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Pragmatic skills in children with autism spectrum disorder

Habilidades pragmáticas em crianças com transtorno do espectro do autismo

Habilidades pragmáticas en niños con trastorno del espectro autista

Marcos Henrique Borges[1]
Valeriana de Castro Guimarães[2]
Deborah Branco Ferreira Perilo[2]
Edson Junior de Melo Fernandes[2]
Angelina Emiliano Oliveira[1]
Ivone Felix Sousa[1]
Fernanda Dreux Miranda Fernandes[3]

Abstract

Objective: To evaluate pragmatic skills in children diagnosed with autism spectrum disorder, using the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorders. **Method:** The convenience sample included 115 children with autism spectrum disorder, of both sexes, whose data were collected by nine speech therapists at a speech therapy clinic in the Midwest Region of Brazil. For statistical analyses, the basic assumptions of the results obtained in the application of Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorders were evaluated. The one-sample binomial, chi-square, and Kolmogorov-Smirnov tests were used to assess the occurrence of statistical difference between the social communication skills observed in children with autism spectrum disorder when only two different responses were obtained, when more than two types

[1] Pontifícia Universidade Católica de Goiás - PUC-Goiás, Goiânia, GO, Brazil.
[2] Universidade Federal de Goiás, Goiânia, GO, Brazil.
[3] Universidade de São Paulo - USP, São Paulo, SP, Brazil.

Authors' contributions:
MHB: conception, methodology, data collection, and article drafting.
VCG: conception, methodology, and supervision.
DBFP: article drafting, critical review.
EJMF: data collection.
AEO: conception, methodology, data collection.
IFS: critical review, supervision, methodology.
FDMF: conception, article drafting.

Email for correspondence: mhborgesgo@gmail.com
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of responses were obtained, and between the different types of responses to assess social communication skills for each child, respectively. **Results:** Of the 115 participating children, 98 (85.7%) are male, 59 (84.3%) attended school, and their ages ranged between 3 and 12 years. Of the 29 questions that make up the five Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorders factors, i.e. language, inadequacy, interactivity, functionality, and responsiveness, we observed that the null hypothesis was rejected in 79.3% of the responses from the speech therapists who collected the data. The adoption of the null hypothesis indicates that no statistically significant difference was found in the perception of the performance of the children evaluated in relation to pragmatic skills, an outcome corroborated by the literature when identifying heterogeneity and uniqueness in the communication of people with autism spectrum disorder. **Conclusion:** The identification of unique points of difficulty in social (pragmatic) communication should contribute to raising awareness of the need to offer children with autism spectrum disorder interventions that stimulate and train their broader communicative skills, social cognition, and verbal capacity, i.e. their ability to conversation.

Keywords: Autism; Speech; Language; Social communication disorder; Autism spectrum disorder.

Resumo

Objetivo: Avaliar as habilidades pragmáticas em crianças com diagnóstico de transtorno do espectro do autismo (TEA), por meio do Protocolo de Avaliação das Habilidades Pragmáticas no Espectro do Autismo (PAHPEA). **Método:** Foram incluídas 115 crianças com transtorno do espectro do autismo, de ambos os sexos, cujos dados foram coletados por nove fonoaudiólogos em clínica de fonoaudiologia da Região Centro-Oeste do Brasil. Foram usados os testes binomial, qui-quadrado e Kolmogorov-Smirnov de uma amostra para avaliar se houve diferença estatística entre as habilidades da comunicação social observadas nas crianças com TEA quando foram obtidas somente duas respostas diferentes, quando houve mais de dois tipos de respostas e entre os diferentes tipos de respostas para avaliação das habilidades de comunicação social para cada criança, respectivamente. **Resultados:** Das 115 crianças participantes, 98 (85,7%) do sexo masculino, 59 (84,3%) frequentavam a escola e as idades variaram entre 3 e 12 anos. Das 29 perguntas que compõem os cinco fatores do PAHPEA, que são linguagem, inadequação, interatividade, funcionalidade e responsividade, observou-se que a hipótese nula foi rejeitada em 79,3% das respostas dos fonoaudiólogos que coletaram os dados. Observou-se que houve diferença estatística significativa na percepção sobre o desempenho das crianças avaliadas em relação às habilidades pragmáticas, o que é corroborado pela literatura ao identificar heterogeneidade e singularidade na comunicação de pessoas com transtorno do espectro do autismo. **Conclusão:** A identificação de pontos singulares de dificuldades na comunicação social (pragmática) deve colaborar para a conscientização da necessidade de oferecer às crianças com transtorno do espectro do autismo intervenções que estimulem e treinem habilidades comunicativas mais amplas, cognição social e capacidade verbal, ou seja, habilidade de conversação.

Palavras-chave: Autismo; Fala; Linguagem; Transtorno da comunicação social; Transtorno do espectro do autismo.

Resumen

Objetivo: Evaluar las habilidades pragmáticas en niños con diagnóstico de trastorno del espectro autista mediante el Protocolo de Evaluación de Habilidades Pragmáticas en el Espectro Autista. **Método:** En la muestra por conveniencia se incluyeron 115 niños con trastorno del espectro autista, de ambos sexos, cuyos datos fueron recopilados por nueve fonoaudiólogos en una clínica de fonoaudiología de la Región Centro-Oeste de Brasil. Para los análisis estadísticos, se evaluaron los supuestos básicos de los resultados obtenidos en la aplicación del Protocolo de Evaluación de Habilidades Pragmáticas en el Espectro Autista. Se utilizaron las pruebas binomial, chi-cuadrado y de Kolmogorov-Smirnov para una muestra, con el fin de evaluar si hubo diferencias estadísticas entre las habilidades de comunicación social observadas en los niños con trastorno del espectro autista cuando se obtuvieron solo dos respuestas diferentes, cuando hubo más de dos tipos de respuestas y entre los diferentes tipos de respuestas para evaluar las habilidades de comunicación social de cada niño, respectivamente. **Resultados:** De los

115 niños participantes, 98 (85,7%) eran del sexo masculino, 59 (84,3%) asistían a la escuela y las edades variaron entre 3 y 12 años. De las 29 preguntas que componen los cinco factores del Protocolo de Evaluación de Habilidades Pragmáticas en el Espectro Autista, que son lenguaje, inadecuación, interactividad, funcionalidad y capacidad de respuesta, se observó que la hipótesis nula fue rechazada en el 79,3% de las respuestas de los fonoaudiólogos que recopilaron los datos. La adopción de la hipótesis nula indica que no hubo una diferencia estadística significativa en la percepción del desempeño de los niños evaluados en relación con las habilidades pragmáticas, lo cual es corroborado por la literatura al identificar heterogeneidad y singularidad en la comunicación de personas con trastorno del espectro autista. **Conclusión:** La identificación de puntos específicos de dificultades en la comunicación social (pragmática) debe contribuir a la concienciación sobre la necesidad de ofrecer a los niños con trastorno del espectro autista intervenciones que estimulen y entrenen habilidades comunicativas más amplias, cognición social y capacidad verbal, es decir, habilidades de conversación.

Palabras clave: Autismo; Habla; Lenguaje; Trastorno de la comunicación social; Trastorno del espectro autista

Introduction

Pragmatic skills involve the ability to use language appropriately in different social contexts, understand and respond to social cues, and maintain effective social interactions. Pragmatic disorders, i.e., social communication, have a significant impact on the development of language, speech, and communication in children with autism spectrum disorder (ASD)[1].

In general, children with ASD have communication skills marked by difficulties in understanding and using non-verbal signals, such as gestures and facial expressions, in addition to having limitations in maintaining eye contact. This affects their ability to engage in meaningful social interactions and understand the communicative intentions of others[2,3].

In the most recent version of the *Diagnostic and statistical manual of mental disorders DSM-5-TR™* [4], it is pointed out, in a very incisive way, that issues related to social communication difficulties (pragmatics) are determining criteria for the diagnosis of ASD. Thus, the assessment of these skills is indispensable in the diagnostic process of ASD and, consequently, the absence of changes in pragmatics invalidates it[5].

Social interaction is closely linked to communicative skills, the lack of repertoire for non-verbal communication can make social interaction and effective communication of children with ASD even more difficult[6,7,8]. Consequently, they may have difficulty establishing and maintaining social relationships, and may seem indifferent or uninterested in what is going on around them, or not knowing how to initiate these interactions or how to respond appropriately when exposed to social contacts[9].

The lack of understanding about the rules implicit in conversation, such as changing turns or staying focused on the topic addressed, is mentioned as one of the weak points that children with ASD present in their communication[10]. Even when their vocabulary is adequate and their grammatical skills are intact, these individuals may face difficulties in starting and maintaining conversations, understanding the social implications of this conversation, and using language with flexibility and adaptation[11].

In a scoping review, referring to a period of 20 years, involving 293 studies, it was found that, although the deficit in social communication (pragmatic) is a striking characteristic of children with ASD, it is inconsistently defined in research. The results showed a lack of consensus on the definition of social communication in general[12].

The role played by speech-language pathologists is crucial in identifying, intervening and supporting the development of pragmatic skills in children in general and, particularly, those diagnosed with ASD. To succeed in this endeavor, it is of fundamental importance that the team involved in the diagnosis be aware of the characteristics that differentiate ASD from other neurodevelopmental disorders[13].

Given that pragmatic skills are complex and multifaceted, their evaluation in children diagnosed

with ASD has peculiar characteristics. Based on the unique identification of the strengths and areas of difficulty that each child with ASD presents, the speech therapy professional can develop personalized, more effective and targeted interventions. In this way, it can promote the communicative and social development of these children, enabling the improvement of pragmatic skills, which, consequently, will have a positive impact on the quality of life[14,15]. In addition, the systematic application of an investigation protocol specifically focused on these skills can help monitor the progress of children with ASD over time, allowing interventions to be adjusted as neede[14].

One of the most significant difficulties that speech-language pathologists face in daily practice refers to the fact that functional language analysis requires real-world communication samples. After all, the functional use of language involves aspects such as interaction, intention, and motivation, which are very difficult to simulate in test-like situations. Samples of spontaneous situations are generally considered the best source of information about children's abilities[15].

In a study developed by Martin et al. (2023)[6], it was found that language, from a pragmatic point of view, was significantly more impacted among male children with ASD. It was also observed that these boys had more difficulties in less structured contexts (conversation)[6].

Individuals with ASD, minimally verbal, mainly use their speech to agree, acknowledge, disagree, answer a question and request something. Usually, they have great difficulty in making comments of any kind. However, the pragmatic aspects of communication may vary between different partners and conversation contexts[16].

The importance of examining multiple modalities and forms of communication in minimally verbal children with ASD is highlighted to achieve a more comprehensive understanding of their communication skills. The inclusion of interactionist models of communication is essential to examine the contribution of these children to their parents' responses, further shaping language learning experiences[17].

It is assumed that children with ASD, like any human being, are unique in their way of communicating, their use of language, behavior, and cognitive, emotional, and social development. Thus, it was hypothesized in this study that each child with ASD has different levels of social communication development (pragmatic skills), which reinforces the need for the speech therapy professional who accompanies them to develop a specific program for each of them, to intervene effectively to obtain efficiency and effectiveness in the results.

Comprehensive approaches are recommended by *the American Psychoiatric Association*[5] and *American Speech-Language-Hearing Association* [4] for the assessment of pragmatic skills in children with ASD. This evaluation should consider multiple sources of information and contexts, including clinical observations, interviews with parents, and the application of standardized instruments[5].

The main advantages of PAHPEA are comprehensiveness, personalization, and evidence base. The scope encompasses a wide range of pragmatic skills, allowing detailed and specific assessment of the child's communicative skills. Personalization refers to activities that can be adapted to meet the individual needs of each child, ensuring more accurate and relevant assessment. The evidence base is presented when the development is based on scientific research and best practices recommended by professional associations, such as ASHA and APA[14].

By providing the identification of areas of difficulty and potentialities of individuals with ASD, PAHPEA allows the development of personalized, more effective and targeted interventions, so that the communicative and social development of the children evaluated can be promoted, with a view to improving their pragmatic skills and, consequently, their quality of life[14, 15].

In view of the above, this study aimed to evaluate the pragmatic skills in children diagnosed with ASD, as well as to evaluate the ability of the PAHPEA test to differentiate pragmatic skills in relation to the factors Interactivity, Responsiveness, Language, Functionality and Inadequacy. To verify whether the answers provided to the PAHPEA for all the children evaluated present repetitive patterns indicating convergent points or not.

Material and methods

After approval by the Research Ethics Committee of the Pontifical Catholic University of Goiás (CAAE 76548623.7.0000.0037), the present study was initiated. This is a descriptive, observational study, carried out from December 2023

to October 2024 in a speech therapy clinic, with more than 20 years of experience, a reference in the care of children with ASD, in the Midwest Region of Brazil.

Participants

The study included 115 children with a confirmed diagnosis of ASD, whose pragmatic skills were evaluated by the speech therapists who work at the clinic.

Inclusion criteria: children with ASD, of both sexes, aged between 2 and 12 years, attending the clinic during the study period, children whose parents voluntarily allowed to participate in this research and signed the Informed Consent Form (ICF).

Exclusion criteria: children with other clinical diagnoses, children who stopped participating until the end of the intervention.

Instrument

To assess the pragmatic abilities of the participating children, the PAHPEA[13] instrument was used. This protocol is composed of 29 questions, distributed among five factors of pragmatic skills: interactivity, responsiveness, language, functionality and inadequacies. In this study, the participating speech-language pathologists indicated their responses to PAHPEA on a three-point Likert-type scale, as follows: always = 3; sometimes = 2; never = 1.

Procedures

Data collection

Data were collected through a convenience sample. Initially, after approval by the research ethics committee, pragmatic skills were collected by nine speech-language pathologists with experience in caring for children with ASD for at least one year. The researchers presented, both to the speech therapists and to the parents of the children they attended, ample explanations about this study. in addition, they scheduled an appointment and explained about the present study to the speech therapy professionals of the Borges e Caetano Clinic, located in Goiânia, GO, who were attending children diagnosed with ASD. All those who chose to participate in this study signed the Informed Consent Form (ICF).

Data analysis

For the statistical analyses, the basic assumptions of the results obtained from the application of the PAHPEA[13] were evaluated. Since the data on the Likert scale are ordinal and the results of the factors, although analyzed in scalar measures (number of responses in each category), did not present basic requirements to meet the parameters necessary to perform parametric analyses, we continued with non-parametric analyses in this study.

In order to identify the main observations of the participating speech-language pathologists about the pragmatic abilities perceived in the children with ASD evaluated, inferential analyses were carried out, with specific tests to evaluate the null hypotheses of each item of the PAHPEA, as well as for each of the five factors of pragmatic abilities.

The null hypothesis is a proposition that states the inexistence of a significant difference, effect, or relationship between variables in a study. In research, this hypothesis generally suggests that the observed results do not present statistical significance when compared with the expected values, assuming the hypothesis of normality. The null hypothesis should be rejected when the answers are very extreme (< 5% of the probability of occurrence) in different means [19]. In the context of the evaluation of individuals with alterations in the development or use of social communication skills (pragmatics), rejecting the null hypothesis means respecting the variability, heterogeneity and uniqueness of each individual in their communicative capacity within a group, as people can perform on different tests without these being outside the standards of normality established for them.

The binomial and chi-square tests were performed in one sample, accepting the null hypothesis, i.e., that there is no statistically significant difference ($p > 0.05$) between the pragmatic communication skills observed through the PAHPEA in the children evaluated. The binomial test of one sample was used to assess whether there was a statistical difference between the social communication skills observed in the participating children when only two different answers were obtained. The chi-square test of one sample made it possible to assess whether there was a statistical difference between the social communication skills observed in the children when there were more than two types of answers. Finally, the Kolmogorov-Smirnov test was used to assess whether there was a statistically significant difference between the different types of responses to assess social communication skills for each participating child[18].

Results and discussion

Of the 115 children with ASD involved in the study, 98 (85.7%) are male, 59 (84.3%) attended school, and their ages ranged from 2 to 12 years. According to the statistical analyses employed, in the five questions of the PAHPEA that refer to the language factor, it was observed that the null hypothesis was rejected (Table 1). This means that there was a statistically significant difference in relation to the perception of performance in these skills among the children with ASD evaluated.

Table 1. Analysis of the null hypothesis: statistically significant difference in the language factor in the answers to the questions that make up the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder (PAHPEA).

PAHPEA* question with a null hypothesis	p
3. Mainly uses speech to communicate (occurred with equal probabilities)	0.000
4. Uses mostly nonverbal sounds to communicate (occurred with equal probabilities)	0.000
5. Mostly uses gestures to communicate (occurred with equal probabilities)	0.000
14. Uses single words and two-word phrases to communicate (occurred with equal probabilities)	0.001
15. Uses complete sentences and complex structures to communicate (occurred with equal probabilities)	0.013
The **language factor** was normal, with a mean of 10.704 and a standard deviation of 2.14	0.000

* PAHPEA - Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder
** Chi-square test.

These results confirm that, in the present study, the speech-language pathologists rejected the null hypothesis when they observed the language factor in the children evaluated, who presented difficulties to predominantly use speech, non-verbal sounds and complex sentences to communicate, predominantly using gestures, isolated words and sentences with two elements. The lack of uniformity of responses perceived by speech-language pathologists in this study is confirmed by the study by Matthews, Biney and Abbot-Smith[20], who reported that pragmatic skills vary according to social contexts. This variability in the ability to use pragmatic skills on a daily basis is associated with the use of formal language, memory, and personal performance in executive functions, both in people with typical development and in people with atypical development [20].

The occurrence of individual variations among the children with ASD evaluated was identified in the PAHPEA, which is fundamental for the delineation of the individualized profile of abilities and difficulties. This idea of uniqueness was exposed in a meta-analysis that revealed that there is no specific receptive and/or expressive profile among young children with ASD, but rather a receptive-expressive language discrepancy among schoolchildren diagnosed with ASD [21].

Heasman and Parfitt[22] also identified that the profile of the language skills of individuals with ASD was responsible for crucial manifestations of language use and acquisition. The authors indicated that pragmatic disabilities in people diagnosed with ASD do not occur at all levels, even though these individuals may experience ongoing pragmatic disabilities. The same idea was defended by Idris *et al*[23], who stated that children with severely disorganized speech had significantly more inappropriate initiations and less coherence. These results of the present study also find resonance in the work of Haebig *et al.*[24] when they pointed out that lexical development in preverbal and minimally verbal children with ASD not only reflects a great delay in language, but that such conditions contribute to the understanding of how social and cognitive processes produce lexical differences in the early development of children with ASD.

Analyzing the PAHPEA questions that make up the inadequacy factor, it was also found that there was a statistically significant difference in relation to the perception of speech-language pathologists about the development of the pragmatic skills of the children with ASD evaluated, which indicates that the null hypothesis should be rejected (Table 2).

Table 2. Analysis of the null hypothesis: statistically significant difference in the inadequacy factor in the answers to the questions that make up the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder (PAHPEA).

PAHPEA* question with a null hypothesis	p
21. Uses crying, tantrum, or aggression when frustrated or to interrupt some activity (occurred with equal probability)	0.000
22. Produces decontextualized or non-functional speech, sounds, or gestures (occurred with equal probabilities)	0.000
27. Playing in isolation, in repetitive activities (occurred with equal probabilities)	0.000
The **inadequacy factor** was normal, with a mean of 6.843 and standard deviation of 1.52.	0.000

*PAHPEA- Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder
** Chi-square test.

For the questions through which the findings of the speech-language pathologists about possible inadequacies in communication were identified (21. Uses crying, tantrums or aggression when frustrated or to interrupt some activity; 22. Produces speech, sounds or gestures that are decontextualized or non-functional; 27. Plays in isolation, in repetitive activities), the null hypothesis was also rejected. These results are in line with the findings of Wong *et al.* [25] who, when comparing the performance of social communication between neuroatypical children and children with typical development, even in older subjects, observed a degree of discrepancy. Such observation suggests that there is a relatively inferior development of skills in the pragmatic aspects of language in children with ASD. Likewise, Reindal *et al.*[26] described the existence of more profound pragmatic deficiencies among children with ASD compared to children who have typical development.

When evaluating the PAHPEA questions related to the interactivity factor, presented in Table 3, it was found that for question 1, "Look at the adult", the null hypothesis should be accepted, while for the other questions there was a significant difference in the perception of the speech-language pathologists about the development of the pragmatic skills of the children evaluated, indicating that the null hypothesis should be rejected.

Table 3. Analysis of the null hypothesis: statistically significant difference in the interactivity factor in the answers to the questions that make up the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder (PAHPEA).

PAHPEA* question with a null hypothesis	p
1. Look at the adult (always and sometimes occurred with a probability of 0.5)	0.709
2. Interacts with the adult (occurred with equal probabilities)	0.000
6. It is easily understood (they occurred with equal probabilities)	0.000
11. Interacts to ask for actions or objects (occurred with equal probabilities)	0.000
18. Switching communicative turns appropriately (occurred with equal probabilities)	0.023
28. It is attentive and understands facial expressions and prosody (they occurred with equal probabilities)	0.001
29. Uses facial expressions and prosodic variations to express himself (occurred with equal probabilities)	0.024
The **interactivity factor** was normal, with a mean of 20.661 and a standard deviation of 4.75	0.003

*PAHPEA- Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder
** Chi-square and Binomial test

For the interactivity factor, it was found that the participating children with ASD had different levels of responses, except for the ability to look at the adult, a striking feature in autism. For the other questions, which involve interaction with adults, ability to make oneself understood, comprehension, expression and forms of communication, there were answers with statistically significant differences. This finding was also made by Martin *et al.*[5] who concluded that pragmatics is differently impacted, in all contexts of conversation, especially among male individuals with ASD. However, in less structured contexts, more difficulties were observed, as well as in subjects with the presence of comorbidities, especially cognitive deficits.

The interactivity factor was also highlighted by Haebig *et al.*[24], which found the occurrence of a lower proportion of words used by people with ASD. The authors stated that such conditions may be related to lower rates of social orientation and less attention to people's faces, specifically in minimally verbal children with ASD. On the other hand, when assessing the comprehension of sentences with prosodic cues (level intonation *versus* increasing intonation) to determine (non-) interrogative readings of certain words in identical sentences, children with ASD who had structural language impairment performed worse than neurotypical children[27].

Also, regarding the interactivity factor, the participating speech-language pathologists observed a statistically significant frequency in the response pattern to question 1. Look at the adult. In the study by Thorsson et al. (2024), on eye contact behavior during face-to-face interaction, the low quality/maintenance of eye contact by children with ASD28. In addition to demonstrating very reduced gaze and eye contact compared to what was expected, the participants in that study reported discomfort when asked to maintain this type of contact. In addition, in a review conducted by Stuart *et al.*[29], the authors described the staring relationship as an overactivity of the amygdala or amygdaloid complex in people with ASD, which causes neural dysfunction of eye avoidance.

During the evaluation of the PAHPEA questions concerning the functionality factor, it was found that there was a significant difference in relation to the perception of the speech-language pathologists regarding the development of the pragmatic skills of the children evaluated. This indicates that the null hypothesis should be rejected (Table 4).

Table 4. Null hypothesis analysis: statistically significant difference in the functionality factor in the answers to the questions that make up the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder (PAHPEA).

PAHPEA* question with a null hypothesis	**p**
12. Ask for information (occurred with equal probabilities)	0.516
13. Make proper comments (occurred with equal probabilities)	0.784
16. Gives orders (occurred with equal probabilities)	0.941
17. Expresses pleasure, fear or discontent clearly (occurred with equal probabilities)	0.000
19. Pretend play (occurred with equal probabilities)	0.000
20. Make it clear when you don't want to do something properly (they occurred with equal probabilities)	0.000
24. Tells stories or reports facts (occurred with equal probabilities)	0.000
25. Comment on what is happening or may happen (it will fall..., one, two, one more...) (occurred with equal probabilities)	0.573
Functionality factor was normal, with a mean of 16.591 and standard deviation of 4.95	0.000

*PAHPEA- Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder
** Chi-square test.

It is perceived, therefore, that the children with ASD evaluated here presented the functionality factor in the development of pragmatic communication skills at different stages from each other, except in relation to the skills of asking for information, making appropriate comments, giving orders and commenting on what is happening or may happen. This was the factor with the most abilities that were evaluated without a statistically significant difference in the participating children with ASD.

The observations about the children with ASD most frequently mentioned by the participating speech therapists were those related to making it clear that they do not want to do something, to the fact that they never tell stories or report facts that occurred. These findings are in line with those of Schaeffer *et al.*[27], which described the heterogeneity of linguistic profiles in individuals with ASD. The authors highlighted that the components of language may be impaired in these people, as well as the areas of extralinguistic cognition, characterizing sources of difficulty or, conversely, that they can provide extraordinary resources for language construction for them.

Kissine[30] reinforced that each individual with ASD has a unique profile, in which linguistic competence is dissociated from communication skills. His experimental studies on pragmatic language in people with ASD indicated that many pragmatic processes develop without them adopting the perspective of conversation partners. In addition, the patterns of language acquisition and learning of individuals with ASD represent a strong challenge to the central role that constructionist theories attribute to socio-communicative skills.

In the four questions (12, 13, 16 and 25) of the PAHPEA related to the functionality of communication that involve requesting information, making comments and giving orders, the participating speech-language pathologists observed weaknesses and inconsistencies in the answers of the children with ASD evaluated. These results agree with those obtained by Puricelli, Marenda and Filippo[6], who described that immature assertive and responsive skills, resulting from difficulties in lexical and morphosyntactic development, in children with ASD were superior to those of children without this diagnosis, which negatively impacts the performance and development of language in these subjects. Similarly, performance in complex language skills, such as the ability to narrate facts, may be influenced by the genetic risk of ASD inherited from parents, and such characteristics may impair children's narrative ability [31].

Regarding the evaluation of the PAHPEA questions regarding the responsiveness factor, it was found that there was a significant difference in relation to the perception of speech therapists with regard to the development of pragmatic skills among the children with ASD evaluated. These results indicated that the null hypothesis should be rejected (Table 5).

Table 5. Analysis of the null hypothesis: statistically significant difference in the responsiveness factor in the answers to the questions that make up the Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder (PAHPEA).

PAHPEA* question with a null hypothesis	**p**
7. Answers simple questions (where's the cart?, what do you want?...) (occur with equal probabilities)	0.001
8. Answers complex questions (why did he/she do it? what did you do in school?...) (occur with equal probabilities).	0.152
9. Responds with single words or two-word sentences (occur with equal probabilities).	0.017
10. Answers with complete sentences with complex structures (occur with equal probabilities).	0.008
Responsiveness **factor** was normal, with a mean of 7.774 and standard deviation of 1.98	0.000

*PAHPEA- Protocol for the Assessment of Pragmatic Skills of Children with Autism Spectrum Disorder
** Chi-square test.

Regarding the responsiveness factor, it was proven that the children with ASD evaluated presented different stages of development of communicative skills, except for the ability to answer complex questions (question 8 of the PAHPEA). Speech therapists pointed out the difficulties of these children in elaborating answers with complex sentences. This data reaffirms the contributions of Sandbank *et al.*[32], according to which, the intervention can facilitate improvements in language outcomes for children with ASD. The authors also emphasized that the effects may be greater for expressive and compound language outcomes in children with initially higher language skills and for interventions implemented by clinicians or by caregivers and clinicians combined.

The results obtained for the responsiveness factor reinforce the hypothesis that each child with ASD has different levels of development of pragmatic communication skills. Thus, the speech-language pathologists who accompany them must develop a specific program for each of them to intervene effectively, to achieve efficiency and effectiveness in the results. The present findings are also in line with those presented by Geurts, Kissine, and van Tiel [30], who asserted that the first point to be highlighted in relation to the development of children with ASD is that the pragmatic deficiencies in these individuals are neither global nor uniform. Additionally, Vogindroukas *et al.*[34] described the diversity in the speech and language profiles of individuals with ASD, which makes language development and performance in these people very heterogeneous. The authors suggested a classification of at least four profiles, with different combinations of difficulties, involving pragmatic skills without any other alterations, with the existence of other comorbidities (language disorder, apraxia of speech, sound speech disorders), with intellectual disability and with severe difficulties, without the use of orality.

The heterogeneity of the manifestations of children with ASD makes it difficult to obtain statistically relevant results. However, the fact that the PAHPEA allows the identification of these variations justifies its application to the delineation of individual profiles. In addition, it was observed in participating speech-language pathologists a certain clinical tendency to obstinately try to confirm changes in pragmatic abilities as a result of a medical diagnosis of ASD. However, when applying an evaluation protocol, evaluators and observers should refute the certainty of the diagnosis or at least question its veracity. Otherwise, they may be incurring in confirmation bias.

Conclusion

When evaluating the questions and factors of the PAHPEA, only in six of them the results related to the communication of children with ASD showed proximity, that is, they have different probabilities of developing pragmatic skills. On the other hand, inadequate analysis of the social communication skills and competencies of children with ASD can mistakenly interfere with their diagnosis, as well as deprive them of the benefits of appropriate interventions and the opportunity to minimize clinical symptoms early, leading to unnecessary suffering and problems for children and their families, in addition to increasing health service costs. It was also concluded that the identification of singular points of difficulties in social communication (pragmatics) should contribute to the awareness of the need to offer children with ASD interventions that stimulate and train broader communicative skills, encompassing social cognition and verbal capacity (i.e., conversational skills).

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