Considering responsivity: a proposal for pragmatic analysis in autism spectrum

Considerando a responsividade: uma proposta de análise pragmática no espectro do autismo

ABSTRACT

Purpose: To compare the pragmatic profile referring to the communicative initiatives and the bi-dimensional profile involving the aspects of initiative and responsivity. It also aimed to analyze the most common types of responses presented by the studied individuals. Methods: Thirty recorded samples of interaction between speech-language therapist and children with autism spectrum disorders (mean age: 9 years and 6 months) sessions were analyzed. The samples were transcribed and data analyzed about number of communicative acts, occupation of the communicative space, use of communicative means (verbal, vocal and gestural) and total number of participations (initiatives and responses). The responses were qualified as “non-answer”, “adequate answer”, “inadequate answer” and “pragmatically inappropriate answer”. Results: Significant differences in the comparison of the numbers of initiatives and total participations and of occupation of communicative space and total number of communicative acts. There was also a significant difference in the number of “adequate answers”. Conclusion: Results show the need to consider the bi-dimensional communicative profile and qualify the answers in order to determine the child’s communication abilities.

RESUMO

Objetivo: Comparar o perfil pragmático das iniciativas de comunicação e o perfil bidimensional envolvendo os aspectos de iniciativa e responsividade. Além disso, buscou-se analisar os tipos mais comuns de resposta apresentadas pelos indivíduos pesquisados. Métodos: Foram analisadas trinta gravações de terapia fonoaudiológica, nas quais as terapeutas interagiam com crianças do espectro do autismo (média de idade: 9 anos e 6 meses). As filmagens foram transcritas e os dados derivados foram analisados quanto ao número de atos comunicativos, à ocupação do espaço comunicativo e ao uso dos meios verbal, vocal e gestual nas iniciativas e no total de participações (iniciativas e respostas). As respostas apresentadas foram qualificadas como: não resposta, resposta adequada, resposta inadequada e resposta pragmaticamente inapropriada. Resultados: Houve diferença na comparação entre as iniciativas e o total de participações no que concerne à ocupação do espaço comunicativo e no total de atos. Quanto às respostas, houve diferença no número de respostas adequadas. Conclusão: Os resultados evidenciaram a necessidade de considerar o perfil bidimensional de comunicação e ressaltaram a necessidade de qualificar as respostas a fim de discriminar as habilidades comunicativas da criança.

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Conflict of interests: None
INTRODUCTION

Autism was described more than 60 years ago and is now considered a pervasive developmental disorder that involves cognitive, social and linguistic areas. Although the 3 areas are always affected to some extent, there are important variations from one individual to the other. Language may be impaired on several levels, specially on pragmatic aspects\(^{(1,2)}\), and it is considered an important prognostic element\(^{(3,4)}\).

Pragmatic competence includes knowledge about language structure as well as about the rules that govern social behavior and environmental reality\(^{(5,6)}\). It can also be considered a system to the interpretation of world phenomena and human actions\(^{(7)}\). In this perspective there is a close association with the notion of social cognition and the ability to understand nonverbal communication signs and make complex inferences about other people’s behavior, thinking and beliefs\(^{(8)}\). There are different ways to assess the pragmatic aspects\(^{(9-11)}\), from the analysis of speech acts to the conversational macrostructure description\(^{(12-17)}\).

The communicative act is the main unit of pragmatic analysis when the focus is placed on the monologue, that is, when each communicative turn is observed, regardless of the general dialog organization\(^{(18)}\). They may be studied regarding their language structure, the intentions they convey (this is the general focus of analysis) and their effects on the listener. However, the analyzed acts are necessarily those that fit on a certain idea of assertivity. Especially in the case of autism spectrum disorders, the importance of initiating communicative exchanges refers to the fact that it shows the intention of communicating with the other person using all available resources. Such intention is the overlapping point of desiring to communicate, wanting to be understood and understanding the necessary social mechanisms to achieve the task. Therefore these initiatives are the privileged meeting point between one individual and the other.

However, communicative exchanges are two-fold. On one side there is the initiative and on the other the responsivity\(^{(19)}\). The exchange will only be effective if the participants share a common interactional nucleus\(^{(20)}\). During a dialog it is effective through an adjust between speech and silent segments and non-verbal elements\(^{(21,22)}\). A statement with no answer is considered a communicative failure by the initiator and therefore most answers have an important value in maintaining the communicative flow. Some authors\(^{(18,23)}\) have been studying the responsibility issue in children with pragmatic language disorders. The authors proposed four types of adjust between the precedent speech and the answer. This way, they aimed to understand the harmony degree determined between interlocutors. Answering means understanding the precedent speech, being interested in continuing to talk, wanting to provide new information and guarantee turn exchanges. This way, answering is – as well as the initiatives – another privileged meeting point between one individual and the other.

Aiming to improve the understanding about the communication process of children of the autism spectrum, this study had the purpose to compare the functional communicative profile of the communicative initiatives with a bi-dimensional profile that includes initiatives and answers. Besides, the most common types of answers presented by the studied individuals were analyzed.

METHODS

The research was approved by the Research Ethics Committee of the School of Medicine of Universidade de São Paulo under protocol number 091/10, and an adult responsible by each child signed the approved consent form.

Research corpus was comprised by three samples of 10 different patients (total of 30 samples). All subjects were diagnosed by psychiatrists according to the criteria proposed by the DSM-IV\(^{(23)}\) and the IDC-10\(^{(24)}\). The classification registered in the medial reports was maintained, as displayed in Chart 1. All subjects were assessed and attended speech-language therapy on a specialized service (LIF-DEA) at the Communication Sciences and Disorders Program of School of Medicine – Universidade de São Paulo during the period of this study. None of the subjects presented other diseases or hearing complaint. The inclusion criteria was the spontaneous use of oral language.

Among the ten subjects, just one was a girl (Chart 1). All the subjects interacted with female therapists that were graduate students of a training practice program in speech-language therapy with childhood psychiatric disorders.

**Chart 1. Research subjects and video sampling order**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Gender</th>
<th>Age</th>
<th>Therapist</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>11y5m</td>
<td>A</td>
<td>Autism</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>6y4m</td>
<td>B</td>
<td>High functioning autism</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>6y2m</td>
<td>B</td>
<td>Asperger syndrome</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>5y6m</td>
<td>C</td>
<td>Asperger syndrome</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>13y2m</td>
<td>D</td>
<td>Autism spectrum</td>
</tr>
<tr>
<td>6</td>
<td>Male</td>
<td>6y0m</td>
<td>B</td>
<td>High functioning autism</td>
</tr>
<tr>
<td>7</td>
<td>Male</td>
<td>16y8m</td>
<td>E</td>
<td>Autism spectrum</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>13y1m</td>
<td>E</td>
<td>Atypical autism</td>
</tr>
<tr>
<td>9</td>
<td>Male</td>
<td>7y5m</td>
<td>A</td>
<td>Autism spectrum</td>
</tr>
<tr>
<td>10</td>
<td>Male</td>
<td>11y0m</td>
<td>B</td>
<td>Autism spectrum</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>9y6m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: y = years; m = months

The analysis used filmed samples of three therapeutic situations in which the therapists interacted with the subjects following specific guidelines regarding the initial presentation of the material. All the recording sessions were conducted during the second semesters of 2009 and 2010 because at these periods the dyad’s members were already acquainted with each other for at least six months. This procedure was adopted in all the recordings aiming to diminish the impact of the interference of the familiarity among the interlocutors\(^{(25)}\).

The filmed samples were obtained specifically to the present
The Functional Communicative Profile\footnote{\textsuperscript{26}} was used to assess the communicative acts. Besides the communicative functions, the communicative means used in each act were also analyzed: verbal mean (emissions with at least 75\% of the correct phonemes); vocal mean (emissions with less than 75\% of the correct phonemes) and gestural mean (including body and face movements).

The filmed sample was transcribed and analyzed according to the incidence of each communicative function and mean, proportion of occupation of the communicative space, number of communicative acts expressed per minute and proportion of communicative acts expressing interpersonal communicative functions.

The Functional Communicative Profile considers the communicative initiatives of both interlocutors. But conversational aspects include not just the initiatives but also how much one of the interlocutors is responsive to the other’s initiatives.

Therefore, to assess the responsibility the following categories of answers were considered\footnote{\textsuperscript{21}}:
- Non-answer (NA): when there was a clear opportunity for the subject to answer but it wasn’t used;
- Adequate answer (AA): when the answer was adjusted to the prior question or demand;
- Inadequate answer (IA): when the answer provided wasn’t satisfactory due to linguistic limitations, misunderstandings or general issues regarding the comprehension of reality;
- Pragmatically inappropriate answer (PI): when there wasn’t a satisfactory adjustment of the answer’s social and communicative context to the demand.

The non-answer (NA) category posed some troubles to the analysis. Unlike the other types of answers this one is defined by the absence and not by the presence of a certain characteristic. Furthermore, to determine the absence of answer implies in the certainty that the opportunity to answer was guaranteed. Even with the turn exchanging the interlocutor may opt not to answer or to ignore the questioning or even to initiate another topic, organizing ideas. Considering these difficulties – that are frequent in conversational contexts – the NA was strictly classified just when there was a communicative breakdown determined by the absence of the expected answer. Therefore, even situations where one interlocutor asked something and the other didn’t answer were not always classified as NA. The main criterion to the classification of NA was the identification of a communicative breakdown due to the lack of answer.

To include the answers the Functional Communicative Profile protocol was completed with the following items (Appendix 1):
- Types of answers;
- Number of participations (including initiatives and answers);
- Communicative space (of initiatives and general – initiatives and answers);
- Communicative means (used in the initiatives and in general - initiatives and answers).

The analysis of the Functional Communicative Profile deals with the communication initiatives and the responsivity items refer to the answers. An item about “total of participations” was created, including the initiatives as well as the answers.

Therefore, after the original protocol and the information about responsibility were completed, the software that was specially developed to this research calculated the following items referring to the participation: general use of communicative means; proportion of initiatives and answers; occupation of the communicative space. This last item considered also the total participation of the adult, ensuring the fidelity of data.

The data were compared within variables through the Analysis of Variance – Anova. The significance level adopted was 0.05 (5\%). When there was statistical significance the t-Student test was used to analyze the pair of variables where the difference was identified.

**RESULTS**

Table 1 presents the values of average and variance of participations, initiatives and answers of the subjects during the interaction.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Participations</th>
<th>Initiatives</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>45.80</td>
<td>34.37</td>
<td>11.43</td>
</tr>
<tr>
<td>Variance</td>
<td>97.75</td>
<td>100.65</td>
<td>21.98</td>
</tr>
<tr>
<td>p-value</td>
<td>&gt;0.001*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant value (p=0.05) – Student’s t test (comparing participation and initiatives)

The comparison of the number of initiatives and the total number of participations (i.e., the sum of the initiatives and answers) revealed statistical difference. This result shows the difference of considering just the assertive aspects of communication without observing the double communicative movement of initiatives and answers.

Table 2 shows the use of communicative means. The values between brackets refer to the variance of data. The comparison of the three communicative means in each category of analysis (initiatives, answers and total of participations) has shown that there was significant difference in all of them (p<0.001). In the comparison of the use of each communicative mean in initiatives, answers and total of participations the only difference was related to the vocal mean. The pairwise comparison has shown that the three pairs of variables were different among each other (p<0.001 in all cases).

The average values of occupation of the communicative space, as well as the significance values determined in the comparison of data are presented in Table 3. That ratio of communicative space considering all of the child’s participation was
The surprising result was the significant difference between AA and the other types of answers, which was different from prior studies(13,21). It can be related to the interactive context, where the information about objects and events experimented during interaction through the turn-taking and the conditional sequence of the interventions. The sequence is conditioned by what was said/done before and that will, to some extent, determine what will be said/done afterwards. To participate in an interaction, as a conversation for example, the person needs to understand and answer appropriately(19) and to do it not just the content of the communication is important, but also the form aspects of the contribution(20).

The pragmatic analyses of the communicative functions, by their nature, assess the initiative movements. Considering the reverse movement, that is, the responsivity allows the understanding about how participative a certain individual is during a determined situation. This way, adding the information about responsivity to those regarding the initiatives provides an overview about general interaction structures. This perspective revealed a significant difference, when the total of interventions by the children and the occupation of the communicative space were considered (Tables 1 and 3, respectively). When just the initiatives are considered there is a tendency of not attributing to the child any responsibility for a collaborative exchange because their ability to adjust to requests and demands are not considered. The bi-dimensional analysis – considering initiatives and answers - attributes the appropriate value to the double role on communication, i.e., as speaker and as listener, as shown in turn-taking and sequencing rules. Research that assess the occupation of the communicative space(25,28,29) show that the children often have a smaller occupation ratio. However, the communicative “space” is a virtual concept that occurs during the communicative exchange and can only be understood with reference to the interactive stile. Some of the literature mentioned(26) also suggest that the therapists use communicative functions of requests that imply on an answer by the other. If the therapists make more requests, it is desirable that the patients respond to the requests, although these answers still have not been considered in the functional analysis.

The use of communicative means indicated that only the vocal mean had a significant difference between answers, initiatives and the total of participations (Table 2). It can be related to the smaller use of validating resources by children with autism spectrum disorders, since many of them are vocal markers(30). Besides that, an answer should offer new information, ratify or rectify a prior statement and verbal and gestural resources are more appropriate to these functions.

The results indicate that there is a difference between an analysis that considers all communicative participations or just the initiatives. The social engagement difficulties there are frequent in the autism spectrum disorders are mainly responsible by the smaller number of communicative initiatives and other pragmatic impairments(1,2). Certainly initiating an interaction and maintaining it on the expected form (i.e., exchanging turns and respecting the topic contingency) is a challenge to all speakers because it requires the use of linguistic, social and cognitive resources. They are necessary because there is the understanding that interactional exchanges are effective just when there is reciprocity.

A reciprocal interaction involves a tacit agreement between participants that will contribute to the successful communication. There are undeclared (nevertheless, shared) common purposes among interlocutors, what turns interaction into a complex social experience(20). It implies that interactions are cooperative and inter-subjective because the speakers must understand what is said as well as express their own understanding about it(27). This understanding and revealing movement is also different of the traditional ratio (considering just the initiatives).

The comparison between the types of answers (NA, AA, IA and PI) is synthesized in Table 4. The pairwise comparison has shown that AA had a statistically different behavior than IA and PI) is synthesized in Table 4. The pairwise comparison between the types of answers (NA, AA, IA and PI) is synthesized in Table 4. The pairwise comparison has shown that AA had a statistically different behavior than IA and PI. The pragmatic analyses of the communicative functions, by their nature, assess the initiative movements. Considering the reverse movement, that is, the responsivity allows the understanding about how participative a certain individual is during a determined situation. This way, adding the information about responsivity to those regarding the initiatives provides an overview about general interaction structures. This perspective revealed a significant difference, when the total of interventions by the children and the occupation of the communicative space were considered (Tables 1 and 3, respectively). When just the initiatives are considered there is a tendency of not attributing to the child any responsibility for a collaborative exchange because their ability to adjust to requests and demands are not considered. The bi-dimensional analysis – considering initiatives and answers - attributes the appropriate value to the double role on communication, i.e., as speaker and as listener, as shown in turn-taking and sequencing rules. Research that assess the occupation of the communicative space(25,28,29) show that the children often have a smaller occupation ratio. However, the communicative “space” is a virtual concept that occurs during the communicative exchange and can only be understood with reference to the interactive stile. Some of the literature mentioned(26) also suggest that the therapists use communicative functions of requests that imply on an answer by the other. If the therapists make more requests, it is desirable that the patients respond to the requests, although these answers still have not been considered in the functional analysis.

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**Table 2. Average use of communicative means in initiatives, answers and total of participations**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Verbal mean (variance)</th>
<th>Vocal mean (variance)</th>
<th>Gestural mean (variance)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiatives</td>
<td>66.9 (452.16)</td>
<td>7.6 (74.4)</td>
<td>45.53 (259.84)</td>
<td>&gt;0.001*</td>
</tr>
<tr>
<td>Answers</td>
<td>64.6 (866.24)</td>
<td>0.2 (1.2)</td>
<td>40.79 (898.74)</td>
<td>&gt;0.001*</td>
</tr>
<tr>
<td>Participations</td>
<td>66.75 (478.02)</td>
<td>5.7 (44.25)</td>
<td>42.51 (322.8)</td>
<td>&gt;0.001*</td>
</tr>
<tr>
<td>p-value</td>
<td>0.92</td>
<td>&gt;0.001</td>
<td>0.89</td>
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</tr>
</tbody>
</table>

* Significant value s (p<0.05) – ANOVA

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**Table 3. Occupation of the communicative space referring to the initiatives and to the total participations: average and significance**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Initiatives</th>
<th>Participations</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>39.1</td>
<td>45.77</td>
<td>&gt;0.001*</td>
</tr>
<tr>
<td>Variance</td>
<td>42.57</td>
<td>23.15</td>
<td></td>
</tr>
</tbody>
</table>

* Significant value (p<0.05) – Student’s t test

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**Table 4. Average and variance values for each type of answer in the three assessment situations**

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>Mean</th>
<th>Variance</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non answer (NA)</td>
<td>1.66</td>
<td>31.26</td>
<td></td>
</tr>
<tr>
<td>Adequate answer (AA)</td>
<td>95.96</td>
<td>59.41</td>
<td></td>
</tr>
<tr>
<td>Inadequate answer (IA)</td>
<td>0.86</td>
<td>4.67</td>
<td>&gt;0.001*</td>
</tr>
<tr>
<td>Pragmatically inappropriate answer (PI)</td>
<td>1.63</td>
<td>24.37</td>
<td></td>
</tr>
</tbody>
</table>

* Significant value (p<0.05) – ANOVA
where limited to the immediate context, familiar to adults and children. That is, during an interaction determined by an specific proposal the number of variables is smaller, the linguistic structures refer to a more circumscribed environment(10) that is, therefore, less challenging. Or even because as the proposal’s demand don’t rely on the emotional factor, the participants didn’t have difficulties to answer appropriately(22). The ability to discriminate (and not only identify) the adjustment’s degree between the adult’s demand and the child’s answer provides information about the comprehension level and the kind of difficulties presented by the subjects(18), allowing more effective intervention proposals.

The limited corpus is one of the main limitations of this research, but it is usual in studies involving detailed microanalysis(19). Other research may assess if a larger sample would produce similar results. Other limitation refers to the kind of interaction that was analyzed. This research used video samples of interaction with specific themes. Other types of interaction (for example, social exchanges in home environment, school or free exchanges) may present different results than the ones found in this research.

CONCLUSION

Analyzing the responsivity and considering it on the comprehension of the communicative profile of children of the autism spectrum provide information about the interactions’ global structures and broader communicative abilities. This information has an undeniable value to the language analysis but may be especially important to the therapeutic planning. Understanding the how much a child is assertive and responsive provides a notion about the kind of communicator the child is and what steps should be taken to achieve better communication efficacy.

REFERENCES

Appendix 1. Functional Communicative Profile – Enlarged

Name:  
Diagnosis:  
Examiner:  
Age:  
Date:  
DVD #:  

Time: ___ minutes

<table>
<thead>
<tr>
<th>Communicative acts</th>
<th>A</th>
<th>%</th>
<th>Participations</th>
<th># functions</th>
<th>C</th>
<th>%</th>
<th>Initiatives</th>
<th>Interactive functions</th>
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<tr>
<td>TOTAL</td>
<td>%</td>
<td>Answers</td>
<td>%</td>
<td>Interactive acts</td>
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Communicative acts per minute:

<table>
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<tr>
<th>Function</th>
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<th>N</th>
<th>%</th>
<th>Function</th>
<th>Mean</th>
<th>N</th>
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</tr>
<tr>
<td>Answer</td>
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<td>N</td>
<td>%</td>
<td>Answer</td>
<td>Mean</td>
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<td>%</td>
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<tr>
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<tr>
<td>Tot. Answers</td>
<td>Mean</td>
<td>N</td>
<td>%</td>
<td>Tot. Answers</td>
<td>Mean</td>
<td>N</td>
<td>%</td>
<td>Tot. Answers</td>
<td>Mean</td>
<td>N</td>
<td>%</td>
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