

Pragmatic Skills in Nonverbal Identical Twins with Autism Spectrum Disorders

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Abstract

The present study investigated the use of six pragmatic language skills by a pair of five year old male identical twins with autism spectrum disorders during the course of a session of mother-child interaction. Frequency of each pragmatic language skill used by the mother along with type and frequency of pragmatic language skills used by the two subjects were analyzed. Results showed similarities in use of pragmatic skills in both. However, differences existed with respect to frequency of use.

Key words: Autism Spectrum Disorders, Identical Twins, Pragmatic Skills.

Autism Spectrum Disorders (ASDs) are a set of complex neurobiological disorders, considered to be one of the most profound disorders of childhood. ASDs affect each child differently, to different degrees of severity. However, all children with ASDs share difficulties in 3 areas: qualitative impairments in social interaction, qualitative impairments in communication and restricted, repetitive and stereotyped patterns of behavior, interest and activities (Diagnostic and Statistical Manual of Mental Disorders, 4th edition {DSM-IV}, 1994). The onset is always in childhood and the symptoms persist throughout life. Hence, the term pervasive developmental disorders (PDD's). As per DSM-IV-TR published in 2000, the PDD's includes Autism, Asperger disorder, Rett's disorder, Childhood disintegrative disorder, Pervasive developmental disorder (not otherwise specified).

Autism is more common in males with the average male to female ratio of four to one (Bailey et al. 1995; Fombonne 1999). ASDs roughly occur in 1 of every 150 individuals (Centers for Disease Control and Prevention, 2007).

The etiology of autism spectrum of disorders is unknown. The genetic component of autism was confirmed by the first twin study in 1977 showing significantly higher concordance rates for monozygotic twins (MZ) (36-95%) compared to dizygotic twins (DZ) (0-23%) (Folstein & Rutter 1977; Steffenburg et al. 1989; Bailey et al. 1995).

A current estimate for the recurrence risk of autism in the siblings is ~3%, and the heritability estimate is over 90% (Folstein and Rosen-Sheidley 2001). In British twin Study (Bailey et al., 1995) an examination of 16 MZ pairs concordant for autism or autism spectrum disorders showed clinical heterogeneity even when pairs shared exactly the same segregating genetic alleles.

Autism is one of the language disorder primarily characterized by inability to relate to other people and communicate effectively (Bernard-Opitz, 1982). Regardless of age, level of intellectual functioning, and developmental level, all individuals with autism demonstrate deficits in social-communicative domain (Wing, 1997; Tager-Flusberg, Joseph, & Folstein, 2001) i.e. **pragmatic skills**. Pragmatics is 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 (Berko-Gleason, 2005). Pragmatic aspect of language acquisition accounts for children's growing communicative competence, rather than focusing on the structural forms (syntax) or content (semantics) of their language.

Review of literature identifies a number of studies on pragmatic deficits in children with PDD's / ASD's. Aarons and Gittens (1987); Wing (1988) have even suggested that pragmatic disability is just another term for autism. (Ball,

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1978; Cantwell, Baker & Rutter, 1978; Paul & Cohen 1985; Loveland & Landry, 1986) have reported that the autistic children's language and gestures are pragmatically deficient, even when level of language acquisition or IQ is taken into account. These children show pragmatic deficits both in how they communicate (communication means) and how they express intentions (communicative intents) (Rollins, 1999).

The present study is an attempt to investigate the performance of non verbal identical twins with autism spectrum disorders on six pragmatic skills namely, giving on request, pointing / visual gestures for requesting, joint attention, gaze exchange, non verbal turn taking and non verbal indication of negation.

Aims and Objectives

The objectives of the study were manifold:

1. To study the type of pragmatic skills used by the two twin subjects during the course of interaction with the mother.
2. To study the frequency / percentage of each pragmatic skill used by mother and the two twin subjects during initiation of communication.
3. To study the frequency / percentage of each pragmatic skill used by mother and the two twin subjects during response course.
4. To compare difference in the performance between the two twin subjects.

Method

Subjects: 5 years old male identical twins (A1 and A2) primarily diagnosed as delayed speech and language with autism spectrum disorders by qualified speech language pathologist served as subjects for the present study.

The subjects fulfilled the following criteria

1. They had Kannada as their mother tongue.
2. Subjects had no medical history.
3. Subjects had normal hearing sensitivity and vision.
4. Subjects had no history of regression in motor development.

Subject details (A1 & A2)

As per the information obtained from the mother during clinical interview, the onset of the symptoms was before 12 months for the two subjects. Comprehension skills were reported to be poor with no speech, only vocalization (clinical condition for speech was the same at the time of recording). Motor development was reported to be normal with poor socialization skills, poor imaginative play and stereotyped repetitive behaviors. (Subjects demographic data are given below).

Client Report	SUBJECTS	
	A1	A2
Age of onset	Before one year	Before one year
Medical history	- ve	- ve
Motor development	Normal	Normal
Hearing	Normal	Normal
Vision	Normal	Normal
Speech – language skills	No speech (only vocalization)	No speech (only vocalization)
Social skills	Poor	Poor
Imaginative play	Absent	Absent
Stereotyped repetitive behaviors	Present	Present

Table-1: Demographic data

Interventions for both the subjects were started at 4 years of age. Both the subjects under went speech-language therapy and occupational therapy for two days per week at the duration of 45 minute each. Speech-language therapy was mainly focused on improving prelinguistic skills and communication skills using Picture Exchange Communication System (PECS) focused mainly on functional skills.

Materials used: The materials used to elicit responses consisted of several toys, puzzles and building blocks.

Procedure: An informed consent was obtained in writing from the mother, prior to the study. The procedure undertaken in the present study consisted of audio - video recording of mother-child interaction using semi-instructed method. Sony (DCR-DVD703E) digital video camera recorder was used for video recording. Prior to video recording, mother was instructed to feel free and to focus on play activity and not to the camera.

The mother was demonstrated the method of using toys / materials given to elicit the target behaviors to be studied. Mother was also instructed to interact naturally and to play with the child using toys/materials given by introducing series of questions to elicit different pragmatic functions. Six pragmatic functions were tapped with these questions. These functions are **1. Giving on request** (the act of giving objects, toys, eatables, etc to the partner on request). **2. Pointing / Visual gestures for requesting** (the act of addressing desire for an object, action, etc). **3. Gaze exchange** (the act of maintaining eye contact in long alternating intervals). **4. Joint attention** (the act used to direct other's attention to an object, event or topic of communicative act). **5. Non verbal turn taking.** (The act of interactional behavior, where the partner should wait for his / her turn during play activity). **6. Non verbal indication of negation** (the act of confirming the absence of an object, person, etc, nonverbally)

One hour audio-video sample of mother-child interaction was collected. Each child was recorded separately in 3 sittings for 20 minute duration each. Recording was done at the home and at therapy room. All the sittings were recorded with in a week's time.

Analysis: The six pragmatic skills studied were analyzed in terms of type of pragmatic skills used and percentage of occurrence / frequency and functional appropriateness of use by mother and the two subjects. The audio-video recorded sample of mother-child interaction was analyzed by three judges, including the 1st author all the three were Master degree holders in speech-language pathology. Before the analysis of the data, latter two judges underwent training for the duration 3 hours. During the training period an audio-video sample of typically developing child interacting with the mother was introduced and the two judges were trained for familiarization of the terminologies used in the present study and identifying the pragmatic skills which were functionally appropriate to the context.

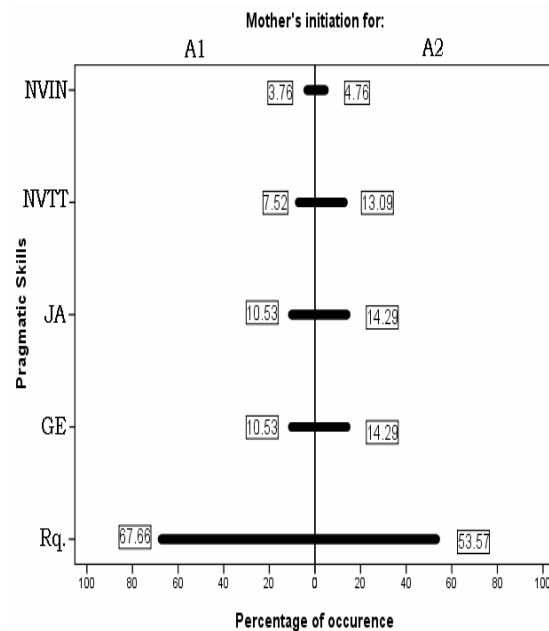
Once both the judges were confident in identifying the pragmatic skills, audio-video sample of 40 minute duration of mother-child interaction of each individual subject were shown to the judges separately. Judges were instructed to identify the type and frequency of answering appropriate to the context by the mother and the two subjects separately.

Statistical analysis: Reliability analysis was carried out to find inter and intra judge reliability. Frequency of each pragmatic skill used by mother and the two subjects were analyzed in terms of percentage of occurrence using population pyramid graph,

Results and Discussion

Inter and intra judge reliability for frequency of occurrence of pragmatic skills was found to be 0.9. Figure 1 & 2 shows the compiled results of all the 3 judges.

Combined communicative strategies (verbal and nonverbal) used by the mother were considered for analysis of percentage of occurrence of each pragmatic language skill.



RQ: Requesting; GE: Gaze exchange; JA: joint attention; NVT Nonverbal turn taking; NVIN: Nonverbal indication of negation.

Figure-1: Frequency of use of pragmatic skills (expressed as percentage) by the mother during the course of initiation of communication with the two subjects A1 and A2.

Percentage of initiation of each pragmatic skill by the Mother w.r.t the subject 1 (A1)

As shown in fig 1, 67.66% of the time, mother introduced questions for requesting objects, action, initiation of new task etc. Gaze

exchange was introduced and maintained for 10.53% of time. Joint attention was introduced and maintained for 10.53% of times during play activity (examples of play activity introduced, cricket, playing with soap bubbles and action for rhymes) and conversational task. 7.52% of the time nonverbal turn taking task was introduced during the play activity and 3.76% of the time mother requested the child to identify the item/object which was not present in the surrounding at the time of recording.

Percentage of initiation of each pragmatic skill by the Mother w.r.t the subject 2 (A2)

Requesting task dominated with 53.57% of occurrence followed by gaze exchange (14.29%). Introducing and maintaining Joint attention was found to be 14.29% during play activity (examples of play activity introduced, playing with soap bubbles and action for rhymes) and conversational task. While 13.09% of the times nonverbal turn taking task was introduced during the play activity. The least of all was introducing question for indication of negation (4.76%).

It is clear from figure-1 that, mother maintained uniformity when introducing different questions to elicit responses for the five different pragmatic skills. Requesting task was introduced more frequently and least was the questions on negation. But, examining for the percentage of occurrence of each pragmatic skill, w.r.t the A1 & A2, there were slight variations among them.

The reason for introducing requesting questions more frequently is possibly because of the influence of training method used at therapy session and at home using Picture Exchange Communication method, in terms to encourage the subjects to perform giving task on request. The reduced frequency of occurrence of other pragmatic language skills (joint attention, nonverbal indication of negation) could be due to poor responses on the part of the two subjects (see fig: 2)

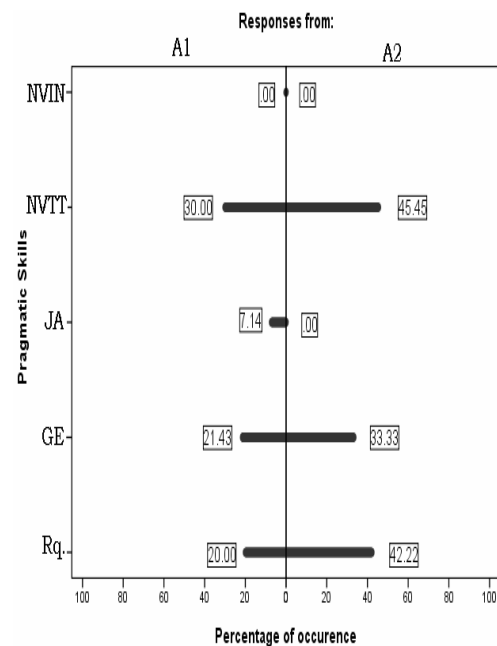
Nonverbal responses obtained from subject-1 (A1)

As shown in fig-2, out of 67.66% of mothers requesting, contextually appropriate response was given for 20.00% of the time. Gaze exchange was maintained well with 21.43%. Maintenance of Joint attention for activities was less i.e. 7.14% for 10.53% from the mother side. Involvement for non verbal turn taking was equally good with

30.00%. Non verbal response for negation was nil i.e 0% (No response).

Non verbal responses obtained from subject-2 (A2)

Out of 53.57% of requesting A2 showed good response (42.22%). Gaze exchange was maintained well with the percentage at 33.33. 0% (No response) was obtained for maintaining Joint attention. Involvement for non verbal turn taking (play activity) was more (45.45%). Non verbal response for negation was nil i.e. 0% (No response).



RQ: Giving on Request; GE: Gaze exchange; JA: joint attention; NVTT Nonverbal turn taking; NVIN: Nonverbal indication of negation.

Figure-2: Frequency of use of contextually appropriate pragmatic skills by the two subjects (A1 & A2), (expressed as percentage).

From the results obtained (refer fig 2) it is clear that, there were individual differences seen in percentage of use of pragmatic skills even though there are certain similarities in terms of type of pragmatic skill used by the two subjects. This result is in agreement with British twin study (Bailey et al., 1995) that clinical heterogeneity is commonly seen in monozygotic twin pairs with ASDs. However, further research is warranted on the same line for generalization of the results.

It was also seen that, the percentage of occurrence of giving on request, gaze exchange and nonverbal turn taking (taking part in play

activity namely, cricket, action for rhymes and playing with soap bubbles) was highest compared to other two pragmatic functions namely, joint attention and non verbal indication of negation. This pattern was similar among the two subjects. This pattern may be mainly because of the affect of speech-language therapy and occupational therapy attended.

Frequency of initiation of pragmatic skills by the two subjects (A1 & A2) during the course of interaction with the mother

Initiation of pragmatic language skills by the two subjects was restricted for **requesting**. Requesting was mainly for eatables and toys of their interests. Picture cards were used to indicate their requirements. Other pragmatic skills namely, initiation of gaze exchange, initiation of joint attention, initiations of non verbal turn taking, nonverbal questioning for identification of non existence of items/objects, was not introduced. Response from the mother (i.e giving the requested object) was 100% for the two subjects.

The result indicates poor performance by the two subjects for initiation of pragmatic questions/skills during the course of mother-child interaction. The obtained results are in agreement with the studies reporting that pragmatic skills are generally affected in children with autism spectrum disorders (Aarons and Gittens, 1987; Wing, 1988; Rollins, 1999).

Conclusions

The results of this study has shown that, during the course of mother-child interaction, initiation of pragmatic questions were mainly by the mother as compared to the two subjects who were limited only for requesting. On the other hand the two subjects responded well for the pragmatic questions introduced by the mother. Even though the two subjects showed similar performance in use of contextually appropriate three of five pragmatic functions namely, giving on request, maintain gaze exchange and non verbal turn taking task during play behavior, they differed in percentage of use of each function. This is an indicative of both pragmatic skill deficits in children with autism spectrum disorders and heterogeneity of behaviors among the group. Hence, early identification of the condition and individualized therapy program assume great importance in such clinical population.

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