Lexical performance of children with specific language impairment in formal assessment and spontaneous speech

Desempenho lexical em avaliação formal e fala espontânea em crianças com distúrbio específico de linguagem

Desempeño léxico en evaluación formal y habla espontánea en niños con trastorno específico del lenguaje

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Abstratc

Introduction: The lexical deficit is usually one of the first signs observed in children with language disorders, and expressive vocabulary has been indicated as an important measure for language development. **Purpose:** To verify the relationship between the percentage of naming usual words in formal assessment and the use of nouns in the spontaneous speech of children with specific language impairment (SLI). **Methods:** Subjects were 30 children of both genders with ages between 4 and 5 years old who were diagnosed with SLI and were enrolled in speech-language therapy for at least one year. To assess the use of nouns, the percentages of naming usual words (NUW) obtained in the expressive vocabulary test were collected from subjects' records, and their pragmatics tests were analyzed for the total number and diversity of nouns spontaneously produced. **Results:** There was a continuous increase in the NUW mean

in the formal assessment, but the same was not found in spontaneous speech. Moreover, no correlation was found between NUW and the total number or the diversity of nouns used in spontaneous speech. **Conclusion:** There is no direct relationship between lexical performance in formal assessment and in spontaneous speech, suggesting that the improvement in lexical items in isolated tasks does not imply their better use during actual communication situations. Thus, it is important that language assessment is also based on the careful analysis of the spontaneous speech of children with language disorders.

Keywords: Child, Language, Vocabulary, Language development, Language development disorders.

Resumo

*Introdução: O prejuízo lexical costuma ser um dos primeiros sinais observados em crianças com alteração de linguagem, e o desempenho no vocabulário expressivo tem sido apontado como uma medida importante no desenvolvimento da linguagem. **Objetivo:** Verificar qual a relação entre a porcentagem de designações por vocábulo usual (DVU) em avaliação formal e o uso de substantivos em fala espontânea por crianças com distúrbio específico de linguagem (DEL). **Método:** Foi realizado o levantamento dos prontuários de 30 sujeitos com idade entre 4 e 5 anos, de ambos os gêneros, diagnosticados com DEL e em terapia fonoaudiológica por pelo menos 1 ano. Para o uso de substantivos em prova formal foi coletada a porcentagem de designações verbais usuais obtidas no vocabulário expressivo, e para tal uso em fala espontânea foram considerados o número total e a diversidade de substantivos produzidos pela criança durante a avaliação da pragmática. **Resultados:** Houve um aumento contínuo apenas na média DVU em prova formal, mas o mesmo não ocorreu em fala espontânea. Além disso, não houve correlação entre o DVU e o total ou a diversidade de substantivos usados em fala espontânea. **Conclusão:** A relação entre o desempenho lexical em prova formal e em fala espontânea não é direta, o que significa que a melhora no reconhecimento de itens em tarefas isoladas não necessariamente implica em melhor uso em situação de comunicação real. Portanto, é importante que a avaliação de linguagem seja baseada também na análise criteriosa da fala espontânea de crianças com alteração de linguagem.*

Palavras-chave: *Criança, Linguagem, Vocabulário, Desenvolvimento da Linguagem, Transtornos do Desenvolvimento da Linguagem.*

Resumen

*Introducción: el daño léxico suele ser una de las primeras señales observadas en niños con trastornos del lenguaje y el rendimiento en el vocabulario expresivo ha sido considerado como una medida importante en el desarrollo del lenguaje. **Objetivo:** verificar la relación entre el porcentaje de asignaciones por vocablo usual (AVU) en evaluación formal y el uso de sustantivos en el habla espontánea por niños con trastorno específico del lenguaje (TEL). **Método:** se llevo a cabo el levantamiento de las actas de 30 sujetos de edades comprendidas entre los 4 y 5 años, de ambos sexos, con diagnóstico de TEL y en terapia durante al menos 1 año. Para el uso de sustantivos en evaluación formal se ha recogido el porcentaje de asignaciones verbales usuales obtenidas en el vocabulario expresivo, y para tal uso en el habla espontánea se consideró el número total y la diversidad de sustantivos producidos por el niño durante la evaluación de la pragmática. **Resultados:** hubo un aumento continuo sólo en el promedio de AVU en evaluación formal, pero esto no ocurrió en habla espontánea. Además, no hubo correlación entre AVU y el total o la diversidad de sustantivos usados en el habla espontánea. **Conclusión:** la relación entre el rendimiento léxico en evaluación formal y en habla espontánea no es directa, lo que significa que la mejora en el reconocimiento de ítems en tareas aisladas no necesariamente implica un mejor uso en situación de comunicación real. Por lo tanto, es importante que la evaluación de lenguaje se apoye también en un análisis cuidadoso del habla espontánea de niños con trastorno de lenguaje.*

Palabras clave: *Niño, Lenguaje, Vocabulario, Desarrollo del Lenguaje, Trastornos del Desarrollo del Lenguaje.*

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Introduction

Specific language impairment (SLI) is a disorder characterized by an atypical and discrepant development of language abilities, which is, by an asynchrony in the acquisition of its components due to specific deficits in certain linguistic aspects[1]. The language alterations are deviant, persistent and have repercussions over written language abilities[2,3]. This diagnosis is confirmed in children that present deficits in two or more language assessments, along with the absence of any neurological, psychiatric, physical/sensorial or intellectual deficits[4,5].

The lexical deficit is usually one of the first signs observed in children with language disorders. Children with SLI present both difficulties in the acquisition of words and in lexical access[6].

Some authors have suggested that children with SLI present worse performance in the production of new words due to difficulties in the fast mapping of phonological information. These difficulties may be related to deficits in storing information in memory, in discriminating the phonemes of an unfamiliar word, or in lexical access[7]. However, a more recent study verified that scholars with SLI and their peers within typical development had similar performances in a fast mapping task[8]. In this study, the authors were able to verify that vocal rehearsal was positive for typically developing children, but not to their subjects with SLI, suggesting that this population have different mechanisms for the acquisition of new words[8,9].

Semantic difficulties related to the hierarchic organization are also observed in children with SLI, with the use of superordinate terms and co-hyponyms[10]. In naming tasks, they usually present more errors and substitution processes than children within typical language development, which evidences their lexical deficit[7,11,12]. Additionally, they use simpler and more incomplete information to define objects, even when they can name them correctly[12].

A retrospective study have indicated that vocabulary, when assessed formally, is a measure capable to predict the amount of time a child with specific language development disorders will be enrolled in therapy[13].

Moreover, a recent study showed that the expressive vocabulary performance of children with language disorders had a positive correlation with the use of closed class words and with the total number of words in a sentence, as measured by the mean length utterance (MLU) assessment. This study did not confirm the same correlation between the MLU variables and age, suggesting that grammar development is associated with improvements in the use of nouns[14].

The evaluation of children with language disorders using spontaneous speech tasks is essential, because it allows the assessment of linguistic abilities in a situation that is closer to the actual communication context[15] and provides data regarding the functional use of different word classes[16].

Considering the importance of vocabulary in language development, the aim of this study was to verify the relationship between the percentage of naming usual words (NUW) in formal assessment and the use of nouns in the spontaneous speech of children with SLI.

Method

Participants

The study was approved by the Research Ethics Committee of the institution where it was developed, with protocol number 42/08. The parents or legal guardians of all selected subjects signed the Free and Informed Consent.

The sample comprised 30 children of both genders with ages between 4 and 5 years. All subjects were diagnosed with SLI according to international criteria, and had been enrolled in weekly speech-language therapy for at least a year at the Investigation Laboratory in Language Development and Disorders (LIF-ADL) of the Undergraduate Program in Speech-Language Pathology and Audiology of the School of Medicine, Universidade de São Paulo (USP).

Materials and Procedures

The records of LIF-ADL were searched to verify which children met the criteria for inclusion

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in the study (age, at least one year of therapeutic process, and both expressive vocabulary[17] and pragmatics[18] assessments.

The expressive vocabulary test used comprises 118 figures divided into nine semantic fields: clothes, animals, food, means of transportation, furniture and utensils, professions, places, shapes and colors, and toys and musical instruments.To complete the test, the child is asked to name all the figures presented one by one for each semantic field[17].

The percentage of naming by usual words(NUW) was registered for each child, and then classified according to the expected for their age range, for the purposes of this study, as it follows:

a)   0 –no occurrencesof NUW

b)   1–between 0% and 24.9% of correct naming (NUW), in relation to the expected for the age range

c)   2 –between 25% and 44.9% of correct naming (NUW), in relation to the expected for the age range

d)   3 – between 50% and 74.9% of correct naming (NUW), in relation to the expected for the age range

e)   4–between 75% and 100% of correct naming (NUW), in relation to the expected for the age range

f)   5 –over 100% of correct naming (NUW), in relation to the expected for the age range[19].

The pragmatics test consists on the identification and interpretation of the communicative acts presented by the child in a free interaction situation with the evaluator. This test has the aim to register the child's communicative competence and effectiveness, characterizing her communication according to the number of communicative acts per minute, the predominant communicative means, and the predominant communicative function[18].The interaction situation used in this study was selected to provide a rich communicative context and allow that the child's spontaneous speech reflects a sample of her actual communication abilities.

Both the total number of nouns produced by the child and the diversity of nouns used were obtained from the transcription of the spontaneous speech produced during the 15-minute interaction considered for the pragmatics analysis[18].

Descriptive and inferential statistical analyses were conducted using the variance analysis (ANOVA), the Tukey test, and the Pearson correlation test. It was adopted a significance level of 5%.

Results

Considering the whole group of subjects, the NUW mean was 54,0 (±14,75), the mean number of nouns used in spontaneous speechwas 30,8 (±19,07),and the mean diversity of nouns was 16,4 (±9,10) (Table 1).

Table 1 –Descriptive statistics for each variable studied

Variable	Mean	Standard deviation	Median	Minimum	Maximum
NUW	54,0	14,75	51,4	22,0	84,7
Total number of nouns	30,8	19,07	29,0	3	79
Diversity of nouns	16,4	9,10	16,0	1	36

The NUW classification divided the group as it follows: one child (3,3%) was classified into subgroup 2, six (20%) intosubgroup 3, 11 (36,7%) intosubgroup 4, and 12 (40%) into subgroup 5. It was observed a continuous increase in the NUW mean with the subgroups. However, for the total number and the diversity of nouns, an increase was observed in subgroups 1 through 4, followed by a decrease in the means obtained by the subjects in subgroup 5 (Table 2).

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Table 2 –Descriptive statistics for each variable studied, according to the classification into subgroups

Variable	Subgroup	Mean	Standard deviation	Median
NUW	2	22,0	*	*
	3	41,6	1,86	41,9
	4	48,7	6,19	47,5
	5	67,8	11,11	66,7
Total number of nouns	2	13,0	*	*
	3	24,3	8,64	26,5
	4	36,7	24,8	27,0
	5	30,0	16,63	33,0
Diversity of nouns	2	5,0	*	*
	3	14,0	7,70	14,0
	4	18,0	9,03	17,0
	5	17,1	9,96	18,0

*Only one subject in the group

The ANOVA was used to verify whether the differences observed were statistically significant. Subgroup 2 was excluded from this analysis because it comprised only one subject. Only the variable NUW presented significant results, showing that the means obtained in subgroups 3 and 4 were different from the mean obtained in subgroup 5 (Table 3)..

Table 3 –Comparison between subgroups for each variable studied

Variable	F	p-value	Tukey
NUW	25,776	<0,001	3 = 4
Total number of nouns	0,861	0,434	3 ≠ 5
Diversity of nouns	0,376	0,690	4 ≠ 5

A correlation was found between the total number and the diversity of nouns ($r=0,836$ $p<0,001$), which suggests that the more nouns are produced in spontaneous speech, the greater their diversity.

The variable NUW, on the other hand, was not significantly correlated to the total number of nouns used in spontaneous speech ($r=0,325$ $p=0,080$) or to the diversity of nouns produced in this communicative situation ($r=0,340$ $p=0,066$). It is noticeable that the p-values are close to the significance level adopted (0,05) and therefore might be interpreted as a tendency towards significance; however, the correlation index (r) was low in both cases. Thus, the increase in the percentage of NUW obtained in formal assessment does not necessarily mean an increase in the total number and in the diversity of nouns produced in spontaneous speech.

Discussion

The investigation regarding the lexical performance of children with SLI in formal assessment and in spontaneous speech showed that, when these children were classified according to the expected performance on the expressive vocabulary test, there was a continuous increase in the number of naming by usual word (NUW). However, there was no linear or significant increase in the total number and the diversity of nouns used in spontaneous speech. Thus, the formal assessment was able to identify the subjects' lexical expansion, which was not observed in spontaneous speech. If, on the one hand, the type of situation that elicited spontaneous speech may not have provided

opportunities for the use of a richer vocabulary[20]; on the other, it is possible that, in their daily lives, these children actually useonly common wordsthey already dominate, due to their lexical and grammar structure deficits[6,7,10,21,22].

Based on this observation, it is possible to suggest that, just like receptive vocabulary expands before expressive vocabulary[6], children with SLI may be able to correctly name a word before they can actually use it in spontaneous speech.

Our findings also indicated that the increase in the percentage of NUW obtained in formal assessment does not necessarily mean an increase in the number and the diversity of nouns used in spontaneous speech. However, the more nouns used in spontaneous speech, the greater their diversity, and vice-versa. This result had a strong correlation.

Since these assessment situations are really quite different from each other, it is understandable that the subjects' performances were also diverse. As showed in a previous study, each assessment situation is able to verify lexical expansion in different moments[20].

It had been already shown that the expansion of expressive vocabulary correlates only with the use of pronouns, prepositions and conjunctions in spontaneous speech[14]. This suggests that, although the integration between grammatical and lexical abilities is very demanding for the population with SLI, the more nouns used in spontaneous speech, the more different nouns are used. In this sense, further study should aim to investigate the relationship between mean length utterance and diversity of word classes, in order to verify the integration between morphosyntactic abilities.

When analyzing the results of this study, it is important to consider that the spontaneous speech sample was based on the pragmatics test, which means that the materials used for interaction were selected based on each child's preferences, but were different between subjects. As an alternative, the analysis could use the sample obtained for assessing the mean length utterance (MLU). This evaluation has a predetermined set of stimuli, which is the same for all subjects, and the evaluator is encouraged to interact with the child avoiding only the use of closed questions[23].

Similar studies with children within typical language development are also needed in order to verify, for example, if there is any correlation in the lexical performance when a formal assessment situation is compared to spontaneous speech. Understanding the development differences between children with language disorders and their normal peers provide important diagnostic measures.

In summary, this study contributes to emphasize the importance of carefully analyzing the spontaneous speech of children with language disorders in the initial evaluation, as well as in the follow-up assessments, since the improvement observed in the recognition of lexical items in isolated tasks does not necessarily mean improvement in the use of these items in actual communication situations.

Conclusion

The classification of the performance according to the expected in the expressive vocabulary test evidenced a continuous increase in the mean naming usual words (NUW), but the total number of occurrences as the diversity of nouns in spontaneous speech were not different between performance groups.

NUW was not significantly correlated to the total and the diversity of nouns used in spontaneous speech. A positive correlation was found only between the total number and the diversity of nouns, suggesting that the more nouns produced in spontaneous speech, the more the diversity found among them.

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