Habilidades pragmáticas, vocabulares e gramaticais em crianças com transtornos do espectro autístico***

Pragmatic, lexical and grammatical abilities of autistic spectrum children

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Abstract
Background: development of grammatical, functional and lexical aspects in the language of children with autism spectrum disorders. Aim: to analyze the development of grammatical, functional and lexical aspects in three different moments: initial assessment, after six and twelve months of language therapy. Method: participants of this study were ten boys with ages between 2:7 and 11:2 years, with psychiatric diagnosis within the autistic spectrum. Video recorded samples of a 30 minutes patient-therapist interaction were recorded in three different moments (therapy onset, after six and twelve months of therapy) for each subject. The first 15 minutes of each sample was transcribed for the analysis of the functional communicative profile. Grammatical and lexical aspects were analyzed through the transcription of 100 speech segments of each sample. All data were longitudinally compared within and between areas. Results: there were significant associations between the studied variables but no statistically significant differences along the studied period of language therapy. Conclusion: there are associations between grammatical and pragmatic performances.
Key Words: Language Therapy; Language; Autism; Speech.

Resumo
Tema: evolução dos aspectos formais da linguagem de crianças do espectro autístico. Objetivo: analisar a evolução dos aspectos funcionais e gramaticais em três momentos distintos: avaliação inicial, após seis meses de terapia e após doze meses de terapia. Método: participaram desta pesquisa dez crianças do sexo masculino, com idades entre 2:7 e 11:2 anos. Todos foram diagnosticados por médicos como portadores de transtornos do espectro autístico. Foram realizadas filmagens de 30 minutos de interação entre terapeuta e paciente, em três momentos diferentes (inicial, após 6 e 12 meses de terapia). Das filmagens, foram transcritos os 15 minutos iniciais para análise do perfil funcional da comunicação. Para a análise dos aspectos gramaticais foram transcritos 100 segmentos de fala, estes também foram utilizados como corpus de análise dos aspectos vocabulares. Os dados foram analisados quanto à funcionalidade, aspectos gramaticais e vocabulares e serão comparados entre si longitudinalmente. Resultados: não houve diferença estatisticamente significante entre as variáveis estudadas ao longo de 12 meses de terapia fonoaudiológica. Houve associações entre as variáveis entre si ao longo do período estudado. Conclusão: há relação entre o desempenho gramatical e pragmático.
Palavras-Chave: Fonoaudiologia; Linguagem; Autismo Infantil; Fala.

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Introduction

Linguistic issues are frequently highlighted in the descriptions and diagnosis within the autistic spectrum (1-5).

Language may be studied through different methods that have specific advantages and disadvantages. However, due to their lack of social engagement, spontaneous speech samples are very useful to the analysis of autistic children's language. These samples may provide important information about their social-linguistic functioning, especially when variables such as context, familiarity and cognitive demands are controlled. Besides, this kind of data reflects the language use productivity (6-7).

The exact nature of language disorders of autistic children is still little understood mostly due to the great phenotypic variations. Approximately half of the autistic children do not use language functionally and present persistent delays in communication development. Other children have language development similar to normality, although pragmatic disorders can be observed (8-11).

Jarrold and colleagues (12) suggested that autistic children's language have at least three differences when compared to normality: articulation abilities seem to be more developed than the others, verbal expression seems to be more advanced than the comprehension and vocabulary comprehension seems to be better than grammatical comprehension. Hetzroni and Tannous (13) proposed that linguistic disorders were associated to impairments in one of the language components (form, use and content) or in the interaction amongst them. Walenski and colleagues (14), on the other hand, pointed out that the linguistic profile in autism may be related to pragmatic and grammatical impairments while the lexical abilities are intact.

Several authors (1, 3-5, 10) suggested that the pragmatic inabilities are central to autism. Tager-Flusberg and Calkins (15) pointed out that tha grammatical abilities assessed by the Index of Productive Syntax (IPSyn) and by the Mean Length of Utterance (MLU) are the same in autistic children, whether spontaneous or imitative speech is analyzed. Rollins and Snow (16) suggested that, apparently, pragmatic abilities of autistic children contribute to their grammatical acquisition. Other authors (7,17) observed that autistic children present lexical syntactic and grammatical handicaps in standard tests and spontaneous speech. Recent researches investigated the relations between pragmatic and grammatical development (18) and between grammatical development and syntax (8, 14, 19-20).

Literature generally points out to grammatical, lexical and pragmatic deficits in autistic children. The mutual interference and relations between these abilities, however, still is a matter of great debate. The aim of the present research was to analyze the relations between grammatical and pragmatic development of autistic children during a period of 12 months of language therapy.

Method

This study was approved by the institution's ethic committee and the caregivers of all participants signed a consent form.

Subjects

Participated in this research ten individuals that were diagnosed with autism, by psychiatrists, according to the criteria proposed by the DSM-IV (2) and by the ICD-10 (21). All subjects were assessed and enrolled in speech-language therapy on a specialized program.

On the first assessment subjects' mean age was 7:2 years (varying from 2:7 to 11:2 years). All were of the male gender and had never received language-therapy.

Recorded segments of the initial evaluation, after periods of six and twelve months were used, comprising three recording per patient and therefore a total of 30 filmed segments of 30 minutes of duration were analyzed.

Material and Procedure

1. To the assessment of the Functional Communication Profile were used video-taped samples of language therapy sessions.

During the sessions the child and the familiar adult interacted within a known environment. Toys that prompted the better communicative situations for each patient-therapist dyad were used. Each sample had 30 minutes duration. Recorded data were transcribed to a specific protocol and the first 15 minutes were used to the pragmatic analysis.

The analysis of the pragmatic profile used the Recording Pragmatic Protocol (22) where the communicative functions are identified (as object request, action request, social routine request, consent request, information request, protest,

protest expression, comment, acknowledgement of other, show-off, exclamatory, narrative, joint play, exploratory, play, non-focused, reactive, performative, labeling and self-regulatory). Besides the functions, the communicative means were identified as verbal (with more than 75% of the correct phonemes), vocal (with less than 75% of the correct phonemes) and gestual (body and face movements).

The communicative functions were grouped as more interpersonal and less interpersonal (23). Functions were also grouped according to the classification proposed by Halliday (24) as: instrumental, regulatory, interactive, personal, heuristic and imaginative. The information used referred to communicative function groups, communicative means, total of communicative functions, total of more interpersonal communicative acts and communicative acts per minute.

2. To the assessment of the Mean Length of Utterance (MLU) the same recordings described in item 1 were used. To the MLU analysis 100 speech segments were transcribed to a protocol (25).

Utterances in which the subjects sang were excluded but those with delayed echolalia weren't.

Grammatical morphemes were grouped in two sub-groups: GM-1 - nouns, verbs and articles and GM-2 - prepositions, conjunctions and pronouns. MLU total is the result of the sum of GM-1 and GM-2. The mean length of utterance-words (MLU-w) and morphemes (MLU-m) were determined.

The amount of words of the following grammatical classes was identified: adverbs, adjectives, articles, conjunctions, prepositions, pronouns, nouns and verbs.

3. To the assessment of vocabulary the same 100 speech segments were used. The occurrence of psychological state terms (physical, emotional, of desire and cognitive) and designative terms (natural and cultural entities, body parts, action, artifact, time and space localization and people's names) were counted. In the case of psychological state terms the number of different terms was also counted (26-27).

Statistics

The initial (M1), after a six-month period of language therapy (M2) and afte a twelve-months period of language therapy (M3) moments were associated through the Pearson's Correlation analysis> The adopted significance level was 0,05 (5%).

Results

Of all the assessed variables the ones with the larger number of significant associations to other were "MLU-words": 34 correlations; verbs: 31 correlations; GM-1, MLU-morphemes and proportion of interpersonal communicative acts, with 29 significant correlations each. These five variables will be further detailed.

The Chart 1 presents the variables with the largest number of correlations in the three moments of data gathering.

CHART1. Variables with the largest number of correlations

Variables	Moment 1	Moment 2	Moment 3
MLU – words	Total number of functions	*Acts/minute*	*Acts/minute*
	% interpersonal acts	*% interpersonal acts*	
	Verbal mean	*Verbal mean*	
	Gestual mean (-)	*Gestual mean (-)*	
	Artifacts	*Communicative space*	*Communicative space*
	Total of designative terms	Instrumental function (-)	
	Terms of desire	Regulatory function	
	Different cognitive terms		Interactive functions
Verbs	Terms of action		
	Terms of spatial location	*Terms of spatial location*	
	Total of designative terms	Acts/minute	
	% interpersonal acts	*% interpersonal acts*	*% interpersonal acts*
	Instrumental function (-)	*Instrumental function (-)*	
	Interactive functions	*Interactive functions*	*Interactive functions*
	Verbal mean	*Verbal mean*	
	Gestual mean (-)	*Gestual mean (-)*	*Gestual mean (-)*
MLU - morphemes	*Artifact*	Acts/minute	*Artifact*
	Total of designative terms	Communicative space	Total of designative terms
	Total of functions (-)	% interpersonal acts	
		Regulatory function	
	Verbal mean	*Verbal mean*	
		Gestual mean (-)	
Grammatical morphemes type 1	Cultural entity	Acts/minute	
	Artifact	Instrumental function (-)	*Artifact*
	Total of designative terms	Regulatory function	Total of designative terms
	Terms of desire	Interactive function	
	% interpersonal acts	*% interpersonal acts*	
	Verbal mean	*Verbal mean*	
		Gestual mean (-)	
Interpersonal communicative acts	Action		*Terms of time location*
	Artifact		
	Terms of spatial location		
	Total of designative terms	MLU-morphemes	
	GM1	*GM1*	Unintelligible segments
	MLU-words	*MLU-words*	
	Adverbs		Adverbs
	Verbs	*Verbs*	*Verbs*
	Preposition	Articles	Pronouns

Discussion

The correlations with statistical significance show the association between vocabulary, grammar and pragmatic. Of the total 46 variables, MLU-words was the item with the largest number of associations (34 correlations). There were more associations in the first and second moments than in the third moment. According to Araújo and Befi-Lopes (25) MLU-words assess phrasal extension and can also be a useful indicator of grammatical development. However, they point out that since it doesn't differ structure and morpho-syntactic complexity, MLU-words could be better used as an index of linguistic development.

The grammatical variables associated with MLU-words were: grammatical morphemes type 1 (nouns, verbs and articles), MLU-morphemes and the word classes: adverbs, adjectives and verbs. With the exception of grammatical variables, the others seem to mirror the communicative use, more than specifically the language system. MLU-words was higher in the subjects with the better pragmatic abilities and that presented better social-emotional engagement during the communicative exchanges.

The association between MLU-words and the occupation of communicative space shows the importance of the verbal communicative means to the interaction symmetry, although the last doesn't depend on the first, as suggested by other studies (22).

As can be observed in Chart 1 in what refers to the pragmatic variables the second moment

functions as a transition. On the first moment all the variables referred exclusively to the child's own performance within the child's own parameter (number of communicative functions that the subject expressed and number of interpersonal communicative acts produced by the subject). On the third moment both variables referred to the child's performance in relation to an external parameter: in the case of acts per minute the parameter in time and in the case of communicative space the parameter is the other. The second moment presented a merging of these two types of parameters and seam to function as a rehearsal to the third moment. That is, during the second moment the association between phrasal extension and performance factors with internal and external parameters coexists.

The second variable with the largest number of correlations was the grammatical class verb. Variables as the proportion of interpersonal communicative acts, use of interactive functions and gestual communicative mean were associated with the class "verbs" on the three different moments. Although the correlation cannot be viewed as a causal relation, a strong correlation suggests that two variables have something important in common (16). Considering that verbs convey less evident meanings than most nouns, a larger use of verbs may suggest more attention to the other. This in turn, indicates better social abilities that are evident not only in social attention but also in the interactivity of interpersonal communication. While several nouns refer to concrete objects, verbs may refer to transitory events or to changes in state with multiple organizational principles. The concepts conveyed by verbs may have more varied attributes than those conveyed by nouns (27).

The role of the one-to-one interaction is important to verb learning and use. Factors as the verbal mean, socio-pragmatic clues and input influence the order of verbal acquisition (26). In verbal interaction children learn that some syntactic differences between verbs have correspondent semantic differences. Learning that the semantic-syntactic link exists allow the child to make suppositions about the meaning of a verb based on the syntactic structure where it occurs. The results of the present study confirm the suggestion that the evolution on the use of verbs is compatible with the hypothesis that the acquisition is based on the use and on the attention to contextual and semantic-syntactic clues (25).

The negative association with the use of gestual mean may suggest that either the use of gestures is replaced by verbalization or the use of verbal utterances do not exclude the gestural delay that can be observed even in children with better linguistic abilities (20).

The MLU-morphemes presented correlations on the first and on the third moments with artifacts and with designative terms. Artifacts are words that designate things that exist due to human action, as a clock, a house and others (27) and in most cases are expressed by words that refer to objects. These, in turn, are included in the category nouns, that may result in the maximal score: three points (morphemes designating gender, number and degree) and therefore is the grammatical class with the better scoring possibilities in MLU according to the criteria proposed by Araújo and Befi-Lopes (25). In the study by Tager-Flusberg and colleagues (6) the MLU was highly correlated with measures of syntactic productivity and lexical diversity.

In the two first moments there were associations between grammatical morphemes type 1 and the proportion of interpersonal communicative acts and the use of verbal communicative mean. In the first and third moments there were associations with artifacts and with the total number of designative terms. Nouns, verbs and articles constitutes the basic structure of a phrase in Portuguese, therefore the association between artifacts, designative terms and verbal communicative mean is not surprising. Besides this association with the language it is possible that the association between designative terms and artifacts is related to the fact that autistic children tend to speak about less complex events, that is, more concrete events (19) and therefore use more words related to concrete objects, as is the case of the artifacts. The correlation with interactivity indicates that the intention to socially participate in communicative situations is essential to the effective use of the linguistic knowledge. The idea that the communication effectiveness depends on the aspects of form and use (besides content) is made evident through this association (13, 15).

The linguistic idiosyncrasies that are widely described in the literature (19) may hide the fact that autistic children do present communicative intent. The association between interpersonal communicative acts and other variables shows that there is an association between the linguistic and the socio-pragmatic apparatus (26). A correlation analysis does not determine the path of the association; that is, if the interactivity of the communicative acts favors the use of certain lexical terms or a larger MLU, or if larger MLU and certain lexical terms favors the communication interactivity. What can be stated is that there is an association and that it can be related to social-pragmatic mechanisms that act as language facilitators (26) or a mechanism of reciprocal influence (12, 17).

Conclusion

The analysis of the spontaneous speech showed the communicative functionality of the subjects and indicated that there was association between two kinds of variables generated by the same samples. The number of subjects restricts the generalization of the findings and future research may confirm if the results are the same with a more homogeneous group of subjects. The study of grammatical abilities showed the delay reported in the literature and, considering the correlations, mean that can be used in the clinical practice as possible strategies to promote language development of children with autism.

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