Selection of words for implementation of the Picture Exchange Communication System – PECS in non-verbal autistic children

Seleção de vocábulos para implementação do Picture Exchange Communication System – PECS em autistas não verbais

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ABSTRACT

Purpose: It is known that some autistic individuals are considered non-verbal, since they are unable to use verbal language and barely use gestures to compensate for the absence of speech. Therefore, these individuals' ability to communicate may benefit from the use of the Picture Exchange Communication System – PECS. The objective of this study was to verify the most frequently used words in the implementation of PECS in autistic children, and on a complementary basis, to analyze the correlation between the frequency of these words and the rate of maladaptive behaviors. **Methods:** This is a cross-sectional study. The sample was composed of 31 autistic children, twenty-five boys and six girls, aged between 5 and 10 years old. To identify the most frequently used words in the initial period of implementation of PECS, the Vocabulary Selection Worksheet was used. And to measure the rate of maladaptive behaviors, we applied the Autism Behavior Checklist (ABC). **Results:** There was a significant prevalence of items in the category "food", followed by "activities" and "beverages". There was no correlation between the total amount of items identified by the families and the rate of maladaptive behaviors. **Conclusion:** The categories of words most mentioned by the families could be identified, and it was confirmed that the level of maladaptive behaviors did not interfere directly in the preparation of the vocabulary selection worksheet for the children studied.

RESUMO

Objetivo: Sabe-se que alguns autistas são considerados não verbais, uma vez que não são hábeis para utilizar o código linguístico. E tampouco usam gestos para compensar a ausência de fala. Sendo assim, a habilidade comunicativa desses indivíduos pode ser beneficiada pelo uso do sistema de comunicação alternativa Picture Exchange Communication System – PECS. O objetivo deste estudo foi verificar os vocábulos mais frequentemente utilizados na implementação do PECS em crianças autistas. E, de forma complementar, analisar a correlação entre a frequência destes vocábulos e o índice de comportamentos não adaptativos. **Método:** Trata-se de um estudo transversal. A amostra foi constituída por 31 crianças autistas, sendo vinte e cinco meninos e seis meninas, na faixa etária de 5 a 10 anos. Para identificação dos vocábulos mais frequentemente utilizados no período inicial de implementação do PECS, utilizamos a Planilha de Seleção de Vocabulário. E, para obtermos o índice de comportamentos não adaptativos, aplicamos o Autism Behavior Checklist (ABC). **Resultados:** Houve predomínio significativo de itens na categoria alimentos, seguido de atividade e bebidas. Não houve correlação entre o total de itens identificados pelas famílias com o índice de comportamentos não adaptativos. **Conclusão:** Foi possível identificar as categorias de vocábulos mais mencionados pelas famílias e verificar que o índice de comportamentos não adaptativos não interferiu diretamente na elaboração da planilha de seleção de vocábulos das crianças estudadas.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is characterized by severe and invasive impairments in the areas of interaction and social communication and by a restricted and stereotyped repertoire of interests[1-3].

Although numerous clinical manifestations can be observed, changes in the area of communication need to be investigated, since they impact both the degree of severity of the clinical condition and the individual's prognosis.

It is known that some autistic individuals are considered non-verbal, since they are unskilled in their use of language. Neither do they use gestures to compensate for the absence of speech[1-6].

Thus, these individuals' ability to communicate can benefit from the use of an alternative communication system, the Picture Exchange Communication System - PECS[5-10].

PECS (Picture Exchange Communication System) is currently one of the most widely used communication systems for non-verbal autistic individuals worldwide[5-7,10-15].

This system is composed of pictures/photographs selected according to each individual's lexical repertoire, and involves not only replacing speech with pictures, but also encourages expression of needs and desires[5-7,10-15].

Implementation must be carried out by experienced speech-language therapists and is performed in six stages, as follows: Stage I (Physical exchange: how to communicate): the child is encouraged to use the cards in order to ask/express their desire for an object to which they are attracted. Stage II (Distance and persistence) aims for the child to effectively understand the importance of using the cards and persisting in using them in all communicative situations. At stage III (Discrimination of pictures), the child is encouraged to select a target picture among the various options. They must discriminate the cards and hand to their communication partner the one appropriate for the situation. At stage IV (Sentence structure), they learn to build sentences with the cards, using verbs (e.g. to want) and the object's attributes (e.g. color, size). At stage V (Responding to "What do you want?"), they are encouraged to answer the question "What do you want?", by means of simple sentences built with the cards. At stage VI (Commenting), there are answers to questions such as "What are you seeing?". "What are you hearing?", "What is this?", using simple sentences with the cards[4-7].

We are aware that, in order to guarantee efficient implementation of the system, it is key to accurately select each individual's favorite words. These words are going to encourage interpersonal communicative behavior.

Therefore, this study aimed to verify the most frequent words used for PECS implementation in autistic children.

Additionally, on a complementary basis, it aimed to analyze the correlation between the frequency of these words and the rate of maladaptive or atypical behavior.

We consider the hypothesis that families seem to more easily identify stimuli relating to food. Furthermore, a potential difficulty of these families to complete the entire vocabulary selection worksheet may be related to the child's maladaptive or atypical behavior.

METHODS

This is a cross-sectional study.

All parents and guardians have been informed of the study's procedures and have signed the Informed Consent in accordance with the rules established by the Institution's Research Ethics Committee (Ruling CEP 60704).

The sample consisted of 31 children, twenty-five boys and six girls, aged between 5 and 10 years old (mean = 7 years old), who have been diagnosed with autism spectrum disorder by a multidisciplinary team according to the ICD 10[1] and DSM V[3] criteria. They were seen for speech-language therapy intervention for an average of twenty-seven months at Núcleo de Investigação Fonoaudiológica de Linguagem da Criança - Transtorno do Espectro Autista - NIFLINC-TEA of UNIFESP's Departamento de Fonoaudiologia.

All children were regularly enrolled in school - twenty-one children were enrolled in regular education, and ten in specialized schools.

With regard to the communicative performance observed during the speech-language therapy evaluation, twenty-five children produced mostly vocalizations, and only six were able to produce isolated words containing at least 75% of the phonemes of Portuguese language. It is worth noting, however, that the speech produced was unsystematic and out of context, which characterizes a predominance of minimum verbal communication performance.

As sample inclusion criteria, we considered ASD diagnosis, non-verbal or minimum communication performance, and age range.

As exclusion criteria, we considered the presence of comorbidities, such as associated syndromes and sensory, motor and/or physical impairments.

In order to identify the vocabulary most frequently used for the initial period of speech-language therapy intervention with PECS, the Vocabulary Selection Worksheet proposed by the system's manual was used[7].

In this worksheet, family members or carers must list between 5 and 10 favorite items in the following categories: food, beverage, activity, social games, places visited, leisure activities, familiar persons and unpleasant activities.

For analysis of results, we considered only the words used for implementation of stages I (physical exchange: how to communicate) and II (distance and persistence) of PECS, using their total and per category values.

In order to obtain the rate of maladaptive or atypical behavior, the Autism Behavior Checklist (ABC)[16,17] was applied during the speech-language therapy evaluation period. This list consists in 57 maladaptive behaviors divided into five areas: sensory[9], relational[12], use of body and object[12], language[13] and personal and social[11]. It was provided by the family in the form of an interview, in order to minimize the effect of educational level. The behavioral characteristics that best describe the individual are checked and, subsequently, scores are added up. The higher

Table 1. Frequency of items mentioned in each semantic category

	Unpleasant	Leisure	Games	Place	Beverage	People	Activity	Food
Mean	1.32	2.03	2.10	2.81	3.74	4.06	4.90	7.84
Median	0.00	2.00	2.00	3.00	3.00	4.00	5.00	9.00
Minimum	0	0	0	0	0	0	0	2
Maximum	7	6	10	8	9	10	10	11
Standard deviation	2.06	1.47	2.39	2.07	2.03	2.49	2.60	2.61
N	31	31	31	31	31	31	31	31

Caption: Unpleasant = Unpleasant activities

Table 2. Multiple comparisons among frequencies of items in the categories

		Unpleasant	Leisure	Games	Place	Beverage	People	Activity	Food
	Mean	1.32	2.03	2.10	2.81	3.74	4.06	4.90	7.84
Unpleasant	1.323								
Leisure	2.032	**0.870**							
Games	2.097	**0.809**	**1.000**						
Place	2.806	**0.079**	**0.090**	**0.870**					
Beverage	3.742	<0.001*	0.021*	0,032*	0.614				
People	4.065	<0.001*	0.002*	0.004*	0.225	**0.999**			
Activity	4.903	<0.001*	<0.001*	<0.001*	0.001*	**0.324**	**0.737**		
Food	7.839	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	

*Statistical significance
Capiton: Unpleasant = Unpleasant activities; Games = Social games

Table 3. Calculation of Spearman's correlation between total frequency of items and the ABC

		Total
	Correlation coefficient	0.185
ABC	Sig. (p)	0.319
	N	31

There was no significant correlation

the score, the more compromised is the clinical status[16-19]. A score equal to 68 has been considered of high probability for identification of autism, since the original study[16] observed that 99% of children who reached a score of 68 or more had been previously diagnosed with the condition.

Statistical methodology

The Friedman Test was used to analyze the frequency of items in each category. In order to identify where the differences among frequencies were, we applied Tukey's multiple comparisons test. And to analyze the correlations between the total frequency of items and the ABC values, Spearman's correlation was used. A level of significance of 0.05% was adopted.

RESULTS

Table 1 presents the frequency of items mentioned for each category.

Table 2 contains the multiple comparisons carried out to obtain the differences between the frequency of category items.

In the color groups, we have the items that were equivalent in quantity. Thus, the following hierarchy was established: (Unpleasant = Leisure = Games = Places) < (Beverage = People = Activities) < (Food).

Table 3 presents the correlation calculation between the total of items mentioned and the rate of maladaptive behaviors. The latter was obtained by means of ABC's total values.

DISCUSSION

The first hypothesis considered in this study was that families identify preferences related to food more easily upon filling out the PECS Vocabulary Selection Worksheet.

As we are aware that in order to guarantee an efficient implementation of the system it is essential to select the appropriate preferred vocabulary of each individual, analyzing such construction seemed as an important and necessary course of action.

By observing results per se, we verified that the category "food" was in fact the most significantly category identified. This rate proves that items related to food are recognized by carers as highly attractive and, therefore, may positively influence implementation of PECS[4-7,10-15,20].

In the PECS manual itself[7], the authors suggest that initial implementation of the system be carried out with the use of treats, since they are considered attractive and provide the child with shared attention and the engagement necessary to understand the use of the cards.

The second most frequent category was "activities". Activities, even though often considered atypical to the context and interlocutors, represent the restricted repertoire of the child's interests, so it is natural that they be used by families in an attempt to share everyday situations[7-15].

In a complementary manner, categories such as "beverage" and "people" presented a lower frequency of use compared to the "food" category. Nevertheless, all families were still able to build diversified listings.

Categories such as "places", "games", "leisure" and "unpleasant items" presented the lowest rates, which evidences the difficulty of families to recognize such preferences of the child. This probably occurs due to the children's restricted repertoire of interests and activities.

Yet, it must be noted that the three categories: "Places", "games", and "leisure" largely refer to social and cultural contexts. Therefore, the low frequency of identification by families may be associated with the social interaction impairments inherent to ASD[4-7,12-15] and their own difficulty to deal with such atypical repertoire of behaviors, interests and activities[11-15].

A second hypothesis raised in this study was that there would be a possible correlation between the frequency of use of the items listed by the families and the child's rate of maladaptive or atypical behavior. That is, a low mention of items in the listing could be explained by the severity level of ASD symptoms that would prevent families from observing and identifying favorite items, particularly due to the lack of social engagement and the restricted and stereotyped repertoire of interests and activities. However, this hypothesis was not confirmed.

We believe that the lack of correlation between the frequency of use of categories and the rate of maladaptive behaviors may be related to the sample size, thus constituting a limitation of this study. Therefore, we recommend that further research be designed with larger samples, so that there is a deeper understanding of evidence-based clinical practices focusing on the use of PECS by autistic individuals.

Finally, it is known that efficient implementation of PECS depends on the correct planning of actions by the speech-language therapist[4-6]. Among these actions, selecting the vocabulary is a fundamental step, since it allows initial engagement of the child in communicative exchange and, ultimately, autonomous use of the system.

CONCLUSIONS

It was possible to identify the vocabulary categories most mentioned by the families and to verify that the rate of maladaptive behaviors did not directly interfere in the preparation of the vocabulary selection worksheet of the children studied.

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Author contributions

CF was responsible for data collection and tabulation and for producing the manuscript; MB contributed to the study with data collection and tabulation; MI contributed with data tabulation; AF, with data collection; AA, with data collection; JP, with the production of the final manuscript; ACT followed-up by overseeing collection, contributed with data analysis and was responsible for the study design and overall guidance of the execution stages and production of the final manuscript.