps

(collection of unrelated ideas) and sequences (story elements linked by perceptual bonds).

8. At 3 to 4 years children engage themselves in longer dialogues. Assumes the role of another person in play. Uses more fillers to acknowledge partner's message (uh-huh, ok). Use code switching (using simpler language) when talking to very young children. Use more elliptical responses. Requests permission. Use language for fantasies, jokes, teasing. Makes conversational repairs when listener has not understood the speech. Corrects others. Use of inference in stories. Children maintain topic for 3 turns and provide explanations for it. Requests more information to keep conversation going. Uses appropriate eye contact. Terminates conversation appropriately. Uses indirectives/hints to get listener to do/get something. Refines speech to insure listener has background information. Initiate role playing, temporarily assumes another's perspective-jokes with conversation partner, and provides warning.

9. At 5 to 6 years children use indirect requests. Correctly uses deictic items such as this, that, here, there. Uses utterances as 3-year old to discuss emotions and feelings. Narrative development is characterized by unfocused chains; stories have sequence of events but no central character or theme. Tells a story by looking at pictures. Describes functions of objects. Communicates cause-and-effect relationships. Uses contingent queries to maintain a conversation. Creates interest in a listener by indirect references. Communicates knowledge about the world to peers and adults. Tells 2 familiar stories without pictures for help; includes all important parts. States a problem. Sustains a topic for 4 turns. Provides information that is relevant

to the listener. Responds appropriately to questions involving time concepts Will answer/ask "where", "when", "why", "how many", "what do you do?","why do we?". Extends topic. Asks permission to use other's belongings. Uses such terms as, "thank you", "please", and "you're welcome" appropriately. Recognizes another's need for help and provides assistance.

6.0 Pragmatic disorder

Prutting & Kirchner (1987) defined pragmatic deficits as inappropriate behaviour rating in one or more of the areas as they relate to conversational competence; verbal aspects, paralinguistic aspects, and nonverbal aspects. Verbal aspects are defined as the actual linguistic behaviours and include speech acts, topic, turn taking, lexical selection, and stylistic variations. Paralinguistic characteristics are defined as the mechanics of speaking, including intelligibility, vocal quality, intensity, prosody, and fluency. Nonverbal aspects to include physical proximity, physical contact, body posture, foot/leg and hand/arm movements, gestures, facial expression, and eye gaze.

Pragmatic skills have been studied in many childhood language disorders. Some developmental syndromes place children at risk for pragmatic language impairment, one among them is Autism spectrum disorders (ASD) researchers have identified pragmatics as the aspect of language that is most seriously impaired in Autism (Baltaxe, 1977; Tager-Flusberg, 1981).

7.0 Autism Spectrum Disorders / Pervasive Developmental Disorders

Autism was first named by Kanner (1943), he first described a set of 11 children, all of whom had in common a core set of atypical characteristics. He named the condition "early infantile autism" as the symptoms were evident in early infancy (Kanner, 1944; Kanner, 1951). Characteristically, the severity of impairment varies from individuals to others and even, within the same individual (Baron-Cohen, Leslie, & Frith, 1985). Hence, it is referred to as the Autistic Spectrum of Disorders (Baron-Cohen, 1995).

Autism spectrum disorders (ASD's) refer to a wide spectrum of developmental disorders characterized by three core features: difficulties in social interaction, impairments in communication and language, and restricted and repetitive patterns of behaviour (American Psychiatric Association, 2000). Rapin & Dunn (2003) reports that, Autism is a developmental disorder of brain function which has many different causes however, genetic etiologies are more prevalent than acquired insults to the immature brain.

Since Kanner's (1943) original description of a group of children with autistic disturbance have undergone considerable refinement (Witwer & Lecavalier, 2008). Autism is diagnosed by the presence or absence of certain behaviours, characteristic symptoms, and developmental delays. The assessment of the characteristic features of Autism spectrum disorders, and to differentially diagnose this spectrum of disorders, using standard tools is crucial to work out an individual plan for therapy. Various classification systems have evolved over years, the most popularly used among them is Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM has gone

through five revisions since it was first published in 1952. The last major one was the DSM – IV in 1994, although a "text revision" was produced in 2000. The DSM-V is currently in consultation, planning and preparation, due for publication. In the DSM-IV ASD's is sub grouped into five types: Autistic Disorder (AD), Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), Asperger's Syndrome (AS), Rett's syndrome and Childhood Disintegrative Disorder (CDD).

Children with Autism spectrum disorders (ASDs) have been associated with impairments in the acquisition and functioning of various aspects of language, speech, and nonverbal communication skills (American Psychiatric Association, 2000). These impairments are pervasive and heterogeneous, lasting throughout the lives of people with autism and varying in degree from individual to individual.

The communication impairment which partially defines Autism is closely related to the impairment of social interaction, and includes impaired use of language even when language is present (Boucher, 2003). Rapin & Dunn (2003) reports that pragmatic impairments remain lifelong whereas the other language related difficulties are no longer manifest in every single child when they mature. Pragmatic language disorders (PLDs) are the major defining linguistic characteristic of Autism regardless of the functional level of the affected individual; in some cases, it may be the only parameter of language that is deficient (Young, Diehl, Morris, Hyman, & Bennetto, 2005).

8.0 Pragmatic skills in typically developing children Vs children with Autism spectrum disorders

Wetherby and Prutting (1984) analyzed the range of speech acts in autistic children's language. They found that, autistic children requested objects and actions more often than normal children did, and protested more. However, there was a complete absence of speech acts used for requests for information, for acknowledgments of others, for showing off, and for commenting.

Loveland, Landry, Hughes, Hall, & McEvoy (1988) investigated pattern of speech acts (both verbal and nonverbal) used by verbal autistic children interacting with the mother. The performance of autistic children were compared with mental age matched children with Developmental language delay (DLD) and normally developing (ND) 2 year olds. Mothers were provided with toys, games and puzzles, 15 min of free-play mother-child interaction was video recorded. The results of child speech act category reveled that, the autistic group did not give response to most of the mother's initiation of speech act, but, used affirming and turn taking vocalizations less often than the other two groups. The DLD group used negation more often than the ND group, but the Autistic group did not differ from the other two on this variable. The results of parent's speech act reveled that, parents of Autistic children initiated a significantly greater percentage of their observed acts than parents of DLD and ND children. Parents of Autistic children also performed a greater percentage of imperatives than parents of DLD children, but not ND children.

Landry & Loveland (1989) investigated the effect of three different interactive situations, which may vary with respect to a variety of social context factors, on

autistic children's use of attention-directing gesture and language. The three situations used were (a) an Adult-directed situation, in which the adult directed the interaction through specific language and gesture tasks and the child was required to show comprehension of these tasks by using specific kinds of communication responses, (b) a Requesting situation, in which the adult defined a highly motivating situation for the child and the child was required to make a request of some kind using language or gesture, and (c) a Spontaneous situation, in which the child had the opportunity to initiate freely and determine the nature of the interaction without directives from the examiner.

Participants were autistic children (n = 15), children with developmental language delay (n = 14), matched on mental age and mean length of utterance (MLU), and MLU matched young normal children (n = 13). The three interactive situations were assessed and videotaped during play behavior with an examiner in a playroom stocked with toys. The three context situations were interspersed throughout this play procedure. The results were mainly focused on comparing the autistic children's use of these behaviors across the three situations with that of mental age- and MLU-matched developmentally language-delayed (DLD) children and MLU-matched, young normal (ND) children. Results indicated that the autistic children used attention-directing behaviors less frequently than the ND or DLD children, and their use of these behaviors varied less with communicative context than that of the other two groups.

Anjana (1999) studied the pragmatic abilities of children with Autism spectrum disorders (ASDs) in comparison with typically developing children matched for mental age range between 3-6 years. Each group consisted of 5 participants.

Pragmatic skills of all the participants were assessed on parameters adapted from the test developed by Roth and Spekman (1984). The test included the following pragmatic skills;

1. Range of communicative intentions

- Attention seeking
- Request object
- Request action
- Request information
- Naming
- Greeting
- Responding
- Protest
- Comment
- Other performatives

2. Presupposition

- Social context variable

3. Social organization of discourse

- Social Vs nonsocial speech
- Turn taking
- On topic / off topic exchange
- Conversational repair

Pragmatic skills were assessed through parental interview and free play interaction session between parent-child and clinician-child. This interaction session was carried out for the duration of 30 minutes each. In addition to free play activity, communicative temptation given by Wetherby & Prutting (1984) was used by the

examiner to initiate maximum responses from the participants. The responses obtained were audio recorded and analyzed.

The results indicated quantitative and qualitative difference between the two groups. Children with ASD had used language predominantly for non-social or quasi social purpose in comparison to typically developing children who had utilized language for a social function. Children with ASD had exhibited higher turn taking behaviours during the parent-child interaction when compared to clinician-child interaction session, percentage of non- social utterances was found to be least during parent-child interaction session when compared to clinician-child interaction. In contrast to typically developing children performance, children with ASD had shown more of non socialized speech during the clinician-child session than the parent-child session. Children with ASD had used more of off topic utterances, linguistic content of the repair attempts were found to be at a much lower level than typically developing children.

Senju, Yaguchi, Tojo & Hasegawa (2003) investigated mutual gaze (direct gaze & gaze-averted) behaviour in children with high functioning autism under experimental conditions using visual oddball paradigm. 13 Japanese children with autism (males) in the age range of 9:10–14:11 years and 15 age-matched typically developing children (13 males and 2 females) in the age range of 9:5–14:10 years participated in the study. All of the children were students or graduates of a primary school that is attended by both autistic and typically developing children. All children had average scores on Japanese Raven's Colored Progressive Matrices (RCPMs) test. The results indicated that typically developing children detected direct gaze better than children with autism, while performance in detecting averted gaze did not differ

between the two groups. Therefore, the children with autism had a problem specific to direct gaze processing, in that they failed to preferentially detect direct gaze. The authors report that, failure in establishing the normal course of eye contact behavior might result in altered eye-contact behavior, which hampers subsequent development of social and communicative skills.

Biji (2003) evaluated the pragmatic skills in children with pervasive developmental disorders (PDD's). "The test of pragmatic skills" developed by Thankam (2002) was used for assessment of pragmatic skills. This test incorporated pragmatic skills namely greeting, labeling, requesting, negation, affirmation, repair, stylistic variation, referential communication, turn taking, closing conversation, eye gaze and proximity. The test was administered on 24 children with PDD in the age range of 3.6-7.6 years, who were enrolled for speech-language intervention program. The participants had been grouped into five subgroups with one year of age interval each, group A: 3.5-4.5 years; group B: 4.6-5.5 years; group C: 5.6-6.5 years; group D: 6.6-7.5 years; group E: 7.6-8.5 years.

A structured method with standard set of materials namely ball, pencil, picture to colour, crayon book, building blocks, toys of animal and birds like cow, dog, cat, lion, parrot and crow were used by the examiner to elicit different aspects of pragmatic skills. The responses obtained were audio recorded and scored by the examiner using four point rating scale; 0-no response, 1-inappropriate response, 2-culturally and contextually appropriate nonverbal response, 3-culturally and contextually appropriate verbal response. The author compared the results of the study with the normative data given by Thankam (2002) with the following conclusions.

➢ Children with PDD had performed poorly on the pragmatic skills compared to the normative data given by Thankam (2002).

➢ Performances on pragmatic skills namely greeting, eye gaze, affirmation, negation, proximity, closing conversation, and labeling was better compared to other skills. This was attributed to the effect of intervention program during which these aspects received more attention.

Dawson et al., (2004) studied social attention impairments in autism (social orienting, joint attention, and attention to another's distress) and their relations to language ability. Three groups of children participated in the study: (a) 72 children with ASD comprising 50 children with autistic disorder and 22 children with pervasive developmental disorder not otherwise specified (PDD-NOS); (b) 34 children with Developmental delay (DD) without autism comprising, 31 children with idiopathic Developmental delay and 3 children with Down's syndrome and (c) 39 children with typical development. Groups were matched on mental age. The testing was conducted over the course of three sessions. Experimenter tested each participant individually. Cognitive ability and diagnosis of ASD were assessed during the child's first laboratory visit, the joint attention and attention to distress tasks were administered during the second visit, and the experimental assessment of social orienting was administered during the third visit. The results showed that preschool-age children with ASD were significantly impaired in the domains of social orienting, joint attention, and attention to distress relative to mental-age-matched children with Developmental delay and typical development.

Volden (2004) compared the performance of nine school-aged, high functioning children with Autism spectrum disorder (ASD) on response to a stacked

series of request for clarification (RQCLs) with reference to nine children who were individually matched to the children with ASD on the basis of language age (LA). Response type was assessed by involving each participant in conversation about topics of general interest (e.g. hobbies, vacations, television shows, etc.).   During conversation 10 episodes of communicative breakdown was introduced for each child. Each consisted of a stacked series of three RQCLs ('What?', 'I don't understand', 'Tell me another way'). Conversational interactions were videotaped and responses to each RQCL were coded from the videotapes by the principal investigator. Verbal responses were coded into one of the categories; repetition, revision, cue, meta-comments, inappropriate. Results indicated that, children with ASD had recognized the need to repair communicative breakdown as signaled by RQCLs and used a range of strategies to attempt repairs. The average number of inappropriate responses for the group with ASD was significantly greater than the mean number of inappropriate responses for the control group. Analysis of the non-verbal components of the responses to RQCLs revealed that, participants in both groups were more likely to add suprasegmental elements (e.g. increased emphasis, slowed speech, etc.) to their response after the first RQCL ('what?') and gestural elements after the second ('I don't understand').

Chiang, Soong, Lin, & Rogers (2008) studied the nonverbal communication abilities in young children with autism. The subjects were 104 children and infants. 28 children with autism, 24 with Developmental delay (DD). DD included speech and language delay (n = 10, 42%), Down's syndrome (n = 3, 12%), and unspecified mental retardation (n = 11, 46%), 27 13–15-month old typically developing infants (TD1), and 25 18–20-month old typically developing children (TD2). Each child was

seen twice with one or more of his or her parents. The first visit measured child's nonverbal communicative skills and other sociocognitive abilities, and the second visit measured the child's MA and IQ. Nonverbal communication was measured using abbreviated version of the Early social communication scales (ESCS) (Mundy, Hogan, & Doehring, 1996). During the ESCS administration, the tester presented a series of situations and toys designed to elicit initiations or responses involving requesting, joint attention, and social interaction. The behaviours studied were categorized into high and low levels for scoring the child's development of nonverbal communication.

The results revealed that the duration of the ESCS testing did not differ across the four groups. There was a significant difference in the average number of nonverbal communicative acts in four groups in ESCS. Children with autism had significantly fewer nonverbal communications than the children in other three groups, while the latter three groups did not differ. The results of frequency data revealed that, the young children with autism displayed deficits on Low Level initiating joint attention compared to other three groups, as well as impairments on High Level initiating joint attention compared to DD and TD2 groups. In addition, TD2 group displayed significantly more High Level initiating joint attention acts than the TD1 group. Initiating requests revealed that young children with autism displayed fewer Low and High level requests than TD2 and TD1 groups. Social interaction data revealed that children with DD group displayed more initiating social interaction than children with autism group and both of typically developing groups.

The results of proportion data revealed that, young children with autism displayed proportionately fewer High Level of initiating joint attention behaviors

compared to DD and TD2 groups. TD2 group had higher proportion of High Level of initiating joint attention skills than TD1 group. Requesting data revealed that young children with autism displayed significant higher proportion of Low Level requests than the DD group. Analysis of initiating social interaction revealed that, the children with DD group had significant higher proportion than children with autism, and other two typically developing groups. The results of the study on early social-communicative difficulties in autism highlight the need for both early diagnosis and early intervention.

Jones & Schwartz (2009) investigated communication patterns between high functioning children with autism and their families and typically developing children and their families within traditional dinner time conversation. The participant's were 30 families, 20 families with a child with autism, and 10 families with only typically developing children. Children in the ''typical'' group were proportionally matched according to age, gender, ethnicity, and approximate family size. Family dinner session was videotaped. Video recording was carried out once all family members were sitting at the dinner table and continued until the target child left the dinner table and did not return or until all other family members left and did not return. Responses were analyzed by coding interactions of family members with the target child. Individual interactions were split into component parts coming from each interactive partner and coded as either bids or responses. Bids were categorized into communications that are in the form of a question, request, directive, comment, or other. These included both verbal and non-verbal bids. Reponses were defined as any communicative act that follows a bid.

Results indicated that the families of children with autism spent an average of 45% of the time engaged in interactions with the target child compared to 51% of the time for families of typically developing children. The rate of bids (question, request, directive, comment, or other) measured as bids per minute revealed that typically developing children engaged in significantly more directives and comments per minute than children with autism but they did not differ significantly on questions, requests, and other bids. The function of target child bids and responses indicated that, typically developing children began more interactions per minute and continued interactions through more conversational turns per minute than children with autism. Children with autism ignored or rejected family bids more often (55% versus 38%) while typically developing children acknowledged more frequently (62% vs. 45%). Children with autism ignored/rejected significantly more family bids than typically developing children. The ignored/rejected bid was significantly more for comments than either questions or directives. From the above finding the author reports that the dinner time is an interesting and important time for studying family interactions. The behaviors demonstrated by the children with autism differed from their typically developing peers in number rather than form.

Research is now recently focusing on an area often ignored in the past, that of pragmatics. It is clear from the above mentioned literature that, pragmatic skills in typically developing children follows a developmental continuum and pragmatic skill deficits are one of the clinical symptoms which are commonly seen in children with Autism spectrum disorders (ASDs). Majority of the findings on pragmatic skills in children with ASD were based on individual aspects of pragmatic skill only. Much less is known about developmental aspect of pragmatic skills in children with ASD.

Due to the paucity of work in this area, the present cross sectional study was designed to address the developmental pattern of pragmatic skills in children with Autism spectrum disorders besides studying language age and social age matched Kannada speaking typically developing children as reference. Such a study would serve as basis for further research in Indian context and would enhance our understanding on the normal pattern of pragmatic skill development in typically developing children. It also helps in understanding the developmental changes of pragmatic skills in children with Autism spectrum disorders in comparison to typically developing children.

METHOD

The present cross sectional study aimed to investigate the developmental pattern of pragmatic skills in children with Autism spectrum disorders (ASD's) besides studying language age and social age matched Kannada speaking typically developing children as reference in a mother-child interactional context.

Research Design

A standard group comparison design was used. The group with Autism spectrum disorders was compared with language age and social age matched typically developing children in the context of mother-child interactions.

Aims and Objectives

The objectives of the study were three:

1. To study the development of pragmatic skills in Kannada speaking typically developing children from birth to six years of age in the context of mother-child interactions.

2. To study the development of pragmatic skills in children with Autism spectrum disorders having language age and social age up to six years in the context of mother-child interactions.

3. To compare the developmental pattern of pragmatic skills between the two groups in the context of mother-child interactions.

Participants

108 mother–child pairs participated in this study. The participants were divided into two groups, group I: reference group and group II: clinical group. Participants in the reference group were selected from individual home, crèche, play home and kindergarten located in different areas of Mysore and Bangalore city were chosen in order to get a representative cross sectional population from various socio-economic strata. Participants in the clinical group were drawn from the unit specialized in the evaluation and therapy for children with Autism spectrum disorders at the center of present study and various rehabilitation centers for children with Autism spectrum disorders in Bangalore city. Written informed consent was obtained from mothers prior to their inclusion along with their children in the study.

Group I: Reference group

Inclusion criteria for typically developing children:

Age: A random sample of 72 typically developing children from birth to six years of age (mean age of 4.3 years) in interaction with their mothers participated in this study. Literature review on the development of pragmatic skills reports that numerous pragmatic functions are noted during the first year of life. Hence, participants below one year of age were selected for the study. The entire group was divided into six subgroups with one year of age interval from birth to 6 years respectively. The subgroups included, birth – 1 year (mean age: 8months); 1.1 – 2 years (mean age: 1.5 years); 2.1 – 3 years (mean age: 2.7 years); 3.1 – 4 years (mean age: 3.5 years); 4.1 – 5 years (mean age: 4.9 years); 5.1 – 6 years (mean age: 5.10 years). Each subgroup consisted of 12 participants (6 male each and 6 female each).

Language used and spoken: All participants were from native Kannada speaking (a language of the Dravidian family spoken largely in South India) families.

Language measures: Direct assessment of language skills and social skills of very young children are not very amenable to behavioural testing. This is also true of 'difficult to test' children such as those in the Autism Spectrum Disorders group. Therefore, mother's interview method was used for both the groups i.e. reference group and clinical group in the study. The interview was carried out by the investigator. All mothers were cooperative on being interviewed and provided adequate information. The following are the screening tests used for assessment of language age and social age.

1. The Receptive-Expressive Emergent Language Scale (REELS) for the measurement of language skills in infancy (Bzoch & League, 1971). This scale is an implicit replica of a tri-dimensional model of linguistic behaviour which emphasizes the process of receptive language, expressive language and combined language age. This test is applicable for children in the age range from birth to three years. The questions in the test are framed with an age interval of one month in the first year; two months in the second year and three months in the third year respectively. Each level consists of six questions, three questions for assessment of receptive language age and three questions for assessment of expressive language age. Each level is equal to the chronological age of the child.

2. Comprehensive Language Assessment Tool for Children (Navitha & Shyamala, 2009). The test measures language skills (receptive language and expressive language) and cognitive skills of children from 3 to 6 years of age. The questions

in the test are framed with an age interval of six month from 3 to 5 years; one year interval from 5 to 6 years. Each level consists of six questions for assessment of receptive language age, six questions for assessment of expressive language age and six questions for assessment of cognitive skills. Each level is equal to the chronological age of the child.

3. Vineland Social Maturity Scale (VSMS), Indian adaptation (Malin, 1972). This scale measures the social maturity in terms of social age and social quotient. The items represent progressive maturation in self-help, self-direction, locomotion, occupation, communication and social relations. This test is used for individuals in the age range from birth to fifteen years. The scale provides a definite outline of detailed performance in respect to which children show a progressive capacity for looking after themselves and for participating in those activities which lead towards ultimate independence as adults.

Only participants who scored chronological age adequate scores in the above mentioned tests were included for this study.

The Modified Checklist for Autism in Toddlers (M-CHAT, Robins, Fein, Barton, & Green, 2001). The test provides information in terms of identifying children at risk for Autism. The test consist of 23 yes/no items. Yes/no answers convert to pass/fail responses. Six items represents critical items. A child fails the checklist when 2 or more critical items are failed or when any three items are failed.

In this study, M-CHAT was used to rule out presence of Autistic features in typically developing children. This test was administered on participants below three years of age through mother's interview. For participants above three years of age,

mothers were instructed to report if they had observed the behaviours listed in the test when their children were below three years of age. Only participants who passed the test were included for this study.

Hearing measure: Hearing loss was ruled out on informal assessment through mother's interview and through informal testing at the time of investigation of participants.

Exclusion criteria for typically developing children:

Children with the history of visual impairment, hearing loss, ear discharge, seizures and other developmental disabilities (based on parental reports) and also, with family history of any relevant speech, language and hearing disorders were excluded from the study.

Group II: Clinical group

Inclusion criteria for children with Autism spectrum disorders:

Age: Clinical group consisted of 36 children with a diagnosis of Autism Spectrum Disorders (ASDs) in the chronological age from 2.5-6.2 years (mean chronological age of 4.5 years) but with language age and social age up to six years in interaction with their mothers. The lower age of the participants in this study was 2.5 years (arbitrarily fixed on par with most common age period of the clinical encounter of such cases as, their age at first visit usually is greater than 3 years and occasionally between 2 to 3 years). Among the 36 participants, 35 were males and one child was female. All of the children with ASD met the DSM-IV criteria for Autistic disorder (American Psychiatric Association, 1994) as per diagnosis by Psychologists. All

participants had also received a diagnosis of Autistic disorder from qualified peadiatricians and Speech-language pathologists based on routine screening tests / diagnostic tests / and on clinical observation and profiling.

Intervention: All the participants had enrolled for speech and language therapy for duration up to two years respectively. These speech and language therapy durations were noted for analysis purposes.

Language used: All participants were from native Kannada speaking (a language of the Dravidian family spoken largely in South India) families. 26 participants had received intervention in Kannada and 10 participants were also trained in English at therapy sessions. The latter 10 participants were also exposed to Kannada language in the home environment.

Language measures: The Receptive-Expressive Emergent Language Scale (REELS) (Bzoch & League, 1971) and Comprehensive Language Assessment Tool for Children (Navitha & Shyamala, 2009) were used to assess language age of children with ASD. Language age was assessed by interviewing the mothers of children with ASD by the investigator.

Social skills and severity of ASD measures: Vineland Social Maturity Scale (VSMS), Indian adaptation (Malin, 1972) was used to assess social age. Social skills were assessed by qualified Psychologists by interviewing the mothers of children with ASD. The severity of the clinical condition was assessed using Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Rochen Renner, 1986). The test asses

the behavioural pattern in children with ASD on 15 parameters such as, relating to people, imitation, emotional response, body use, object use, adaptation to change, visual responses, listening responses, taste, smell, touch response & use, fear or nervousness, verbal communication, nonverbal communication, activity level, level and consistency of intellectual response and general impression. This test helps in distinguishing mild-to-moderate from severe Autism categories. The severity is assessed using rating scale. The scores in the rating scale ranges from 15 to 60. If the scores obtained by children falls within 15 to 30 it is considered as non Autistic; scores of 30 above to 36 refers to mild-to-moderate Autistic and score of 36 above to 60 refers to severely Autistic. For the present study, severity testing was carried out by the investigator. Children with ASD at the severity rate of mild-to-moderate (CARS score ranging from 30 above to 36) level were considered for the present study.

The demographic details of children with ASD, their language age, social age, diagnostic category and Speech-language therapy duration obtained at the time of investigation are given below (refer table: 1 & 2).

Table-1: Demographic details of children with ASD, their language age and social age

Participants	Gender	Chronological age (years. months)	Current Language age (years. months)		Current social age (years. months)
			Receptive	Expressive	
A1	M	2.5	1.8	0.9	1.3
A2	M	2.5	1.8	0.10	1.2
A3	M	2.6	1.4	0.9	1.4
A4	M	2.7	1.8	0.9	1.6
A5	M	2.10	1.8	1	1.8
A6	M	3.5	2.3	2	2.2
A7	M	3.6	2.3	0.11	2
A8	M	3.6	2.6	1.10	2.2

A9	M	3.6	1.4	11	2.2
A10	M	3.8	2.3	2.3	2.3
A11	M	3.8	1.4	0.9	2.1
A12	M	3.8	1.8	11	2.3
A13	M	4	3.6	3.6	2.6
A14	M	4	1.4	0.9	2.1
A15	M	4.2	3	2.3	2.6
A16	M	4.3	1.4	0.9	2.3
A17	F	4.5	2.6	2	2.7
A18	M	4.7	3	2.6	3.1
A19	M	4.7	2.6	1.6	3.1
A20	M	4.8	1.4	0.9	2.4
A21	M	5	2.6	0.9	2.6
A22	M	5	2.6	0.9	2.4
A23	M	5.2	4	3.6	3.2
A24	M	5.2	2.3	1.10	3
A25	M	5.2	3	1.10	3.2
A26	M	5.4	2.8	0.11	2.4
A27	M	5.4	3	1.10	3.2
A28	M	5.5	4	3.6	4.1
A29	M	5.6	3	1.2	3.6
A30	M	5.7	2.6	1	3.3
A31	M	5.8	2.6	1.8	3.2
A32	M	5.8	3	0.11	3.2
A33	M	5.10	3	1	3.3
A34	M	6	4.6	4	4.2
A35	M	6	3	1.8	4.1
A36	M	6.2	4.6	4	4.2

Table-2: Demographic details of children with ASD, their diagnostic category and Speech-language therapy duration

Participants	Gender	Chronological age (years. months)	Diagnostic category	Speech language therapy duration
A1	M	2.5	Autism	4months
A2	M	2.5	Autism	3months
A3	M	2.6	Autism	6months
A4	M	2.7	Autism	6months
A5	M	2.10	PDD(NOS)	3months
A6	M	3.5	Autism	6months
A7	M	3.6	Autism	5months
A8	M	3.6	Autism	1yr. 4months
A9	M	3.6	Autism	8months
A10	M	3.8	Autism	10months
A11	M	3.8	Autism	4 months

A12	M	3.8	Autism	1year
A13	M	4	PDD(NOS)	1year
A14	M	4	Autism	1year
A15	M	4.2	Autism	11months
A16	M	4.3	Autism	1yr 6months
A17	F	4.5	Autism	5months
A18	M	4.7	PDD(NOS)	10months
A19	M	4.7	Autism	1yr 6months
A20	M	4.8	Autism	11months
A21	M	5	Autism	1yr 1months
A22	M	5	Autism	1yr 1months
A23	M	5.2	Autism	1yr 6months
A24	M	5.2	Autism	5months
A25	M	5.2	Autism	1yr 6months
A26	M	5.4	Autism	1yr 4months
A27	M	5.4	Autism	2year
A28	M	5.5	PDD(NOS)	2year
A29	M	5.6	Autism	1yr 1months
A30	M	5.7	Autism	2year
A31	M	5.8	Autism	2year
A32	M	5.8	Autism	2year
A33	M	5.10	Autism	2year
A34	M	6	Autism	2year
A35	M	6	Autism	2year
A36	M	6.2	PDD(NOS)	2year

Exclusion criteria for children with Autism spectrum disorders:

Children with the history of visual impairment, regression in motor skills, hearing loss, seizures or any other medical condition that warranted medical attention (based on parental and other professional reports) were excluded from the study.

Test protocol

A developmental protocol for pragmatics (Dheepa & Shyamala, 2008) is the pragmatic test designed to investigate sequential pragmatic milestones for children from birth to eight years of age in Indian context. The authors had designed the test protocol along the domains of perlocutionary, locutionary and illocutionary act. The test consisted of 50 pragmatic skills. In their study, the method used for assessment of

pragmatic skills was parental interview method. The responses obtained were rated using 4 point rating scale, 0-almost never/not present; 1-very rare/25% present; 2-sometimes/50% present; 3-often/75% present and 4-almost always/100% present. The results of their study indicated a developmental continuum in acquisition of pragmatic skills by typically developing children. The results are given in appendix-1.

For the present study the above test protocol was used by eliminating skills that were repeated. This resulted in a list with a total of 19 pragmatic skills. In addition to this pragmatic skills namely labeling given item on request and negation were also included resulting in total of 21 pragmatic skills (refer appendix-2).

In the present study, emergence of pragmatic skills in children with ASD and typically developing children were assessed through mother-child interaction procedure. The study mainly focused to identify child's efficiency in responding to pragmatic skills initiated by the communicative partner (i.e. mother) and child's efficiency in initiating pragmatic skills during the course of interaction with his/her communicative partner (i.e. mother) in the given context.

With reference to the objective of the study, each of 21 pragmatic skills (refer appendix-2) were grouped into two categories. Pragmatic skills used by children as responses were grouped under category of responses from the children to mother's initiation of pragmatic skills. Pragmatic skills self initiated by children were grouped under the category of self initiation of pragmatic skills by children from two groups i.e. reference group and clinical group. This resulted in 26 pragmatic skills (refer appendix-3). Operational definition / explanatory note for each of the pragmatic skills is given in the appendix-4.

Pilot study

The pilot study was undertaken as a preliminary try-out of the test material and administration. The pilot study was necessary in order to evaluate whether the pragmatic skills used was effective in the group studied. Before the administration, an informed consent was obtained from the mothers. 36 mothers of typically developing children in the age range of birth to six years participated in the pilot study. The group was divided into six subgroups with one year of age interval for children. Each subgroup consisted of 6 mothers (3 mothers of 3 male children and 3 mothers of 3 female children). The performance of each child on the pragmatic skills studied was collected by interviewing the mother's individually. The results of the pilot study advocated no changes in the pragmatic skills used. As a result the same 26 pragmatic skills (refer appendix-3) were retained for the final test administration.

Procedure

An informed consent (refer appendix-6) in writing was obtained from all the mothers of children of the study. Before administration of the test, mothers were provided a full explanation of the nature of the study in terms of video recording, number of visits, time required, and tests administered to the child.

Developmental evaluation

Each participant of the two groups (reference group and clinical group) was seen first for a developmental evaluation. A detailed developmental history was acquired by interviewing the mothers. To establish speech and language skills, The Receptive-Expressive Emergent Language Scale (REELS) (Bzoch & League, 1971)

and Comprehensive Language Assessment Tool for Children (Navitha & Shyamala, 2009) were administered. Description of social skills was obtained using Vineland Social Maturity Scale (VSMS) (Indian adaptation; Malin, 1972). To rule out presence of Autistic features in typically developing children, The Modified Checklist for Autism in Toddlers (M-CHAT, Robins, Fein, Barton, & Green, 2001) was used. Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Rochen Renner, 1986) was used to identify the severity of the clinical condition in children with Autism spectrum disorders. Informal assessment was carried to collect information about motor skills development, hearing ability, and presence of any medical complications.

Materials:

Toys and activities suitable for children in the selected age range were included based on guidelines from 'Toy kit for children with developmental disabilities' (Venkatesan, 2003). The toys included were noisemakers, flash cards, story and picture books, puzzles, building blocks, toy vehicles, ball, doll, kitchen set. The same sets of toys were provided for both the groups (reference group and clinical group).

Familiarization and Rapport building

Before the recording participants were familiarized with the clinical settings. The investigator built rapport with mother-child to help overcome shyness/fear if any.

Sessions of semi instructed mother-child interactions served as the media through which the pragmatic skills were assessed. This testing method was used to create environment that promotes conversational social interaction between mother and child rather than merely a stimulus-response format. Mothers and children were instructed to play and interact with each other as they would normally do at home using as many of the toys and materials provided to them. The participants were also instructed to ignore the presence of investigator and camera.

The mothers of children above one year age were provided with all 14 pragmatic skills (refer appendix-3, Responses from children for mother's initiation of pragmatic skills) and were instructed to elicit responses covering all the 14 pragmatic skills. Mothers were also provided with 12 pragmatic skills (refer appendix-3, self initiation of pragmatic skills by children) and were instructed to create situations during interaction section to provide an opportunity for children to self initiate the pragmatic skills. Due to limited speech output among children below one year of age, the mothers were provided with pragmatic skills which elicited non verbal responses namely eye contact, gaze exchange, smiling / laughing, joint attention, turn taking and requesting of object and actions.

Mothers were instructed not to provide any clues to elicit responses from the child and provided the child requests for the same. Children were instructed to play with toys given and to interact with their mother as they naturally did at home. The investigator provided them with a few examples and instructions on how to use a particular toy and they were also encouraged to be more creative while handling a

particular toy in order to cover and increase the chances of occurrence of pragmatic functions, which were intended to be studied.

Recording

The session began with audio-video recording of mother-child interactions for assessing pattern of pragmatic skills in each child. The audio-video recording was done using a Sony (DCR-DVD703E) digital video camera recorder. The video camera was handled by the investigator. In this study the mother served as the child's playmate and conversational partner. Though the contributions from fathers are well acknowledged, they were not studied here. Mothers were selected as communication partners as they were the only available partner for communication in most cases.

Pragmatic skills of participants were recorded individually in the children's homes, the intervention center or study center, depending on the preference of the mother. Audio-video recording of mother-child interaction of 60 typically developing children was carried out at their homes and mothers of 12 typically developing children preferred to come to the study center for recording. Since most of the mothers of children with Autism spectrum disorders were familiar with the environment at the intervention center, majority of them preferred to be recorded at the intervention center they attended except for two mothers who preferred their home for recording. There was no difference seen in recording or behaviour of mother-child interaction recorded at home, intervention center and study center, as the recording was done according to the preference of the mothers.

The recording was done on the matted floor in order to create a nontesting environment for the child, to minimize test anxiety and to maximize naturalistic social

interaction, during the time of recording. The recording was done in a quiet room with limited distraction. During the time of recording except the investigator and mother-child pair, no other person was entertained.

Each mother-child interaction was recorded. The same sets of toys were provided to all the participants. No restrictions were given regarding play or position of the participants in the room. Toys appropriate for children aged birth to six years were scattered throughout the recording room. In order to keep the mothers as unconcerned as possible about the nature of their own speech, the mothers were told that the research was primarily about child pragmatic skill development.

An hour's audio-video recording of mother-child interaction was collected. The recorded sample mainly focused on the aim of the study, in between disturbances and other out of topic interruptions were avoided and not recorded. Each mother-child interaction session was recorded for four to five sessions within a week's duration. Number of interactive recording sessions varied for each child depending on the active participation of the participants. Based on the temperament of the child, adequate rest periods were given between the recordings. At the end of each session, children were provided with tangible reinforcement.

Coding procedure

The recoded video samples of mothers-child interaction were subjected to frequency calculation. Frequency referred to the number of instances of initiation from mother and responses given by each child and self initiation by each child for each pragmatic skill. The responses obtained from each child to mother's initiation of pragmatic skills was grouped into two categories namely, response and no response.

- ➢ *Response*: Contextually appropriate response (gestures and / or utterances) from the child that occurred to mother's initiation of pragmatic skills
- ➢ *No response*: Ignoring the question without answering. Responses out of topic were also grouped in "no response" category, for ease of practical analysis for statistical purpose.

Selection of judges

Including the experimenter three professionals, who were postgraduates in speech and language pathology having a minimum of 2 years of experience in intervention of children with Autism spectrum disorders, were selected as judges. The samples were judged independently by these three judges.

Training the judges for analysis and coding

The judges were familiarized with the operational definitions for the various pragmatic skills used by the mothers and children. Pretraining procedures included familiarization, discussion, and clarification of the definitions of each of the pragmatic skills to be evaluated and coding procedure. Pretraining was accomplished using videotape of one typically developing child (not the part of this study) meeting all the criteria under study.

After the completion of training period, the two judges were blind to the purpose of the study. No identity was revealed about the subjects, except information on age. The audio-video recording from the cassette of the digital video camera were loaded on to a personal computer and recorded on to a Digital Video Disc (DVD) that was then analyzed. Recorded audio-video samples were shown to the judges along

with the operational definitions / explanatory note and score sheets (refer appendix-4 & 5). Judges were allowed to see the video any number of times they wanted. Adequate time was given to the judges for frequency calculation. The judges viewed the video recording of mother-child interaction and coded the frequency of response, no response and child's self initiation of pragmatic skills studied.

Statistical analysis

Data obtained were tabulated for each participated and analyzed using the statistical package for the social sciences program (SPSS Version17). The data of reference group were subjected to, MANOVA, Duncan's Post Hoc and Discriminant analysis. Due to limited number of participants in the clinical group the data was subjected to non parametric tests namely Mann-Whitney U test and Kruskal-Wallis H test. Reliability measures using alpha co-efficient.

Test-retest reliability

Test-retest reliability measure was carried out by re-recording 10% of the participants from each group after 10 days from the first recording. The procedure employed was similar as mentioned earlier. The scores obtained were subjected to statistical analysis. Reliability co-efficient alpha was calculated and was found to be 0.7 to 0.8 that showed high reliability between the first and second recording.

Interjudge reliability:

For each pragmatic skill, interjudge reliability was calculated among the three judges. Reliability co-efficient alpha was calculated and it was found to be 0.7 to 0.8 indicating high reliability between the judges.

Intrajudge reliability:

10% of the samples were randomly chosen and re-analyzed independently by the same three judges after a month of first analysis. Reliability co-efficient alpha was calculated and it was found to be 0.8 indicating high intra judge reliability.

The raw scores were converted into percentile values. The statistical data obtained were tabulated and depicted graphically wherever it was felt necessary. Results & Discussion of the data are presented in the following chapter.

RESULTS AND DISCUSSION

The present cross sectional study aimed to explore the developmental pattern of pragmatic skills in children with Autism spectrum disorders (ASDs) besides studying language age and social age matched Kannada speaking typically developing children as reference in a mother-child interactional context. Statistical analyses were carried out to compare the performance within the group and between the two groups for pragmatic skills studied. The different statistical tests used were MANOVA, Duncan's Post Hoc test, Discriminant analysis, Mann-Whitney U test, Kruskal-Wallis H test, Reliability measures using alpha co-efficient. The results of the study are presented under the following sections:

I. Pragmatic skills that emerged in typically developing children

   IA. Responses from children for mother's initiation of pragmatic skills in the communicative context.

   IB. Self initiation of pragmatic skills by children in the communicative context.

II. Comparison between the two groups i.e. reference Vs clinical group

   IIA. Responses from children for mother's initiation of pragmatic skills in the communicative context: Comparison based on language age (i.e. language comprehension age and language expression age) and social age.

   IIB. Self initiated pragmatic skills by children in the communicative context: Comparison based on language age (i.e. language comprehension age and language expression age) and social age.

III. Comparison within the clinical group based on the duration of speech-language therapy received.

    IIIA. Responses from children for mother's initiation of pragmatic skills in the communicative context.

    IIIB. Self initiation of pragmatic skills by children in the communicative context.

Pragmatics refers to the use of language in social communication. The language used for communication can be verbal or gestural. Since, this study aimed at identifying development of pragmatic skills and not the modality of use of language, verbal or gestural responses were taken into consideration for analysis. The study does not focus about the cause and effect relationship between the performances of children with Autism spectrum disorders on pragmatic skills studied with their clinical symptoms.

I. Pragmatic skills that emerged in typically developing children

The present study mainly aimed to identify child's efficiency in responding to pragmatic skills initiated by the communicative partner (i.e. mother) and child's efficiency in initiating pragmatic skills during the course of interaction with his/her communicative partner (i.e. mother) in the given context. The performance of typically developing children on 26 pragmatic skills (refer appendix-3) are presented below:

IA. Responses by typically developing children to mother's initiation of pragmatic skills in the communicative context.

Based on their functions, 14 pragmatic skills (refer appendix-3, responses from children for mother's initiation of pragmatic skills in the communicative context) were considered in this section. 80% criterion level was used in the study to indicate the emergence of pragmatic skills at the given age. This criterion level was used to strengthen the results of the study. 80% criterion level for individual child in this study referred to, any child responding for minimum of 80% of the time to mother's initiation of pragmatic skills, indicating that the given pragmatic skill is acquired by the child. Total 80% criterion level in this study referred to, minimum of 80% of children in the given age group were found to be responding each 80% of the time to mother's initiation of pragmatic skills, indicating that the given pragmatic skills are acquired at the given age group.

In the present study, the analyses of responses by typically developing children for pragmatic skills initiated by mothers revealed no differences in performance between male and female participants of the study. Hence, in the final analysis, data was combined and the results are presented in the table-3.

Table-3: Pragmatic skills that emerged in typically developing children
(responses to mother's initiation of pragmatic skills)

Sl. No	Pragmatic skills	Birth - 1 year	1.1-2 years	2.1-3 years	3.1-4 years	4.1-5 years	5.1-6 years
1	Response for eye contact	+	+	+	+	+	+
2	Smiling	+	+	+	+	+	+
3	Response for gaze exchange	-	-	-	+	+	+
4	Response for Joint attention	-	-	-	+	+	+
5	Response for request of object and / or action	-	-	-	+	+	+
6	Response for labeling	-	-	-	+	+	+

7	Answering questions	-	-	-	+	+	+
8	Response for negation	-	-	-	+	+	+
9	Response for Turn taking	-	-	-	+	+	+
10	Response for conversational repair	-	-	-	-	+	+
11	Response for Topic initiation	-	-	-	-	+	+
12	Response for Topic maintenances	-	-	-	-	+	+
13	Response for comment / feedback	-	-	-	-	-	+
14	Response for adding information	-	-	-	-	-	+

Table-3: presents the type of pragmatic skills (responses to mother's initiation of pragmatic skills) that emerged in typically developing children in the age range from birth to 6 years. The shaded block represents the age at which 80% criterion level was met by typically developing children on pragmatic skills studied. As observed in table-3, pragmatic skills that emerged at different age range are as follows:

1. At birth to one year of age: Response for eye contact and smiling.

2. At 1.1 to 2 years: Response for eye contact and smiling.

3. At 2.1 to 3 years of age: Response for eye contact and smiling.

4. At 3.1 to 4 years of age: Response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, and response for turn taking.

5. At 4.1 to 5 years of age: Response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, response for conversational repair, response for topic initiation and response for topic maintenances.

6. At 5.1 to 6 years of age: In the study all the 14 pragmatic skills emerged at 5.1-6 years of age, response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, response for conversational repair, response for topic initiation, response for topic maintenances, response for comment / feedback and response for adding information.

The results of the study on responses given by typically developing children for pragmatic skills initiated by mothers in the communicative context indicates that, acquisition of pragmatic skills follows a developmental continuum.

IA.1. Percentage of responses by typically developing children to mother's initiation of pragmatic skills

In order to check for the presence of gender effect on percentage of responses by typically developing children to mother's initiation of pragmatic skills, Mann-Whitney U test was carried out. These analyses revealed that no significant differences at .05 level of significance were present between male and female participants of the study. Hence, in the final analysis, data was combined and MANOVA was carried out to determine the effect of age on pragmatic skills studied (refer table-5). Duncan's Post Hoc test was carried out to check pair wise differences between the age groups on pragmatic skills studied (refer table-6).

Table-4: Mean percentage & SD values for responses from typically developing children to mother's initiation of pragmatic skills.

Pragmatic skills	Birth – 1 year		1.1-2 years		2.1-3 years		3.1-4 years		4.1-5 years		5.1-6 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
R_EC	80.33	4.24	80.45	4.44	83.72	4.243	85.20	3.18	86.85	3.13	88.52	1.75
Sml	81.20	5.06	81.97	4.95	83.09	3.87	81.41	3.47	85.31	5.74	87.49	3.15
R_GEx	53.48	12.41	59.83	23.07	76.28	9.71	78.55	8.32	79.03	8.98	82.39	4.34
R_JA	61.48	6.28	69.85	11.18	78.24	5.56	79.84	7.74	81.11	4.67	83.14	4.38
R_Rq	8.41	5.51	35.76	14.61	72.15	13.80	78.93	8.75	83.71	7.08	87.29	5.36
R_Lb	.00	.00	73.35	24.57	81.69	10.64	87.24	9.08	90.60	7.55	92.68	5.62
AQ	.00	.00	35.22	16.42	70.65	9.48	79.73	5.47	79.41	9.98	86.09	3.90
R_Ng	.00	.00	17.96	13.87	84.74	11.31	85.91	9.14	87.63	8.54	91.42	7.14
R_TT	43.85	7.03	71.98	20.26	79.73	8.80	84.71	6.33	85.01	4.73	84.96	4.04
R_Rp	.00	.00	.00	.00	70.60	10.00	70.31	11.95	79.92	5.52	80.91	4.62
R_TI	.00	.00	40.20	9.66	73.30	8.85	76.46	9.56	81.30	4.88	82.80	4.37
R_TM	.00	.00	37.98	9.52	71.35	9.89	73.56	9.18	81.30	4.88	82.80	4.37
R_C/Fb	.00	.00	.00	.00	69.27	12.48	70.75	14.70	82.61	8.25	83.75	6.21
R_AI	.00	.00	.00	.00	66.95	9.57	69.25	13.03	74.76	9.65	84.05	6.08

R_EC: response for eye contact, Sml: smiling, R_GEx: response for gaze exchange, R_JA: response for joint attention, R_Rq: response for request of object and / or action, R_Lb: response for labeling, AQ: answering questions, R_Ng: response for negation, R_TT: response for turn taking, R_Rp: response for conversational repair, R_TI: response for topic initiation, R_TM: response for topic maintenances, R_C/Fb: response for comment / feedback, R_AI: response for adding information

Table-4: shows mean percentage and SD values for responses from typically developing children to mother's initiation of pragmatic skills. As indicated in table-4, responses for pragmatic skills by typically developing children increased with age for skills like, eye contact, gaze exchange, joint attention, request of object and / or action, labeling, answering questions, negation, turn taking, conversational repair, topic initiation, topic maintenances, comment / feedback and adding information. For the skill namely smiling there was a slight decrease in response pattern at 3.1-4 years

of age. However, the pragmatic responses increased at 4.1-5 years and 5.1-6 years of age compared to the younger age groups i.e. birth-1 year; 1.1-2 years and 2.1-3 years.

At the age of 1.1-2 years none of the participants responded for pragmatic skills such as, conversational repair, comment / feedback and adding information. At birth-1 year of age none of the participants responded for pragmatic skills namely, labeling, answering questions, negation, conversational repair, topic initiation, topic maintenances, comment / feedback and adding information. The percentage of responses from typically developing children for pragmatic skills initiated by mother increased with increase in age.

Table-5: MANOVA values for responses from typically developing children to mother's initiation of pragmatic skills

Pragmatic skills	F (5,66)
R_EC	10.23***
Sml	3.76**
R_GEx	10.76***
R_JA	16.75***
R_Rq	123.47***
R_Lb	101.85***
AQ	164.63***
R_Ng	228.91***
R_TT	30.61***
R_Rp	375.80***
R_TI	254.46***
R_TM	243.66***
R_C/Fb	240.69***
R_AI	273.01***

*** p< .001, ** p< .01,

R_EC: response for eye contact, Sml: smiling, R_GEx: response for gaze exchange, R_JA: response for joint attention, R_Rq: response for request of object and / or action, R_Lb: response for labeling, AQ: answering questions, R_Ng: response for negation, R_TT: response for turn taking, R_Rp: response for conversational repair, R_TI: response for topic initiation, R_TM: response for topic maintenances, R_C/Fb: response for comment / feedback, R_AI: response for adding information

Table-5: shows MANOVA results for responses from typically developing children to mother's initiation of pragmatic skills. MANOVA was carried out to

determine the effect of age on pragmatic skills studied. The results of pragmatic responses by typically developing children across the age groups indicated significant differences at .01 level and .001 level of significance. i.e. statistically significant differences for pragmatic skill namely smiling were found to be at .01 level of significance. The rest of the pragmatic skills indicated significant differences at .001 level of significance.

Table-6: Duncan's test at 0.05 level of significance for responses from typically developing children to mother's initiation of pragmatic skills

Age (in years)	Pragmatic skills													
	R_EC	Sml	R_GEx	R_JA	R_Rq	R_Lb	AQ	R_Ng	R_TT	R_Rp	R_TI	R_TM	R_C/Fb	R_AI
Birth-1 & 1.1-2	NS	NS	NS	S	S	S	S	S	S	NS	S	S	NS	NS
Birth-1 & 2.1-3	S	NS	S	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 3.1-4	S	NS	S	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 4.1-5	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 5.1-6	S	S	S	S	S	S	S	S	S	S	S	S	S	S
1.1-2 & 2.1-3	S	NS	S	S	S	NS	S	S	NS	S	S	S	S	S
1.1-2 & 3.1-4	S	NS	S	S	S	S	S	S	S	S	S	S	S	S
1.1-2 & 4.1-5	S	NS	S	S	S	S	S	S	S	S	S	S	S	S
1.1-2 & 5.1-6	S	S	S	S	S	S	S	S	S	S	S	S	S	S
2.1-3 & 3.1-4	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS
2.1-3 & 4.1-5	S	NS	NS	NS	S	S	S	NS	NS	S	S	S	S	S
2.1-3 & 5.1-6	S	S	NS	NS	S	NS	S	NS	NS	S	S	S	S	S
3.1-4 & 4.1-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	S	S	NS
3.1-4 & 5.1-6	S	S	NS	NS	NS	NS	NS	NS	NS	S	S	S	S	S
4.1-5 & 5.1-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S

S: Significant; **NS:** Not significant

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, **R_Lb:** response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-6: shows results of Duncan's test at 0.05 level of significance (pair wise comparison for the parameters which showed significant age affect under MANOVA) for responses from typically developing children to mother's initiation of pragmatic skills. These results were cross checked with non parametric Mann-Whitney U test. Same results were obtained on both the tests.

The results indicated that, except between the age group pairs of, 2.1-3 years & 3.1-4 years; 2.1-3 years & 4.1-5 years; 2.1-3 years & 5.1-6 years; 3.1-4 years & 4.1-5 years; 3.1-4 years & 5.1-6 years; 4.1-5 years & 5.1-6 years the other group pairs indicated statistically significant differences at .05 level of significance for most of the responses given by typically developing children for mother's initiation of pragmatic skills. This result indicates that, at the higher age level the performance of typically developing children showed similar results as, statistically significant differences were not seen for all the pragmatic responses.

Discriminant function analysis

In this study, the statistical measure of discriminant function analysis was used to differentiate between the age groups studied on 14 pragmatic skills. The discriminant function analysis showed five functions. The first function (DF1) accounted for 86.2% of the total variability (Eigen value = 109.84, λ = .000, $p < 0.05$, Chi-square = 531.822); the second function (DF2) accounted for 12.3% (Eigen value = 15.709, λ = .017, $p < 0.05$, Chi-square = 246.979); the third function (DF3) accounted for 1.1% (Eigen value = 1.410, λ = .282, $p < 0.05$, Chi-square =76.614);

the fourth function (DF4) accounted for .2% (Eigen value = .300, λ = .679, p > 0.05, Chi-square =23.399); the fifth function (DF5) accounted for .1% (Eigen value = .133, λ = .883, p > 0.05, Chi-square =7.537). While DF1, DF2, & DF3 were statistically significant for separating the age group data, DF4 & DF5 were not. On standardized discriminant function coefficients, DF_1 was found to be most heavily weighted on pragmatic skills studied. Tables 7, 8 & 9 shows discriminant function coefficient, structure matrix and centroids for groups for responses of pragmatic skills.

Table-7:Discriminant function coefficient for responses from typically developing children to mother's initiation of pragmatic skills

Parameters	Standardized canonical Discriminant function coefficient				
	Function				
	1	2	3	4	5
R_EC	.117	.054	-.117	.543	.265
Sml	-.058	-.041	.513	-.037	-.500
R_GEx	-.788	.640	.203	.075	-.108
R_JA	-.052	-.101	.072	.580	-.128
R_Rq	-.102	.176	.178	.119	.487
R_Lb	.915	-2.035	.151	-.781	-.269
AQ	.069	-.028	-.158	.684	.431
R_Ng	.702	.232	-.506	.016	-.587
R_TT	-.639	1.438	-.386	.349	.565
R_Rp	.556	.338	-.029	-.558	.168
R_TI	.258	-2.183	-4.771	.661	-.056
R_TM	-.228	1.335	4.816	-.892	-.021
R_C/Fb	-.057	.421	.109	-.295	.773
R_AI	.572	.323	-.018	.415	-.785

*R_EC: response for eye contact, **Sml**: smiling, **R_GEx**: response for gaze exchange, **R_JA**: response for joint attention, **R_Rq**: response for request of object and / or action, **R_Lb**: response for labeling, **AQ**: answering questions, **R_Ng**: response for negation, **R_TT**: response for turn taking, **R_Rp**: response for conversational repair, **R_TI**: response for topic initiation, **R_TM**: response for topic maintenances, **R_C/Fb**: response for comment / feedback, **R_AI**: response for adding information*

Table-8: Structure matrix for responses from typically developing children to mother's initiation of pragmatic skills

Parameters	Structure Matrix				
	Function				
	1	2	3	4	5
R_Rp	**.497***	.284	-.013	-.250	.163
R_AI	**.423***	.246	.041	.357	-.148
R_TI	**.412***	-.203	.020	.103	.124
R_TM	**.404***	-.174	.139	.086	.130

R_C/Fb	**.398***	.229	.096	-.092	.327
R_Ng	**.396***	.074	-.217	-.049	-.157
R_Lb	.232	**-.337***	.066	.071	.242
Sml	.033	.013	**.319***	.154	-.281
AQ	.333	-.108	-.030	**.521***	.238
R_EC	.076	.046	.212	**.362***	.212
R_JA	.106	-.030	.057	**.178***	.034
R_GEx	.086	.011	.004	**.137***	.004
R_Rq	.291	-.047	.071	.293	**.327***
R_TT	.135	-.140	-.003	.109	**.288***

*. Largest absolute correlation between each variable and any discriminant function

*R_EC: response for eye contact, **Sml**: smiling, **R_GEx**: response for gaze exchange, **R_JA**: response for joint attention, **R_Rq**: response for request of object and / or action, **R_Lb**: response for labeling, **AQ**: answering questions, **R_Ng**: response for negation, **R_TT**: response for turn taking, **R_Rp**: response for conversational repair, **R_TI**: response for topic initiation, **R_TM**: response for topic maintenances, **R_C/Fb**: response for comment / feedback, **R_AI**: response for adding information*

Table-9: Centroids for groups for responses by typically developing children to mother's initiation of pragmatic skills

	Centroids for groups				
	Function				
AGE	1	2	3	4	5
1.00	-17.466	5.311	0.0674 8030	0.0053 5654	0.0316396 0
2.00	-10.106	-7.491	.298	0.0621 9767	- 0.0268476
3.00	5.425	.394	-.964	-.654	-.542
4.00	5.801	0.0013 2394	-1.900	.454	.370
5.00	7.782	.486	1.216	-.641	.460
6.00	8.563	1.299	1.282	.774	-.292

Figure-1: Canonical discriminant functions of age groups (responses by typically developing children to mother's initiation of pragmatic skills)
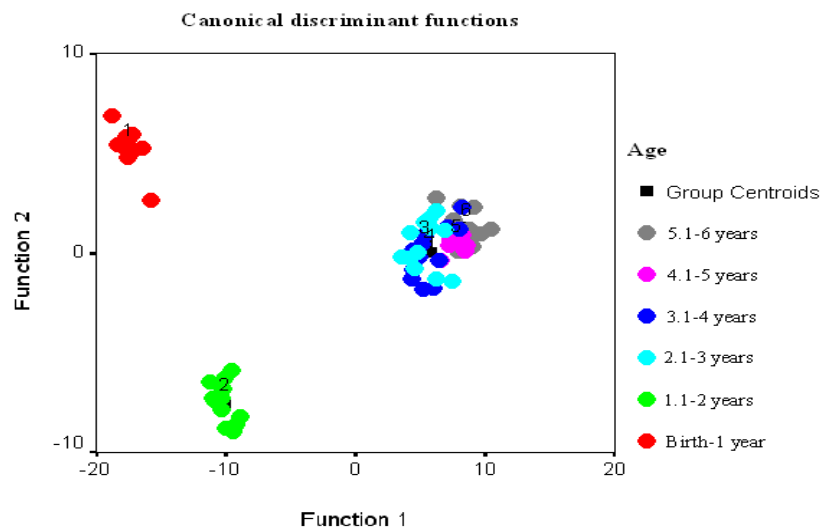
Figure-1: Shows canonical discriminant functions of age groups i.e. from birth to 6 years respectively for responses from typically developing children to mother's initiation of pragmatic skills. As indicated in the figure-1, responses for pragmatic skills by birth-1 year old typically developing children were found to be unique from the rest of the groups. Similarly typically developing children at 1.1-2 years of age performed differently compared to other age groups. The response pattern obtained at 2.1-3 years; 3.1-4 years; 4.1-5 years and 5.1-6 years of age were found to be similar and overlapping. The results of the study indicated that, at the higher ages pragmatic responses by typically developing children to mother's initiation of pragmatic skills were similar compared to the responses of children at lower age groups.

The results obtained from discriminant functions are similar with mean percentage of responses for pragmatic skills by typically developing children (refer table-4). The percentage responses on pragmatic skills by participants in the age of 2.1-3 years; 3.1-4 years; 4.1-5 years and 5.1-6 years indicted similarity in performance. Participants in the age of birth-1 year and 1.1-2 years differed from rest of the groups. As indicated in table-4, for all the 14 pragmatic skills responses from typically developing children were seen at 2.1-3 years; 3.1-4 years; 4.1-5 years and 5.1-6 years of age. At the age of 1.1-2 years none of the participants responded for pragmatic skills namely, conversational repair, comment / feedback and adding information. At the age of birth-1 year of age none of the participants responded for pragmatic skills like, labeling, answering questions, negation, conversational repair, topic initiation, topic maintenances, comment / feedback and adding information.

IB. Self initiation of pragmatic skills by typically developing children in the communicative context.

Based on their functions, 12 pragmatic skills (refer appendix-3, self initiation of pragmatic skills by children) were considered in this section. The emergence of pragmatic skills was considered only if the child initiated the given pragmatic skill for minimum of fifteen times during an hour of mother-child interaction. Here again total 80% criterion level was used i.e. 80% of children in the given age group were found to be initiating the pragmatic skills for minimum of fifteen times each. This criterion level was used to strengthen the results of the study.

In the present study, the analyses of self initiation of pragmatic skills by typically developing children revealed no differences in performance between male and female participants of the study. Hence, in the final analysis, data was combined and the results are presented in the table-10.

Table-10: Self initiation of pragmatic skills by typically developing children

Sl. No	Pragmatic skills	Birth -1 year	1.1-2 years	2.1-3 years	3.1-4 years	4.1-5 years	5.1-6 years
1	Refusal	+	+	+	+	+	+
2	Communicative intent	-	+	+	+	+	+
3	Request for object and / or action	-	+	+	+	+	+
4	Stylistic variation	-	-	+	+	+	+
5	Questioning	-	-	+	+	+	+
6	Initiation of Turn taking	-	-	+	+	+	+
7	Narration	-	-	-	+	+	+
8	Topic initiation	-	-	-	+	+	+
9	Initiation of Topic maintenances	-	-	-	+	+	+
10	Topic change	-	-	-	+	+	+
11	Initiation of Joint attention	-	-	-	-	+	+
12	Request for Repair	-	-	-	-	+	+

Table-10: represents the type of pragmatic skills (self initiated) emerged in typically developing children from birth to 6 years of age. The shaded block represents the age at which 80% criterion level was met by children for self initiation of pragmatic skills. The pragmatic skills self initiated by typically developing children at different age range are as follows:

1. At birth to one year of age: Refusal.

2. At 1.1 to 2 years: Refusal, communicative intent and request for object and / or action.

3. At 2.1 to 3 years: Refusal, communicative intent, request for object and / or action, stylistic variation, questioning and initiation of turn taking.

4. At 3.1 to 4 years: Refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances and topic change.

5. At 4.1 to 5 years: At this age all the 12 pragmatic skills emerged, Refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair. Similar results were obtained at 5.1 to 6 years of age.

IB.1 Frequency of self initiation of pragmatic skills by typically developing children

In order to check for the presence of gender effect on self initiation of pragmatic skills by typically developing children, Mann-Whitney U test was carried out. These analyses revealed that no significant differences at .05 level of significance were present between male and female participants of the study. Hence, in the final analysis, data was combined and MANOVA was carried out to determine the effect of

age on pragmatic skills self initiated by typically developing children (refer table-12). Duncan's Post Hoc test was carried out to check pair wise differences between the age groups on pragmatic skills self initiated by typically developing children (refer table-13).

Table-11: Mean & SD values for self initiation of pragmatic skills by typically developing children

Pragmatic skills	Birth-1year		1.1-2 years		2.1-3 years		3.1-4 years		4.1-5 years		5.1-6 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Rf	16.75	5.34	23.67	4.75	21.75	2.70	18.67	2.06	16.33	3.89	16.00	4.07
CI	10.47	2.31	14.67	3.28	16.75	2.77	25.25	4.86	22.58	4.03	25.67	4.48
Rq	.00	.00	20.59	4.03	34.00	4.86	21.83	6.10	27.58	7.15	28.25	10.38
SV	.00	.00	7.00	2.17	22.17	4.71	24.83	5.18	24.83	9.88	25.50	6.64
Qn	.00	.00	8.08	2.54	32.25	6.86	26.25	5.79	20.83	3.93	18.33	2.67
I_TT	2.08	3.15	5.92	1.31	46.02	5.94	48.00	6.61	44.73	5.22	48.63	5.60
Nr	.00	.00	.00	.00	7.83	2.62	17.58	2.678	18.50	2.65	20.42	3.29
TI	.00	.00	.00	.00	13.58	3.06	24.93	3.77	23.27	3.59	25.75	5.09
I_TM	.00	.00	.00	.00	10.50	2.71	20.75	3.20	18.84	1.83	21.00	3.87
TC	.00	.00	.00	.00	13.58	3.06	24.88	3.82	23.27	3.59	25.75	5.09
I_JA	.00	.00	.00	.00	8.08	2.57	8.25	2.22	16.67	3.45	18.83	4.13
R_Rp	.00	.00	.00	.00	12.00	4.02	11.75	3.84	19.83	5.59	23.75	7.63

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-11: shows mean and SD values for self initiation of pragmatic skills by typically developing children. The mean values were calculated for raw scores. Raw scores in the study referred to the number of times each pragmatic skill was initiated by typically developing children.

As shown in table-11, pragmatic skills self initiated by typically developing children increased with age for skills namely stylistic variation, narration, initiation of joint attention and request for conversational repair. For skills such as communicative

intent, initiation of turn taking, topic initiation, initiation of topic maintenances and topic change, there was slight decrease in response pattern at 4.1-5 years of age. This may be due to the poor performances observed in one of the participant belonging to this particular age group. However, the self initiation of pragmatic skills increased at 5.1-6 years compared to the younger age groups i.e. birth-1 year; 1.1-2 years; 2.1-3 years and 3.1-4 years indicating increase in initiation of pragmatic skills with increase in age. Requesting for object and / or action was found to be high at 2.1-3 years compared to the higher age groups. However, it was observed that requesting skill increased with age from 3.1-4 years to 5.1-6 years respectively with lesser frequency of initiation compared to 2.1-3 years old.

Initiation of pragmatic skills like questioning was high at the age of 2.1-3 years and decreased with age, indicates the interest / curiosity in understanding new concepts compared to the higher age groups. Refusal skill decreased with increase in age, probably because of maturity and socio-cultural awareness.

At the age of 1.1-2 years none of the participants initiated pragmatic skills like narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair. At the age of birth-1year none of the participants initiated pragmatic skills namely, request for object and / or action, stylistic variation, questioning, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

MANOVA was carried out to determine the effect of age on self initiation of pragmatic skills by typically developing children. MANOVA values are given in table-12

Table-12: MANOVA values for self initiation of pragmatic skills
by typically developing children

Pragmatic skills	F (5,66)
Rf	7.70***
CI	33.27***
Rq	42.70***
SV	44.92***
Qn	92.06***
I_TT	237.97***
Nr	198.77***
TI	169.28***
I_TM	198.21***
TC	168.06***
I_JA	113.10***
R_Rp	57.88***

*** p< .001

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-12: shows MANOVA results for self initiation of pragmatic skills by typically developing children. The results indicated significant differences at .001 level of significance across the age groups for all the 12 pragmatic skills self initiated by typically developing children.

Duncan's Post Hoc test was carried out to check pair wise differences between the age groups on pragmatic skills self initiated by typically developing children. The results are given in table-13.

Table-13: Duncan's test at 0.05 level of significance for self initiation of pragmatic skills by typically developing children

Age (in years)	Pragmatic skills											
	Rf	CI	Rq	SV	Qn	I_TT	Nr	TI	I_TM	TC	I_JA	R_Rp
Birth-1 & 1.1-2	S	S	S	S	S	S	NS	NS	NS	NS	NS	NS
Birth-1 & 2.1-3	S	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 3.1-4	NS	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 4.1-5	NS	S	S	S	S	S	S	S	S	S	S	S
Birth-1 & 5.1-6	NS	S	S	S	S	S	S	S	S	S	S	S
1.1-2 & 2.1-3	NS	NS	S	S	S	S	S	S	S	S	S	S
1.1-2 & 3.1-4	S	S	S	S	S	S	S	S	S	S	S	S
1.1-2 & 4.1-5	S	S	NS	S	S	S	S	S	S	S	S	S
1.1-2 & 5.1-6	S	S	S	S	S	S	S	S	S	S	S	S
2.1-3 & 3.1-4	NS	S	S	NS	S	NS	S	S	S	S	NS	NS
2.1-3 & 4.1-5	S	S	S	NS	S	NS	S	S	S	S	S	S
2.1-3 & 5.1-6	S	S	S	NS	S	NS	S	S	S	S	S	S
3.1-4 & 4.1-5	NS	NS	S	NS	S	NS	NS	NS	NS	NS	S	S
3.1-4 & 5.1-6	NS	NS	NS	NS	S	NS	S	NS	NS	NS	S	S
4.1-5 & 5.1-6	NS	NS	S	NS	NS	NS	S	NS	S	S	S	S

S: Significant; NS: Not significant

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-13: shows results of Duncan's test at 0.05 level of significance (pair wise comparison for the parameters which showed significant age affect under MANOVA) for pragmatic skills self initiated by typically developing children. These results were cross checked with non parametric Mann-Whitney U test. Same results were obtained on both the tests.

The results indicated that, except between the age group pairs of 3.1-4 years & 4.1-5 years; 3.1-4 years & 5.1-6 years; 4.1-5 years & 5.1-6 years, other group pairs indicated statistically significant differences at .05 level of significance for most of the pragmatic skills self initiated by typically developing children. This result indicates that at the higher age level, the performance of typically developing children was similar hence, statistically significant differences were not seen for all pragmatic skills self initiated by typically developing children.

Discriminant function analysis

The discriminant function analysis for self initiation of pragmatic skills by typically developing children showed five functions. The first function (DF1) accounted for 82.8% of the total variability (Eigen value = 47.517, λ = .000, p < 0.05, Chi-square = 483.465); the second function (DF2) accounted for 12% (Eigen value = 6.864, λ = .020, p < 0.05, Chi-square = 242.787); the third function (DF3) accounted for 3.1% (Eigen value = 1.789, λ = .157, p < 0.05, Chi-square =114.926); the fourth function (DF4) accounted for 1.9% (Eigen value = 1.086, λ = .437, p < 0.05, Chi-square =51.324); the fifth function (DF5) accounted for .2% (Eigen value = .097, λ = .912, p > 0.05, Chi-square =5.727). While DF1, DF2, DF3 & DF4 were statistically significant for grouping the age group data, DF5 was not. On standardized discriminant function coefficients, DF_1 was found to be most heavily weighted on performance of typically developing children on self initiation of pragmatic skills. Tables 14, 15 & 16 show discriminant function coefficient, structure matrix and centroids for groups for responses of pragmatic skills.

Table-14: Discriminant function coefficient for self initiation of pragmatic skills by typically developing children

Parameters	Standardized canonical Discriminant function coefficient				
	Function				
	1	2	3	4	5
Rf	-.035	.168	.180	.185	.075
CI	.197	-.129	.233	.377	.473
RQ	.111	.349	.919	.385	.058
SV	.119	.096	.478	.346	-.088
QN	-.051	.855	-.159	-.184	-.638
I_TT	.501	.229	-.612	-.376	.611
NR	.458	-.008	.347	.143	-.614
TI	4.125	1.807	-5.984	2.239	-1.409
I_TM	.404	-.511	-.256	.281	.439
TC	-4.255	-1.857	5.881	-2.047	1.053
I_JA	.465	-.427	.197	-.696	-.414
R_Rp	.075	.184	.025	-.063	.611

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-15: Structure matrix for self initiation of pragmatic skills by typically developing children

Parameters	Structure Matrix				
	Function				
	1	2	3	4	5
I_TT	**.589***	.446	-.311	-.093	.287
I_TM	**.554***	-.093	-.305	.449	-.166
NR	**.553***	-.246	-.087	.309	-.386
TI	**.514***	-.062	-.261	.331	-.172
TC	**.512***	-.062	-.258	.326	-.171
SV	**.258***	.176	.060	.119	-.147
QN	.280	**.678***	-.212	.099	-.311
RQ	.183	.397	**.561***	-.046	.166
I_JA	.398	-.187	.414	**-.665***	-.041
CI	.216	-.059	.073	**.479***	.341
R_Rp	.291	-.073	.220	**-.446***	.302
Rf	-.053	.213	.196	**.244***	.195

*. Largest absolute correlation between each variable and any discriminant function

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-16: Centroids for groups for self initiation of pragmatic skills by typically developing children

| | Centroids for groups | | | | |
| | Function | | | | |
AGE	1	2	3	4	5
1.00	-9.344	-2.568	-1.470	-.791	0.00670422
2.00	-8.382	.633	1.941	1.009	0.02106500
3.00	.477	4.921	-.348	-.998	0.08010616
4.00	4.357	.415	-1.629	1.705	-0.0110161
5.00	5.590	-1.161	.702	-.499	-.559
6.00	7.302	-2.240	.804	-.425	.462

Figure-2: Canonical discriminant functions of age groups (Self initiation of pragmatic skills by typically developing children)

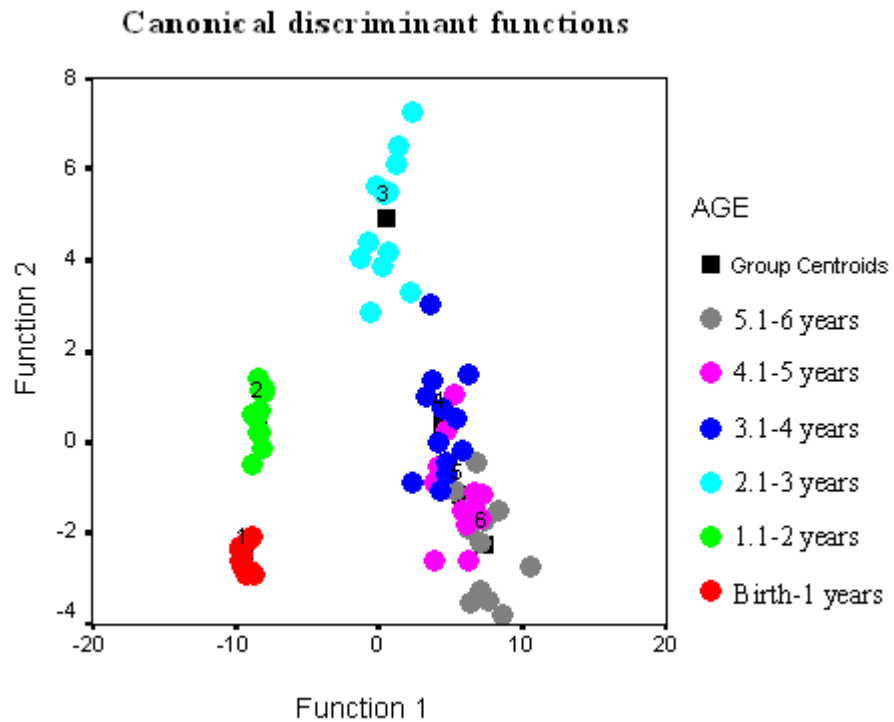Figure-2: Shows canonical discriminant functions of age groups i.e. from birth to 6 years respectively for self initiation of pragmatic skills by typically developing children. As indicated in figure-2, pragmatic skills initiated by typically developing children at birth-1 year; 1.1-2 years and 2.1-3 years were found to be unique from the rest of the groups. The pattern obtained for participants in the age range of; 3.1-4

years; 4.1-5 years and 5.1-6 years were found to be similar and overlapping. The results of the study indicated that, at the higher age groups, pragmatic skills self initiated by typically developing children were similar compared to lower age groups.

The results obtained from discriminant functions are similar with mean values for self initiation of pragmatic skills by typically developing children (refer table-11). As indicated in table-11, all the 12 pragmatic skills were self initiated by typically developing children at 2.1-3 years; 3.1-4 years; 4.1-5 years and 5.1-6 years of age. The mean scores for self initiation of pragmatic skills by typically developing children at 3.1-4 years; 4.1-5 years and 5.1-6 years of age were slightly similar compared to the performance seen in children at 2.1-3 years of age.

At the age of 1.1-2 years, none of the participants initiated pragmatic skills namely narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair. At the age of birth-1year none of the participants initiated pragmatic skills namely request for object and / or action, stylistic variation, questioning, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

Discussion

The study investigated emergence of pragmatic skills in typically developing children from birth – 6 years of age. 26 pragmatic skills (refer appendix-3) were studied and grouped into two categories: 14 pragmatic skills indicating mother's initiation and child's responses and 12 pragmatic skills indicating child's self

initiation of pragmatic skills. The combined results of emergence of pragmatic skills in typically developing children in the age range from birth – 6 years are as follows:

1. **At birth to one year of age:** Response for eye contact, smiling and refusal.

2. **At 1.1 to 2 years of age:** Response for eye contact, smiling, refusal, communicative intent and request for object and / or action.

3. **At 2.1 to 3 years of age:** Response for eye contact, smiling, refusal, communicative intent, request for object and / or action, stylistic variation, questioning and initiation of turn taking.

4. **At 3.1 to 4 years of age:** Response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances and topic change.

5. **At 4.1 to 5 years of age:** Response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, response for conversational repair, response for topic initiation, response for topic maintenances, refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

6. **At 5.1 to 6 years of age:** In the study all the 26 pragmatic skills emerged at 5.1-6 years of age, response for eye contact, smiling, response for gaze exchange,

response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, response for conversational repair, response for topic initiation, response for topic maintenances, response for comment / feedback, response for adding information, refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

Results of the study indicated that, the pragmatic skills that emerged in typically developing children increased with age. These results give further support to the thought that the pragmatic skills follow a developmental continuum. However, the type of pragmatic skill that emerged at each age level in the study is not been generalized, as the study was carried out on a small group of population.

The results of this study are in support with earlier Indian studies that focused on development of pragmatic skills in typically developing children for different age groups. Thankam (2002) studied development of pragmatic skills in typically developing children in the age range from 3.5 to 8.5 years; Nishi (2004) for children in the age range from 2.6 to 3.6 years; Nitta (2006) for 1.1 to 3 year old typically developing children and Dheepa & Shyamala (2008) for typically developing children from birth to 8 years of age. The results of these Indian studies highlight on the developmental continuum in emergence of pragmatic skills in typically developing children.

The results of the study are also in agreement with various researchers giving the developmental profiles, Woolfolk and Lynch (1981) who have given the developmental stages of pragmatics in child language from 2months to high school age, Dewart and Summers (1995) who have summarized the development of pragmatic skills from infants to children of seven years and beyond, and Marasco, O'Rourke, Riddle, Sepka, & Weaver (2004) who have given highlights of the pragmatic language development from birth to six years. All these reports support the view that pragmatic skills follow a developmental continuum.

II. Comparison between the two groups i.e. reference group Vs clinical group

The performance of children with Autism spectrum disorders (ASDs) on 26 pragmatic skills (refer appendix-3) was evaluated in comparison with language age (comprehension age and expression age) and social age matched typically developing children. Among the 36 children with ASD 35 were male participants and 1 female participant. Hence, gender differences on responses for pragmatic skills were not tested.

IIA. Comparison between the two groups based on Language comprehension age

A total of 36 children with ASD participated in the study. The distribution of language comprehension age (refer table-1) was as follows: eleven (11) children with language comprehension age of 1.1 to 2 years; twenty (20) children with language comprehension age of 2.1 to 3 years; three (03) children with language comprehension age of 3.1 to 4 years and two (02) children with language comprehension age of 4.1 to 5 years. The performances of children with ASD on 26 pragmatic skills were evaluated under two categories: responses by children with

ASD to mother's initiation of pragmatic skills. Self initiation of pragmatic skills by children with ASD.

IIA.1. Responses by children with Autism spectrum disorders (ASDs) to mother's initiation of pragmatic skills in the communicative context.

The performance of children with ASD with language comprehension age from 1.1 to 5 years was compared with the pragmatic skills that emerged in typically developing children with language comprehension age from 1.1 to 5 years (refer table-3) for mother's initiation of pragmatic skills. Here again 80% criterion level was used.

Table-17: Pragmatic skills observed in children with ASD in comparison with language comprehension age matched typically developing children (Responses to mother's initiation of pragmatic skills)

Sl. No	Pragmatic skills	1.1-2 years (N=11)	2.1-3 years (N=20)	3.1-4 years (N=03)	4.1-5 years (N=02)
1	Response for eye contact	-	-	-	-
2	Smiling	-	-	-	-
3	Response for gaze exchange	-	-	-	-
4	Response for Joint attention	-	-	-	-
5	Response for request of object and / or action	-	-	-	-
6	Response for labeling	-	-	02	-
7	Answering questions	-	-	-	-
8	Response for negation	-	-	-	-
9	Response for Turn taking	-	-	-	-
10	Response for conversational repair	-	-	-	-
11	Response for Topic initiation	-	-	-	-
12	Response for Topic maintenances	-	-	-	-

N: Number of participants with ASD

Table-17: represents pragmatic skills of children with ASD (to mother's initiation of pragmatic skills) in comparison with pragmatic skills that emerged in

typically developing children with language comprehension age from 1.1 to 5 years. The shaded block in the table represents number of children with ASD who responded for pragmatic skills initiated by mothers. As shown in the table-17, it was the Labeling skill for which children with ASD responded 80% of time. Two children with ASD with language comprehension age of 3.1 to 4 years presented with 80% responses for labelling skill. For the rest of the pragmatic skills none of the children presented with 80% responses.

IIA.2. Percentage of responses by children with ASD to mother's initiation of pragmatic skills

The raw scores i.e. pragmatic responses of children with ASD with language comprehension age from 1.1 to 5 years to mother's initiation of pragmatic skills were converted into percentile scores. Mean percentage for pragmatic responses and SD values were calculated for participants with language comprehension age from 1.1 to 4 years. Pragmatic responses of participants with language comprehension age of 4.1-5 year were not considered for statistical analysis, as there were only two participants in this age group. Mean percentage, SD values are presented below in table-18.

Table-18: Mean percentage and SD values for responses by children with ASD with language comprehension age from 1.1 to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	1.1-2 years		2.1-3 years		3.1-4 years	
	Mean	SD	Mean	SD	Mean	SD
R_EC	10.27	9.95	11.94	7.17	29.67	3.51
Sml	4.18	9.14	4.85	4.40	11.00	1.73
R_GEx	10.59	6.92	26.58	14.44	27.83	2.25
R_JA	15.75	10.58	23.20	11.08	32.00	2.65
R_Rq	3.52	3.60	9.81	5.53	53.69	14.97
R_Lb	.00	.00	20.18	24.77	80.37	.65
AQ	.00	.00	6.55	7.43	35.91	4.26
R_Ng	.00	.00	.32	1.43	35.17	30.54
R_TT	6.55	11.03	20.09	12.26	29.33	1.15
R_Rp	.00	.00	.00	.00	.00	.00
R_TI	.00	.00	3.42	6.39	29.33	1.15

R_TM	.00	.00	2.56	4.92	26.00	1.00
R_C/Fb	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00

R_EC: *response for eye contact,* **Sml:** *smiling,* **R_GEx:** *response for gaze exchange,* **R_JA:** *response for joint attention,* **R_Rq:** *response for request of object and / or action, R_**Lb:** *response for labeling,* **AQ:** *answering questions,* **R_Ng:** *response for negation,* **R_TT:** *response for turn taking,* **R_Rp:** *response for conversational repair,* **R_TI:** *response for topic initiation,* **R_TM:** *response for topic maintenances,* **R_C/Fb:** *response for comment / feedback,* **R_AI:** *response for adding information*

Table-18: shows mean percentage and SD values of pragmatic skills as responses by children with ASD for mother's initiation of pragmatic skills. The percentage of responses obtained for children with ASD is compared with the percentage of responses obtained from typically developing children (refer table-4) with the language comprehension age from 1.1 to 4 years. The results of the study indicated that, for pragmatic skills namely eye contact, smiling, gaze exchange, joint attention, request of object and / or action, labeling, answering questions, negation, turn taking, topic initiation and topic maintenances the responses increased with age for both the groups. However, mean percentage of responses were very less in children with Autism spectrum disorders compared to typically developing children.

For pragmatic skills namely, labeling, answering questions, negation, topic initiation and topic maintenance typically developing children responded from 1.1 year to 4 years indicating increase in percentage of such responses with increase in age. In children with ASD percentage of responses was found to be 00 at 1.1-2years of age and from 2.1-3 years to 3.1-4 years of age percentage of responses increased with age. None of the children with ASD responded for skill namely response for conversational repair, response for comment / feedback and response for adding information in the study. Whereas typically developing children responded for these skills at 2.1-3 years of age.

The results of the study indicated that the percentage of responses by children with ASD for mother's initiation of pragmatic skill increased with increase in comprehension age. However, percentage of responses was very less in children with ASD compared to typically developing children on all the pragmatic skills studied.

IIA.3. Graphical representation of percentage of responses by typically developing children and children with ASD matched on language comprehension age for pragmatic skills initiated by mothers

Percentage of responses by children with ASD in comparison with percentage of responses by typically developing children with language comprehension age from 1.1-4 years for mother's initiation of pragmatic skills (table-18 & 4) are graphically represented i.e. figure: 3 to 16. In the figures, **MC:** refers to mother initiation and child's response, **TDC:** refers to typically developing children and **ASD** refers to children with Autism spectrum disorders. Right side of the figure indicates the percentage of responses given by typically developing children (TDC) to mother's initiation of pragmatic skills. Left side of the figure indicates the percentage of responses given by children with ASD to mother's initiation of pragmatic skills.

Figure-3: Percentage of response for eye contact
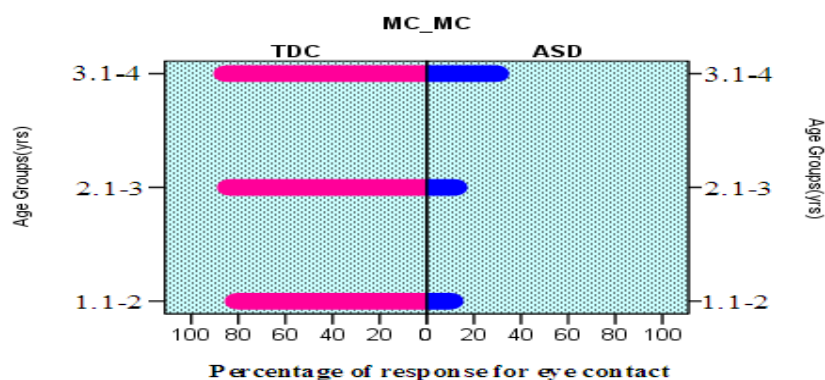
Figure-4: Percentage of response for smiling
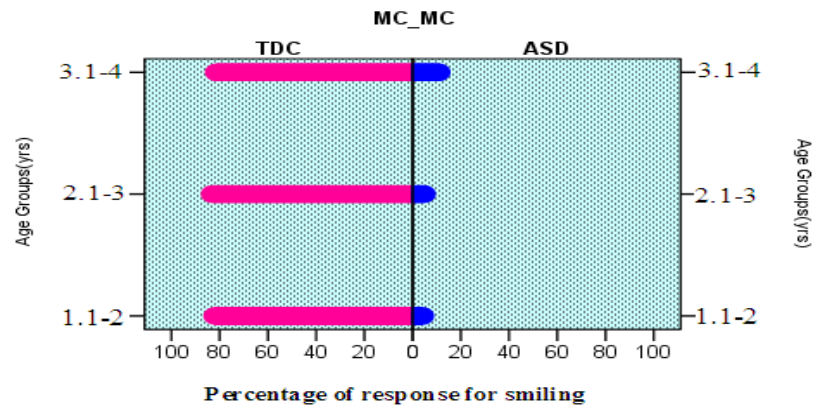
Figure-5: Percentage of response for gaze exchange
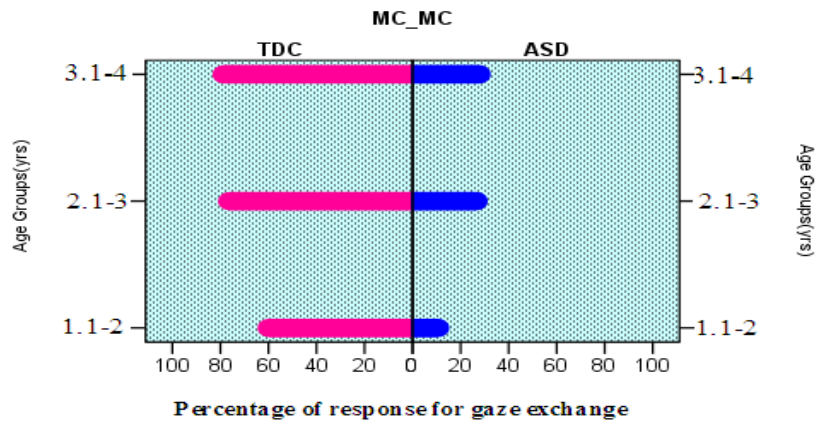
Figure-6: Percentage of response for joint attention
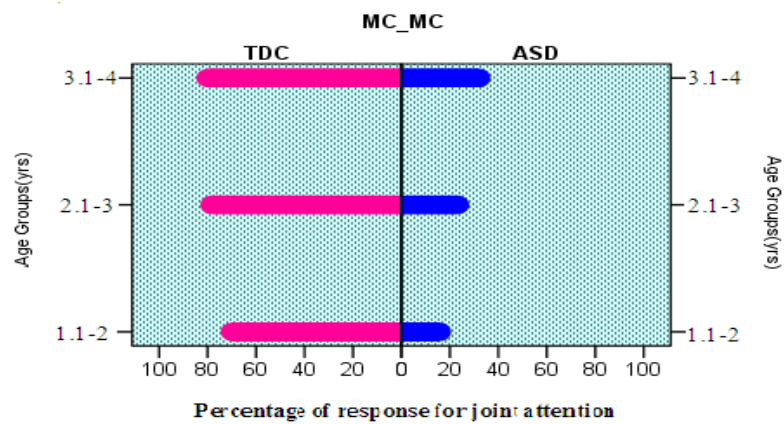
Figure-7: Percentage of response for request

MC_MC

Percentage of response for request
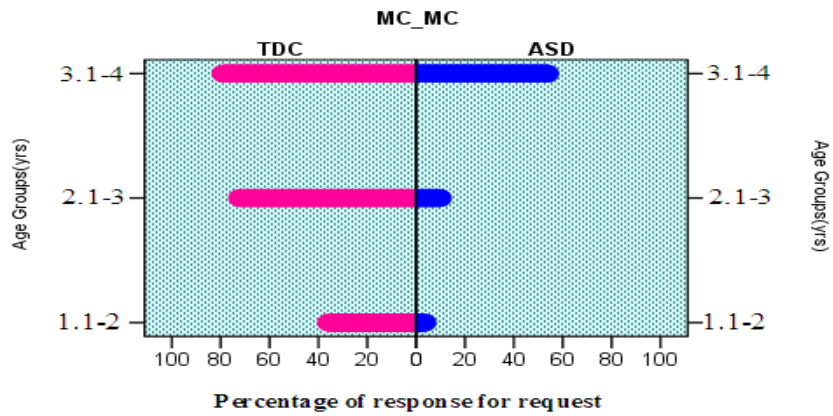
Figure-8: Percentage of response for labeling

MC_MC

Percentage of response for labeling
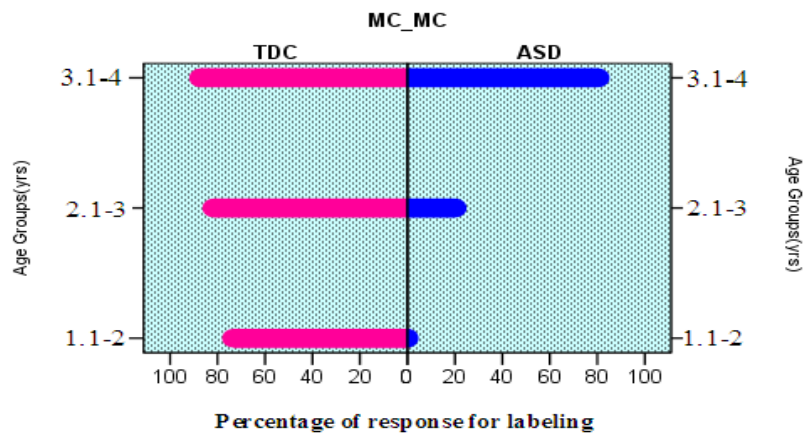
Figure-9: Percentage of response for answering questions

MC_MC

Percentage of response for answering questions
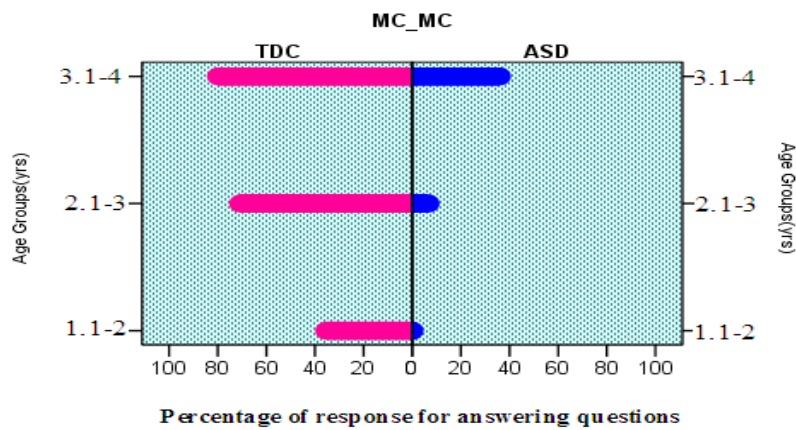
Figure-10: Percentage of response for negation

Percentage of response for negation
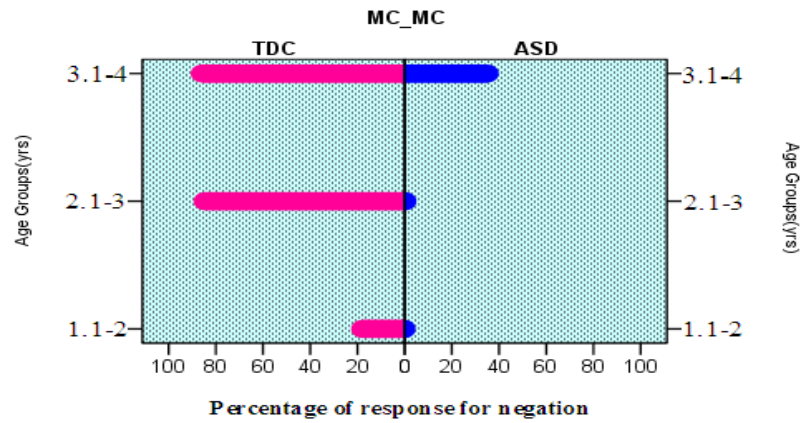
Figure-11: Percentage of response for turn taking

Percentage of response for turn taking
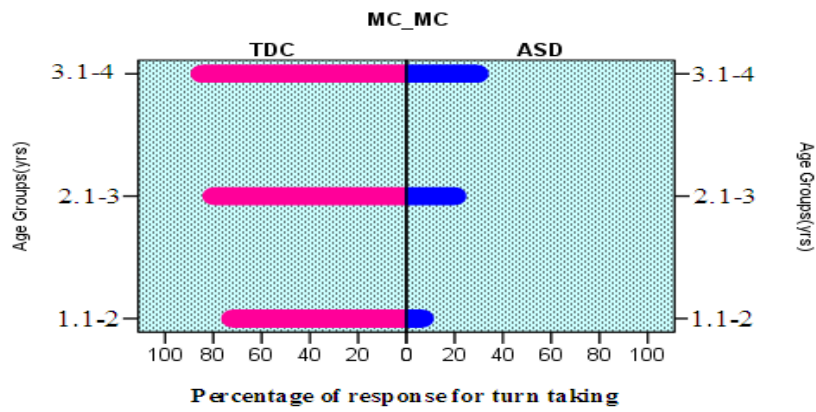
Figure-12: Percentage of response for repair

Percentage of response for repair
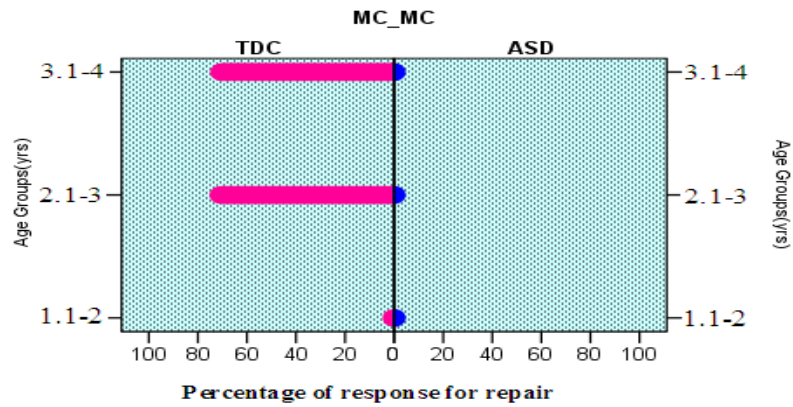
Figure-13: Percentage of response for topic initiation
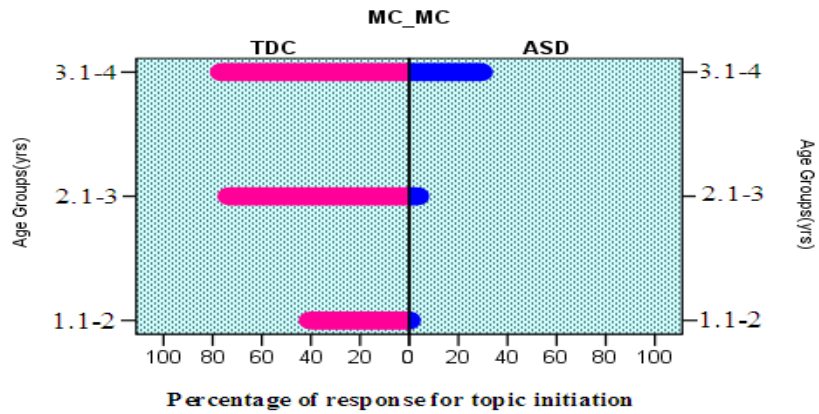
Figure-14: Percentage of response for topic maintenance
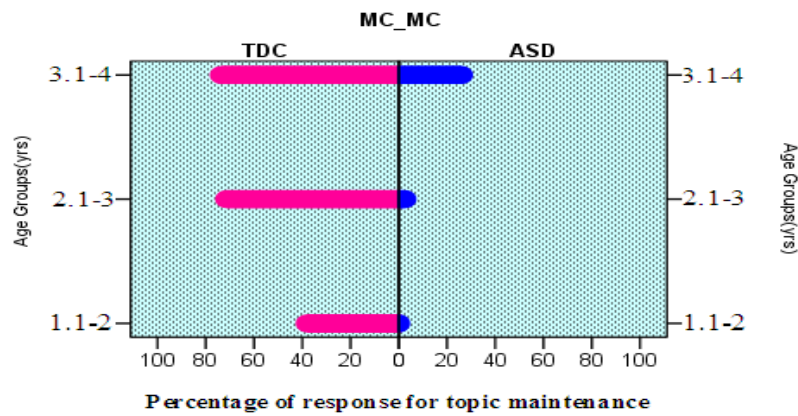
Figure-15: Percentage of response for comment/feedback
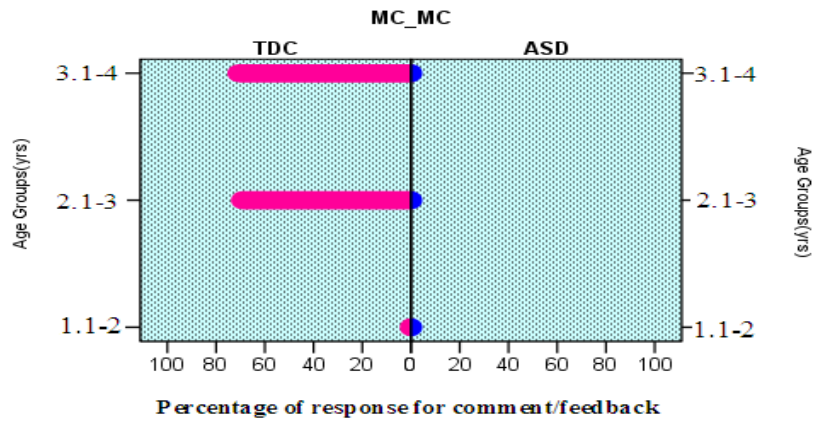
Figure-16: Percentage of response for adding information
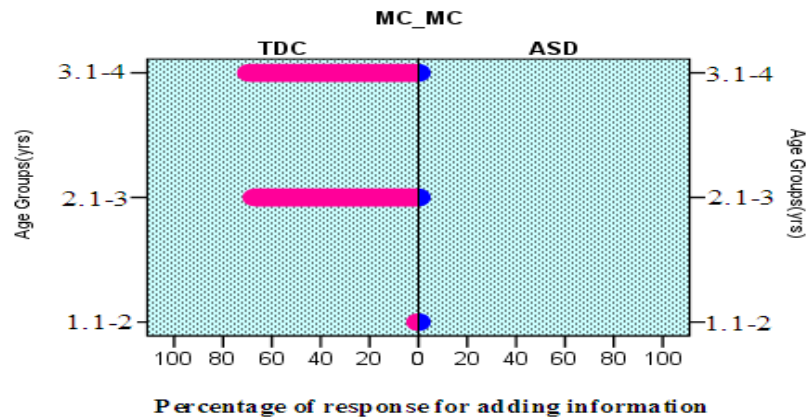
Non parametric test Kruskal-Wallis H was carried out to determine the effect of age across the group on pragmatic responses from children with ASD with language comprehension age from 1.1 to 4 years for mother's initiation of pragmatic skills. The results are given in table-19

Table-19: Kruskal-Wallis H test of significance for responses from children with ASD with language comprehension age from 1.1 to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	$\chi2$ (2)
R_EC	9.34**
Sml	7.51*
R_GEx	11.17**
R_JA	6.26*
R_Rq	15.99***
R_Lb	15.32***
AQ	16.05***
R_Ng	14.35**
R_TT	9.54**
R_Rp	.00
R_TI	16.36***
R_TM	16.36***
R_C/Fb	.00
R_AI	.00

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling,*

AQ: answering questions, R_Ng: response for negation, R_TT: response for turn taking, R_Rp: response for conversational repair, R_TI: response for topic initiation, R_TM: response for topic maintenances, R_C/Fb: response for comment / feedback, R_AI: response for adding information

Table-19: shows Kruskal-Wallis H test results for responses from children with ASD to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD across the age groups indicated significant differences at .001, .01 and 0.05 level of significance for all the pragmatic skills except for conversational repair, comment / feedback and adding information. For these three pragmatic skills, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the clinical group on responses for pragmatic skills initiated by mothers. The results are given in table-20

Table-20: Mann-Whitney U test of significance for responses from children with ASD with language comprehension age from 1.1 to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	| Z | value		
	1.1-2 & 2.1-3 years	1.1-2 & 3.1-4 years	2.1-3 & 3.1-4 years
R_EC	2.09*	2.11*	2.38*
Sml	1.38	2.33*	2.29*
R_GEx	3.16**	2.18*	.18
R_JA	1.84	2.11*	1.37
R_Rq	3.10**	2.58*	2.74**
R_Lb	2.74**	3.58***	2.67**
AQ	2.76**	3.56***	2.86**
R_Ng	.74	2.81**	3.04**
R_TT	2.74**	2.19*	1.10
R_Rp	.00	.00	.00
R_TI	1.77	3.58***	3.22**
R_TM	1.77	3.56***	3.22**
R_C/Fb	.00	.00	.00
R_AI	.000	.00	.00

*** p< .001, ** p< .01, * p< .05

R_EC: response for eye contact, Sml: smiling, R_GEx: response for gaze exchange, R_JA: response for joint attention, R_Rq: response for request of object and / or action, R_Lb: response for labeling, AQ: answering questions, R_Ng: response for negation, R_TT: response for turn taking, R_Rp: response for conversational repair, R_TI: response for topic initiation, R_TM: response for topic maintenances, R_C/Fb: response for comment / feedback, R_AI: response for adding information

Table-20: shows Mann-Whitney U test results for responses from children with ASD to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD between the age groups indicated significant differences at .001, .01 and 0.05 level of significance for all the pragmatic skills except for conversational repair, comment / feedback and adding information. For these three pragmatic skills, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups on children responses for pragmatic skills initiated by mothers. The results are given in table-21

Table-21: Mann-Whitney U test of significance between typically developing children and children with ASD with language comprehension age from 1.1 to 4 years on responses for mother's initiation of pragmatic skills

Pragmatic skills	|Z| value		
	1.1-2 years	2.1-3 years	3.1-4 years
R_EC	4.06***	4.67***	2.60**
Sml	4.15***	4.71***	2.60**
R_GEx	3.97***	4.67***	2.60**
R_JA	4.07***	4.67***	2.60**
R_Rq	4.07***	4.67***	2.31*
R_Lb	4.30***	4.55***	1.45
AQ	4.30***	4.74***	2.60**
R_Ng	3.74***	5.25***	2.60**
R_TT	4.04***	4.67***	2.60**
R_Rp	.00	5.37***	2.61**
R_TI	4.30***	4.93***	2.60**
R_TM	4.30***	4.93***	2.60**
R_C/Fb	.00	5.37***	2.61**
R_AI	.00	5.37***	2.61**

*** p< .001, ** p< .01, * p< .05

Table-21: shows Mann-Whitney U test results for responses between the two groups for mother's initiation of pragmatic skills. The results of pragmatic responses between the two groups indicated significant differences at .001, .01 and 0.05 level of significance for all the pragmatic skills except for conversational repair, comment / feedback and adding information at 1.1-2 years. For these three pragmatic skills, 00 values were obtained as these skills were not used by both the groups at 1.1-2 years of age.

IIA.4. *Self initiation of pragmatic skills by children with ASD in the communicative context*

The performance of children with ASD with language comprehension age from 1.1 to 5 years was compared with the pragmatic skills that emerged in typically developing children with language comprehension age from 1.1 to 5 years (refer table-10) for self initiation of pragmatic skills. The criteria used were similar to that of typically developing children.

Table-22: Self initiation of pragmatic skills observed in children with ASD in comparison with language comprehension age matched typically developing children.

Sl. No	Pragmatic skills	1.1-2 years (N=11)	2.1-3 years (N=20)	3.1-4 years (N=03)	4.1-5 years (N=02)
1	Refusal	04	11	02	01
2	Communicative intent	-	-	-	-
3	Request for object and / or action	-	01	01	-
4	Stylistic variation	-	-	-	-
5	Questioning	-	-	-	-
6	Initiation of Turn taking	-	-	-	-

7	Narration	-	-	-	-
8	Topic initiation	-	-	-	-
9	Initiation of Topic maintenances	-	-	-	-
10	Topic change	-	-	-	-
11	Initiation of Joint attention	-	-	-	-
12	Request for Repair	-	-	-	-

<div align="center">N: Number of children with ASD</div>

Table-22: represents self initiation of pragmatic skills by children with ASD in comparison with pragmatic skills self initiated by typically developing children with language comprehension age from 1.1 to 5 years. The shaded block in the table represents number of children with ASD self initiated pragmatic skills during mother-child interaction session. As shown in the table-22, it was the refusal and request for object and / or action skills for which children with ASD initiated for minimum of 15 times during mother-children interaction session. For the rest of the pragmatic skills none of the children fulfill the criterion level.

IIA.5. Frequency of self initiation of pragmatic skills by children with ASD

Mean values for self initiation of pragmatic skills were calculated for children with ASD with language comprehension age from 1.1 to 4 years. Frequency of self initiation of pragmatic skills of participants with language comprehension age of 4.1-5 years were not considered for statistical analysis, as there were only two participants in this age group. Mean and SD values are presented below in table-23.

Table-23: Mean and SD values for self initiation of pragmatic skills by children with ASD with language comprehension age from 1.1 to 4 years

Pragmatic skills	1.1-2 years		2.1-3 years		3.1-4 years	
	Mean	SD	Mean	SD	Mean	SD
Rf	13.00	4.05	15.40	4.39	14.67	3.52
CI	.64	1.433	6.20	3.86	10.00	2.00
Rq	1.27	2.87	7.60	4.87	13.67	3.06
SV	.00	.00	.00	.00	.00	.00

95

Qn	.00	.00	1.05	2.63	10.00	2.00
I_TT	.00	.00	6.45	4.08	8.00	1.73
Nr	.00	.00	.00	.00	2.00	1.73
TI	.00	.00	.55	1.43	6.67	2.31
I_TM	.00	.00	.50	1.28	6.67	2.31
TC	.00	.00	.50	1.28	6.00	1.73
I_JA	.00	.00	.00	.00	.00	.00
R_Rp	.00	.00	.00	.00	.00	.00

Rf: refusal, **CI:** *communicative intent,* **Rq:** *request for object and / or action,* **SV:** *stylistic variation,* **AQ:** *questioning,* **I_TT:** *initiation of turn taking,* **Nr:** *narration,* **TI:** *topic initiation,* **I_TM:** *initiation of topic maintenances,* **TC:** *topic change,* **I_JA:** *initiation of joint attention and* **R_Rp:** *request for conversational repair.*

Table-23: shows mean and SD values for self initiation of pragmatic skills by children with ASD with language comprehension age from 1.1 to 4 years. The mean values were calculated for raw scores. Raw scores in the study referred to the number of times each pragmatic skill was initiated by children with ASD. As seen from the above table, mean scores for self initiation of pragmatic skills by children with ASD increased with increase in language comprehension age. Similar results were obtained by typically developing children on self initiation of pragmatic skills (refer table-11). However, frequency of self initiation of pragmatic skills was less in children with ASD compared to typically developing children on all the pragmatic skills studied. None of the children with ASD initiated skill like stylistic variation, initiation of joint attention and request for conversational repair.

IIA.6. Graphical representation of self initiation of pragmatic skills by typically developing children and children with ASD matched on language comprehension age

Frequency of self initiation of pragmatic skills by children with ASD in comparison with frequency of self initiation of pragmatic skills by typically developing children matched for language comprehension age from 1.1-4 years. (table-23 & 11) are graphically represented i.e. figure: 17 to 28.
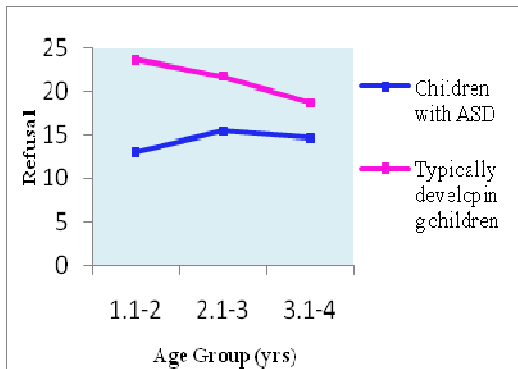
Figure-17: Refusal

Figure-18: Communicative intent
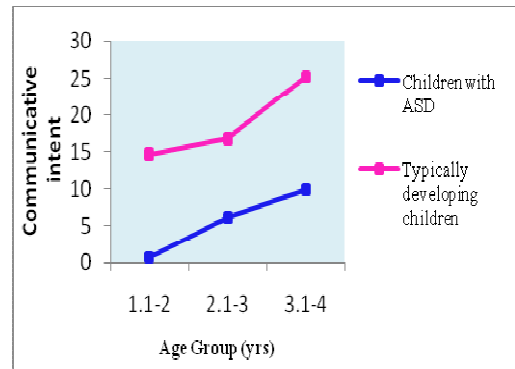
Figure-19: Request
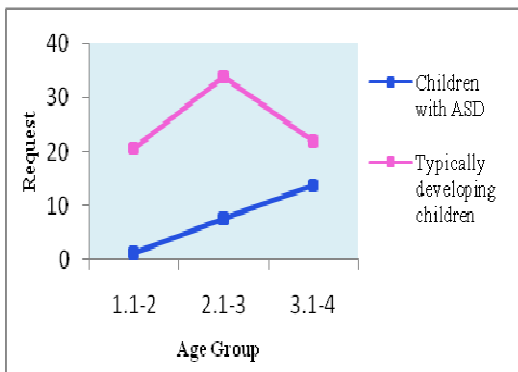
Figure-20: Stylistic variation
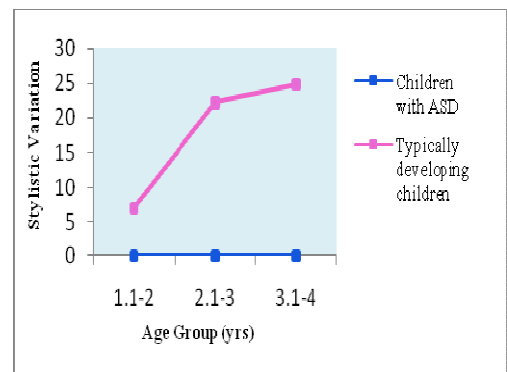
Figure-21: Questioning
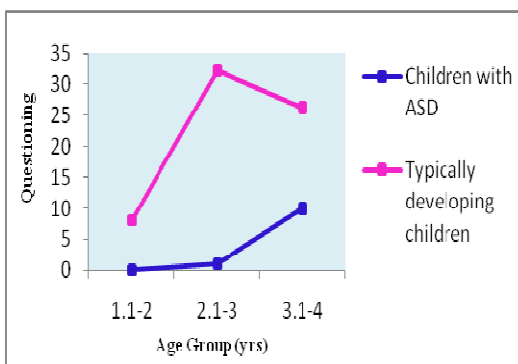
Figure-22: Turn taking
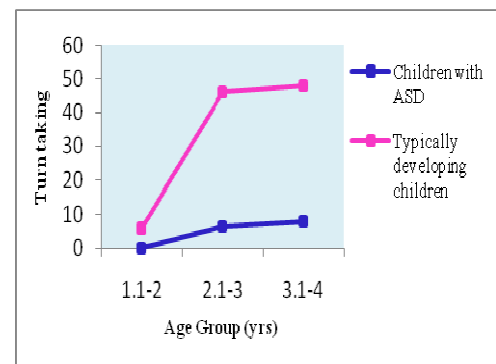
Figure-23: narration
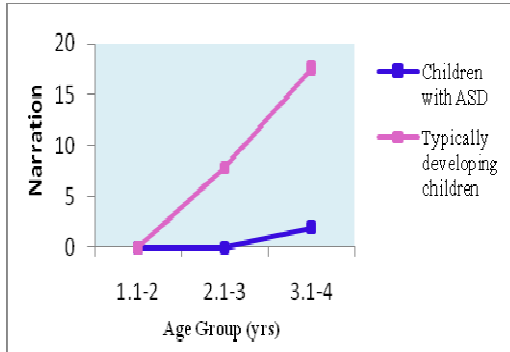
Figure-24: Topic initiation
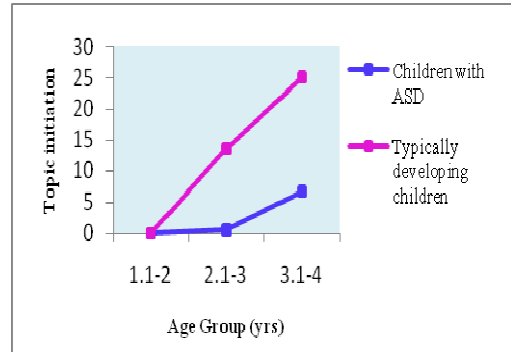
Figure-25: Topic maintenance
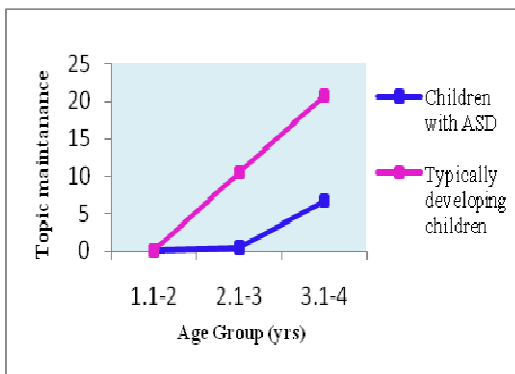
Figure-26: Topic change
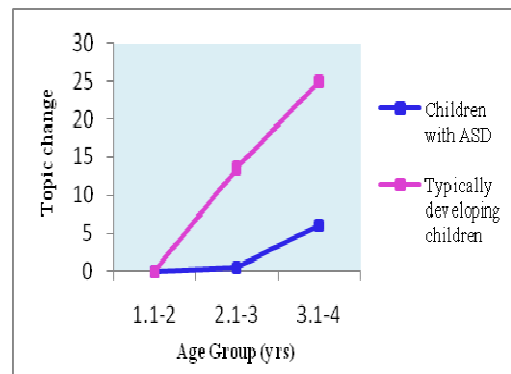
Figure-27: Joint attention
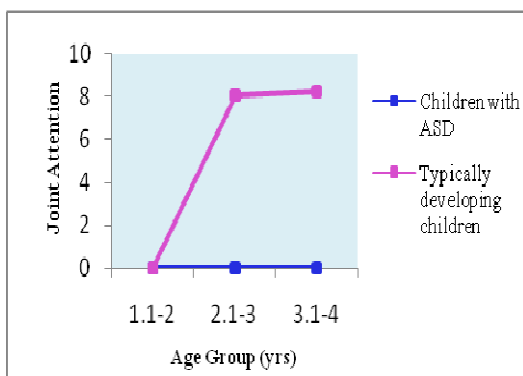
Figure-28: Repair
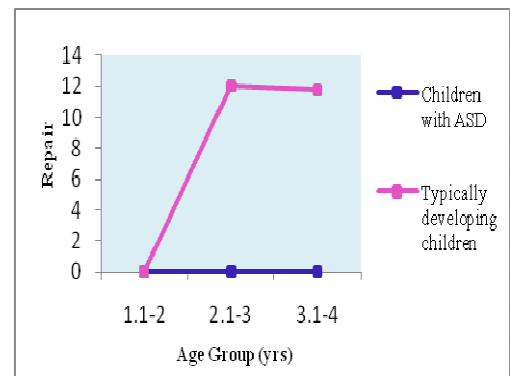
Non parametric test Kruskal-Wallis H was carried out to determine the effect of age on self initiation of pragmatic skills by children with ASD with language comprehension age from 1.1 to 4 years. The results are given in table-24

Table-24: Kruskal-Wallis H test of significance for self initiation of pragmatic skills by children with ASD with language comprehension age from 1.1 to 4 years

Pragmatic skills	χ2 (2)
Rf	2.46
CI	16.33***
Rq	15.21***
SV	.00
Qn	18.22***
TT	16.56***
Nr	21.31***
TI	17.85***
TM	18.22***
TC	18.22***
I_JA	.00
Rp	.00

*** p< .001,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-24: shows Kruskal-Wallis H test results for self initiation of pragmatic skills by children with ASD. The results across the age groups indicated significant differences at .001, level of significance for all the pragmatic skills except for refusal, stylistic variation, initiation of joint attention and conversational repair, For skills namely stylistic variation, initiation of joint attention and conversational repair, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the clinical group on self initiation of pragmatic skills by children with ASD. The results are given in table-25

Table-25: Mann-Whitney U test of significance for self initiation of pragmatic skills by children with ASD with language comprehension age from1.1 to 4 years

Pragmatic skills	| Z | value		
	1.1-2 & 2.1-3 years	1.1-2 & 3.1-4 years	2.1-3 & 3.1-4 years
Rf	1.54	.79	.18
CI	3.59***	2.99**	1.66
Rq	3.269**	2.99**	2.02*
SV	.000	.00	.00
Qn	1.33	3.58***	3.43**
TT	3.87***	3.58***	.42
Nr	.00	2.82**	3.78***
TI	1.33	3.58***	3.37**
TM	1.33	3.58***	3.43**
TC	1.33	3.58***	3.43**
I_JA	.000	.000	.000
Rp	.000	.000	.000

*** p< .001, ** p< .01, * p< .05

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-25: shows Mann-Whitney U test results for self initiation of pragmatic skills by children with ASD. The results indicates, significant differences at .001, .01 and 0.05 level of significance. For pragmatic skill like narration the values were 00 between the age group 1.1-2 & 2.1-3; skills namely, stylistic variations, initiation of joint attention and conversational repair the values obtained were 00 at all the age level, as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups on self initiation of pragmatics by children with language comprehension age from 1.1 to 4 years. The results are given in table-26

Table-26: Mann-Whitney U test of significance between typically developing children and children with ASD with language comprehension age from 1.1 to 4 years for self initiation of pragmatic skills

Pragmatic skills	| Z | value		
	1.1-2 years	2.1-3 years	3.1-4 years
Rf	3.66***	3.53***	1.90
CI	4.21***	4.56***	2.62**
Rq	4.19***	4.68***	2.17*
SV	4.31***	5.37***	2.61**
Qn	4.31***	5.07***	2.60**
TT	4.33***	4.69***	2.61**
Nr	.00	5.38***	2.61**
TI	.00	5.07***	2.60**
TM	.00	5.07***	2.61**
TC	.00	5.07***	2.60**
I_JA	.00	5.38***	2.62**
Rp	.00	5.38***	2.61**

*** p< .001, ** p< .01,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-26: shows Mann-Whitney U test results for self initiation of pragmatic skills between the two groups. The results indicated statistically significant differences at .001, .01 level of significance for pragmatic skills studied except for narration, topic initiation, topic maintenance, topic change, initiation of joint attention and conversational repair at 1.1-2 years of age. For these skills, 00 values were obtained as these skills were not used by both the groups at 1.1-2 years of age.

IIB. Comparison between the two groups based on Language expression age

A total of 36 children with Autism spectrum disorders (ASDs) participated in the study. The distribution of language expression age (refer table-1) was as follows, eighteen (18) children with language expression age of birth to 1 year; nine (09)

children with language expression age of 1.1 to 2 years; six (06) children with language expression age of 2.1 to 3 years and three (03) children with language expression age of 3.1 to 4 years. The performance of children with Autism spectrum disorders (ASDs) on 26 pragmatic skills (refer appendix-3) were evaluated under two categories: responses by children with ASD to mother's initiation of pragmatic skills. Self initiation of pragmatic skills by children with ASD

IIB.1. Responses by children with ASD to mother's initiation of pragmatic skills in the communicative context.

The performance of children with ASD with language expression age from birth to 4 years was compared with the pragmatic skills that emerged in typically developing children with language expression age from birth to 4 years (refer table-3) for mother's initiation of pragmatic skills. Here again 80% criterion level was used as used.

Table-27: Pragmatic skills observed in children with ASD in comparison with language expression age matched typically developing children (responses for mother's initiation of pragmatic skills)

Sl. No	Pragmatic skills	Birth - 1 year (N=18)	1.1-2 years (N=9)	2.1-3 years (N=6)	3.1-4 years (N=3)
1	Response for eye contact	-	-	-	-
2	Smiling	-	-	-	-
3	Response for gaze exchange	-	-	-	-
4	Response for Joint attention	-	-	-	-
5	Response for request of object and / or action	-	-	-	-
6	Response for labeling	-	-	-	02
7	Answering questions	-	-	-	-
8	Response for negation	-	-	-	-
9	Response for Turn taking	-	-	-	-

Table-27: represents responses by children with ASD to mother's initiation of pragmatic skills in comparison with pragmatic skills that emerged in typically developing children with language expression age from birth to 4 years. The shaded block in the table represents number of children with ASD who responded for pragmatic skills initiated by mothers. As shown in the table, it was the Labeling skill for which children with ASD responded 80% of time. Two children with ASD with language expression age of 3.1 to 4 years presented with 80% responses for labelling skill. For the rest of the pragmatic skills none of the children presented with 80% responses.

IIB.2. Percentage of responses by children with ASD to mother's initiation of pragmatic skills

Mean percentage for pragmatic responses and SD values were calculated for children with ASD with language expression age from birth to 4 years. Mean percentage and SD values are presented below in table-28.

Table-28: Mean percentage, SD values for responses by children with ASD with language expression age from birth to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	birth-1year		1.1-2 years		2.1-3 years		3.1-4 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
R_EC	9.37	7.78	14.18	9.49	18.58	8.28	27.82	4.65
Sml	2.83	7.31	6.88	4.34	8.33	2.25	11.33	1.15
R_GEx	13.64	9.46	35.49	13.29	22.76	10.05	26.23	3.53
R_JA	17.22	10.75	21.73	10.50	32.09	6.05	30.33	4.04
R_Rq	5.06	5.28	11.15	5.40	22.41	18.24	45.30	22.61
R_Lb	.00	.00	30.32	28.91	48.63	26.94	73.76	5.43
AQ	.00	.00	9.46	7.69	18.93	12.49	30.00	10.00
R_Ng	.00	.00	.70	2.12	8.41	20.61	22.97	27.89
R_TT	10.00	12.56	18.26	9.59	31.23	6.67	26.70	2.95
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00
R_TI	.00	.00	1.35	4.06	19.04	8.58	26.70	2.95
R_TM	.00	.00	.91	2.73	15.82	8.66	22.66	2.88
R_C/Fb	.00	.00	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00	.00	.00

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-28: shows mean percentage, SD values for responses by children with ASD for mother's initiation of pragmatic skills. The percentage of responses obtained for children with ASD is compared with the percentage of responses obtained from typically developing children (refer table-4) with the language expression age from birth to 4 years. The results of the study indicated that, pragmatic responses for skills namely eye contact, request, labeling, answering questions, negation, topic initiation and topic maintenances increased as language expression age increased in both the groups.

Skills namely responses for gaze exchange, joint attention, and turn taking skills increase with age in typically developing children. In children with ASD, responses for gaze exchange skill increased from birth-1 and 1.1-2 years of age, decreased at 2.1-3 years of age and again increased at 3.1-4 years of age. For pragmatic skills like joint attention and turn taking increased from birth-1; 1.1-2 and 2.1-3 year, decreased at 3.1-4 years in children with ASD.

Pragmatic skills like answering questions, following instructions, labeling, negation, topic initiation, and topic maintenance had no responses at birth – 1 year of age and from 1.1 year to 4 years percentage of responses increased as language expression age increased. This pattern was similar for both the groups i.e. reference group and clinical group.

The results of the study also indicated that at birth- 1 year and 1.1-2years of age none of the typically developing children used pragmatic skills namely; adding

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information, comment / feedback and response for repair. However, mean score increased with age from 2.1-3 years to 3.1-4 years for the same skills in typically developing children. None of the children with ASD used adding information, comment / feedback and response for repair skills in this study.

Sum mean score for pragmatic skills namely smiling in typically developing children increased from birth to 3 years of age, but at 3.1-4 years of age mean score decreased slightly. In children with Autism spectrum disorders sum mean score for smiling increased as the function of age. However, percentage of responses for all the pragmatic skills were very less in children with ASD compared to typically developing children at all the age groups.

IIB.3. Graphical representation of percentage of responses by typically developing children and children with ASD matched on language expression age for pragmatic skills initiated by mothers

Percentage of responses by children with ASD in comparison with percentage of responses by typically developing children with language expression age from birth-4 years for mother's initiation of pragmatic skills (table-28 & 4) are graphically represented i.e. figure: 29 to 42. In the figures, **MC** refers to mother's initiation of pragmatic skills and child's response for it, **TDC** refers to typically developing children and **ASD** refers to children with Autism spectrum disorders. Right side of the figure indicates the percentage of responses given by typically developing children (TDC) to mother's initiation of pragmatic skills. Left side of the figure indicates the percentage of responses given by children with ASD to mother's initiation of pragmatic skills.

Figure-29: Percentage of response for eye contact
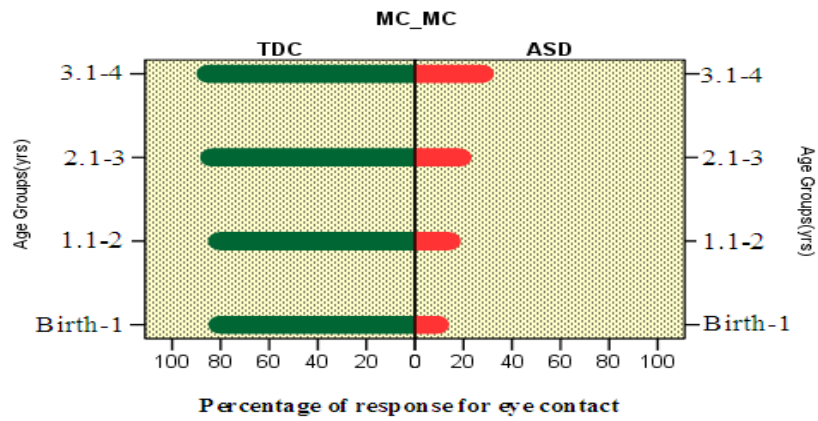
Figure-30: Percentage of response for smiling
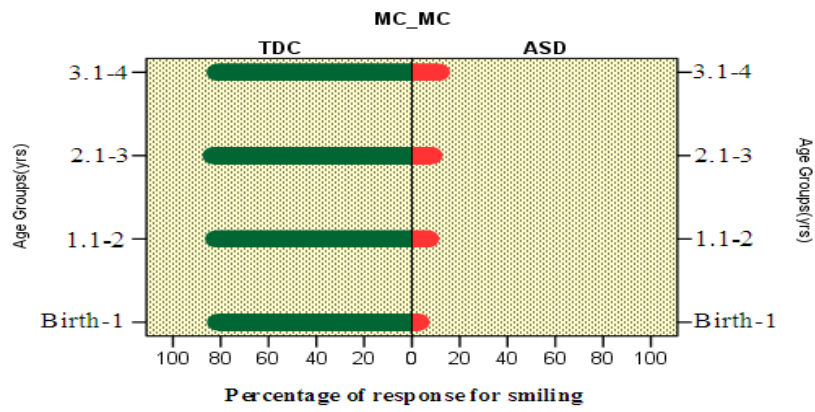
Figure-31: Percentage of response for gaze exchange
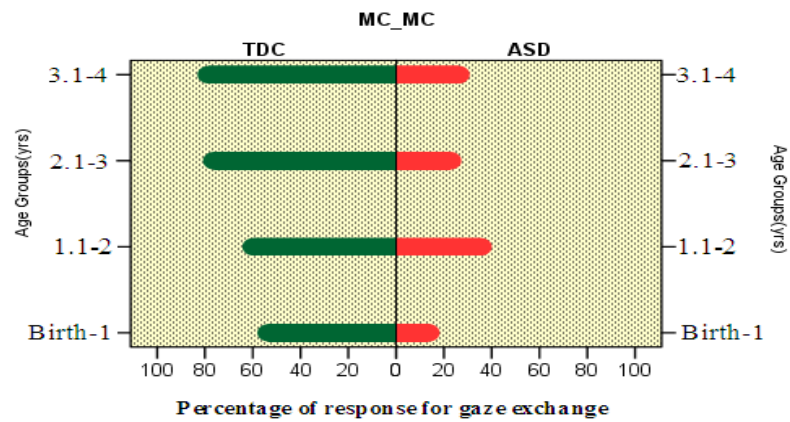
Figure-32: Percentage of response for gaze joint attention
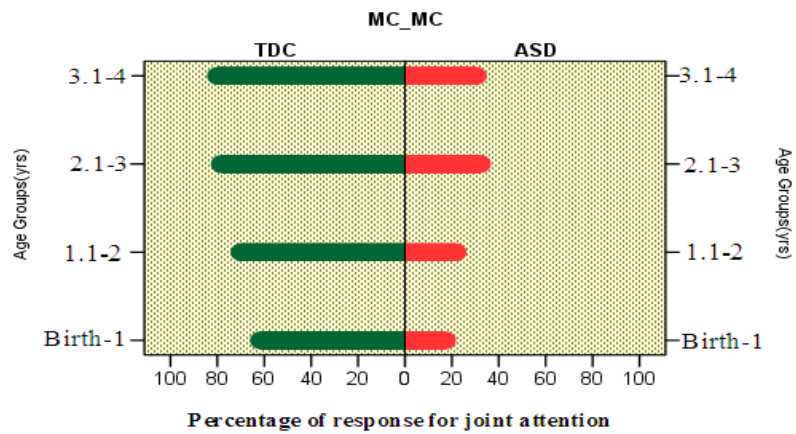
Figure-33: Percentage of response for request
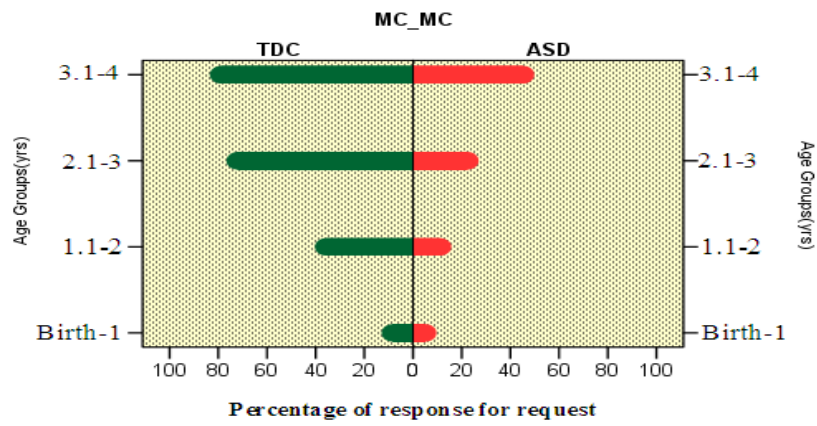
Figure-34: Percentage of response for labeling
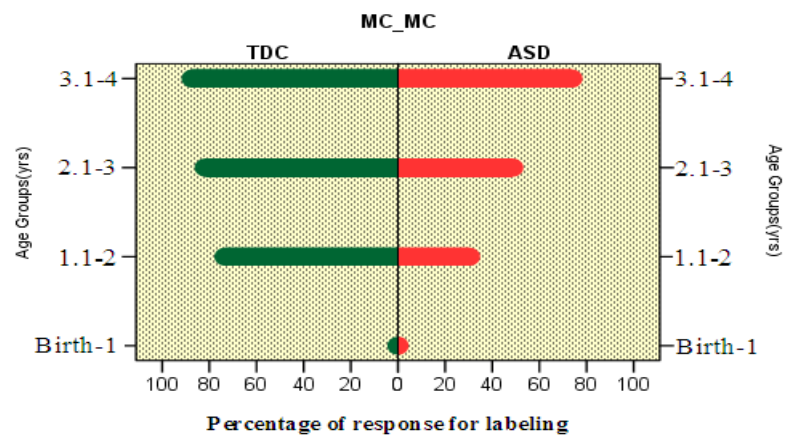
Figure-35: Percentage of response for answering questions

Percentage of response for answering questions
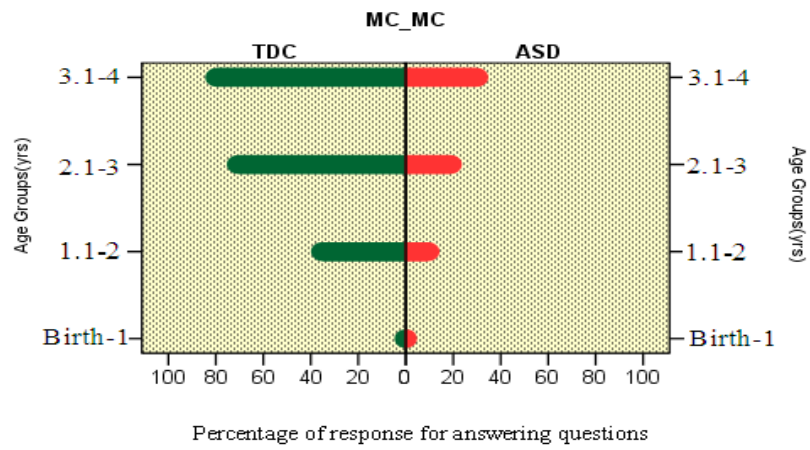
Figure-36: Percentage of response for negation

Percentage of response for negation
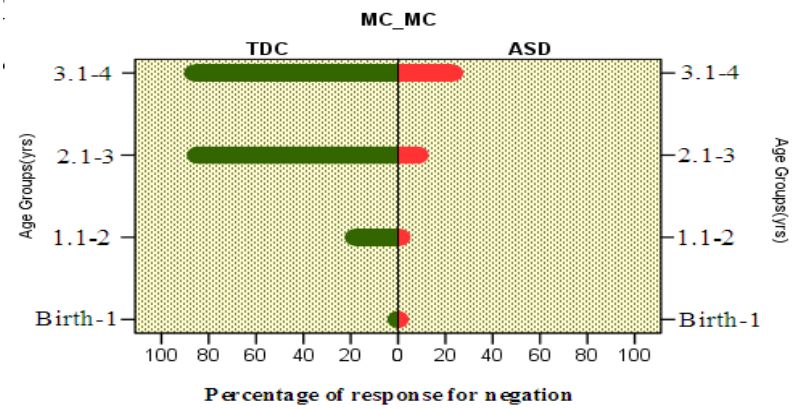
Figure-37: Percentage of response for turn taking

Percentage of response for turn taking
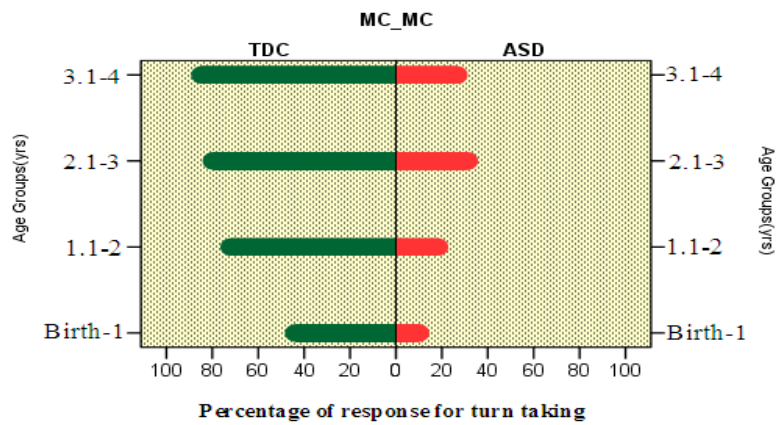
Figure-38: Percentage of response for repair
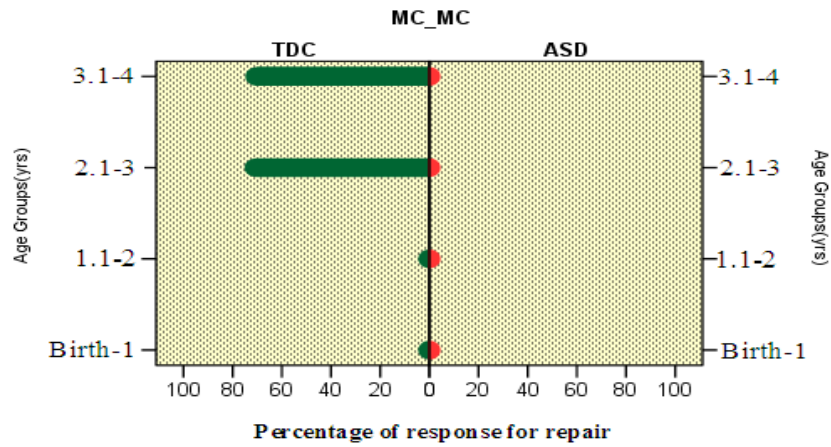
Figure-39: Percentage of response for topic initiation
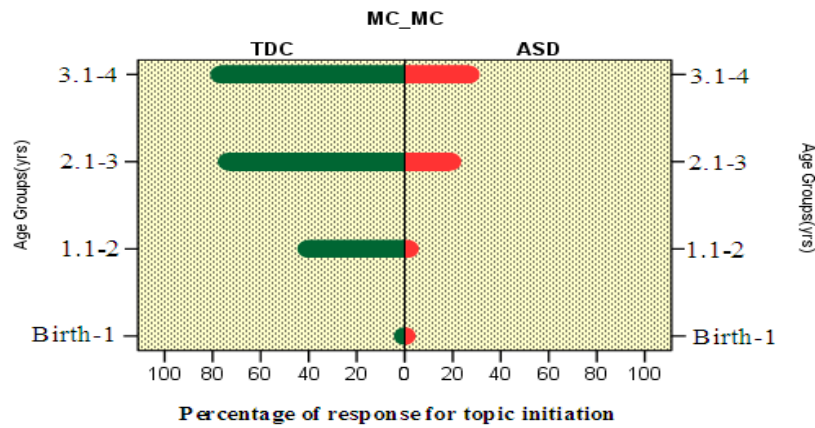
Figure-40: Percentage of response for topic maintenance
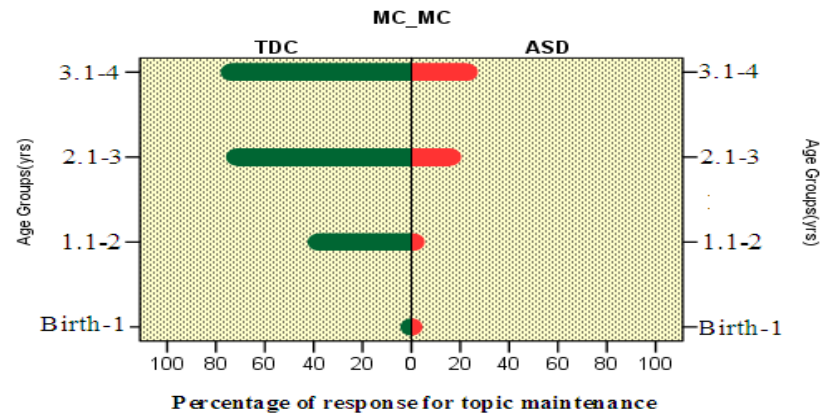
Figure-41: Percentage of response for comment/feedback
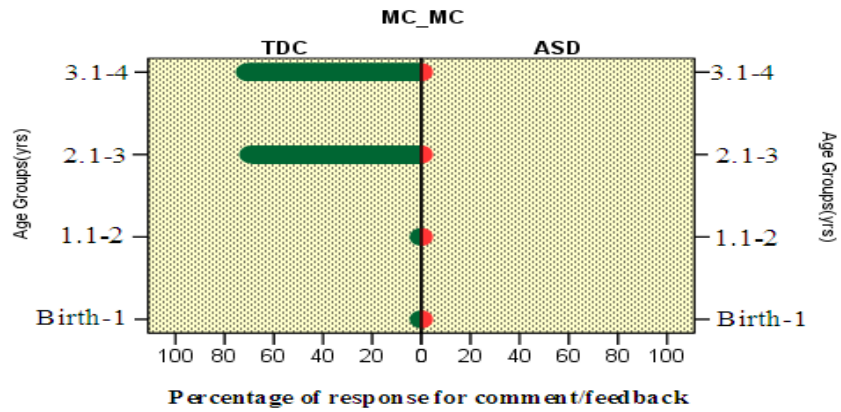
Figure-42: Percentage of response for adding information
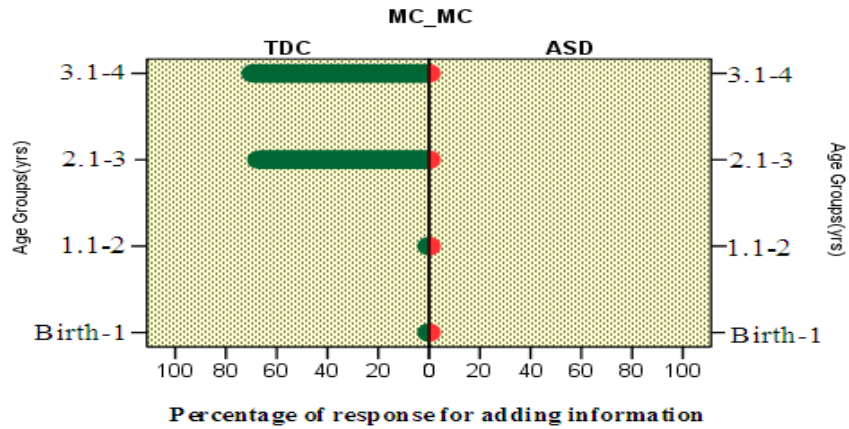
Non parametric test Kruskal-Wallis H was carried out to determine the effect of age across the group on pragmatic responses from children with ASD with language expression age from birth to 4 years, for mothers initiation of pragmatic skills. The results are given in table-29

Table-29 Kruskal-Wallis H test of significance for responses from children with ASD with language expression age from birth to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	$\chi2$ (3)
R_EC	13.91**
Sml	16.70**
R_GEx	15.52**
R_JA	10.21*
R_Rq	18.78***
R_Lb	25.93***
AQ	26.91***
R_Ng	20.91***
R_TT	12.29**
R_Rp	.00
R_TI	31.02***
R_TM	31.45***
R_C/Fb	.00
R_AI	.000

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, **R_Lb:** response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-29: shows Kruskal-Wallis H test results for responses from children with ASD to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD across the age groups indicated significant differences at .001, .01 and 0.05 level of significance for all the pragmatic skills except for conversational repair, comment / feedback and adding information. For these three pragmatic skills, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the clinical group on responses for pragmatic skills initiated by mothers. The results are given in table-30

Table-30: Mann-Whitney U test of significance for responses from children with ASD with language expression age from birth to 4 years for mother's initiation of pragmatic skills

Pragmatic skills	| Z | value					
	Birth-1 & 1.1-2 years	Birth-1 & 2.1-3 years	Birth-1 & 3.1-4 years	1.1-2 & 2.1-3 years	1.1-2 & 3.1-4 years	2.1-3 & 3.1-4 years
R_EC	2.35*	2.64**	2.42*	1.00	1.57	1.55
Sml	2.75**	3.21**	2.88**	.298	1.98*	1.85
R_GEx	3.34**	2.20*	1.86	1.89	1.39	.78
R_JA	1.31	2.67**	1.91	1.89	1.02	.78
R_Rq	2.78**	2.94**	2.72**	1.41	2.50*	1.30
R_Lb	3.82***	4.73***	4.46***	1.18	1.96	.91
R_AQ	3.82***	4.73***	4.46***	1.36	2.43*	1.29
R_Ng	1.41	1.73	4.46***	.398	2.75**	1.98**
R_TT	1.92	2.80**	1.69	2.36*	1.20	1.17
R_Rp	.00	.00	.00	.00	.00	.00
R_TI	1.41	4.73***	4.46***	3.20**	2.97**	1.17
R_TM	1.41	4.73***	4.46***	3.32**	2.98**	1.04
R_C/Fb	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_Lb: response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-30: shows Mann-Whitney U test results for responses from children with ASD to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD between the age groups indicated significant differences at .001, .01 and 0.05 level of significance. Pragmatic skills namely response for conversational repair, comment / feedback and adding information 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups on pragmatic skills studied. The results are given in table-31

Table-31: Mann-Whitney U test of significance between typically developing children and children with ASD with language expression age from birth to 4 years on responses for mother's initiation of pragmatic skills

Pragmatic skills		Z	value		
	Birth-1year	1.1-2 years	2.1-3 years	3.1-4 years
R_EC	4.58***	3.84***	3.37**	2. 60**
Sml	4.82***	3.84***	3.38**	2.60**
R_GEx	4.51***	2.06*	3.37**	2. 60**
R_JA	4.57***	3.84***	3.37**	2.60**
R_Rq	2.44*	3.62***	3.19**	2.31*
R_Lb	.00	2.78**	2.34*	2.31*
AQ	.000	3.38**	3.37**	2.60**
R_Ng	.00	3.23**	3.41**	2.60**
R_TT	4.45***	3.84***	3.37**	2.60**
R_Rp	.00	.00	3.44**	2.61**
R_TI	.00	3.95***	3.37**	2.60**
R_TM	.00	3.95***	3.37**	2.60**
R_C/Fb	.000	.00	3.44**	2.61**
R_AI	.000	.00	3.43**	2.61

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling, **AQ:** answering questions, R_**Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-31: shows Mann-Whitney U test results for responses between the two groups for mother's initiation of pragmatic skills. The results of pragmatic responses between the two groups indicated significant differences at .001, .01 and 0.05 level of significance. Skills namely responses for labeling, answering questions, negation, conversational repair, topic initiation, topic maintenances, comment / feedback and adding information, 00 values were obtained at birth-1 year of age as these skills were not used by children with ASD and typically developing children in the present study. For skill like conversational repair, comment / feedback and adding information, 00 values were obtained at 1.1-2 years of age.

IIB.4. Self initiation of pragmatic skills by children with ASD in the communicative context

The performance of children with ASD with language expression age from birth to 4 years was compared with the pragmatic skills that emerged in typically developing children with language expression age from birth to 4 years (refer table-10) for self initiation of pragmatic skills. The criteria used were similar to that of typically developing children.

Table-32: Self initiation of pragmatic skills observed in children with ASD in comparison with language expression age matched typically developing children.

Sl. No	Pragmatic skills	Birth -1 year (N=18)	1.1-2 years (N=9)	2.1-3 years (N=6)	3.1-4 years (N=3)
1	Refusal	08	05	03	02
2	Communicative intent	-	-	-	-
3	Request for object and / or action	-	-	02	-
4	Stylistic variation	-	-	-	-
5	Questioning	-	-	-	-
6	Initiation of Turn taking	-	-	-	-
7	Narration	-	-	-	-
8	Topic initiation	-	-	-	-
9	Initiation of Topic maintenances	-	-	-	-
10	Topic change	-	-	-	-

N: Number of children with ASD

Table-32: represents self initiation of pragmatic skills by children with ASD in comparison with pragmatic skills self initiated by typically developing children with language expression age from birth to 4 years. The shaded block in the table represents number of children with ASD self initiated pragmatic skills during mother-child interaction session. As shown in the table, it was the refusal and request for object and / or action skills for which children with ASD initiated for minimum of 15

times during mother-children interaction session. For the rest of the pragmatic skills none of the children fulfill the criterion level.

IIA.5. Frequency of self initiation of pragmatic skills by children with ASD

Mean values i.e. frequency of self initiation of pragmatic skills were calculated for children with ASD with language expression age from birth to 4 years. Mean and SD values are presented below in table-33.

Table-33: Mean and SD values for self initiation of pragmatic skills by children with ASD with language expression age from birth to 4 years

Pragmatic skills	Birth-1 year		1.1-2 years		2.1-3 years		3.1-4 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Rf	13.50	3.88	16.89	4.65	14.17	4.40	12.67	4.04
CI	2.22	3.21	7.11	3.33	7.83	4.67	6.00	5.29
Rq	2.94	4.15	8.89	4.43	10.17	5.98	7.67	6.81
SV	.00	.00	.00	.00	.00	.00	.00	.00
Qn	.00	.00	.00	.00	6.50	3.56	6.67	6.11
I_TT	2.17	3.94	7.00	3.35	7.00	4.29	6.33	5.51
Nr	.00	.00	.00	.00	.50	1.22	1.00	1.73
TI	.00	.00	.00	.00	3.83	2.71	4.33	4.04
I_TM	.00	.00	.00	.00	3.67	2.66	4.33	4.04
TC	.00	.00	.00	.00	3.50	2.35	3.67	3.51
I_JA	.00	.00	.00	.00	.00	.00	.00	.00
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-33: shows mean and SD values for self initiation of pragmatic skills by children with ASD with language expression age from birth to 4 years. The mean values were calculated for raw scores. Raw scores in the study referred to the number of times each pragmatic skill was initiated by children with ASD. As seen from the above table, mean scores for self initiation of pragmatic skills increased with increase in language expression age for skills namely, questioning, narration, topic initiation, topic maintenance and topic change. This pattern was seen in participants from 2.1 to

4 years of age. None of the participants at the lower age groups i.e. birth-1 year and 1.1-2 years initiated these skills. The frequency pattern of self initiation of pragmatic skills like refusal, communicative intent, request for object and / or action, stylistic variation were found to differ at each age level.

The pattern of self initiation of pragmatic skills by children with ASD in comparison with typically developing children were found to be similar to certain pragmatic skills (refer table-11), but not for all the 12 skills studied. However, frequency of self initiation of pragmatic skills was very less in children with ASD compared to typically developing children on all the pragmatic skills studied.

IIB.6. Graphical representation of self initiation of pragmatic skills by typically developing children and children with ASD matched on language expression age

Frequency of self initiation of pragmatic skills by children with ASD in comparison with typically developing children matched for language expression age from birth-4 years. (table-33 & 11) are graphically represented i.e. figure: 43 to 54.

Figure-43: Refusal
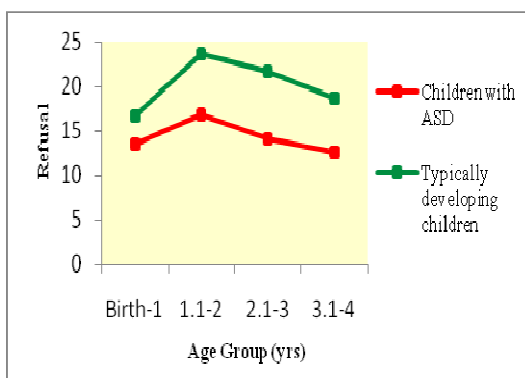
Figure-44: Communicative intent
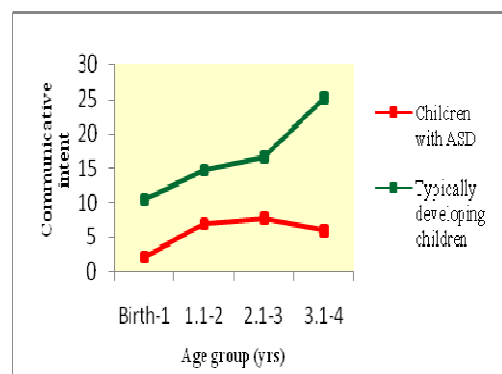
Figure-45: Request
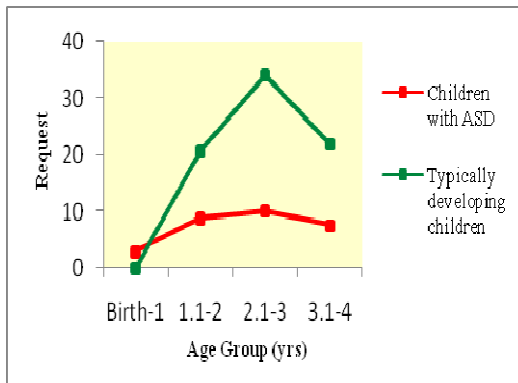
Figure-46: Stylistic variation
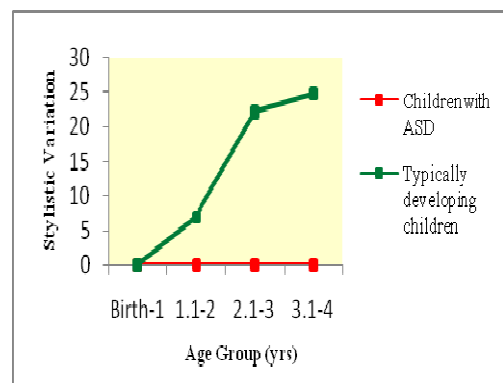
Figure-47: Questioning
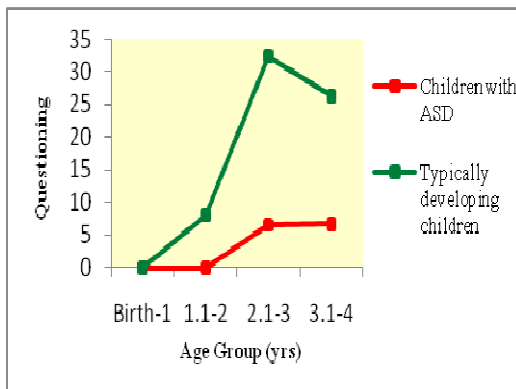
Figure-48: Turn taking
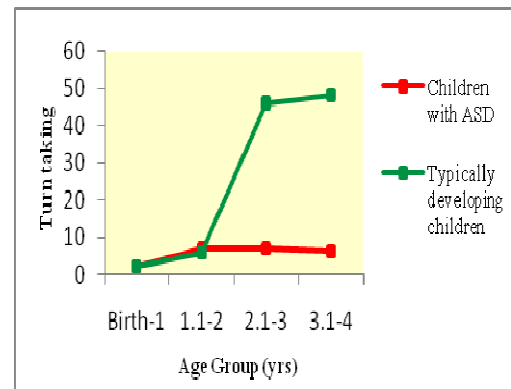
Figure-49: narration
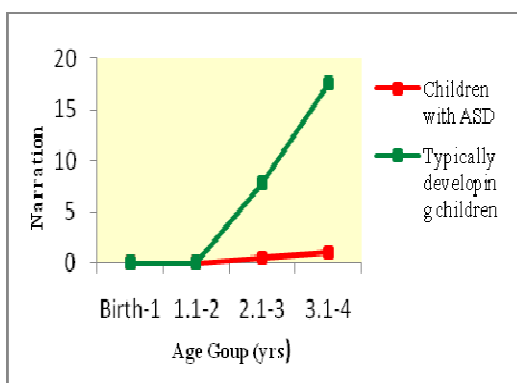
Figure-50: Topic initiation
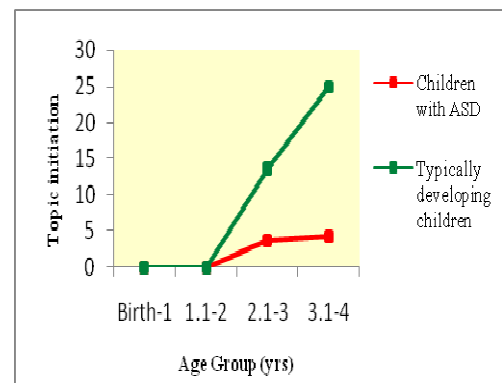
Figure-51: Topic maintenance
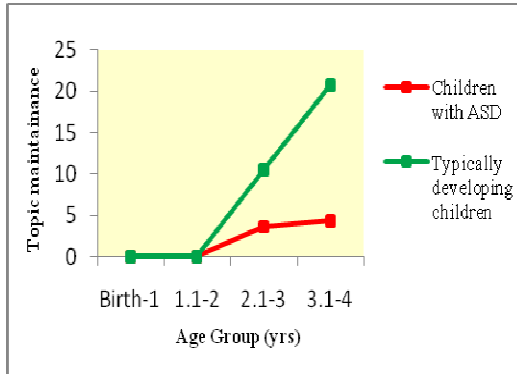
Figure-52: Topic change
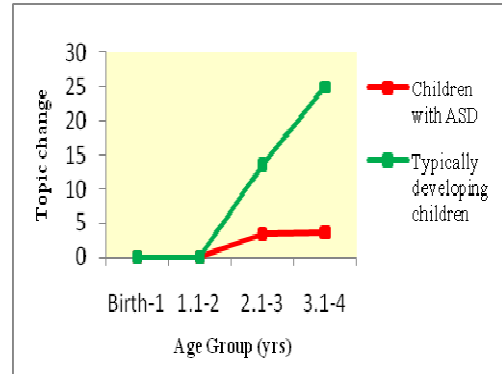
Figure-53: Joint attention
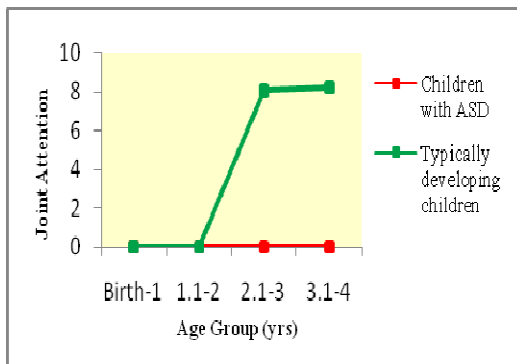
Figure-54: Repair
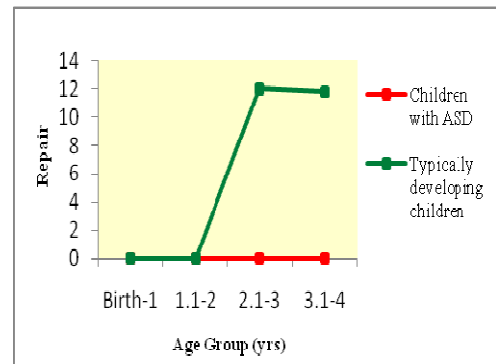
Non parametric test Kruskal-Wallis H was carried out to determine the effect of age within the group on self initiation of pragmatic skills by children with ASD. The results are given in table-34

Table-34: Kruskal-Wallis H test of significance for self initiation of pragmatic skills by children with ASD with language expression age from birth to 4 years

Pragmatic skills	$\chi 2$ (3)
Rf	3.85
CI	12.15**
Rq	11.53**

SV	.00
Qn	25.15***
TT	9.94*
Nr	7.21
TI	25.07***
TM	25.06***
TC	25.19***
I_JA	.00
Rp	.00

*** p< .001, ** p< .01, * p< .05

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-34: shows Kruskal-Wallis H test results for self initiation of pragmatic skills by children with ASD. The results across the age groups indicated statistically significant differences at .001, .01 and ,05 level of significance. For skills namely stylistic variation, initiation of joint attention and conversational repair, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the clinical group on self initiation of pragmatic skills by children with ASD. The results are given in table-35

Table-35: Mann-Whitney U test of significance for self initiation of pragmatic skills by children with ASD with language expression age from birth to 4 years

Pragmatic skills		Z	value				
	Birth-1 & 1.1-2 years	Birth-1 & 2.1-3 years	Birth-1 & 3.1-4 years	1.1-2 & 2.1-3 years	1.1-2 & 3.1-4 years	2.1-3 & 3.1-4 years
Rf	1.89	.31	.36	1.30	.84	.78
CI	3.05**	2.57*	1.39	.66	.19	.66
Rq	2.89**	2.57*	1.45	.71	-.09	.521
SV	.00	.00	.00	.00	.00	.00
Qn	.00	4.23***	3.55***	3.17**	2.56**	.27
TT	2.81**	2.38*	1.44	.12	.00	.13
Nr	.00	1.73	2.45*	1.23	1.73	.54
TI	.00	4.23***	3.55***	3.16**	2.56**	.39
TM	.00	4.23***	3.55***	3.17**	2.56**	.53

TC	.00	4.23***	3.55***	3.17**	2.56**	.14
I_JA	.00	.00	.00	.00	.00	.00
Rp	.00	.00	.00	.00	.00	.00

*** p< .001, ** p< .01, * p< .05

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-35: shows Mann-Whitney U test results for self initiation of pragmatic skills by children with ASD. The results indicates, significant differences at .001, .01 and 0.05 level of significance. The zero values in the above table for few pragmatic skills indicated absence of self initiation of pragmatic skills at the given age.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups matched with expressive language age on self initiation of pragmatics skills. The results are given in table-36

Table-36: Mann-Whitney U test of significance between typically developing children and children with ASD with language expression age from birth to 4 years for self initiation of pragmatic skills

Pragmatic skills	| Z | value			
	Birth-1 year	1.1-2 years	2.1-3 years	3.1-4 years
Rf	1.84	2.46*	2.97**	2.48*
CI	4.39***	3.23**	3.16**	2.62**
Rq	2.40*	3.57***	3.37**	2.60**
SV	.00	4.01***	3.44**	2.61**
Qn	.00	4.01***	3.38**	2.60**
TT	.21	1.27	3.38**	2.61**
Nr	.00	.00	3.38**	2.61**
TI	.00	.00	3.39**	2.60**
TM	.00	.00	3.12**	2.60**
TC	.00	.00	3.39**	2.60**
I_JA	.00	.00	3.45**	2.62**
Rp	.00	.00	3.44**	2.61**

*** p< .001, ** p< .01, * p< .05

Rf: refusal, **CI:** *communicative intent,* **Rq:** *request for object and / or action,* **SV:** *stylistic variation,* **AQ:** *questioning,* **I_TT:** *initiation of turn taking,* **Nr:** *narration,* **TI:** *topic initiation,* **I_TM:** *initiation of topic maintenances,* **TC:** *topic change,* **I_JA:** *initiation of joint attention and* **R_Rp:** *request for conversational repair.*

Table-36: shows Mann-Whitney U test results for self initiation of pragmatic skills between the two groups matched for language expression age. The results indicates, significant differences at .001, .01 and 0.05 level of significance. The zero values in the above table for few pragmatic skills indicated absence of self initiation of pragmatic skills at the given age.

IIC. Comparison between the two groups based on social age

A total of 36 children with Autism spectrum disorders (ASDs) participated in the study. The distribution of social age (refer table-2) were as follows, six (06) children with social age of 1.1 to 2 years; sixteen (16) children with social age of 2.1 to 3 years; ten (10) children with social age of 3.1 to 4 years and four (04) children with social age of 4.1 to 5 years. The performance of children with Autism spectrum disorders (ASDs) on 26 pragmatic skills were evaluated under two categories: responses by children with ASD to mother's initiation of pragmatic skills. Self initiation of pragmatic skills by children with ASD

IIC.1. Responses by children with ASD to mother's initiation of pragmatic skills in the communicative context.

The performance of children with ASD with social age from 1.1 to 5 years was compared with the pragmatic skills that emerged in typically developing children with social age from 1.1 to 5 years (refer table-3) for mother's initiation of pragmatic skills. 80% criterion level was to indicate presence of the given pragmatic skills.

Table-37: Pragmatic skills observed in children with ASD in comparison with social age matched typically developing children (responses for mother's initiation of pragmatic skills)

Sl. No	Pragmatic skills	1.1-2 years (N=06)	2.1-3 years (N=16)	3.1-4 years (N=10)	4.1-5 years (N=04)
1	Response for eye contact	-	-	-	-
2	Smiling	-	-	-	-
3	Response for gaze exchange	-	-	-	-
4	Response for Joint attention	-	-	-	-
5	Response for request of object and / or action	-	-	-	-
6	Response for labeling	-	-	01	01
7	Answering questions	-	-	-	-
8	Response for negation	-	-	-	-
9	Response for Turn taking	-	-	-	-
10	Response for conversational repair	-	-	-	-
11	Response for Topic initiation	-	-	-	-
12	Response for Topic maintenances	-	-	-	-

N: Number of children with ASD

Table-37: represents responses by children with ASD to mother's initiation of pragmatic skills in comparison with pragmatic skills that emerged in typically developing children with social age from 1.1 to 5 years. The shaded block in the table represents number of children with ASD who responded for pragmatic skills initiated by mothers. As shown in the table, it was the Labeling skill for which children with ASD responded 80% of time. Two children with ASD with social age of 3.1 to 4 and 4.1-5 years presented with 80% responses for labelling skill. For the rest of the pragmatic skills none of the children presented with 80% responses.

IIC.2. Percentage of responses by children with ASD to mother's initiation of pragmatic skills

Pragmatic responses of children with ASD with social age from 1.1 to 5 years to mother's initiation of pragmatic skills were converted into percentile scores. Mean

percentage for pragmatic responses, SD values were calculated for participants with social age from 1.1 to 5 years. Mean percentage, SD values are presented below in table-38.

Table-38: Mean percentage and SD values for responses by children with ASD with social age from 1.1 to 5 years for mother's initiation of pragmatic skills

Pragmatic skills	1.1-2 years		2.1-3 years		3.1-4 years		4.1-5 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
R_EC	11.95	13.83	11.06	6.43	15.79	10.60	21.11	8.80
Sml	5.00	12.24	3.87	4.81	6.70	4.13	10.00	1.41
R_GEx	12.70	8.71	13.68	8.57	37.71	8.66	26.99	4.67
R_JA	17.27	13.98	24.02	10.93	20.61	10.53	23.75	9.87
R_Rq	3.85	4.29	11.60	16.43	13.06	11.47	30.61	19.29
R_Lb	.00	.00	20.00	29.26	24.46	28.96	55.32	37.14
AQ	.00	.00	7.83	11.33	8.19	11.73	20.37	14.51
R_Ng	.00	.00	3.43	13.75	5.68	15.87	3.48	4.68
R_TT	8.23	14.40	18.21	13.11	18.56	13.27	21.36	9.46
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00
R_TI	.00	.00	5.40	9.30	4.20	9.81	19.52	13.10
R_TM	.00	.00	4.20	7.68	3.69	8.76	16.75	11.32
R_C/Fb	.00	.00	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00	.00	.00

*R_EC: response for eye contact, **Sml**: smiling, **R_GEx**: response for gaze exchange, **R_JA**: response for joint attention, **R_Rq**: response for request of object and / or action, R_Lb: response for labeling, **AQ**: answering questions, R_Ng: response for negation, **R_TT**: response for turn taking, **R_Rp**: response for conversational repair, **R_TI**: response for topic initiation, **R_TM**: response for topic maintenances, **R_C/Fb**: response for comment / feedback, **R_AI**: response for adding information*

Table-38: shows mean percentage and SD values for responses by children with ASD for mother's initiation of pragmatic skills. The percentage of responses obtained for children with ASD is compared with the percentage of responses obtained from typically developing children (refer table-4) with the social age from 1.1 to 5 years. The results of the study indicated that, responses for pragmatic skills namely eye contact, request and turn taking increased as social age increased in both the groups.

Pragmatic responses for answering questions, labeling, gaze exchange, joint attention, negation, topic initiation, and topic maintenance skills increased with

increase in social age in typically developing children. However, there were lots of variations in the pattern of responses in children with ASD.

In children with ASD for answering questions and labeling skill responses were zero at 1.1-2 years of social age and increased from 2.1 to 5 years of age. Pragmatic skills namely topic initiation, and topic maintenance responses were zero at 1.1-2 years of social age; responses increased from 1.1-2 to 2.1-3 years; responses decreased from 2.1-3 to 3.1-4 years and increased from 3.1-4 to 4.1-5years. On negation skill responses were zero at 1.1-2 years of age; responses increased from 1.1-2 to 3.1-4 years; decreased from 3.1-4 to 4.1-5years. For gaze exchange; responses increased from 1.1-2 to 3.1-4 years; decreased from 3.1-4 to 4.1-5years. In case of response for joint attention; pragmatic responses increased from 1.1-2 to 2.1-3 years; decreased from 2.1-3 to 3.1-4years and increased from 3.1-4 to 4.1-5years.

At 1.1-2 years of social age none of the typically developing children used pragmatic skills namely; adding information, comment / feedback and repair. However, pragmatic responses increased with increase in social age from 2.1-3 years, 3.1-4 years and 4.1-5 years for the same skills. None of the children with Autism spectrum disorders used adding information, comment / feedback and response for repair skills in this study.

However, pragmatic responses were found to be very less in children with Autism spectrum disorders compared to typically developing children at all the four age levels i.e. 1.1-2years; 2.1-3 years; 3.1-4 years and 4.1-5 years.

IIB.3. Graphical representation of percentage of responses by typically developing children and children with ASD matched on social age for pragmatic skills initiated by mothers

Percentage of responses by children with ASD in comparison with percentage of responses by typically developing children with social age from 1.1-5 years for mother's initiation of pragmatic skills (table-38 & 4) are graphically represented i.e. figure: 55 to 68. In the figures, **MC**: refers to mother's initiation and child's responses, **TDC** refers to typically developing children and **ASD** refers to children with Autism spectrum disorders. Right side of the figure indicates the percentage of responses given by typically developing children (TDC) to mother's initiation of pragmatic skills. Left side of the figure indicates the percentage of responses given by children with ASD to mother's initiation of pragmatic skills.

Figure-55: Percentage of response for eye contact
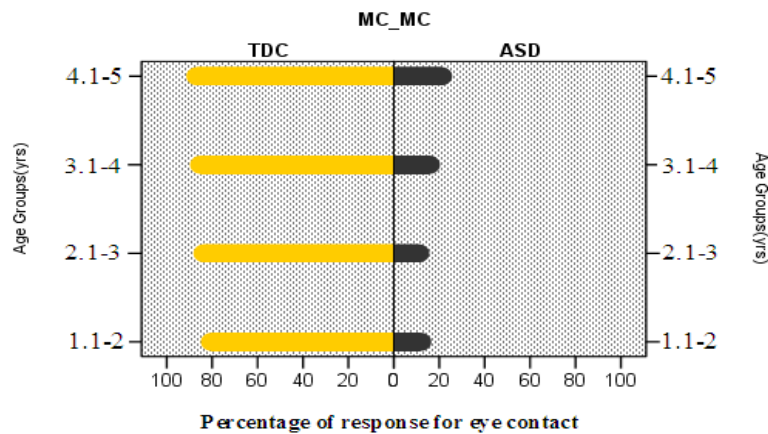
Figure-56: Percentage of response for smiling
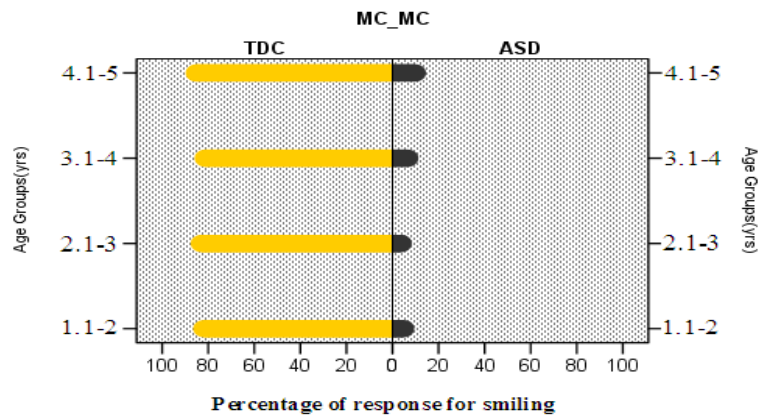
Figure-57: Percentage of response for gaze exchange
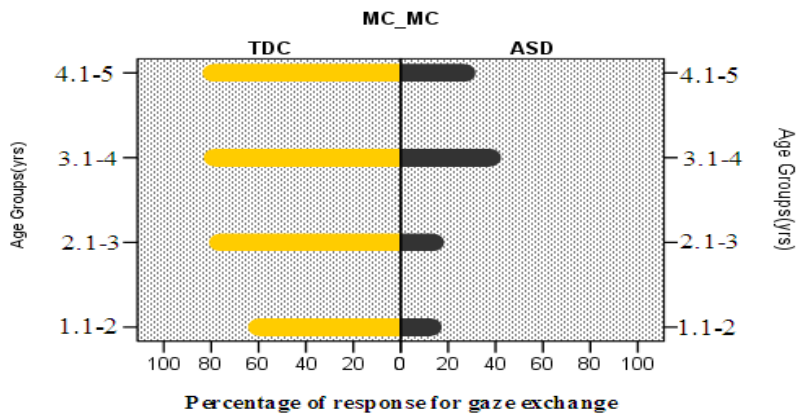
Figure-58: Percentage of response for gaze joint attention
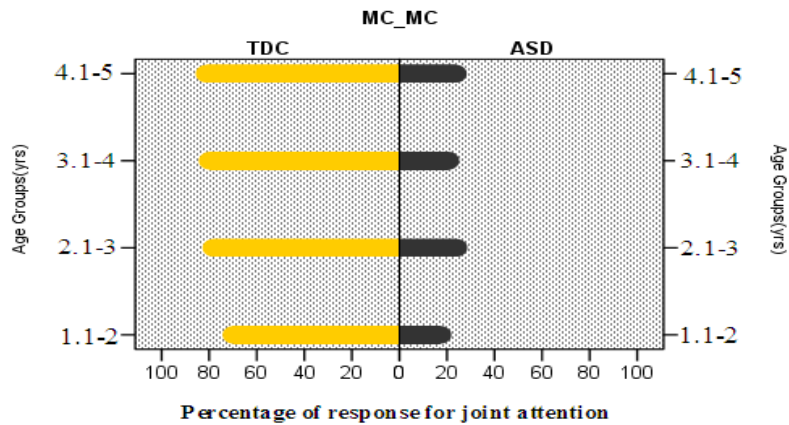
Figure-59: Percentage of response for request
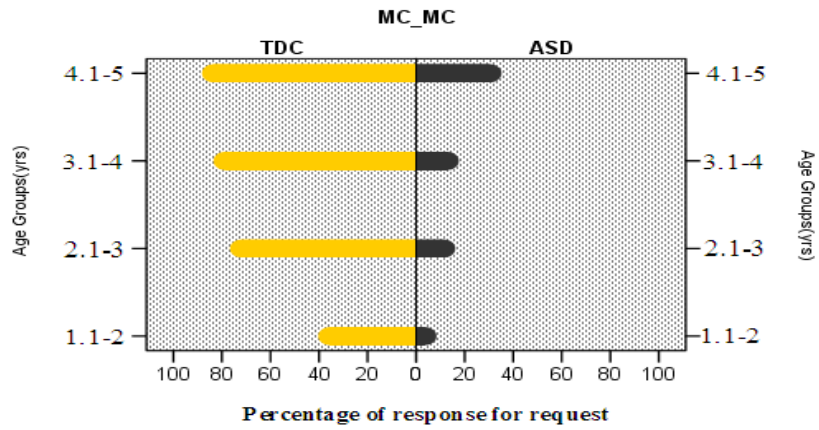
Figure-60: Percentage of response for labeling
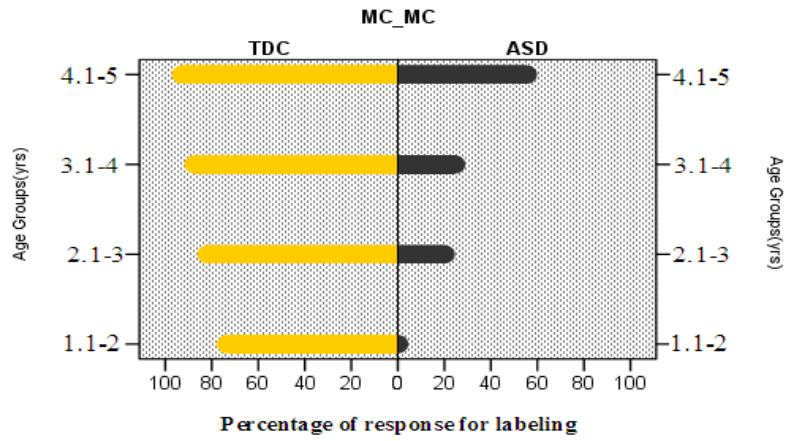
Figure-61: Percentage of response for answering questions
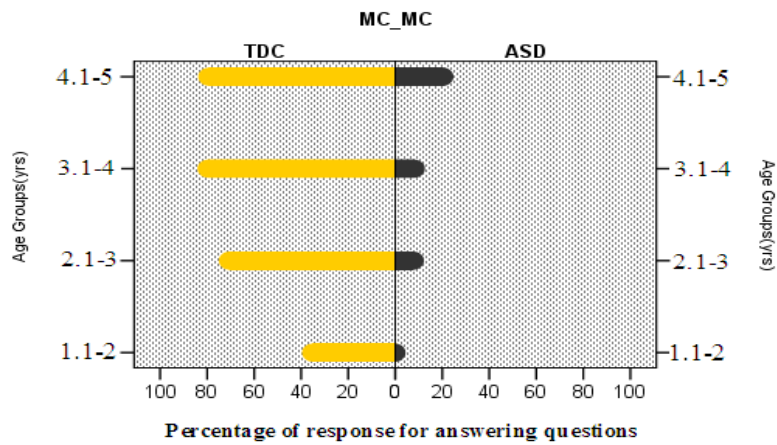
Figure-62: Percentage of response for negation

Percentage of response for negation
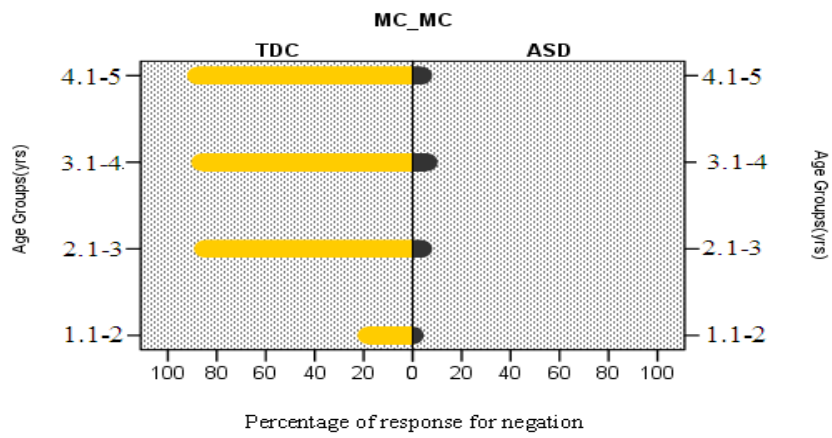
Figure-63: Percentage of response for turn taking

Percentage of response for turn taking
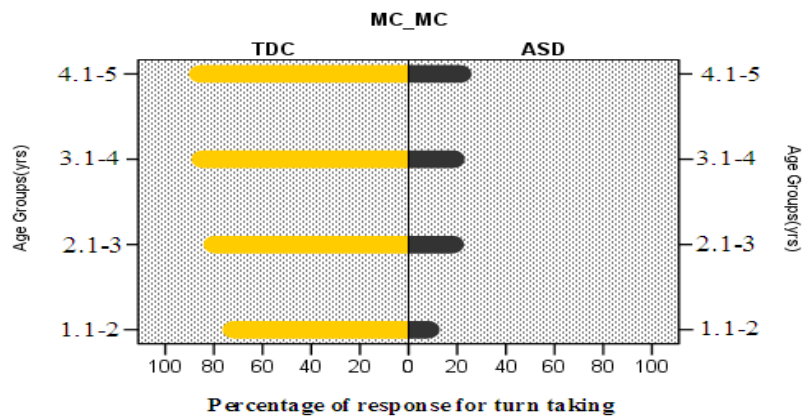
Figure-64: Percentage of response for repair

Percentage of response for repair
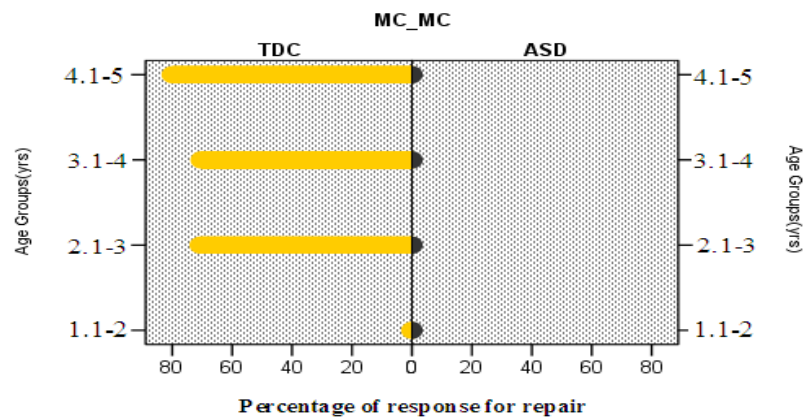
Figure-65: Percentage of response for topic initiation
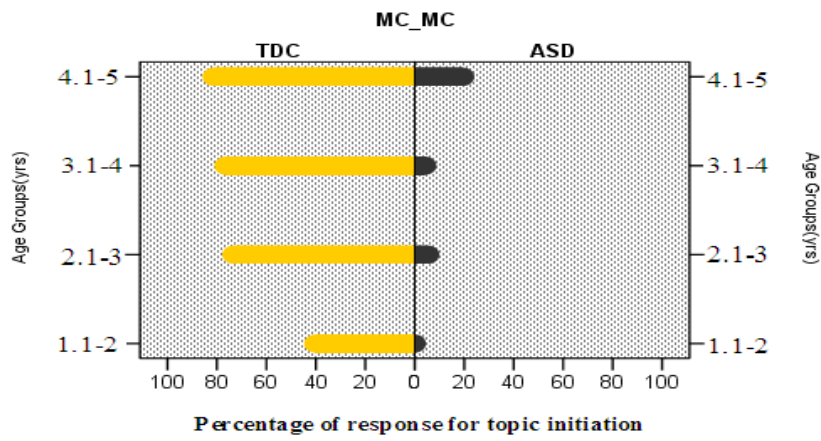
Figure-66: Percentage of response for topic maintenance
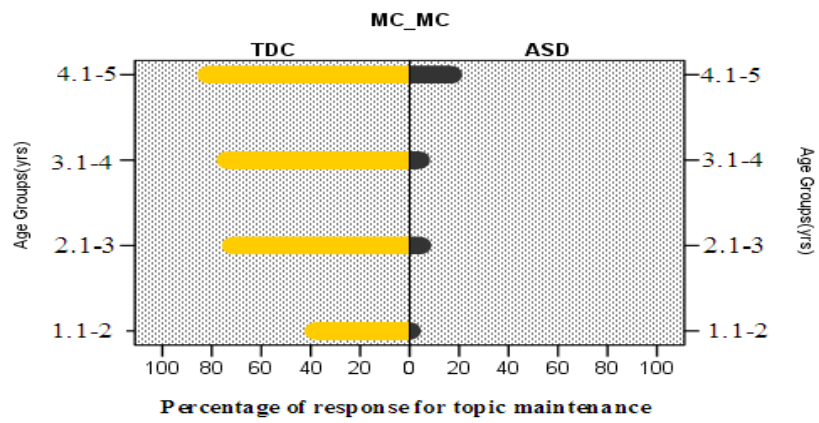
Figure-67: Percentage of response for comment/feedback
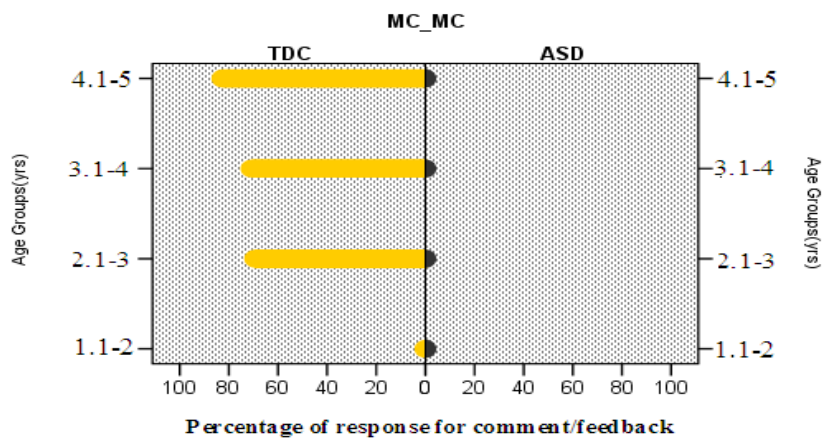
Figure-68: Percentage of response for adding information
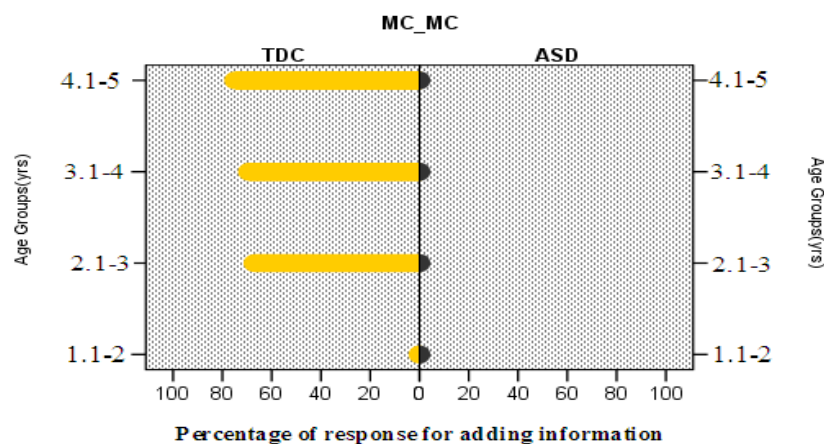
Non parametric test Kruskal-Wallis H was carried out to determine the effect of age on pragmatic skills studied in children with ASD with social age from 1.1 to 5years . The results are given in table-39

Table-39 Kruskal-Wallis H test of significance for response from children with ASD with social age from 1.1 to 5years to mother's initiation of pragmatic skills

Pragmatic skills	$\chi 2$ (3)
R_EC	4.97
Sml	7.78
R_GEx	20.47***
R_JA	2.30
R_Rq	8.92*
R_Lb	7.12
AQ	7.38
R_Ng	5.45
R_TT	3.26
R_Rp	.00
R_TI	7.81*
R_TM	7.74
R_C/Fb	.00
R_AI	.00

*** p< .001, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, **R_Lb:** response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-39: shows Kruskal-Wallis H test results for responses from children with ASD with social age from 1.1 to 5years to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD across the age groups indicated significant differences at .001 and 0.05 level of significance. For pragmatic skills namely, response for conversational repair, comment / feedback and adding information, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the group on pragmatic skills studied. The results are given in table-40

Table-40: Mann-Whitney U test of significance for response from children with ASD with social age from 1.1 to 5 years to mother's initiation of pragmatic skills

Pragmatic skills		Z	value				
	1.1-2 & 2.1-3 years	1.1-2 & 3.1-4 years	1.1-2 & 4.1-5 years	2.1-3 & 3.1-4 years	2.1-3 & 4.1-5 years	3.1-4 & 4.1-5 years
EC	1.63	1.36	1.39	.98	1.61	.50
Sml	.81	1.70	1.83	1.43	2.24*	1.50
GazeEx	.48	2.93**	1.92	3.901***	2.36*	2.12*
R_JA	1.37	.98	.75	.79	.38	.28
R_Rq	1.92	2.01*	2.35*	.74	1.89	1.41
Lb	1.87	1.98*	2.36*	.37	1.52	1.40
AQ	1.87	1.98*	2.36*	.03	1.72	1.40
Ng	.61	1.13	1.83	.95	1.98*	.89
R_TT	1.45	1.69	1.51	.08	.19	.00
R_Rp	.00	.00	.00	.00	.00	.00
R_TI	1.51	1.13	2.36*	.57	1.97*	1.81
R_TM	1.51	1.13	2.37*	.47	1.97*	1.82
FB	.00	.00	.00	.00	.00	.00
AI	.00	.00	.00	.00	.00	.00

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling, **AQ:** answering questions, R_**Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-40: shows Mann-Whitney U test results for responses from children with ASD to mother's initiation of pragmatic skills. The results of pragmatic responses by children with ASD between the age groups indicated significant differences at .001, .01 and 0.05 level of significance. For pragmatic skills namely response for conversational repair, comment / feedback and adding information zero values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups matched for social skills on pragmatic skills studied. The results are given in table-41

Table-41: Mann-Whitney U test of significance between typically developing children and children with ASD with social age from 1.1 to 5 years on response for mother's initiation of pragmatic skills

Pragmatic skills		Z	value		
	1.1-2 years	2.1-3 years	3.1-4 years	4.1-5 years
EC	3.37**	4.46***	3.96***	2.91**
Sml	3.41**	4.53***	3.96***	2.92**
GazeEx	3.23**	4.46***	3.96***	2.91**
R_JA	3.38**	4.46***	3.96***	2.92**
R_Rq	3.37**	4.25***	3.96***	2.91**
Lb	3.43**	4.06***	3.72***	2.93**
AQ	3.43**	4.53***	3.98***	2.91**
Ng	2.94**	4.84***	4.06***	2.92**
R_TT	3.29**	4.46***	3.96***	2.91**
R_Rp	.00	4.94***	4.16***	2.93**
R_TI	3.43**	4.60***	4.05***	2.91**
R_TM	3.43**	4.60***	4.05***	2.92**
FB	.00	4.94***	4.16***	2.94**
AI	.00	4.94***	4.16***	2.94**

*** p< .001, ** p< .01, * p< .05

*R_EC: response for eye contact, **Sml**: smiling, **R_GEx**: response for gaze exchange, **R_JA**: response for joint attention, **R_Rq**: response for request of object and / or action, R_**Lb**: response for labeling, **AQ**: answering questions, **R_Ng**: response for negation, **R_TT**: response for turn taking, **R_Rp**: response for conversational repair, **R_TI**: response for topic initiation, **R_TM**: response for topic maintenances, **R_C/Fb**: response for comment / feedback, **R_AI**: response for adding information*

Table-41: shows Mann-Whitney U test results for responses between the two groups matched for social skills for mother's initiation of pragmatic skills. The results of pragmatic responses between the two groups indicated significant differences at .001, .01 and 0.05 level of significance. Skills namely response for conversational repair, comment / feedback and adding information, 00 values were obtained at 1.1-2 year of age as these skills were not used by children with ASD and typically developing children in the present study at 1.1-2 years of age.

IIC.4. Self initiation of pragmatic skills by children with ASD

The performance of children with ASD with social age from 1.1 to 5 years was compared with the pragmatic skills that emerged in typically developing children with social age from 1.1 to 5 years (refer table-10) for self initiation of pragmatic skills. The criteria used were similar used for typically developing children.

Table-42: Self initiation of pragmatic skills observed in children ASD in comparison with social age matched typically developing children

Sl. No	Pragmatic skills	1.1-2 years	2.1-3 years	3.1-4 years	4.1-5 years
1	Refusal	02	06	05	02
2	Communicative intent	-	-	-	-
3	Request for object and / or action	-	-	02	-
4	Stylistic variation	-	-	-	-
5	Questioning	-	-	-	-
6	Initiation of Turn taking	-	-	-	-
7	Narration	-	-	-	-
8	Topic initiation	-	-	-	-
9	Initiation of Topic maintenances	-	-	-	-
10	Topic change	-	-	-	-
11	Initiation of Joint attention	-	-	-	-
12	Request for Repair	-	-	-	-

N: Number of children with ASD

Table-42: represents self initiation of pragmatic skills by children with ASD in comparison with pragmatic skills that emerged in typically developing children with social age from 1.1 to 5 years. The shaded block in the table represents number of children with ASD self initiated pragmatic skills during mother-child interaction session. As shown in the table, it was the refusal and request for object and / or action skills for which children with ASD initiated for minimum of 15 times during mother-children interaction session. For the rest of the pragmatic skills none of the children fulfill the criterion level.

IIC.5. Frequency of self initiation of pragmatic skills by children with ASD

Mean values for self initiation of pragmatic skills were calculated for children with ASD with social age from 1.1 to 5 years. Mean and SD values are presented below in table-43.

Table-43: Mean and SD values for self initiation of pragmatic skills by children with ASD with social age from1.1 to 5 years

Pragmatic skills	1.1-2 years		2.1-3 years		3.1-4 years		4.1-5 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Rf	12.83	4.02	12.81	3.12	18.10	3.70	13.75	5.62
CI	.67	1.63	4.19	4.29	7.70	3.80	5.25	3.78
Rq	1.33	3.27	5.56	5.43	9.40	5.32	6.50	5.07
SV	.00	.00	.00	.00	.00	.00	.00	.00
Qn	.00	.00	1.56	3.60	1.80	3.82	4.00	4.62
I_TT	.00	.00	4.06	4.55	7.70	3.62	5.25	4.11
Nr	.00	.00	.1875	.750	.30	.949	.00	.00
TI	.00	.00	.88	2.19	1.30	2.83	2.25	2.63
I_TM	.00	.00	.87	2.19	1.20	2.70	2.25	2.63
TC	.00	.00	.81	1.97	1.10	2.42	2.00	2.30
I_JA	.00	.00	.00	.00	.00	.00	.00	.00
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-43: shows mean and SD values for self initiation of pragmatic skills by children with ASD with social age from 1.1 to 5 years. The mean values were calculated for raw scores. Raw scores in the study referred to the number of times each pragmatic skill was initiated by children with ASD. As seen from the above table, mean scores for self initiation of pragmatic skills namely questioning, topic initiation, initiation of topic maintenances and topic change increased with increase in social age.

Mean score for pragmatic skills like refusal, communicative intent and request for object and / or action turn taking increased from 1.1 to 4 years and at the higher age level there was an decrease in the scores. None of the participant self initiated skills namely stylistic variation, initiation of joint attention and request for conversational repair in the study.

The mean score of children with ASD in comparison with mean score of typically developing children (refer table-11) indicated certain similarities and differences in pattern of self initiation of pragmatic skills studied. However, it was observed that, frequency of self initiation of pragmatic skills by children with ASD were very less compared to social age matched typically developing children

IIC.6. Graphical representation of self initiation of pragmatic skills by typically developing children and children with ASD matched on social age

Frequency of self initiation of pragmatic skills by children with ASD in comparison with typically developing children matched for social age from 1.1-5 years. (table-43 & 11) are graphically represented i.e. figure: 69 to 80.

Figure-69: Refusal
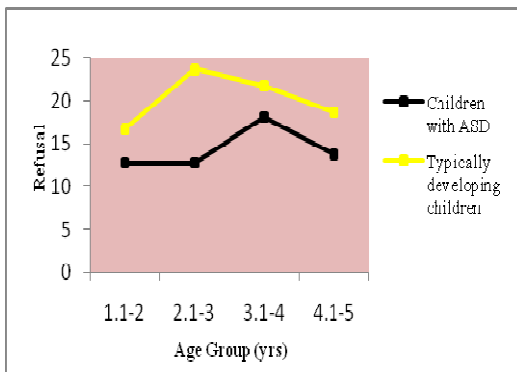
Figure-70: Communicative intent
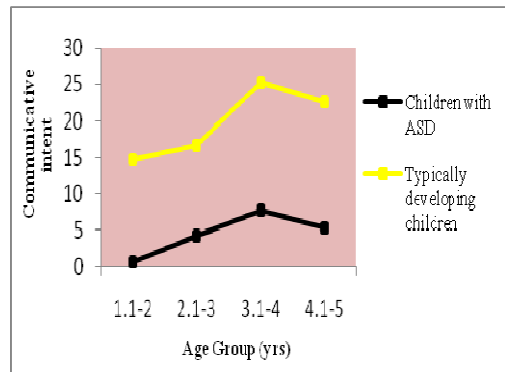
Figure-71: Request
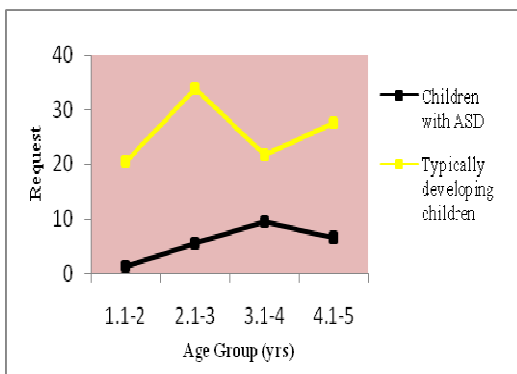
Figure-72: Stylistic variation
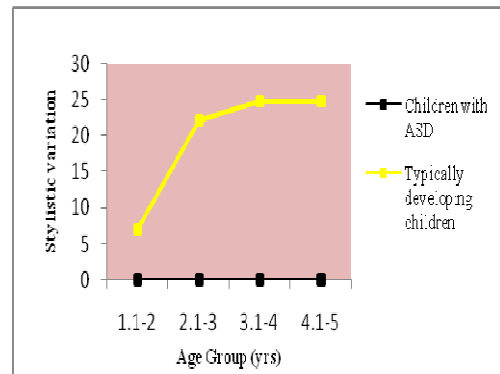
Figure-73: Questioning
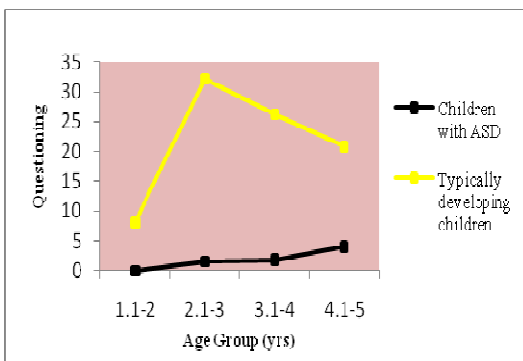
Figure-74: Turn taking
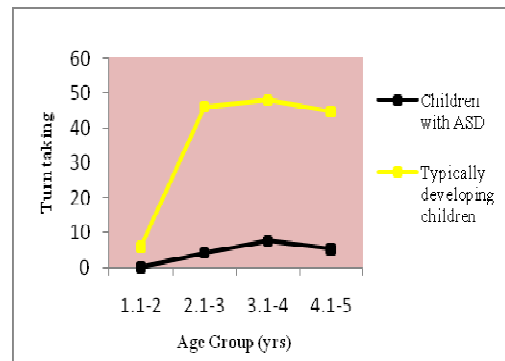
Figure-75: narration
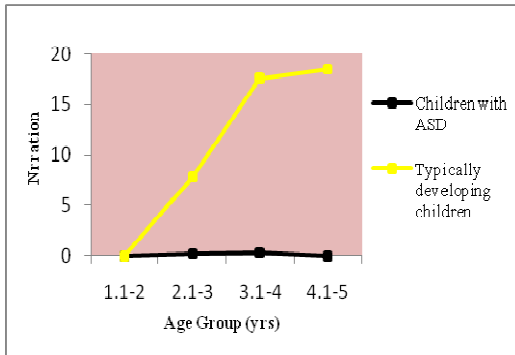
Figure-76: Topic initiation
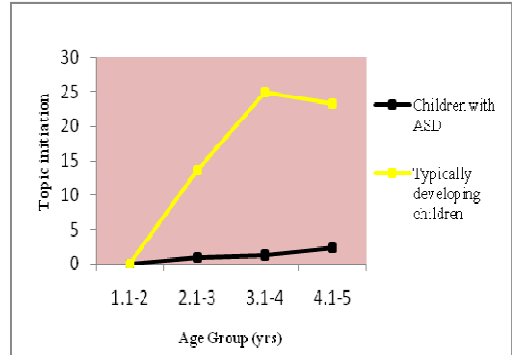
Figure-77: Topic maintenance
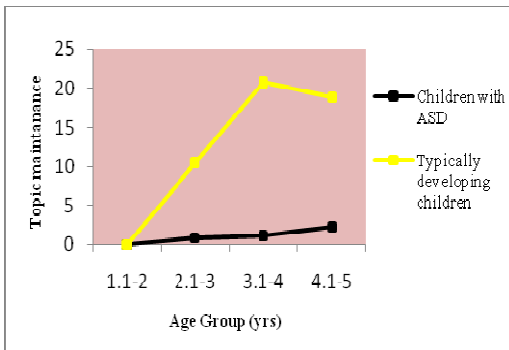
Figure-78: Topic change
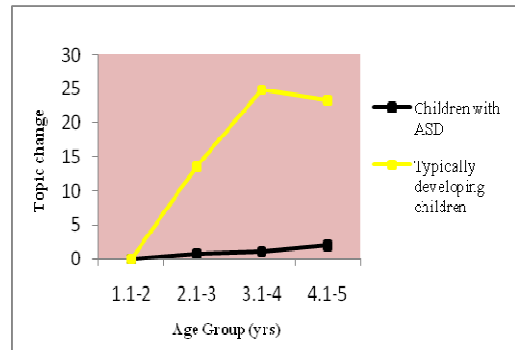
Figure-79: Joint attention
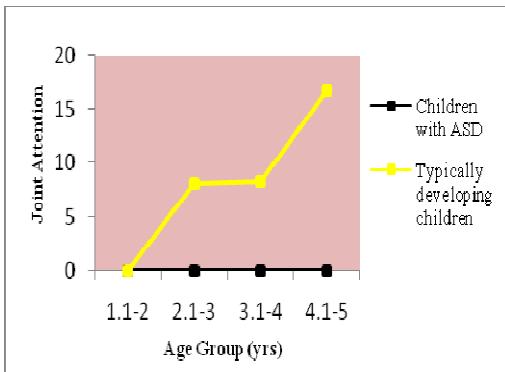
Figure-80: Repair

Non parametric test Kruskal-Wallis H was carried out to determine the effect of age on self initiation of pragmatic skills by children with ASD with social age from 1.1 to 5 years. The results are given in table-44

Table-44: Kruskal-Wallis H test of significance for self initiation of pragmatic skills by children with ASD with social age from 1.1 to 5 years

Pragmatic skills	$\chi 2\ (3)$
Rf	9.65*
CI	10.02*
Rq	8.12*
SV	.00
Qn	3.50
TT	10.96*
Nr	.95
TI	3.52
TM	3.70
TC	3.51
I_JA	.00
Rp	.00

* $p< .05$,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-44: shows Kruskal-Wallis H test results for self initiation of pragmatic skills by children with ASD. The results across the age groups indicated significant differences at .05 level of significance. For skills namely stylistic variation, initiation of joint attention and conversational repair, 00 values were obtained as these skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the age groups within the clinical group on self initiation of pragmatic skills by children with ASD. The results are given in table-45

Table-45: Mann-Whitney U test of significance for self initiation of pragmatic skills by children with ASD with social age from1.1 to 5 years

Pragmatic skills	| Z | value					
	1.1-2& 2.1-3 years	1.1-2& 3.1-4 years	1.1-2 & 4.1-5 years	2.1-3& 3.1-4 years	2.1-3& 4.1-5 years	3.1-4 & 4.1-5 years
Rf	.34	2.19*	.34	3.02**	.14	1.35
CI	1.8	2.90**	2.05*	1.91	.25	1.14
Rq	1.70	2.68**	1.80	1.66	.34	.78
SV	.00	.00	.00	.00	.00	.00
Qn	1.11	1.13	1.84	.12	1.25	.89
TT	2.05*	3.07**	2.36**	1.89	.55	.93
Nr	.61	.78	.00	.34	.50	.63
TI	1.11	1.13	1.83	.19	1.31	.80
TM	1.11	1.13	1.83	.15	1.31	.98
TC	1.11	1.13	1.84	.15	1.25	.89
I_JA	.00	.00	.00	.00	.00	.00
Rp	.00	.00	.00	.00	.00	.00

* p< .05,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-45: shows Mann-Whitney U test results for self initiation of pragmatic skills by children with ASD. The results indicated significant differences at .05 level of significance between the groups only on few pragmatic skills. The 00 values for skills namely stylistic variation, initiation of joint attention and conversational repair indicates that, these pragmatic skills were not used by children with ASD in the present study.

Non parametric test Mann-Whitney U was carried out to check differences between the two groups on self initiation of pragmatic skills. The results are given in table-46

Table-46: Mann-Whitney U test of significance between typically developing children and children with ASD with social age from 1.1 to 5 years on self initiation of pragmatic skills

Pragmatic skills		Z	value		
	1.1-2 years	2.1-3 years	3.1-4 years	4.1-5 years
Rf	3.07**	4.31***	.37	.79
CI	3.45**	4.44***	3.97***	2.92**
Rq	3.41**	4.49***	3.70***	2.92**
SV	3.45**	4.94***	4.16***	2.93**
Qn	3.45**	4.70***	4.06***	2.92**
TT	3.48**	4.51***	3.97***	2.91**
Nr	.00	4.83***	4.11***	2.96**
TI	.00	4.70***	4.06***	2.92**
TM	.00	4.56***	4.06***	2.92**
TC	.00	4.70***	4.06***	2.92**
I_JA	.00	4.95***	4.16***	2.95**
Rp	.00	4.94***	4.16***	2.94**

*** p< .001, ** p< .01,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-46: shows Mann-Whitney U test results between the two groups for self initiation of pragmatic skills. The results indicated significant differences at .001, 0.01 level of significance. Statistically significant differences between the two groups were seen for most of the skills studied. The 00 values in the table indicates that, children in both the group at 1.1-2 years did not use skills like narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

III. Comparison within clinical group based on speech language therapy duration.

A total of 36 children with Autism spectrum disorders (ASDs) participated in the study. The participants were grouped based on duration of speech language

therapy attended (refer table-2), ten (10) children attended therapy for duration of less than 6months; eight (08) children attended therapy for the duration of 7months to 1year; nine (09) children attended therapy for the duration of 1.1year to 1.6 years; and nine (09) children attended therapy for the duration of 1.7year to 2 years.

Table-47: Mean percentage and SD values for responses by children with ASD attending speech language therapy for mother's initiation of pragmatic skills

Pragmatic skills	Duration of Speech language therapy attended.							
	<6months		7months-1year		1.1year-1.7years		1.7year-2years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
R_EC	10.92	10.46	13.83	8.97	13.31	8.89	16.83	10.40
Sml	4.60	9.57	5.50	4.86	5.22	5.38	5.88	4.78
R_GEx	15.54	10.41	16.30	11.46	23.10	17.21	31.82	8.66
R_JA	18.51	11.89	24.05	12.70	25.26	8.58	20.46	11.34
R_Rq	5.01	4.55	14.33	22.89	15.84	11.10	17.17	17.66
R_Lb	18.09	30.22	20.03	28.00	19.27	29.02	30.15	36.58
AQ	3.34	5.50	9.68	14.17	9.52	12.98	10.24	13.51
R_Ng	.00	.00	6.87	19.44	5.61	16.83	2.25	3.69
R_TT	11.14	14.15	17.97	16.16	23.87	9.11	15.75	11.01
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00
R_TI	2.12	4.53	9.66	11.55	3.33	10.00	8.67	13.04
R_TM	1.42	3.03	7.87	9.77	3.00	9.00	7.44	11.22
R_C/Fb	.00	.00	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00	.00	.00

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling, **AQ:** answering questions, **R_Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

As shown from table-47: percentage of responses by children with ASD for pragmatic skills namely eye contact, smiling, gaze exchange, request of object and / or action, labeling, answering questions, increase with increase in duration speech language therapy attended by participant's.

Skills namely responses to joint attention and turn taking increased in participants attended speech language therapy from 6months to 1.6 years but, decreased slightly in participants attending therapy for 1.7 years to 2 years. Responses

for negation decreased as the therapy duration increased. The result of the present study indicates that, duration of therapy attended did not influence on the performances of children with ASD on all the pragmatic functions studied.

None of the children with ASD used pragmatic skills namely conversational repair, comment / feedback and adding information in this study. Pragmatic skills like responses for topic initiation and topic maintenances response pattern varied among participants attending therapy for various duration.

Non parametric test Kruskal-Wallis H was carried out to determine the effect of speech language therapy duration on responses for pragmatic skills by children with ASD for mother's initiation of pragmatic skills. The results are given in table-48

Table-48: Kruskal-Wallis H test of significance for response from children with ASD attending speech language therapy for mother's initiation of pragmatic skills

Pragmatic skills	χ^2 (3)
R_EC	3.15
Sml	1.88
R_GEx	7.74
R_JA	3.37
R_Rq	7.65
R_Lb	.44
AQ	1.55
R_Ng	3.84
R_TT	4.99
R_Rp	.00
R_TI	3.46
R_TM	3.54
R_C/Fb	.00
R_AI	.00

*R_EC: response for eye contact, **Sml:** smiling, **R_GEx:** response for gaze exchange, **R_JA:** response for joint attention, **R_Rq:** response for request of object and / or action, R_**Lb:** response for labeling, **AQ:** answering questions, R_**Ng:** response for negation, **R_TT:** response for turn taking, **R_Rp:** response for conversational repair, **R_TI:** response for topic initiation, **R_TM:** response for topic maintenances, **R_C/Fb:** response for comment / feedback, **R_AI:** response for adding information*

Table-48: shows Kruskal-Wallis H test results for responses from children with ASD to mother's initiation of pragmatic skills. Statistically significant differences were not found on the performance of participants across group.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the groups. The results are given in table-49

Table-49: Mann-Whitney U test of significance for responses from children with ASD attending speech language therapy for mother's initiation of pragmatic skills

Pragmatic skills		Z	value				
	<6months & 7months-1 year	<6months & 1.1-1.7 years	<6months & 1.7-2 years	7months-1year &1.1-1.7 years	7months-1year &1.7-2 years	1.1-1.7years &1.7-2 years
R_EC	.98	1.48	1.53	.05	.77	.22
Sml	1.12	.96	1.24	.05	.25	.18
R_GEx	.40	.90	2.78**	.48	2.31*	1.02
R_JA	.76	1.88	.20	.19	.77	1.37
R_Rq	1.25	2.62**	1.80	1.54	.63	.49
R_Lb	.40	.33	.61	.10	.26	.39
AQ	1.06	.99	.99	.10	.00	.05
R_Ng	1.12	1.05	1.93	.17	.78	.91
R_TT	.91	1.97*	1.15	.68	.19	1.90
R_Rp	.00	.00	.00	.00	.00	.00
R_TI	1.59	.39	.95	1.49	.32	.91
R_TM	1.69	.39	.95	1.43	.32	.91
R_C/Fb	.00	.00	.00	.00	.00	.00
R_AI	.00	.00	.00	.00	.00	.00

** p< .01, * p< .05

R_EC: response for eye contact, Sml: smiling, R_GEx: response for gaze exchange, R_JA: response for joint attention, R_Rq: response for request of object and / or action, R_Lb: response for labeling, AQ: answering questions, R_Ng: response for negation, R_TT: response for turn taking, R_Rp: response for conversational repair, R_TI: response for topic initiation, R_TM: response for topic maintenances, R_C/Fb: response for comment / feedback, R_AI: response for adding information

Table-49: shows Mann-Whitney U test results for responses from children with ASD attending speech language therapy for mother's initiation of pragmatic skills. The results indicated significant differences at .01 and 0.05 level of significance. Statistically significant differences were found only for few pragmatic skills studies. The pragmatic skills with zero values in the table indicates that,

children with ASD did not responded for skills like conversational repair, comment / feedback and for adding information in the study.

Table-50: Mean and SD values for self initiation of pragmatic skills by children with ASD attending speech language therapy

Pragmatic skills	Duration of Speech language therapy attended.							
	<6months		7months-1year		1.1year-1.7years		1.7year-2years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Rf	12.20	3.22	13.38	3.85	15.44	3.97	16.67	5.02
CI	.90	1.91	4.63	5.32	8.56	2.65	5.11	3.33
Rq	1.60	3.37	5.75	6.48	11.22	3.495	6.00	4.24
SV	.00	.00	.00	.00	.00	.00	.00	.00
Qn	.00	.00	4.13	4.79	1.11	3.33	1.78	3.53
I_TT	.50	1.58	4.50	5.189	8.11	3.48	5.44	3.81
Nr	.00	.00	.36	1.06	.33	1.00	.00	.00
TI	.00	.00	2.38	3.02	.89	2.67	1.00	2.00
I_TM	.00	.00	2.25	2.92	.89	2.67	1.00	2.00
TC	.00	.00	2.13	2.64	.78	2.33	.89	1.76
I_JA	.00	.00	.00	.00	.00	.00	.00	.00
R_Rp	.00	.00	.00	.00	.00	.00	.00	.00

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-50: shows mean and SD values for self initiation of pragmatic skills by children with ASD attending speech language therapy. The mean values were calculated for raw scores. Raw scores in the study referred to the number of times each pragmatic skill was initiated by children with ASD. As shown from table-50: mean score for self initiation of pragmatic skills increased with increase in speech language therapy for pragmatic skill namely refusal. None of the children with ASD used pragmatic skills namely stylistic variation, initiation of joint attention and conversational repair skills in this study.

As indicted in the table except for refusal, other skills varied with the mean score for pragmatic skill self initiated by children with ASD indicating that, duration

of therapy attended did not influence on the performance of pragmatic function in children with ASD in this study.

Non parametric test Kruskal-Wallis H was carried out to determine the effect of speech language therapy duration on self initiation of pragmatic skills by children with ASD. The results are given in table-51

Table-51: Kruskal-Wallis H test of significance for self initiation of pragmatic skills by children with ASD attending speech language therapy

Pragmatic skills	χ^2 (3)
Rf	6.16
CI	15.02**
Rq	14.18**
SV	.00
Qn	6.99
I_TT	13.77**
Nr	2.32
TI	6.86
I_TM	6.68
TC	6.87
I_JA	.00
R_Rp	.00

** p< .01,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-51: shows Kruskal-Wallis H test results for self initiation of pragmatic skills by children with ASD. The results showed statistically significant differences at .01 level of significance on few pragmatic skills. The zero values in the table indicate that, the corresponding skills were not used by the children with ASD in the study.

Non parametric test Mann-Whitney U was carried out to check pair wise differences between the groups on self initiation of pragmatic skills by children with ASD. The results are given in table-52

Table-52: Mann-Whitney U test of significance for self initiation of pragmatic skills by children with ASD attending speech language therapy

Pragmatic skills	|Z| value					
	<6months & 7months-1 year	<6months & 1.1-1.7 years	<6months & 1.7-2 years	7months-1year &1.1-1.7 years	7months-1year &1.7-2 years	1.1-1.7years &1.7-2 years
Rf	.82	1.96*	2.02*	1.02	1.41	.62
CI	1.64	3.66***	2.70**	1.33	.10	2.36*
Rq	1.59	3.50***	2.39*	1.61	.20	2.35*
SV	.00	.00	.00	.00	.00	.00
Qn	2.44*	1.05	1.53	1.55	1.14	.48
I_TT	1.97*	3.50***	2.92**	1.33	.45	1.57
Nr	1.12	1.05	.00	.09	1.06	1.00
TI	2.44*	1.05	1.53	1.49	1.13	.48
I_TM	2.44*	1.05	1.53	1.50	1.02	.48
TC	2.44*	1.05	1.53	1.50	1.14	.48
I_JA	.00	.00	.00	.00	.00	.00
R_Rp	.00	.00	.00	.00	.00	.00

*** p< .001, ** p< .01, * p< .05,

Rf: refusal, CI: communicative intent, Rq: request for object and / or action, SV: stylistic variation, AQ: questioning, I_TT: initiation of turn taking, Nr: narration, TI: topic initiation, I_TM: initiation of topic maintenances, TC: topic change, I_JA: initiation of joint attention and R_Rp: request for conversational repair.

Table-52: shows Mann-Whitney U test results for self initiation of pragmatic skills by children with ASD attending speech language therapy. The results indicated significant differences at .001, .01 and 0.05 level of significance. Statistically significant differences were found only for few pragmatic skills studies. The pragmatic skills with zero values in the table indicates that, children with ASD did not initiate pragmatic skills like stylistic variation, initiation of joint attention and request for conversational repair in the study.

Summary

The performance of children with Autism spectrum disorders (ASDs) on pragmatic skills were grouped into two categories: responses to pragmatic skills initiated by mothers and self initiation of pragmatic skills by children in the communicative context of mother-child interaction. The performances of children

with ASD were compared with language age (comprehension age and expression age) and social age matched typically developing children. The performances of children with ASD were also compared within the group based on the duration of speech and language therapy attended by them.

The overall results of the study indicated that, performance of children with ASD on pragmatic skills increased with increase in language comprehension age, language expression age and social age on few of the pragmatic skill in comparison to typically developing children. However, responses for pragmatic skills frequency of self initiation of pragmatic skills were very less in children with ASD compared to typically developing children on all the pragmatic skills studied. Comparison of performance within the group w.r.t duration of speech language therapy attended also revealed the same results.

Discussion

The overall responses for pragmatic skills used by typically developing children for mother's initiation of pragmatic skills in the study indicated that responses for most of the pragmatic skills studied increase as a function of age w.r.t. language comprehension age, language expression age, and social age. It means to say that as the age increased, the number of 'no responses' decreased in typically developing children. The findings of the study are in support with James & Seebach (1982) who investigated the pragmatic function of the question production by young preschool children between the ages of 2 to 5 years. Their results indicated that number of questions produced increased with age. Klecan-Aker & Lopez (1984) investigated pragmatic language skills namely greeting, labeling, description, turn

taking, affirmation/negation, repetition/revision, requesting and personal, in normal preschool children in the age range of 2-5 years. Here again, a decrease in the inappropriate responses used by children with an increase in age was prominent. Klecan-Aker & Swank (1988) evaluated the effectiveness of the pragmatic language function namely description, personal, affirmation/negation, greeting, labeling, revision, turn taking, and requesting, in normal preschool children in the age range of 2-5 years with results reporting a general increase in correct responses with an increase in age up to age 3 years for all the pragmatic functions except revision.

The overall responses for pragmatic skills used by children with Autism spectrum disorders for mother's initiation of pragmatic skills in the study indicated various pattern of results in comparison with typically developing children. However, irrespective of the pattern, the percentage of responses at all the age level and on each pragmatic skill was found to be lower compared to typically developing children.

The results of this study on children with Autism spectrum disorders in comparison with typically developing children are in support with literature studies; Wetherby and Prutting (1984) analyzed the range of speech acts in autistic children's language. They found that, autistic children requested objects and actions more often than normal children did, However, there was a complete absence of speech acts used for requests for information, for acknowledgments of others, for showing off, and for commenting. Loveland, Landry, Hughes, Hall, & McEvoy (1988) investigated the pattern of speech acts (both verbal and nonverbal) used by verbal autistic children interacting with their mothers. The results of child speech act category revealed that the autistic group had more of no responses to most of the mother's initiation of speech act.

Anjana (1999) reported from her study that children with Autism spectrum disorders had used language predominantly for non-social or quasi social purpose in comparison to typically developing children who had utilized language for a social function. Senju, Yaguchi, Tojo & Hasegawa (2003) report from their study that children with Autism spectrum disorders indicated failure in detecting direct gaze compared to typically developing children thus impending communication.

Biji (2003) reported that children with Autism spectrum performed poorly when compared with typically developing children on pragmatic skills namely; greeting, labeling, requesting, negation, affirmation, repair, stylistic variation, referential communication, turn taking, closing conversation, eye gaze, proximity, Volden (2004) compared the performance of high functioning children with Autism spectrum disorders on response to a stacked series of requests for clarification (RQCLs) with reference to language age matched typically developing children. The author reported the results indicating that the average number of inappropriate responses for the group with ASD was significantly greater than the mean number of inappropriate responses for the control group.

The findings of the study support the view that there is dissociation in the response pattern between typically developing children and children with autism spectrum disorders. It also suggested some developmental pattern in the way that children of different ages in both the group i.e. reference group and clinical group respond to different pragmatic skills. They also support the presence of both delay as well as deviance in the development of pragmatic skills in children with ASD. The results of the study also provided an insight into the presence of pragmatic skill deficits in children with Autism spectrum disorders.

SUMMARY AND CONCLUSIONS

Use of language i.e. pragmatics seems to be, by far, the most difficult area for children with Autism spectrum disorders, in some cases, it may be the only parameter of language that is deficient. Literature review gives information on studies on pragmatic deficits in children with Autism spectrum disorders for different age groups and on a few isolated aspects of pragmatics. However, there are hardly any reported studies in pragmatic abilities of children with ASD along a developmental continuum. Hence, the present cross sectional study was designed to address the developmental pattern of pragmatic skills in children with Autism spectrum disorders (specifically those with Autism and PDD-NOS only) besides studying language and social age matched Kannada speaking typically developing children as reference.

Aims and Objectives

1. To study the development of pragmatic skills in Kannada speaking typically developing children from birth to six years of age in the context of mother-child interactions.

2. To study the development of pragmatic skills in children with Autism spectrum disorders having language age and social age up to six years in the context of mother-child interactions.

3. To compare the developmental pattern of pragmatic skills between the two groups in the context of mother-child interactions.

108 mother–child pairs participated in this study. 72 participants were all typically developing children in the age range of birth to six years (mean age of 4.3 years) in interaction with their mothers. 36 participants were children with a diagnosis

of Autism Spectrum Disorders with chronological age of 2.5 to 6.2 years (mean chronological age of 4.5 years) but with language age and social age up to six years in interaction with their mothers. Effective assessment of pragmatic skills requires a situation that reflects the dynamic of social interaction. To satisfy this critical requirement, this study utilized audio-video recording of semi instructed mother-child interaction method for assessment of pragmatic skills (refer appendix: 3).

For the present study "*A developmental protocol for pragmatics*" (Dheepa & Shyamala, 2008) was used by editing or eliminating skills that were repetitive or overlapped. This resulted in a list with a total of 19 pragmatic skills. In addition to this, pragmatic skills namely labeling given item on request and negation were also included resulting in total of 21 pragmatic skills (refer appendix-2).

The study mainly aimed to identify child's efficiency in responding to pragmatic skills initiated by the communicative partner (i.e. mother) and child's efficiency in initiating pragmatic skills during the course of interaction with his/her communicative partner (i.e. mother) in the given context. With reference to the objective of the study, each of 21 pragmatic skills (refer appendix-2) were grouped into two categories. Pragmatic skills used by children as response was grouped under category of responses from the child to mother's initiation of pragmatic skills. Pragmatic skills self initiated by children were grouped under the category of self initiation of pragmatic skills by children from two groups i.e. reference group and clinical group. This resulted in 26 pragmatic skills (refer appendix-3). Operational definitions / explanatory note for each of the pragmatic skills are given in the appendix-4.

An informed consent (refer appendix-6) in writing was obtained from the mother of each child. Toys and activities suitable for children in the selected age range were included based on guidelines from 'Toy kit for children with developmental disabilities' (Venkatesan, 2003). The toys included were noisemakers, flash cards, story and picture books, puzzles, building blocks, toy vehicles, ball, doll, kitchen set. The same set of toys was provided for both the groups (reference group and clinical group). An hour audio-video recording of mother-child interaction was collected. The recorded sample mainly focused on the aim of the study. Mothers and children were instructed to play and interact with each other as they would normally do at home using as many of the toys and materials provided to them. The audio-video recording was done using a Sony (DCR-DVD703E) digital video camera recorder. The video camera was handled by the investigator.

Coding

The recorded video samples of mothers-child interaction were subjected to frequency calculation. Frequency referred to number of instances of initiation and responses given by each child for each pragmatic skill. The responses obtained from each child to mother's initiation of pragmatic skills was grouped into two categories namely; response and no response.

➢ *Response*: Contextually appropriate response (gestures and / or utterances) from the child that occurred to mother's initiation of pragmatic skills.

➢ *No response*: Ignoring the question without answering. Responses out of topic were also grouped in "no response" category, for ease of practical analysis for statistical purposes.

Including the experimenter three professionals who were postgraduates in speech and language pathology having a minimum of 2 years of experience in intervention of children with Autism spectrum disorders, were selected as judges. The samples were judged independently by these three judges. The raw scores (coded responses and no responses) were converted into percentile values. Findings of the study are presented below.

1. The results showed that by 5-6 years of age, all the pragmatic skills studied were mastered by typically developing children. The 26 pragmatic skills studied include, response for eye contact, smiling, response for gaze exchange, response for joint attention, response for request of object and / or action, response for labeling, answering questions, response for negation, response for turn taking, response for conversational repair, response for topic initiation, response for topic maintenances, response for comment / feedback and response for adding information, refusal, communicative intent, request for object and / or action, stylistic variation, questioning, initiation of turn taking, narration, topic initiation, initiation of topic maintenances, topic change, initiation of joint attention and request for conversational repair.

2. The pragmatic skills emerging in typically developing children increased with age. These results gave further support to the finding that the pragmatic skills follow a developmental continuum.

3. The results revealed no gender differences i.e. male and female participants among the typically developing children performed in a similar fashion with respect to the pragmatic skills investigated in this study. But there may be gender

differences beyond this period of 6 years of age which may be explored in the future.

4. Percentage of responses from typically developing children to mother's initiation of pragmatic skills also increased with age.

5. A Self initiated pragmatic skill namely, refusal decreased with age in typically developing children, probably because of maturity and socio-cultural awareness.

6. Children with Autism spectrum disorders were found deficient at all the age levels and for all the pragmatic skills studied compared to typically developing children.

7. Among the 14 pragmatic skills initiated by mothers, response for labeling was the only pragmatic skill found mastered in few children with Autism spectrum. disorders.

8. Among the 12 pragmatic skills self initiated by children with ASD, refusal and requesting for object and / or action were the skills observed in few children with ASD.

9. Percentage of responses from children with ASD to mother's initiation of pragmatic skills and on self initiation of pragmatic skills was not linear or constant for all the pragmatic skills with respect to age as compared to the performance of typically developing children.

10. The results highlight that even when children with Autism spectrum disorders present with pragmatic skills, the use of these skills in different social contexts remains highly underachieved despite the advancing age. This is in total contrast to the pattern seen in typically developing children.

However, the results of the study are yet to be generalized across the clinical group of ASD, as the sample size in the study was small and only children with

limited types of ASD having moderate level of severity were studied. This being the first study of its kind, it adds new information to the existing literature on the development of pragmatic skills in typically developing children and children with Autism spectrum disorders. The study also highlights the need to understand the pattern of response to pragmatic skills used in different social contexts and need for such assessment of pragmatic skills in children with Autism spectrum disorders having adequate language skills. There is a need to incorporate individualized therapy activities to train children with Autism spectrum disorders on various pragmatic skills, as this clinical population is a highly heterogeneous group with varied symptoms and severity of clinical manifestations

IMPLICATIONS

1. This study highlights the pattern of pragmatic skills emerging across age groups in typically developing Kannada speaking children from birth to 6 years of age.

2. The study gives supportive evidence on the deficiencies and pattern of pragmatic skills used by children with Autism spectrum disorders (ASD's), in Indian context.

3. Investigation into the response pattern of children with ASD calls attention on understanding these patterns of response for the given contexts and pragmatic skills assessed for proper planning of intervention program tailored to the unique and individual needs appropriately.

4. The result also highlights the need for assessment of both verbal and nonverbal pragmatic skills in children with ASD despite their age adequate general language skills as measured on routine language tests.

LIMITATIONS OF THE STUDY

1. Limited sample size**.**

2. Mother-child interaction procedure only was used in exploring the pragmatic skills of children with and without ASD. Interaction with others (i.e. other than the mother) was not explored for pragmatics.

3. In the study, no attempt was made to study and control mothers personality, attitude, communication skills etc.

4. Participants in the clinical group selected were all enrolled for speech and language therapy. Due to nonavailability of clients without therapy, these clients were taken as participants. However, duration of therapy was included as a variable for interpretation of the results.

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Appendix: 1

A developmental protocol for pragmatics (Dheepa & Shyamala, 2008)

Age wise acquisition of pragmatic skills in typically developing children

Birth to one year

1. Physical proximity
2. Eye contact
3. Gaze exchange
4. Body posture
5. Smiling
6. Attention
7. Facial expression

1.1 year to 2 years

8. Joint attention
9. Giving
10. Pointing / visual gestures
11. Nonverbal turn taking
12. Requesting objects, actions and information
13. Refusal / denial
14. Greeting
15. Commenting on objects and actions
16. Communicative games
17. Intelligibility.

2.1 years to 8 years

18. Communicative intent
19. Informing
20. Acknowledging
21. Answering questions
22. Topic initiation
23. Topic maintenance
24. Topic change
25. Selection / Choice making
26. Continuation
27. Adding new information
28. Response
29. Clarification
30. Repair / revisions
31. Pause time
32. Interruption / overlap
33. Feedback to listeners
34. Adjacency

35. Contingency
36. Quantity / conciseness
37. Presupposition
38. Code switching
39. Politeness
40. Reciprocity
41. Anticipation
42. Proxemics
43. Permission directives
44. Indirect response
45. Lexical selection and use
46. Stylistic variation
47. Narrative
48. Perspective talking
49. Opinion
50. Referential communication

Appendix: 2

Pragmatic skills pooled and Listed

1. Eye contact
2. Gaze exchange
3. Smiling
4. Joint attention
5. Giving
6. Turn taking
7. Requesting
8. Refusal / denial
9. Commenting/ Feedback on objects and actions
10. Communicative intent
11. Answering questions
12. Topic initiation
13. Topic maintenance
14. Topic change
15. Adding new information
16. Response
17. Repair
18. Stylistic variation
19. Narrative
20. Labeling items on request
21. Negation

Appendix: 3

Modified and selected pragmatic skills

I. *Responses from children for mother's initiation of pragmatic skills in the communicative content.*

1. Response for eye contact
2. Response for gaze exchange
3. Smiling
4. Response for Joint attention
5. Response for turn taking
6. Response for requesting of object and actions
7. Response for commenting/ feedback on objects and actions
8. Answering questions
9. Response for topic initiation
10. Response for topic maintenance
11. Response for Adding new information
12. Response for conversational repair
13. Response for labeling
14. Response for negation

II. *Self initiation of pragmatic skills by children in the communicative content.*

1. Initiation of joint attention
2. Initiation of turn taking
3. Requesting for object and actions
4. Refusal
5. Communicative intent
6. Questioning
7. Topic initiation
8. Initiation of topic maintenance
9. Topic change
10. Request for Repair
11. Stylistic variation
12. Narration

Appendix: 4

Operational definitions / Explanatory note of pragmatic skills assessed

I.   Responses from children for mother's initiation of pragmatic skills in the communicative context

1. **Response for eye contact**

   Child maintains eye contact for at least 2 minutes in an activity with the communicative partner during play and / or any activity introduced by the communicative partner.

2. **Smiling**

   Child enjoys and responds by smiling to the approach / greetings and / or joke introduced by the communicative partner during play and / or conversational interaction.

3. **Response for gaze exchange**

   Child's act of looking at the communicative partner when attempting to communicate while engaged in play and / or any other activity.

4. **Response for Joint attention**

   Child uses attention-following behaviours, such as head turn and eye gaze to follow the visual focus of the communicative partner.

5. **Response for request of object and / or action**

   Child uses gestures and / or utterances that acknowledge the communicative partner's request for an object and / or action.

6. **Response for labeling**

   Child uses utterances that serve to label object, people, event and / or location on request by the communicative partner.

7. **Answering questions**

Child uses utterances and / or gestures that acknowledge the communicative partner wh-question forms that request different kinds of information like specification of objects (what), persons (who), locations (where), reasons and causes (why), instruments or manners of action (how), or times (when). It also elicits a more complex double wh-question form ("Who is eating what?" or "Who is eating which food?").

8. **Response for negation**

Child uses utterances and / or gestures that indicate absences of an object and/or person on request by the communicative partner.

9. **Response for turn taking**

Child's response behavior (verbal and / or nonverbal) each following a verbal or play activity introduced by the communicative partner.

10. **Response for conversational repair**

Child uses utterances in the form of repetition, revision of the original form of the utterance and / or addition that serve to clarify communicative partner's doubt.

11. **Response for Topic initiation**

Child uses utterances that serve as response for conversational topic introduced by the communicative partner.

12. **Response for Topic maintenances**

Child uses utterances which sustains discourse for atleast 3 turns on the topic of conversation introduced by the communicative partner.

13. **Response for comment / feedback**

Child uses utterances that state positive or negative remarks, comments regarding particular activity, place, a person and / or event, judge utterances as appropriate for a particular listener or setting on request by the communicative partner.

14. **Response for adding information**

Child uses utterances that add more information relevant to the topic of conversation introduced and requested by communicative partner.

II. Self initiation of pragmatic skills by children in the communicative context

1. **Refusal**

   Child protests by saying "no", shaking head, moving away or pushing objects away.

2. **Communicative intent**

   Child's utterances that indicate a range of communicative intentions either by gesture, vocalization and / or by words. Eg. attention-seeking, requesting, rejecting, greeting, naming, commenting, express feelings, talk about past and future events, give information, story narration, seek information, give instructions, express a range of feelings/emotions, state opinions, tell jokes, etc,.

3. **Request for object and / or action**

   Child conveys the message to give an object and / or action through pointing / verbally / indirect requests / polite form.

4. **Stylistic variation**

   Child's Use of conversational style to a variety of conversational partners who differ in age, sex, status and familiarity.

5. **Questioning**

   Child's utterances that indicate 'Wh' questions i.e request for information.

6. **Initiation of Turn taking**

   Interactions initiated by child non-verbally (eg. play activity) or verbal activity looking at a communicative partner and waiting for the response from them. Interactions may be terminated by child moving away.

7. **Narratives**

   Child using imaginative speech, use of description, simple / complex stories, tells a story by looking at pictures, talk about past and future events, talk about incidences report experiences, describing own and others' feelings and reactions, etc,.

8. **Topic initiation**

   Child introduces conversational topic.

9. **Initiation of Topic maintenance**

   Child sustains discourse on the conversation topic initiated beyond several turns.

10. **Topic change**

    Child changes conversational topic initiated as per the situational demand.

11. **Initiation of Joint attention**

    Child's use of attention-directing behaviour, such as pointing or showing to coordinate attention with a social partner with reference to an object or event.

12. **Request for Repair**

    Child's use of utterances that serve to request for clarification.

Appendix: 5

Score sheet

Responses from children for mother's initiation of pragmatic skills in the communicative context

Sl. No	Pragmatic skills	Response	No response
1	Response for eye contact		
2	Smiling		
3	Response for gaze exchange		
4	Response for Joint attention		
5	Response for request of object and / or action		
6	Response for labeling		
7	Answering questions		
8	Response for negation		
9	Response for Turn taking		
10	Response for Repair		
11	Response for Topic initiation		
12	Response for Topic maintenances		
13	Response for comment / feedback		
14	Response for adding information		

Self initiation of pragmatic skills by children in the communicative context

Sl. No	Pragmatic skills	Response	No response
1	Refusal		
2	Communicative intent		
3	Request for object and / or action		
4	Stylistic variation		
5	Questioning		
6	Initiation of Turn taking		
7	Narratives		
8	Topic initiation		
9	Initiation of Topic maintenances		
10	Topic change		
11	Initiation of Joint attention		
12	Request for Repair		

Consent form

All India Institute of Speech & Hearing, Naimishm Campus Manasagangothri, Mysore 570 006

Doctral thesis

on

Developmental of Pragmatic skills in Autism Spectrum Disorders

Investigator: Shilpashri H. N

REFERENCE GROUP

Information to the Parents

I Shilpashri H. N have undertaken the research study entitled "Developmental of Pragmatic skills in Autism Spectrum Disorders" under the guidance of Dr. Shyamala K. C, Prof and HOD, Dept. of Speech – Language Pathology, AIISH, Mysore – 6. I request you and your son / daughter to participate in the present study. Information will be collected through an interview and video recording of mother –child interaction for the duration of 15 - 20 min each in four – three sittings. This program has no medication involved and is noninvasive. The information collected will be kept confidential. This study will help us to understand the normal aspects of pragmatic skill development better. If you have any doubt about the study, please feel free to clarify the same.

Informed Consent

I have been informed about the aims, objectives and the procedure of the study. The possible risks-benefits of participating as human subject in the study are clearly understood by me. I understand that I have a right to refuse participation or withdraw my consent at any time. I am also aware that by participating in this study, I will have to give more time for assessments by the investigating team and that these assessments may not result in any benefits to me. I have understood that interview and video recorded of myself and my

child's interaction for duration of 15 - 20 minutes each in four to three settings will be taken. I am interested in participating in the study and hereby give my written consent for the same.

I, _____, the undersigned, give my consent to be participant of this investigation/study/program. I have no objection in permitting my son / daughter to participate in the program. As my child _____

Is a minor, I hereby give consent on his / her behalf to participate in the study.

Signature of Parents

(Name and Address)

Signature of Investigator:

Name and Designation:

Date:

Doctral thesis

on

Developmental of Pragmatic skills in Autism Spectrum Disorders

Investigator: Shilpashri H. N

CLINICAL GROUP

Information to the Parents

I Shilpashri H. N have undertaken the research study entitled "Developmental of Pragmatic skills in Autism Spectrum Disorders" under the guidance of Dr. Shyamala K.C, Prof and HOD, Dept. of Speech – Language Pathology, AIISH, Mysore – 6. I request you along with your son / daughter to participate in the present study. The procedure includes an interview with the mother and video recording of mother – child interaction for the duration of 15 - 20 min each in four - three sittings, if required you may have to participate for two more with same procedure with 6 months of gap each. This program has no medication involved and is noninvasive. The information collected will be kept confidential. This study will help us to understand the development pattern of pragmatic skills and plan for adequate treatment. If you have any doubt about the study, please feel free ton clarify the same.

Informed Consent

I have been informed about the aims, objectives and the procedure of the study. The possible risks-benefits of myself and my child's participation as human subject in the study are clearly understood by me. I understand that I have a right to refuse participation or withdraw my consent at any time without adversely affecting my child's treatment. I am also aware that by subjecting to this investigation, I will have to give more time for assessments by

the investigating team and that these assessments may not result in any benefits to me. I have the freedom to write to Chairman, AEC, in case of any violation of these provisions without the danger of my being denied any rights to secure the clinical services at this institute. I have understood that interview and video recorded of myself and my child's interaction for duration of 15-20 minutes in four-three sittings will be taken. I am interested in participating in the study and hereby give my written consent for the same.

I, _____, the undersigned, give my consent to be participant of this investigation/study/program. I have no objection in permitting my son / daughter to participate in the program. As my child _____

Is a minor, I hereby give consent on his / her behalf to participate in the study.

Signature of Parent / Guardian

(Name and Address)

Signature of Investigator:

Name and Designation:

Date:

ಅಖಿಲ ಭಾರತ ವಾಕ್ ಶ್ರವಣ ಸಂಸ್ಥೆ, ನೈಮಿಷಂ ಆವರಣ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು – ೫೭೦೦೦೬

ಡಾಕ್ಟರಲ್ ಥಿಸಿಸ್

Development of pragmatic skills in Autism Spectrum Disorders

ತಪಾಸಣೆ ಮಾಡುವವರು: ಶಿಲ್ಪಶ್ರೀ ಎಚ್. ಎನ್

ಸಮ್ಮತಿ ಸೂಚನೆ

Reference group

ಪೋಷಕರಿಗೆ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ಮಾಹಿತಿ:

ನಾನು ಶಿಲ್ಪಶ್ರೀ ಎಚ್. ಎನ್ "ಆಟಿಸಂ (ತಂತಾನತೆ) ಮಕ್ಕಳಲ್ಲಿ ಭಾಷೆಬಳಕೆಯ ಬೆಳವಣಿಗೆ" ಎಂಬ ಅಧ್ಯಯನವನ್ನು ಡಾ. ಶ್ಯಾಮಲ ಕೆ. ಸಿ (ಪ್ರೊ. ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ವಾಕ್ – ಭಾಷೆ ದೋಷ ವಿಭಾಗ ಅಖಿಲ ಭಾರತ ವಾಕ್ ಶ್ರವಣ ಸಂಸ್ಥೆ, ಮೈಸೂರು – ೬) ರವರ ಮಾರ್ಗದರ್ಶನದಲ್ಲಿ ಕೈಗೊಂಡಿದ್ದೇನೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನೀವು ಮತ್ತು ನಿಮ್ಮ ಮಗ / ಮಗಳು ಭಾಗವಹಿಸಬೇಕೆಂದು ಈ ಮೂಲಕ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತೇನೆ. ಮೊದಲನೆಯದಾಗಿ ತಪಾಸಣೆ ಮಾಡುವವರು ಕೇಳುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಬೇಕು ನಂತರ, ಸುಮಾರು ಹದಿನ್ಯೆದರಿಂದ – ಇಪ್ಪತ್ತು ನಿಮಿಷದವರೆಗೆ ನಾಲ್ಕರಿಂದ – ಮೂರು ಬಾರಿ ನಿಮ್ಮ ಮಗುವಿನ ಜೊತೆಯಲ್ಲಿ ಪರಸ್ಪರ ಮಾತನಾಡಬೇಕು ನಿಮ್ಮ ಮಗುವಿನ ಭಾಷೆಬಳಕೆಯ ನಮೂನೆಯನ್ನು ವೀಡಿಯೋದಲ್ಲಿ (video) ಚಿತ್ರೀಕರಣ ಮಾಡಲಾಗುತ್ತದೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ಔಷಧವನ್ನು ಉಪಯೋಗಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮಿಂದ ಪಡೆದುಕೊಂಡ ಮಾಹಿತಿಯನ್ನು ಗುಪ್ತವಾಗಿರಿಸುವ ಭರವಸೆ ಕೊಡುತ್ತೇವೆ. ಈ ಅಧ್ಯಯನದ ಮೂಲಕ ಮಕ್ಕಳಲ್ಲಿ ಭಾಷೆ ಬಳಕೆಯ ಬೆಳವಣಿಗೆ ಬಗ್ಗೆ ಹೆಚ್ಚು ಹಾಗು ಉತ್ತಮ ಮಾಹಿತಿ ಪಡೆಯಲು ಅನುಕೂಲವಾಗುತ್ತದೆ. ಭಾಷೆಯ ಬಳಕೆಯ ತೊಂದರೆಯಿಂದ ಬಳಲುತ್ತಿರುವ ಮಕ್ಕಳಿಗೆ ಸೂಕ್ತವಾದ ಚಿಕಿತ್ಸೆಯನ್ನು ಕೈಗೊಳ್ಳಲು ಸಹಾಯವಾಗುತ್ತದೆ. ನಿಮಗೆ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ಸಂದೇಹವಿದ್ದಲ್ಲಿ ಸಂಕೋಚವಿಲ್ಲದೆ ವಿಚಾರಿಸಹುದು

ಸಮ್ಮತಿ ಸೂಚನೆ

ಈ ಅಧ್ಯಯನದ ವಿಚಾರ, ಇದರ ಗುರಿ ಮತ್ತು ಕಾರ್ಯ ವಿಧಾನದ ಬಗ್ಗೆ ನನಗೆ ಪೂರ್ತಿ ಮಾಹಿತಿಯನ್ನು ನೀಡಿದ್ದಾರೆ. ನಾನು ಮತ್ತು ನನ್ನ ಮಗು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರ ಬಗ್ಗೆ, ಇದರಿಂದಾಗುವ ತೊಂದರೆ – ಅನುಕೂಲತೆ ಬಗ್ಗೆ ನನಗೆ ಮಾಹಿತಿಯನ್ನು ನೀಡಿದ್ದಾರೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಅಥವಾ ನಿರಾಕರಿಸಲು ನನಗೆ ಅಧಿಕಾರವಿದೆಯೆಂದು ತಿಳಿಸಿದ್ದಾರೆ. ಈ

ಅಧ್ಯಯನದ ಪರೀಕ್ಷೆಗಾಗಿ ಹೆಚ್ಚು ಸಮಯವನ್ನು ನೀಡಬೇಕಾಗಿ ಬರುವದಲ್ಲದೆ ಇದರಿಂದ ನನಗೆ ಹೆಚ್ಚು ಲಾಭವಿಲ್ಲದೆ ಇರಬಹುದೆಂಬುದನ್ನು ಕೂಡಾ ತಿಳಿಸಿದ್ದಾರೆ. ಸುಮಾರು ಇಪ್ಪತ್ತರಿಂದ – ಮೂವತ್ತು ನಿಮಿಷದವರೆಗೆ ಎರಡರಿಂದ ನಾಲ್ಕರಿಂದ – ಮೂರು ಬಾರಿ ನಾನು ನನ್ನ ಮಗುವಿನ ಜೊತೆಯಲ್ಲಿ ಪರಸ್ಪರ ಮಾತನಾಡುವಾಗ ನನ್ನ ಮಗುವಿನ ಭಾಷೆಬಳಕೆಯ ನಮೂನೆಯನ್ನು ವೀಡಿಯೋದಲ್ಲಿ (video) ಚಿತ್ರೀಕರಣ ಮಾಡಲಾಗುತ್ತದೆ ಎಂದು ತಿಳಿದು ಬಂದಿದೆ. ನಾನು ಮತ್ತು ನನ್ನ ಮಗುವು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛೆಪಟ್ಟಿರುವುದರಿಂದ ಈ ಕಾಗದದಲ್ಲಿ ಸಹಿಯ ಮೂಲಕ ನನ್ನ ಸಮ್ಮತಿಯನ್ನು ಕೊಟ್ಟಿದ್ದೇನೆ.

ನಾನು _____ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಸಮ್ಮತಿಸಿ ಸಹಿ ಹಾಕ್ಕಿದ್ದೇನೆ. ನನ್ನ ಮಗು ಇನ್ನ ಚಿಕ್ಕವನಾಗಿರುವುದರಿಂದ ಅವನ ಪರವಾಗಿ ನಾನು ಒಪ್ಪಿಗೆ ಕೊಡಲು ಇಚ್ಛಿಸುತ್ತೇನೆ. ನನ್ನ ಮಗ / ಮಗಳು _____ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರಲ್ಲಿ ನನ್ನ ಅಭ್ಯಂತರವಿಲ್ಲ.

ಪೋಷಕರ/ಪಾಲಕರ ಸಹಿ

ಹೆಸರು:

ವಿಳಾಸ:

ಅಧ್ಯಯನಕಾರರ ಸಹಿ
ಹೆಸರು:
ತಾರೀಕು

ಅಖಿಲ ಭಾರತ ವಾಕ್ ಶ್ರವಣ ಸಂಸ್ಥೆ, ನೈಮಿಷಂ ಆವರಣ,
ಮಾನಸಗಂಗೋತ್ರಿ,
ಮೈಸೂರು – ೫೭೦೦೦೬

ಡಾಕ್ಟ್ರಲ್ ಥಿಸಿಸ್
Development of pragmatic skills in Autism Spectrum Disorders

ತಪಾಸಣೆ ಮಾಡುವವರು: ಶಿಲ್ಪಶ್ರೀ ಎಚ್. ಎನ್
ಸಮ್ಮತಿ ಸೂಚನೆ
Clinical group

ಪೋಷಕರಿಗೆ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ಮಾಹಿತಿ:

ನಾನು ಶಿಲ್ಪಶ್ರೀ ಎಚ್. ಎನ್ "ಆಟಿಸಂ (ತಂತಾನತೆ) ಮಕ್ಕಳಲ್ಲಿ ಭಾಷೆಬಳಕೆಯ ಬೆಳವಣಿಗೆ" ಎಂಬ ಅಧ್ಯಯನವನ್ನು ಡಾ. ಶ್ಯಾಮಲ ಕೆ. ಸಿ (ಪ್ರೊ. ಹಾಗು ಮುಖ್ಯಸ್ಥರು, ವಾಕ್ – ಭಾಷೆ ದೋಷ ವಿಭಾಗ ಅಖಿಲ ಭಾರತ ವಾಕ್ ಶ್ರವಣ ಸಂಸ್ಥೆ, ಮೈಸೂರು – ೬) ರವರ ಮಾರ್ಗದರ್ಶನದಲ್ಲಿ ಕೈಗೊಂಡಿದ್ದೇನೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನೀವು ಮತ್ತು ನಿಮ್ಮ ಮಗ / ಮಗಳು ಭಾಗವಹಿಸಬೇಕೆಂದು ಈ ಮೂಲಕ ವಿನಂತಿಸಿಕೊಳ್ಳುತ್ತೇನೆ. ಮೊದಲನೆಯದಾಗಿ ತಪಾಸಣೆ ಮಾಡುವವರು ಕೇಳುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಬೇಕು ನಂತರ, ಸುಮಾರು ಹದಿನ್ಯೆದರಿಂದ – ಇಪ್ಪತ್ತು ನಿಮಿಷದವರೆಗೆ ನಾಲ್ಕರಿಂದ – ಮೂರು ಬಾರಿ ನಿಮ್ಮ ಮಗುವಿನ ಜೊತೆಯಲ್ಲಿ ಪರಸ್ಪರ ಮಾತನಾಡಬೇಕು ನಿಮ್ಮ ಮಗುವಿನ ಭಾಷೆಬಳಕೆಯ ನಮೂನೆಯನ್ನು ವೀಡಿಯೋದಲ್ಲಿ (video) ಚಿತ್ರೀಕರಣ ಮಾಡಲಾಗುತ್ತದೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ಔಷಧವನ್ನು ಉಪಯೋಗಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮಿಂದ ಪಡೆದುಕೊಂಡ ಮಾಹಿತಿಯನ್ನು ಗುಪ್ತವಾಗಿರಿಸುವ ಭರವಸೆ ಕೊಡುತ್ತೇವೆ. ಭಾಷೆಯ ಬಳಕೆಯ ತೊಂದರೆಯಲ್ಲಿ ಬಳಲುತ್ತಿರುವ ಮಕ್ಕಳಿಗೆ ಸೂಕ್ತವಾದ ಚಿಕಿತ್ಸೆಯನ್ನು ಕೈಗೊಳ್ಳಲು ಸಹಯವಾಗುತ್ತದೆ. ನಿಮಗೆ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ಸಂದೇಹವಿದ್ದಲ್ಲಿ ಸಂಕೋಚವಿಲ್ಲದೆ ವಿಚಾರಿಸಬಹುದು

ಸಮ್ಮತಿ ಸೂಚನೆ:

ಈ ಅಧ್ಯಯನದ ವಿಚಾರ, ಇದರ ಗುರಿ ಮತ್ತು ಕಾರ್ಯ ವಿಧಾನದ ಬಗ್ಗೆ ನನಗೆ ಪೂರ್ತಿ ಮಾಹಿತಿಯನ್ನು ನೀಡಿದ್ದಾರೆ. ನಾನು ಮತ್ತು ನನ್ನ ಮಗು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರ ಬಗ್ಗೆ, ಇದರಿಂದಾಗುವ ತೊಂದರೆ – ಅನುಕೂಲತೆ ಬಗ್ಗೆ ನನಗೆ ಮಾಹಿತಿಯನ್ನು ನೀಡಿದ್ದಾರೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಅಥವಾ ನಿರಾಕರಿಸಲು ನನಗೆ ಅಧಿಕಾರವಿದೆಯೆಂದು ತಿಳಿಸಿದ್ದಾರೆ.

ಇದರಿಂದ ಈ ಸಂಸ್ಥೆಯಲ್ಲಿ ತರಬೇತಿ ತೆಗೆದುಕೊಳ್ಳುತಿರುವ ನನ್ನ ಮಗುವಿಗೆ ಏನು ಭಾದೆ ಬರುವದಿಲ್ಲವೆಂದೂ ಈ ಅಧ್ಯಯನದ ಪರೀಕ್ಷೆಗಾಗಿ ಹೆಚ್ಚು ಸಮಯವನ್ನು ನೀಡಬೇಕಾಗಿ ಬರುವದಲ್ಲದೆ ಇದರಿಂದ ನನಗೆ ಹೆಚ್ಚು ಲಾಭವಿಲ್ಲದೆ ಇರಬಹುದೆಂಬುದನ್ನು ಕೂಡಾ ತಿಳಿಸಿದಾರೆ. ನನ್ನ ಹಕ್ಕುಗಳು ನನಗೆ ಸಿಗುತ್ತಿಲ್ಲವೆಂದು ನನ್ನ ಗಮನಕ್ಕೆ ಬಂದರೆ, ಇದನ್ನು ಏಇಸಿ ಕಾರ್ಯದರ್ಶಿಗೆ (AEC, Chairman) ದೂರು ಪತ್ರ ಬರೆಯಲು ಸ್ವಾತಂತ್ರ್ಯ ವಿದೆಯೆಂದೂ ಮತ್ತು ನನ್ನ ಮಗುವಿಗೆ ಸಿಗಬೇಕಾದ ಸೌಲಭ್ಯಗಳಲ್ಲಿ ಯಾವ ಕೊರತೆಯು ಬರುವುದಿಲ್ಲ ಎಂದು ತಿಳಿಸಿದ್ದಾರೆ. ಸುಮಾರು ಇಪ್ಪತ್ತರಿಂದ – ಮೂವತ್ತು ನಿಮಿಷದವರೆಗೆ ನಾಲ್ಕರಿಂದ – ಮೂರು ಬಾರಿ ನಾನು ನನ್ನ ಮಗುವಿನ ಜೊತೆಯಲ್ಲಿ ಪರಸ್ಪರ ಮಾತನಾಡುವಾಗ ನನ್ನ ಮಗುವಿನ ಭಾಷೆಬಳಕೆಯ ನಮೂನೆಯನ್ನು ವೀಡಿಯೋದಲ್ಲಿ (video) ಚಿತ್ರೀಕರಣ ಮಾಡಲಾಗುತ್ತದೆ ಎಂದು ತಿಳಿದು ಬಂದಿದೆ. ನಾನು ಮತ್ತು ನನ್ನ ಮಗುವು ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛೆಪಟ್ಟಿರುವುದರಿಂದ ಈ ಕಾಗದದಲ್ಲಿ ಸಹಿಯ ಮೂಲಕ ನನ್ನ ಸಮ್ಮತಿಯನ್ನು ಕೊಟ್ಟಿದ್ದೇನೆ.

ನಾನು _____ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಸಮ್ಮತಿಸಿ ಸಹಿ ಹಾಕ್ಕಿದ್ದೇನೆ. ನನ್ನ ಮಗು ಇನ್ನು ಚಿಕ್ಕವನಾಗಿರುವುದರಿಂದ ಅವನ ಪರವಾಗಿ ನಾನು ಒಪ್ಪಿಗೆ ಕೊಡಲು ಇಚ್ಛಿಸುತ್ತೇನೆ. ನನ್ನ ಮಗ / ಮಗಳು _____ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರಲ್ಲಿ ನನ್ನ ಅಭ್ಯಂತರವಿಲ್ಲ.

ಪೋಷಕರ/ಪಾಲಕರ ಸಹಿ

ಹೆಸರು:

ವಿಳಾಸ:

ಅಧ್ಯಯನಕಾರರ ಸಹಿ
ಹೆಸರು:
ತಾರೀಕು