REVISTA CEFAC
SPEECH, LANGUAGE, HEARING SCIENCES AND EDUCATION JOURNAL
Rev. CEFAC. 2016 Jul-Ago; 18(4):941-950 doi: 10.1590/1982-0216201618421215

Original articles

Characterization of reading comprehension performance of students from 3rd to 5th grades of elementary school

Caracterização do desempenho de escolares do 3º ao 5º ano do ensino fundamental em compreensão de leitura

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Research support source: Higher Education Personnel Improvement Coordination

Conflict of interest: non-existent

Received on: December 17, 2015
Accepted on: May 19, 2016

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ABSTRACT

Purpose: to characterize the performance of the students from 3rd to 5th grade of the elementary school in reading comprehension.

Methods: 378 students participated in this research, divided in 3 groups: GI (102 students of 3rd grade), GII (121 students de 4th grade), GIII (155 students de 5th grade). All of the students were evaluated using the protocol of assessment in reading comprehension, which is composed of four texts: two expositive and two narratives. Each one of the texts has eight questions, four of which are literals and four inferential, two related to the microstructure and two related to the macrostructure of the text.

Results: the statistics analyses showed that the students presented fewer mistakes according to their academic progress, indicating that the experience of lecture during the years at school contributed to improve the reading comprehension. In addition, some students presented better performance in their answerers after reading the texts for the second time.

Conclusion: the study demonstrated that the students had superior averages to inferential questions and to macrostructure questions. They also presented superior averages to literals questions of expositive texts and to inferential questions of narrative texts, which indicated that each type of text presented a particular difficulty to the students. Therefore, it was possible to demonstrate through the application of this protocol the performance of the students in reading comprehension and their difficulties in this ability.

Keywords: Evaluation; Comprehension; Educational Measurement; Education; Reading

RESUMO

Objetivo: caracterizar o desempenho de escolares do 3º ao 5º ano do ensino fundamental I em compreensão de leitura.

Métodos: os participantes deste estudo foram 378 escolares, divididos em 3 grupos, sendo: GI (102 escolares do 3º ano), GII (121 escolares do 4º ano), GIII (155 escolares do 5º ano). Todos os escolares foram avaliados por meio de protocolo de avaliação de leitura, composto por quatro textos, sendo dois textos expositivos e dois textos narrativos, cada um com oito questões, sendo quatro perguntas literais e quatro inferenciais, duas relacionadas à microestrutura e duas à macroestrutura do texto.

Resultados: na análise estatística observou-se que os escolares apresentaram números inferiores de respostas incorretas no decorrer da seriação escolar, indicando que as experiências de leitura durante os anos de escola contribuíram para o desempenho de compreensão, também a segunda leitura proporcionou a alguns escolares melhora em seu desempenho nas respostas às perguntas dos textos. Também foi observado que os escolares tiveram médias superiores para perguntas inferenciais, bem como para questões de macroestrutura.

Conclusão: verificou-se que as médias superiores foram para as perguntas literais dos textos expositivos e para perguntas inferenciais dos textos narrativos, indicando que cada tipo de texto apresentou uma dificuldade específica para os alunos. Foi possível, portanto, mediante a aplicação de protocolo de avaliação, caracterizar o desempenho dos escolares, assim como suas dificuldades em compreensão de leitura.

Descritores: Avaliação; Compreensão; Avaliação Educacional; Educação; Leitura

INTRODUCTION

The ability to read and understand texts is applied daily, however, when it is associated to the educational context, it has greater importance because it influences significantly learning in each of the five areas of prmalry education, such as: total communication, mathematics and sciences, reflecting therefore, upon the personal and social development[1]. Thus, it is important and necessary for the student to develop the decoding ability, also being able to understand the written message in order to acquire knowledge and achieve learning, using reading strategies performed by adults to become a competent and autonomous reader too[2].

Thus, the reading process really happens when there is reading comprehension. It is a highly regarded skill as a complex process which involves various cognitive and linguistic aspects. The cognitive aspects include working memory, stored knowledge, monitoring, information integration and inferences, and among the linguistic aspects, there are the syntactical elements, semantic, lexical and the decodification ability[3]. Thus, reading comprehension depends on the interrelationship of various cognitive and linguistic processes. It is therefore a skill which requires the use of processes considered as basic, as decoding regarding words recognition (process that can transform spelling signs of the written words written into language) and extraction of printed words meanings, which are not enough for a successful reading comprehension, so, it becomes necessary for the reader to use high level cognitive processes, as the ability to draw conclusions (about information which is not explicit in the text or involving a range of prior knowledge on the subject), memory, lexicon access, vocabulary, fluent reading, as well as control or comprehension monitoring[2,4-6].

Thus, in order to establish understanding, there must be a connection between the contents of the literal information of the text read, and the prior knowledge of the reader, characterized as content stored in memory which should be accessed. Therefore, during the reading act, it becomes necessary that the reader, in addition to extracting literal information from the text, should establish links between the linguistic material provided by the text and his/her prior knowledge. To achieve this integration it becomes essential the occurrence of inferential activity. This activity is characterized as a complex process requiring from the reader reflection activities and integration between information which is explicitly expressed in the text (literal information) with implicit information (prior knowledge) that will generate inferences, essential for deep understanding of the text read[3,7].

For this thorough understanding of the material read, the reader must therefore formulate two types of inferences: literal inferences, relating ideas within or between sentences, and implicit inferences, connecting ideas to complete information which is not explicit, incorporating prior knowledge and experience. This process is necessary for the elaboration of a mental representation model of the text[2,8-12].

Thus, the elaboration of this representation model is distributed into structural levels starting by the identification and relationship of propositions among them, which is the microstructure of the text, following by the identification of the overall idea of the text, giving it a global coherence, forming the textual macrostructure and the superstructure (different ways to arrange the text). Then, at a higher level there is the generation of inferences, where the reader should make the integration of text information to his/her prior knowledge, enabling the creative employment of information taken from the text, and answer questions whose answers are not literally written. Throughout the reading process, metacognitive strategies are used to work with textual information, thus allowing the identification of problems occurred during reading and seeking ways to solve them[2,10-14.]

Reading comprehension requires different forms towards the comprehension process, according to the type of text. A newspaper article, for example, includes structural components, features and a number of grammatical rules very different from a scientific article, from a narrative story or a newspaper comic strip. The genres are not simple textual forms, but forms of social action, and they guide understanding, so each type requires specific ways to be understood[7,15].

Most of the research is mainly centered on the expository and narrative texts. This is due, at least in part, to the fact that the student is in contact with the narrative type genre already in oral language and with the expository genre throughout the educational process[16]. The most common purpose of expository texts is to inform the reader about new aspects, generic realities and many times, abstract, besides counting on important technical material. Meanwhile, the narrative texts assume a chronological development and aspire to explain some events in a certain order, following an organization, such as: initial state / complication / action / resolution / final[17].

This study hypothesizes that students underperform in reference to generation of inferences - capacity necessary to integrate explicit information in the text with prior knowledge of information for the consistent integration of the written message – as for understanding information contained in expository texts, considering that, many times, there is not prior knowledge enough to perform such integration. On the other hand, narrative texts contain information which are easily integrated into existing knowledge, since it is a familiar text structure, known even before the written language acquisition.

Based on the research presented, this study aims to characterize the performance of students from the 3rd to 5th grades, of elementary school in reading comprehension of expository and narrative texts.

METHODS

This study was previously approved by the Ethics Committee of the FFC / UNESP-Marilia-SP under Protocol 1881/2008.

After approval of the principal and teachers, all the students were submitted, collectively, to reading comprehension evaluation, in the classroom. It was applied the reading comprehension evaluation protocol PROCOMLE[16], comprising four texts, as follows: two expository texts (Text E1 and Text E2) and two narrative texts (Text N1 and Text N2), each one comprising eight questions, four literal questions and four inferential questions, two related to microstructure and two to macrostructure of the text. Each question, from all the texts, contained four alternatives, and the students should select the correct answer.

Before evaluation, the students were instructed to read the text carefully, and afterwards they should answer questions about it, and could not refer to the text. After reading it, the text was removed and the sheets with the questions and answers weren given to the students. They were instructed to read the questions and each alternative with attention, in order to select the correct one, marking it with a pencil. The response time of each student was not recorded. Each text was applied every other day, and each application took 30 minutes on average.

As sample inclusion, the following criteria were adopted: students with Informed Consent signed by parents or guardians, students without sensory, motor or cognitive impairment, enrolled in school, students without decoding difficulty and students who participated in the application of four texts who take part in the evaluation protocol. Exclusion criteria were as follows: students without the Informed Consent signed by parents or guardians, students with sensory, motor or cognitive impairment enrolled in school, students referred by teachers as having decoding difficulties, students who did not participate in the application of the four texts which take part in the evaluation protocol, and students who refused to participate in the assessment.

Participants

The study enrolled 378 students, divided into three groups, arranged as follows:

- Group I (GI): composed of 102 students from the 3rd grade of elementary school (average age of 8 years and 8 months, 56% male).
- Group II (GII): composed of 121 students from the 4th grade of elementary school (average age of 9 years and 7 months, 52% male).
- Group III (GIII): composed of 155 students from the 5th grade of elementary school (average age of 10 years, 9 months, 49% male).

For description and comparison among the three groups, the *Kruskal-Wallis Test* was applied, in order to check possible differences among the three groups studied, compared concurrently to the variables of interest, with significance level of $p < 0.05$.

RESULTS

The results were analyzed from the scores of incorrect answers, in order to characterize the student profile in relation to the types of questions, amIng to check reading comprehension through the application of the evaluation protocol, proposed by this study.

Table 1 shows the mean, standard deviation and significance found in the comparison among the groups, for each variable of the expository text E1 with values, showing statistically significant difference, indicated with an asterisk.

Table 1. Average Distribution, standard deviation and significance found in the comparison among the groups for each variable in the expository text E1

Variable	Group	n	Average	Standard Deviation	Significance (p)
E1 MiL	I	102	0,83	0,68	< 0,001*
	II	121	0,76	0,76	
	III	155	0,41	0,61	
E1 MaL	I	102	0,86	0,72	0,022*
	II	121	0,67	0,71	
	III	155	0,62	0,65	
E1 Mil	I	102	1,00	0,77	< 0,001*
	II	121	0,61	0,74	
	III	155	0,46	0,64	
E1 Mal	I	102	1,12	0,80	< 0,001*
	II	121	0,66	0,76	
	III	155	0,55	0,77	
E1 MiL+MaL	I	102	1,70	1,14	< 0,001*
	II	121	1,43	1,15	
	III	155	1,03	1,01	
E1 Mil+Mal	I	102	2,12	1,23	< 0,001*
	II	121	1,27	1,16	
	III	155	1,02	1,14	

Legend: E1: expository text 1; **MiL**: microstructure literal questions; **MaL**: macrostructure literal questions; **Mil**: microstructure inferential questions; **Mal**: macrostructure.inferential questions.
Statistical test performed: *Kruskal-Wallis Test*; p <0.05

It was found in Table 1, for expository text E1, when the total averages were compared among the variables, it was observed that the macrostructure literal questions (MaL) were higher than the average of the microstructure literals (MIL). The same occured between micro and macro structure inferentials (Mal and Mil), suggesting that all groups have presented more difficulty regarding macrostructure questions, either to literal questions as to inferential.

Significant differences among the groups were also found when the literal questions were added, and also when added inferential questions, it was observed that the total average of the sum of the questions was higher for inferential questions, suggesting lower performance for this type of question.

Table 2 describes the mean, standard deviation and the significance found in the comparison among the groups for each variable in expository text E2, and statistically significant difference values were indicated with an asterisk.

It was observed in Table 2, for expository text E2, the average of the macrostructure literal questions was higher than the average of macrostructure inference questions, indicating that this text the performance was lower for this type of question.

Significant differences among the groups were also observed in both expository texts, when literal questions were added, as when added inferential questions. These results indicated that the students had different performances among themselves, observing that the averages became lower from GI to GIII, both for E1 and E2. It was also observed that the total average of the sum of the literal questions was lower than the total average of the sum of the inferential questions, indicating superior performance for literal questions.

It was demonstrated in Tables 1 and 2, that there were statistically significant diferences for the two expository texts, in almost all variables, except for macrostructure literal questions of the expository text E2. For the variables in which differences were observed, it was possible to check that the averages were becoming lower with academic progress, that is,students were presenting fewer errors.

These results indicated that the students had different performances among themselves, noting that the averages became lower from GI to GIII, both for E1 and E2, that is, the performance of GIII was higher than GII and from this group to GI .

Table 3 shows the mean, standard deviation and the significance found in the comparison among the

Table 2. Average Distribution, standard deviation and significance found in the comparison among the groups for each variable in the expository text E2

Variable	Group	n	Average	Standard Deviation	Significance (p)
E2 MiL	I	102	0,77	0,83	0,016*
	II	121	0,62	0,78	
	III	155	0,47	0,66	
E2 MaL	I	102	0,95	0,65	0,588
	II	121	0,97	0,75	
	III	155	0,88	0,69	
E2 MiI	I	102	0,88	0,78	0,002*
	II	121	0,68	0,71	
	III	155	0,56	0,73	
E2 MaI	I	102	1,12	0,72	< 0,001*
	II	121	0,89	0,75	
	III	155	0,71	0,77	
E2 MiL+MaL	I	102	1,73	1,17	0,049*
	II	121	1,59	1,26	
	III	155	1,35	1,08	
E2 MiI+MaI	I	102	2,00	1,13	< 0,001*
	II	121	1,57	1,18	
	III	155	1,27	1,26	

Legend: E2: expository text 1; **MiL:** microstructure literal questions; **MaL**: macrostructure literal questions; **MiI**: microstructure inferential questions; **MaI**: macrostructure inferential questions.
Statistical test performed: *Kruskal-Wallis Test*; p <0.05

groups, for each variable in the narrative text N1, with statistically significant difference values indicated with an asterisk.

As for the narrative text, in Table 3, there were also statistically significant differences in most variables of N1, except N1 MiL, indicating smillar performance among the groups, referring to this type of question for this text.The variables which presented statistically significant difference, it was also observed that the averages were declining as the students were achieving academic progress.

It was observed for N1, when literal and inferential questions were added, there were still significant differences referring to the averages, decreasing from GI to GIII. When the total average of the groups regarding the sum of the literal questions was compared to this average for inferential questions, it was superior to the later ones, suggesting inferior performance for this type of question.

Table 4 presents the mean, standard deviation and the significance found in the comparison among the groups for each variable in the narrative text N2, with statistically significant difference values indicated with an asterisk.

It was observed in Table 4, that text N2 also presented statistically significant differences in most variables, except for MiL and MiI, verifying the same result in other texts.

There was significant difference among the groups, when N2 literal questions were added. The same is true for the sum of inferential questions with averages becoming lower from GI to GIII.

For N2, total averages were higher for inferential questions. The same occurred when added literal questions from two narrative texts and inferential questions of both texts.

Table 5 describes the mean, standard deviation and significance found in the comparison among the groups for the sum of the variables of the two expository texts E1 and E2 and the two narrative texts N1 and N2, with statistically significant difference values indicated with an asterisk.

It was observed in Table 5, significant differences among the groups, when added the literal questions of two expository texts, as well as for inferential questions of these texts, with averages decreasing from GI to GIII. Comparing the total average of these sums, it was higher on the sum of the inferential questions, suggesting more difficulty for such questions.

Table 3. Average Distribution, standard deviation and significance found in the comparison among the groups for each variable in the narrative text N1

Variable	Group	n	Average	Standard Deviation	Significance (p)
N1 MiL	I	102	0,42	0,70	0,476
	II	121	0,37	0,65	
	III	155	0,32	0,62	
N1 MaL	I	102	1,04	0,77	0,007*
	II	121	0,82	0,80	
	III	155	0,73	0,72	
N1 MiI	I	102	0,91	0,80	< 0,001*
	II	121	0,67	0,71	
	III	155	0,50	0,67	
N1 MaI	I	102	0,87	0,75	0,005*
	II	121	0,89	0,69	
	III	155	0,65	0,70	
N1 MiL+MaL	I	102	1,46	1,15	0,016*
	II	121	1,19	1,16	
	III	155	1,05	1,05	
N1 MiI+MaI	I	102	1,78	1,28	< 0,001*
	II	121	1,56	1,12	
	III	155	1,14	1,11	

Legend: **N1**: narrative text 1; **MiL**: microstructure literal questions; **MaL**: macrostructure literal questions; **MiI**: microstructure inferential questions; **MaI**: macrostructure inferential questions.
Statistical test performed: *Kruskal-Wallis Test*; p <0.05

Table 4. Average Distribution, standard deviation and significance found in the comparison among the groups for each variable in the narrative text N2

Variable	Group	n	Average	Standard Deviation	Significance (p)
N2 MiL	I	102	0,56	0,71	0,953
	II	121	0,55	0,66	
	III	155	0,52	0,61	
N2 MaL	I	102	0,70	0,69	< 0,001*
	II	121	0,46	0,62	
	III	155	0,35	0,55	
N2 MiI	I	102	0,87	0,78	0,074
	II	121	0,76	0,72	
	III	155	0,65	0,70	
N2 MaI	I	102	1,01	0,78	0,006*
	II	121	0,87	0,80	
	III	155	0,70	0,71	
N2 MiL+MaL	I	102	1,25	1,04	0,007*
	II	121	1,02	1,06	
	III	155	0,86	0,96	
N2 MiI+MaI	I	102	1,88	1,19	0,002*
	II	121	1,63	1,22	
	III	155	1,35	1,15	

Legend: N2: narrative text 1; **MiL**: microstructure literal questions; **MaL:** macrostructure literal questions; **MiI:** microstructure inferential questions; **MaI:** macrostructure inferential questions.
Statistical test performed: *Kruskal-Wallis Test*; p <0.05

Table 5. Average distribuition, standard deviation and significance found in comparisonamong the groups, for the variable sum of the two expositive texts E1 and E2, and for the two narrative texts N1 and n2

Variable	Group	n	Average	Standard Deviation	Significance (p)
E1+E2 MiL+MaL	I	102	3,42	1,98	< 0,001*
	II	121	3,02	1,68	
	III	155	2,39	1,53	
E1+E2 Mil+Mal	I	102	4,12	1,75	< 0,001*
	II	121	2,84	1,68	
	III	155	2,29	1,66	
N1+N2 MiL+MaL	I	102	2,72	1,69	0,001*
	II	121	2,21	1,69	
	III	155	1,92	1,36	
N1+N2 Mil+Mal	I	102	3,67	1,87	< 0,001*
	II	121	3,19	1,69	
	III	155	2,49	1,68	

Legend: **E1**: expository text 1; **E2**: expository text 2; **N1**: narrative text 1; **N2**: narrative text 2; **MiL**: microstructure literal questions; **MaL**: macrostructure literal questions; **Mil**: microstructure inferential questions; **Mal**: macrostructure inferential questions.
Statistical test performed: *Kruskal-Wallis Test*; $p < 0.05$

DISCUSSION

Findings of this study indicated that the students presented more incorrect answers when they were related to the macrostructure of the texts, suggesting, thus, lmiltation on textual macrostructure formation, which, in turn, hinders inferences formation. Thus, data suggested that these students had difficulty for selecting the correct alternative, when answering the questions of the text, even though, failing to notice the macro-structure necessary for inferences formation, the answer did not seem clear to the students, also corroborating previous studies which showed the same difficulties[9,10,12].

Literature refers when there is lack of comprehension, a textual mental representation occurs just on the general theme and details which are related to the theme, in a non-specific manner. That is, the reader can only observe the hierarchical relationship between the ideas of the text, which is denominated as macrostructure, making it impossible to link the text information with other information which he/she has, hindering, therefore, inferences formation necessary for comprehension[14].

However, when there is optmall comprehension, the reader can relate each idea of the text with a specific theme, which can in some situation remain constant and change in others. Thus, there is a continuous variation in the thematic course, a fact that compels the readers to make a continuous process of information review, by requiring the use of their prior knowledge on the theme, and other times obtaining information provided in the text. In this way, the readers check which part of reading refers directly to the theme and which part is referring about the theme, although indirectly. The perception of the text thematic progression compels the reader to relate new information with others given previously, so that the text and the composing interpretation may become consistent[7,12,15].

It was observed, when comparing the total means of the groups, that there was more difficulty for inferential questions, as it was suggested in the hypothesis of this study. This corroborates the literature which reports that comprehension is a constructive and integrative process, and skilled readers do it spontaneously, inferences to link ideas and information which are implied, and this is a necessary process to form the integrated representation of a text[2,9-12].

When the performances of the students from all groups were compared, according to text genre, it was found that the average sum of the inferential questions from two narrative texts was higher than the sum average of the expository texts inferences. However, the average sum of the literal questions of the expository texts was higher than the sum average of the two literal narrative texts. These findings suggested that for the students participating this study, expository texts proved more difficulty in relation to literal questions, which require greater memory capacity for retention of explicit information. The expository texts contain specific information about an addressed topic, while the narrative texts presente, as characteristic,

the organization of events and actions which are in a causal chain in a particular temporal dimension. Thus, the results indicated that the performance of the students was lmilted considering the way to deal with the narrative elements, to form inferences necessary for comprehension[7,15].

Previous studies have reported that variations in reading comprehension performances can be attributed to several factors related to the text characteristics and factors related to the reader. Textual factors are related to the characteristics, such as: genre - narrative, expository, descriptive, among others; discursive structure and syntactic complexity (types of sentences, phrasal extension, use of rhetorical markers, anaphoric elements); number, inference type and cognitive demand required; clear demarcation of the objectives of the text and theme presentation from the title. Factors referring to the readers are related to skills involved in the morphological, syntactic, semantic and pragmatic processes; activation of prior knowledge; ability to generate inferences; motivation and monitoring strategies. All these factors operate on the constitution process of significant representations during the comprehension activity and determine the constructed level of representation, superficial or profound[6,14,16-19].

That is, the effort to provide meaning involves information comprehension obtained from different cognitive processes and activities, which include decoding, lexical access, syntactic processing, different levels of mental representation, multiple realization of inferences, relating prior knowledge to subsequent activities to reading, for example, summarizing, arguing or answering questions. All this contributes to the readers' abilities, to extract meaning connecting multiple sentences in a consistent mental representation[7,20].

The results of this study also demonstrated that with academic progress, there were fewer errors in answers to questions of all applied texts, suggesting development of the processes involved in reading comprehension. The results indicated that the students´performances were very different from the 3rd to the 5th grades, pointing to a different interaction of the reader with the text, from the beginning of schooling to the later years, a fact also verified by previous studies[11,21-24]. Thus, the students from GIII seemed to reach higher levels in that process in relation to GII and this one, in relation to GI.

The results of this study also showed that the students from the 5th grade outperformed both for explicit and implied questions, in relation to the 4th grade and this in relation to the 3rd grade, constituting a higher amount of significant differences between the 5th and the 3rd grade as explained before. These findings corroborate previous studies[1,6,17,23-25] showing that students from the 4th, 5th and 6th grades also differed in their performances, especially regarding answers to explicit questions, presenting superior performance than the 3rd grade. The students of the 4th grade differed from all, nonetheless, presented superior performance in implicit questions, when compared to the other grades.

Data from this study also suggested that the students from the 5th grade could use their development of working memory and experiences with texts, influencing upon the answers of the questions for understanding texts applied, since there were different performances among the highest levels groups for literal questions, which rely on memory in order to be answered, influencing, consequently, upon text comprehension, in agreement with the study[26] which demonstrated relationship between working memory performance with increased comprehension rate.

Extraction of the meaning of texts read constitutes a skill required at each schooling stage, being essential for obtaining learning content. However, some students do not develop this skill, presenting discrepancies when learning how to read.

Thus, the students who have better comprehension, present greater prospects to engage in reading experiences, a fact which makes reading more automatic and more effective, increasing the prior diferences of the students. This fact has preoccupied educational researchers from various countries, pointing to the importance of assessing reading in the educational context, due to its importance, concerning the performance in other curriculum subjects. This distinction in performance ends up influencing further learning[20,27].

For this reason, the characterization of the students' performances in reading comprehension has fundamental importance, for making an intervention as early as possible when a problem is detected, in order to work with specific skills, amilng to elmilnate possible difficulties enabling the students to develop their total potential.

CONCLUSION

Data analyses for characterization of the students' profile, concluded that the students had fewer errors due to academic progress, indicating that reading

experience during the school years contributed for comprehension performance; the second reading provided improvements to some students in their performance when answering questions of the texts, in the second application of comprehension evaluation protocol, however, the students from the 3rd grade were not favored by this second reading, which was found in the expositive text E1 and in both narrative N1 and N2. Moreover, it was possible to observe that the students had higher averages for inferential questions, as well as to the macrostructure questions, corroborating the initial hypothesis of this study, but also had higher averages for the literal questions of the expository texts and inferential questions of the narrative texts, thus indicating that each type of text presented a particular difficulty to the students.

AmIng to assess the content and skills, given the lmiltations of the scope of assessment tools, it becomes essential to broaden, diversify and differentiate the valid and accurate procedures and instruments to evaluate reading comprehension in the psychoeducational evaluation realm, due to the amplitude and multifaceted nature of learning and development of the students, especially in the early schooling stages.

SPECIAL THANKS

To the Coordination of Higher Education Personnel (CAPES) for supporting the research, through the scholarship granted to the first author.

To Prof. Dr. Emilio Sánchez Miguel and his research group, from the University of Salamanca (Spain), for the collaboration on the construction of the assessment tool for reading comprehension, applied to the students in this study.

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