https://doi.org/10.23925/2176-2724.2020v32i2p215-224

Lexical performance and regional differences in expressive vocabulary of schoolchildren aged between 3 to 6 years old of a public school in the Northeast

Desempenho Lexical e diferenças regionais no vocabulário expressivo em crianças de 3 a 6 anos de uma creche-escola pública no nordeste

Desempeño léxico y diferencias regionales en el vocabulario expresivo en niños de 3 a 6 años de una guardería-escuela pública del nordeste de Brasil

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Abstract

Objective: To describe lexical performance and to characterize the regional differences in the vocabulary of children from a region of the country that does not have reference values for the vocabulary test. **Methods:** The corpus of this research was made up of one hundred children between 3 and 6 years old, assessed through the Child Language Test - Vocabulary Test. The evaluations were recorded and the data were transcribed orthographically. Mann-Whitney tests were applied for comparisons between genders

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Received: 30/01/2020
Accepted: 28/04/2020

and Kruskal-Wallis for comparison between age groups and classes, the ANOVA one-way test to compare the usual verbal designation between age groups and the T test - single sample for comparisons between the usual verbal designation means obtained and the percentage expected by the test, finally, a descriptive analysis was performed for the vocabulary. **Results:** There was a significant difference in the performance of the means of usual verbal Designation and Substitution Processes between classes and age groups. Among the semantic categories, clothing and places were more prone to variation. Animals was considered the best category. Among the semantic categories, places presented all the words with the usual verbal designation below. **Conclusion:** The children presented different performances according to the age group and school class, but similar in terms of gender. There was a high number of lexical variations, demonstrating the need for tests that contemplate the sociolinguistic and cultural diversity existing in the country.

Keywords: Vocabulary; Language tests; Child; Language; Language development.

Resumo

Objetivo: Descrever o desempenho lexical e caracterizar as diferenças regionais existentes no vocabulário de crianças de uma região do país que não dispõe de valores de referência para a prova de vocabulário. **Métodos:** O *corpus* desta pesquisa foi constituído por cem crianças entre 3 e 6 anos avaliadas por meio do Teste de Linguagem Infantil – Prova de Vocabulário. As avaliações foram gravadas e os dados foram transcritos ortograficamente. Foram aplicados os testes de Mann-Whitney para comparações entre os gêneros e Kruskal-Wallis para comparação entre as faixas etárias e turmas, o teste Anova one-way para comparação da Designação verbal usual entre as faixas etárias e o teste T – amostra única para comparações entre as médias de Designação verbal usual obtidas e o percentual esperado pelo teste, por fim, foi realizada a análise descritiva para os vocábulos. **Resultados:** Houve diferença significativa no desempenho das médias de Designação verbal usual e Processos de Substituição entre as turmas e faixas etárias. Dentre as categorias semânticas, *vestuário* e *lugares* apresentaram-se como mais propensas à variação. *Animais* foi considerada a melhor categoria. Dentre as categorias semânticas, *lugares* apresentou todos os vocábulos com desempenho de designação verbal usual abaixo. **Conclusão:** As crianças apresentaram desempenhos diferentes em função da faixa etária e turma escolar, porém semelhantes quanto ao gênero. Houve presença de um número elevado de variações lexicais, demonstrando a necessidade de testes que contemplem a diversidade sociolinguística e cultural existente no país.

Palavras-chave: Vocabulário; Testes de linguagem; Criança; Linguagem; Desenvolvimento da linguagem.

Resumen

Objetivo: describir el desempeño lexical y caracterizar las diferencias regionales existentes en el vocabulario de niños de una región del país que no dispone de valores de referencia para la prueba de vocabulario. **Métodos:** el corpus de esta investigación fue constituido por 100 niños entre 3 y 6 años evaluados por medio de la prueba de lenguaje infantil-prueba de vocabulario. Las evaluaciones fueron grabadas y los datos fueron transcritos ortográficamente. Fueron aplicados las pruebas de Mann-Whitney para comparaciones entre los géneros y de Kruskal-Wallis para comparación entre los rangos etarios y clases, la prueba ANOVA de una vía para comparación de la designación verbal usual entre los rangos etarios y la prueba T-Student de muestras únicas para comparaciones entre las medias de designación verbal usual obtenidas y el porcentaje esperado por las pruebas. Al final, fue realizado un análisis descriptivo para los vocablos. **Resultados:** hubo diferencia significativa en el desempeño de las medias de designación verbal usual y procesos de sustitución entre las clases y rangos etarios. Dentro de las categorías semánticas vestuario y lugares se presentaron como las más propensas a variación. Animales fue considerada la mejor categoría. Dentro de las categorías semánticas, lugares presentó todos los vocablos con desempeño de designación verbal usual bajo. **Conclusión:** los niños presentaron desempeños diferentes en función del rango etario y clase escolar, pero siendo semejantes en cuanto a género. Hubo presencia de un número elevado de variaciones lexicales, demostrando la necesidad de pruebas que contemplen la diversidad sociolingüística y cultural existente en el país.

Palabras clave: Vocabulario; Pruebas del Lenguaje; Niños; Lenguaje; Desarrollo del Lenguaje.

Introduction

The process of vehicle acquisition characterizes as private and heterogeneous [1] in the individual as consequence of the lexical development. The lexical configures as all the words available to the subject[2] and can be accessed as much as one wishes to comprehend or produce different kinds of meanings in order to represent objects, actions[3], attributes and any kind of information[4]. It's fundamental for the development of language, to learn and make proper use of words, being able to relate to the acquisition of syntax, morphology and phonology[3].

The vocabulary corresponds to the individual lexicon[2] and, when used properly, allows a good linguistic development during the emission and correct pronunciation of the words[5]. For the development of the linguistic apparatus, it is necessary that the child is inserted in the social medium, one of the environments being the school environment[3,6], that will contribute correlating to the other social, cultural and geographical variables for a global and linguistic development for the acquisition of language and, thus, the vocabulary[5,7].

During the process of lexical acquisition, a series of semantic deviations may occur when there is the absence of correspondence between the lexical inventory of adult language and the meaning of this very word in the child inventory, these deviations are also denominated in the substitution processes[1,4,9]. These deviations can also be related to the fact that the child hasn't organized the traces of meaning that characterize the use of a word and of another in the different sociolinguistic contexts.

In Brazil, one of the most utilized tests for the evaluation of the expressive vocabulary is the Child Language Teste – ABFW, developed based on the linguistic culture of Brazilian Portuguese to execute the evaluation of lexical competence of children in the pre-school and school age, towards the distinct populations like children with typical development, with phonological disorder and specific language disorder[1,8].

Considering the dimension of Brazil and existing regional differences, a research[1] undertaken in the northeast region of the country, pointed to the need of test patterns that evaluate lexical performance amidst the national average, but also the importance of considering the sociolinguistic reality and the existing variations when applying tests of semantic development in the several populations. The authors proposed the performance of multi-centric studies, with the collaboration of local researchers inserted in different regions of Brazil.

Some national studies[1,7,10,11,12,13,14] that evaluated the expressive vocabulary in children, described in their results, the need of language evaluation tests, considering the linguistic variations that presented in the speaking communities of different regions of Brazil. Thus, it must be considered the sociolinguistic reality of each region, as well as the instruments[15] that must be available for the necessary adaptations in what concerns to the variables that circulate the speaking individuals.

Based on what was exposed, the objective of this work was to describe the lexical development and characterizing the different existing differences of region in the vocabulary of children from a region of the country that doesn't possess reference values for the vocabulary test.

Methods

The study of quantitative, descriptive and transversal design was approved by the Ethics in Research Committee of a federal teaching institution under the filing number: 2.133.681. The freedom and clarified consignment term (TCLE) was presented to the parents/tutors of the participants of the research so that the children were included in this study.

To obtain the sampling of children, no statistical calculations were performed, only the simple random selection following the age range pertinent to the one proposed by the sampling instrument (3 years to 6 years and 11 months) of children from both genders, from a public daycare center/school in Maceió-AL, chosen by convenience of access. The sample was constituted by 100 participants of the following grades: Pre-school I, Pre-school II, 1st grade and 2nd grade, being 48 of the male gender and 52 of the female gender. The participants of the male gender are laid out in the following form: 8 three-year-old children, 19 four-year-old children, 14 five-year-old children, 7 six-year-old children. In the female gender sample, the 52 children corresponded to: 8 three-year-old children, 18 four-year-old children, 12 five-year-old children and 12 six-year-old children.

The criteria of inclusion established that all children within the age range of the proposed test

patterns (3 to 6 year old and 11 months) and which parents authorized their participation with signing of the TCLE waiver making part of this research. The exclusion criteria, however, instituted that the children that presented any suspicion of neurological, intellectual and/or hearing commitment, problems in the school performance, referred by the responsible teacher, and with attendance lower than 75% during classes, as well as not having a signed TCLE waiver, would not take part in the core of this research. Thus, within the total of 148 children that composed the selected classes for the research: one child was excluded for presenting deafness, 6 children didn't receive allowance by the parents to attend the study, and 17 children presented a school attendance lower than 75%. No previous language evaluation was performed.

The children were evaluated individually and in a single occasion by two researchers, in two rooms made available by the institution for the application of the ABFW: Child Language Test – vocabulary test, composed by an album of 118 figures. The productions of children were registered by means of the device SM-G531H *Samsung Galaxy Gran Prime Duos Android* 5.1, in MP3 format. All naming performed by the children were transcribed literally and organized in a contingency spreadsheet in Microsoft Excel 2013.

To describe the expressive vocabulary in the studied population, a quantitative analysis was undertook, with the acquisition of the average in occurrence of Usual Verbal Designation (DVU), Non Designation (ND) and Substitution Process (SP) by conceptual field for each child, starting from the sum of percentages obtained in each field and the division by the total of evaluated conceptual fields.

The spreadsheet 1 was built to present the comparison of performance between the gender, age range and school grade variables, with the DVU, ND and PS averages. The second spreadsheet was elaborated to present the related data between the expected performance in the ABFW vocabulary test and the performance average obtained by the age range children.

To characterize the lexical variables present in the expressive vocabulary of the studied population, the PS analysis was performed, as described orthographically in Chart 1. The third and fourth spreadsheets present the wording that presented equal percentage or below 25%, and equal or above 85%, respectively.

The statistical analysis was performed by means of the SPSS Statistics application, making use of the Kruskal-Wallis non-parametric tests for comparison between the age range and class groups, and the Mann-Whitney test for gender comparison. For DVU comparison among age ranges, the Anova one-way parametric test was used with the Bonferroni Post Hoc. The t test – single sample test was used for comparisons among DVU averages obtained from the study children and percentage expected from the ABFW test. The descriptive analysis of the study was performed by means of orthographical transcription and in the percentage of lexical variations found in the target wording of the test.

Results

Among the day-care/school classes, the second grade represents 35% (n=35) of all children from the study, also presenting the bigger female gender sample (12%, n=12) among the evaluated classes, unlike the pre-school I which accounted for the smallest percentage of participants in the study (6%, n=6). There was a statistically significant difference in the performance of the expressive vocabulary analyzed by means of the DVU and PS averages among the classes and age ranges (p-value, 000), showing that the oldest and more educated children had better performance in the vocabulary, those being highlighted with an asterisk in Table 1. There wasn't a significant statistical change for the gender variable.

Table 1. Comparison of performance in children in the expressive vocabulary test following the variables age, class and gender

		DVU		ND		PS	
		Average	**DP**	**Average**	**DP**	**Average**	**DP**
Age	3 years	39,25	13,284	10,44	9,859	68,31	17,020
	4 years	53,57	15,376	8,11	10,060	56,32	14,918
	5 years	65,71	10,971	6,11	6,291	46,18	11,405
	6 years	69,89	9,910	4,32	5,447	43,79	12,196
p-value		,000*		,122		,000*	
Class	Mat.1	33,50	12,178	12,17	13,688	72,33	19,408
	Mat.2	46,41	14,211	8,90	9,582	62,69	14,972
	1 Per.	61,00	12,795	6,67	8,652	50,33	12,786
	2 Per.	68,60	10,901	5,40	5,590	44,00	11,767
p-value		,000*		,379		,000*	
Gender	Male	59,12	14,933	8,27	10,217	50,62	13,976
	Female	56,33	18,049	6,04	5,918	55,63	17,885
p-value		,541		,740		,262	

* statistical difference (0,000)
Subtitle: DVU = Usual Word Designation; ND = No Designation; PS = Substitution Process; p-value = significance value; DP = standard deviation; Mat = maternal; Per = period. Kruskal-Wallis Test, Mann-Whitney Test, Anova one-way with Bonferroni Post Hoc.

Table 2 presents the comparisons between the DVU average obtained from the children in the study and the expected percentage expected from the ABFW test. The children in the three-year-old range presented results similar to what was expected by the ABFW, not presenting a significant statistical difference in any conceptual field. There was a significant difference in the following semantic fields: wear, animals and places for the 4 to 6 year old range; means of transportation for 4 and 5 year-old children; furniture and utensils, colors and shapes, toys and musical instruments for 5 and 6 year-old children. In the semantic field of "animals", the children of the study presented bigger averages than what was expected by the ABFW, this significant statistical difference existing in the 4, 5 and 6 year-old age range. The remaining averages are described in Table 2.

Table 2. Comparison between the DVU expected performance and the performance obtained from students in the vocabulary test

Age / **Semantic Fields**	**3 years**				**4 years**				**5 years**				**6 years**			
	E	**O**	**IC**	**p-value**	**E**	**O**	**IC**	**p-value**	**E**	**O**	**IC**	**p-value**	**E**	**O**	**IC**	**p-value**
Wear.	37	34	29/39	,000*	50	40	33/46	,000*	65	48	42/53	,000*	80	51	45/56	,000*
Anim.	44	58	47/69	,000*	40	67	56/77	,000*	60	79	73/86	,000*	70	84	80/89	,000*
Food.	39	31	22/40	,000*	60	45	33/57	,050	70	67	59/75	,295	90	72	64/81	,000*
M.Trans.	45	48	42/55	,186	50	59	51,67	,000*	60	69	62/77	,003*	70	70	63/76	,962
Furn/Ut.	50	45	36/53	,260	60	51	42/59	,061	60	63	60/66	,000*	65	64	61/67	,461
Profes.	10	12	4/20	,497	20	19	12/26	,113	35	28	21/36	,198	45	38	28/47	,065
Place.	7	3,5	0,8/6	,014*	50	4,6	-0,1/9	,000*	70	16	9,5/22	,000*	70	19	10/27	,000*
Col/Shap.	21	13	5/22	,095	30	24	12/36	,318	70	46	29/62	,002*	85	62	50/74	,003*
Toy/Inst.	21	24	16/32	,418	40	26	15/36	,090	55	43	38/48	,000*	70	52	45/59	,000*

*p-value (0,0001)
Subtitle: DVU = Usual Word Designation; ND = No Designation; PS = Substitution Process; p-value = significance value; Wear. = clothing wear; Anim. = animals; Food. = Food; M. Trans. = means of transportation; Furn/Ut. = Furniture and Utensils; Profes. = Professions; Places. = Places; Col/Shap. = Colors and Shapes; Toy./Inst. = Toys and musical instruments; E = expected; O = Obtained; IC = Trust Interval de 95%; p-value = significance value; Test: T test – single sample.

Lexical variations were observed, denominated by the test as PS, during the application of the expressive vocabulary test. A difference was verified in the naming of some words by the children in the day-care/school in Maceió-AL, in relation to the target words suggested by the vocabulary test in the ABFW testing, among which "service car" and "scale", belonging to the semantic fields "means of transportation", "toys" and "musical instruments" respectively, in which no DVU was observed, only lexical variations, the "car" variation (n=50) being more prevalent for service car and "scale" (n=76) for balance. The "stadium" word presented more than 47 types of variation among children. Variations in other words were also found, according to the presented in Chart 1.

Chart 1. Description of variables found in words with substitution processes above 85% in the children sample

Conceptual Fields	Expected designation	Found variables			
Wear	Cap	Hat (n = 88)	Ball (n = 1)	———	———
	Sneakers	Shoes (n = 87)	Boots (n = 2)	———	Others (n = 2)
Means of transportation	Car	Car (n = 50)	Police Car (n = 31)	Police (n = 14)	Others (n = 5)
Furniture and utensils	Cabinet	Closet (n = 24)	Wardrobe (n = 23)	Drawer (n = 10)	Others (n = 30)
	Toilet	Bathroom (n = 36)	Toilet Bowl (n = 29)	Toilet (n = 12)	Others (n = 13)
	Frying Pan	Pan (n = 74)	Baking pan (n = 3)	Thing that makes food (n = 2)	Others (n = 18)
	Tooth Paste	Paste (n = 44)	Ointment (n = 11)	Cream (n = 6)	Others (n = 26)
Professions	Nurse	Medic (n = 29)	Doctor (n = 17)	Woman (n = 16)	Others (n = 28)
	Guard	Police (n = 25)	Policeman (n = 15)	Man (n = 14)	Others (n = 36)
Places	Classroom	School (n = 60)	Room (n = 8)	Chair (n = 5)	Others (n = 25)
	Stadium	Game (n = 41)	Field (n = 6)	Football field (n = 5)	Others (n = 44)
	Garden	Flower (n = 40)	Flowers (n = 29)	Leaf (n = 3) Plant (n = 3)	Others (n = 18)
Toys and musical instruments	Slip and Slide	Slip and Slide (n = 35)	Rela-rela (n = 11)	Slip n′ Slide (n = 7) Slippery Slide (n = 7)	Others (n = 25)
	See-saw	Balance (n = 76)	See-saw (n = 6)	To swing (n = 2)	Others (n = 15)

Subtitle: n = number of naming

Some words from the test presented a DVU percentage of equal or below 25%, among which are highlighted: iron, frying pan, classroom and stadium. Presented in the semantic fields: furniture, utensils and place. Which were named only once (Table 3). On the other hand, some words presented a DVU of equal or above 85 percentage, in which are highlighted: dog, banana and bicycle (98%), chair and knife (99%) and only the car word (100%) was named by all the children from the test (Table 4).

Table 3. Words from the test that presented a percentage of correctness below or equal to 25% in the Usual Word Designation

Conceptual Field	Test Words	DVU (%)
Wear	Boots	25
	Cap	10
	Pajama	19
	Sneakers	9
Food	Salad	16
	Sandwich	21
	Soup	25
	Vegetable	7
Means of transportation	Ship	25
	Service Car	0
Furniture and utensils	Cabinet	3
	Iron	1
	Ironing Board	0
	Night lamp	6
	Toilet	5
	Frying Pan	1
	Tooth Paste	5
Professions	Barber	2
	Dentist	13
	Farmer	12
	Mailman	14
	Nurse	3
	Guard	2
Place	Mountain	17
	Classroom	1
	Street	17
	Building	14
	City	12
	Statue	19
	Stadium	1
	Store	6
	Garden	4
	Forest	24
	River	10
Colors and forms	Circle	23
	Rectangle	11
Toys and musical instruments	Toy House	19
	Piano	23
	See-saw	18
	Slippery Slide	13
	Swing	0

Subtitle: DVU = Usual Word Designation

Table 4. Words from the test that presented a percentage of correctness above or equal to 85% in the Usual Word Designation

Conceptual Field	Test Words	DVU (%)
Wear	Pants	85
	Shoes	86
	Purse	94
Animals	Cat	92
	Dog	98
	Horse	95
	Elephant	90
Food	Popcorn	88
	Apple	88
	Banana	98
Means of transportation	Boat	95
	Car	100
	Airplane	92
	Bicycle	98
	Train	86
Furniture and utensils	Bed	94
	Chair	99
	Fridge	91
	Couch	92
	Glass	89
	Knife	99
	Plate	88
	Spoon	96
	Comb	95
Toys and musical instruments	Guitar	85

Subtitle: DVU = Usual Word Designation

Discussion

The present study had as an objective the description of the lexical performance and characterizing the existing regional differences in the children vocabulary of a region of the country, which does not possess reference value for the vocabulary test.

The analysis of study results in relation to the age range shows that the increase of DVU average among children is proportional to the chronological increase of age range. This corroborates the findings of Brazilian studies[2,16,17] which utilized the ABFW and showed a tendency of expansion in the DVU average with the increase of age, when compared between 4 to 6 year-old children, showing significant changes and proportional to the DVU average increase.

In relation to the "class" variable, we could notice that, similar to what happened in the DVU proportional increase in "age range" variable, this increase was verified among the school classes. This shows that, the bigger the school degree of the children, the bigger the tendency of naming, meaning, the expressive vocabulary presenting itself more diversified[18]. In literature, there is a lack of research which utilize as variable the school degree of children in vocabulary tests. Only one study showed that the DVU average presented a growth, following the school class[14]. Concerning the gender variable, there was no significant difference for DVU, ND and PS, this fact corroborating the findings of other studies[1,16].

The lexical performance obtained by the children from the study was compared to the reference values proposed by the test. The conceptual fields with lowest results for the 4 to 6 year-old age range were "wear" and "places", these being similar to the ones found in other students[1,3,10,11,16]. This can be related to the fact that the image of many words in the "wear" does not correspond to the items utilized by children in the study, such as "boots", "pajamas" and "coats", commonly designated as

"shoes", "sleeping wear" and "shirt". The "places" figures exhibit places rarely attended by the studied population and/or possess many stimuli, much like the figure related to the "street" word, that presents elements like buildings, cars and people, a fact that can cause visual worth.

The "color" and "shape" categories exhibit averages lower than the expected by the test for the 5 and 6 year-old age ranges, these statistically significant values being also described in other studies that evaluated the expressive vocabulary with the ABFW test[1,3,10,16]. The percentage below the expected for "color" and "shape" can be related to the figures to name the words of geometric shapes. The shapes in black color, for example, may have influenced this low percentage of this population, because besides black being present in "color", many children named the color instead of the shape, even after the researchers asked "what shape is this"? As suggested by the test itself[19].

The way of how the shapes were presented may have influenced this low percentage, especially from among children from 3 to 4 years old. Two studies[20,21] affirm that the geometry in the child education can't be taught in static form, limited to the role or to the simple naming, but must be presented with flexible configuration. Thus, the presentation of images made by the test may be related to the point mentioned above, due to the fact that the children from this sample supported themselves upon the color of the figure, instead of observing the geometric shape, for this being presented plain and limited to paper. The third category with the worst performance was "toys and musical instruments" for children from 5 to 6 years old, in spite of being significant in the application of the test, although it was described in other studies as good performance[3,10,11]. The percentage below the expected can be related to the types of toys and musical instruments that are proposed by the ABFW, the "piano" word may not be part of the cultural reality of these children, a fact not occurring with the word "guitar", for example, which presented good naming in the category.

The "animal" category was the only in which the DVU performance overtook the expected by the test in all age ranges of the study, being statistically significant for the age ranges from 4, 5 and 6 years old, which didn't present words with DVU inferior or equal to 25%. On the other hand, "animals" presented 4 words with DVU superior or equal to 85%. This result may be related to the words from this category being of easy identification and common to the children.

There was a high number of described lexical variations in Chart 1, being common words among the participants, but different from the target wording proposed by the ABFW test. Words like "service car" and "see-saw" were discussed by other authors[1], not presenting any naming in this sample. For the reality of the children in the research, the designation of the word "service car" concentrates in "car" and "police car", while "scale" is denominated "see-saw", because scale is considering a weighing instrument to this population and not a toy.

Between the nine test categories, eight presented words with DVU percentages below 25%; some words were named only once (frying pan, clothing iron, classroom and stadium), while others weren't named by any children (service car, ironing board and scale). On the other hand, some words presented great performance in naming by the children, being a superior percentage or equal to 85% with the highlight to the word car, the only one among the 118 from the ABFW test which was named as expected by 100% of the children, followed by the words knife and chair (99%), banana, dog and bicycle (98%).

This study demonstrated that there were a great number of lexical variations in the test words, considered as PS, deprecating in low performance of the students in the study in comparison to the proposed values. This fact exposes that the sociolinguistic context in which the test was developed reveals itself different from the local context of application of this research. Thus, it is hypothesized that speakers from distinct regions, with different linguistic variety than the one in which the test was elaborated, may present non-satisfactory results in the vocabulary performance. It is necessary that the vocabulary tests are flexible to the existence of these variables during the process of evaluation of children.

It is important to stress the necessity of other studies with defined samples from statistical criteria. Validation and Normalization studies of the vocabulary of students from different Brazilian regions, with a significant sampling, are very necessary, since the existing linguistic diversity within the country influences the lexical composition of

the individual and can stimulate diverging results from the expected in the vocabulary tests.

Conclusion

The children of the research presented different performances in expressive vocabulary in terms of age range and school class, but similar concerning gender. The age range of 3 years old exhibited similar results to the expected by the ABFW within all conceptual fields, while the others presented results below the expected in terms of the test. There was a presence of a high number of lexical variations in words from the test.

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