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# Capacity for self-monitoring reading comprehension in Elementary School

## *Capacidade de automonitoramento da compreensão leitora no Ensino Fundamental*

### Keywords

Reading  
Comprehension  
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### Descritores

Leitura  
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### ABSTRACT

**Purpose:** To investigate the capacity for self-monitoring reading comprehension in Brazilian Elementary School students. **Methods:** Fifty-three Elementary students in the 5th and 9th grades from two Public Schools in the city of São Paulo were assessed. They were selected based on their oral reading rate and grouped according to their performance in reading comprehension in the following categories: Group with best comprehension: students with adequate rate and accuracy, without difficulties in reading comprehension; Group with worst comprehension: students with adequate rate and accuracy but with difficulties in reading comprehension. Two narrative texts followed by eight questions to assess reading comprehension were presented. Two sentences and two words were replaced by ungrammatical elements and pseudo-words. Under the condition of spontaneous monitoring, students read the text aloud and answered the questions. The analysis considered the calculation of hesitation, self-correction, repetitions and mistakes. Under the condition of directed monitoring, students were instructed to read the text, either aloud or silently, after being told that certain parts of the text could not make sense, and they were oriented to underline such parts. The analysis was carried out by counting of underlined items. The comparisons were made with the Mann-Whitney test. **Results:** A difference was observed between the groups only at the sentence level among the 9th grade schoolchildren under the spontaneous monitoring and among the 5th grade schoolchildren under directed monitoring. **Conclusion:** Students with worst comprehension had a poorer performance to monitor the presence of ungrammatical sentences than their peers with best comprehension.

### RESUMO

**Objetivo:** Investigar a capacidade de automonitoramento da compreensão leitora de escolares brasileiros do Ensino Fundamental. **Método:** Avaliaram-se 53 alunos do 5º e 9º anos do Ensino Fundamental de escolas da rede pública de São Paulo, selecionados pelo valor de taxa de leitura oral de texto e agrupados a partir de seu desempenho em compreensão leitora em: Grupo de melhor compreensão: escolares com taxa e acurácia adequadas, sem dificuldades na compreensão leitora; Grupo de pior compreensão: escolares com taxa e acurácia adequadas e dificuldades na compreensão leitora. Dois textos narrativos acompanhados de oito questões para avaliar a compreensão leitora foram apresentados. Duas sentenças e duas palavras foram substituídas por elementos agramaticais, pseudopalavras. Na condição de monitoramento espontâneo, os escolares leram o texto oralmente e responderam a questões. A análise considerou o cômputo de hesitações, autocorreções, repetições e erros. Na condição de monitoramento dirigido, leram o texto, informados de que algumas partes poderiam não fazer sentido e que as sublinhassem. A análise se deu pelo cômputo dos itens sublinhados. Os grupos foram comparados pelo Teste de Mann-Whitney. **Resultados:** Observou-se diferença entre os grupos em nível frasal no 9º ano, na condição de monitoramento espontâneo, e no 5º ano, na condição de monitoramento dirigido. **Conclusão:** Escolares de pior compreensão leitora apresentaram desempenho inferior ao monitorar a presença de sentenças agramaticais.

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## INTRODUCTION

Efficient reading comprehension requires monitoring the content read and the strategies used for reading, until the understanding of the text is reached. Among the indispensable skills, the role of self-monitoring and evaluation of the acquired knowledge stands out. These executive functions<sup>(1,2)</sup> must be directed during reading in order to achieve the very goal of this action: to grasp the meaning or a coherent representation of what is proposed in the text. Effective monitoring must clearly show the perception that there was a failure in comprehension and that this must be resolved to ensure full understanding of the text<sup>(3-5)</sup>. The ability to define strategies to improve comprehension can distinguish good from poor readers<sup>(3,6-9)</sup>. The hypothesis that conditions of the self-monitoring ability during reading may be associated with specific deficits in reading comprehension<sup>(10,11)</sup> guided this research.

This study will show preliminary data from a research that aimed to investigate the ability of self-monitoring reading comprehension among Brazilian elementary school students. The experiment was based on procedures described in the literature to distinguish good from poor readers.

## METHODS

This is a prospective observational study (CAAE: 33421614500005505) that had the Terms of Consent and the Informed Consent forms signed by the Educational Institutions, the schoolchildren and their guardians.

### Sample

Fifty-three students were evaluated (34 girls). They were enrolled in the fifth (N = 34) and ninth (N = 19) grade of Elementary School of two public municipal schools of the city of São Paulo. Teachers indicated them after checking the inclusion criteria: absence of complaints or indicators of hearing or visual (uncorrected) deficits or neurological, behavioral and cognitive disorders as well as history of school retention.

In order to ensure the level of reading comprehension, students with reading rate values below 91 p.p.m. in the case of fifth-grade students, and below 110 p.p.m. in the case of ninth-grade students, were excluded<sup>(12)</sup>. Participants were grouped based on their performance in reading comprehension tests carried out with appropriate texts for the schooling level<sup>(13,14)</sup>: Group with best comprehension (G1); Group with worst comprehension (G2).

### Material

In order to evaluate the ability of self-monitoring reading comprehension, a team composed of 6 speech therapists and 1 linguist developed the protocol that ultimately consisted of 4 narrative texts - 2 for each school year, and 8 literal and inference questions for each text. One of them, as well as the 8 questions attached to it, composed the original protocol<sup>(10)</sup> which was translated and linguistically/culturally adapted to Brazilian Portuguese. The other 3 narrative texts and their questions were developed by the same team. In each text, two

sentences were changed on the order of words, resulting in ungrammatical structures. In addition to these modifications, two pseudo-words replaced the original words in different paragraphs. This research was preceded by pilots that allowed verifying the linguistic adequacy of the texts.

## Procedures

Participants were individually evaluated in times established in advance by the direction of the school.

Each student read 2 school texts: one for spontaneous monitoring assessment and the other for directed monitoring assessment. Because besides the fact that the sample was small, it was collected in two different schools, the order of presentation of texts for the total sample was kept fixed in this experiment in order to avoid bias in the procedure. Thus, the condition of spontaneous monitoring was evaluated first and then, directed monitoring. The instructions followed what is indicated by Oakhill et al.<sup>(10)</sup>.

### Spontaneous monitoring

Schoolchildren were given the instruction: “*You must read this text aloud and then answer the questions*”. The analysis was performed by computing hesitations, repetitions or errors during the reading of the text.

### Directed monitoring

Schoolchildren were given the instruction: “*You must read this text in undertone or aloud and then answer the questions. Some parts of the text may not make sense. Underline the words or phrases that you do not understand*”.

The number of underlined pseudo-words and sentences were counted (underlined words were not considered mistakes).

Comparisons between groups were made using the Mann-Whitney test (significant values: p-value < 0.05).

## RESULTS

Table 1 presents the descriptive statistics of Pseudo-words 1 and 2 and Ungrammatical Sentences 1 and 2 under spontaneous monitoring. Only the variable “hesitation” determined significant differences in the ninth grade, with the largest number of hesitations of G2 for mistakes of syntactic reorganization 1.

Table 2 presents the descriptive statistics and comparisons under directed monitoring: Pseudo-words 1 and 2 and Ungrammatical Sentences 1 and 2.

## DISCUSSION

Monitoring sense is a necessary skill for efficient comprehension<sup>(1,2)</sup>. Differences in self-monitoring ability may determine best or worst results in reading comprehension tasks. For this reason, the hesitations observed throughout the test with the ninth grade, specifically the experiment for identification of ungrammatical sentences, indicated a difference between the best and worst reading comprehension groups (Table 1).

**Table 1.** Descriptive statistics for the no word 1 and 2 and phrasal reorganization 1 and 2 in the situation of spontaneous monitoring and Mann-Whitney test results for comparisons between groups

Year	Groups	Variables	Pseudo-word 1						Pseudo-word 2					
			Min.	Max.	Mean	S.D.	U	p-value	Min.	Max.	Mean	S.D.	U	p-value
5th	G1	Hesitation	0	1	0.78	0.42	114.500	0.980	0	2	0.65	0.57	108.000	0.748
			G2	0	2	0.80			0.63	0	1	0.70		
	G1	Repetition	0	2	0.43	0.59	103.000	0.576	0	2	0.39	0.58	111.000	0.852
			G2	0	1	0.30			0.48	0	1	0.40		
	G1	Self-correction	0	0	0.00	0.00	115.000	1.000	0	1	0.09	0.29	113.500	0.906
			G2	0	0	0.00			0.00	0	1	0.10		
	G1	Total	0	3	1.22	0.85	104.000	0.649	0	3	1.13	0.82	107.000	0.737
			G2	0	3	1.10			0.99	0	2	1.20		
9th	G1	Hesitation	0	1	0.25	0.45	34.500	0.432	0	1	0.67	0.49	34.000	0.376
			G2	0	1	0.43			0.54	0	1	0.86		
	G1	Repetition	0	1	0.08	0.29	39.500	0.691	0	2	0.42	0.67	33.500	0.351
			G2	0	1	0.14			0.38	0	1	0.14		
	G1	Self-correction	0	0	0.00	0.00	42.000	1.000	0	0	0.00	0.00	42.000	1.000
			G2	0	0	0.00			0.00	0	0	0.00		
	G1	Total	0	1	0.33	0.49	36.000	0.550	0	2	1.08	0.52	39.000	0.743
			G2	0	2	0.57			0.79	0	2	1.00		
<b>Ungrammatical sentence 1</b>						<b>Ungrammatical sentence 2</b>								
5th	G1	Hesitation	0	2	0.91	0.52	83.000	0.119	0	4	1.35	0.89	93.000	0.325
			G2	0	1	0.60			0.52	0	2	1.00		
	G1	Repetition	0	2	0.70	0.56	113.500	0.946	0	4	0.83	1.11	102.500	0.598
			G2	0	2	0.70			0.68	0	2	0.90		
	G1	Self-correction	0	1	0.22	0.42	113.000	0.912	0	2	0.39	0.66	111.500	0.865
			G2	0	1	0.20			0.42	0	1	0.30		
	G1	Total	1	3	1.83	0.65	111.000	0.860	1	7	2.57	1.44	109.500	0.822
			G2	0	4	1.80			1.03	0	3	2.20		
9th	G1	Hesitation	0	2	0.83	0.72	19.000	<b>0.036*</b>	0	3	1.08	0.79	42.000	1.000
			G2	1	2	1.57			0.54	1	1	1.00		
	G1	Repetition	0	1	0.50	0.52	33.000	0.374	0	2	0.58	0.79	27.000	0.172
			G2	0	1	0.29			0.49	0	2	1.14		
	G1	Self-correction	0	1	0.17	0.39	37.000	0.550	0	2	0.50	0.67	37.500	0.667
			G2	0	1	0.29			0.49	0	1	0.57		
	G1	Total	0	3	1.58	0.79	21.000	<b>0.046*</b>	0	3	2.17	0.94	27.500	0.172
			G2	2	3	2.29			0.49	2	3	2.71		

\*Significant values ( $p \leq 0.05$ )

**Caption:** G1 = group with better comprehension; G2 = group with worst comprehension; S.D. = Standard Deviation

**Table 2.** Descriptive statistics and Mann-Whitney test results for comparisons between groups in the directed monitoring tasks

Year	Groups	Variables	Minimum	Maximum	Mean	S.D.	U	p-value
5th	G1	DMP1	0	1	0.46	0.51	115.000	0.827
			G2	0	1	0.50		
	G1	DMP2	0	1	0.17	0.38	104.000	0.388
			G2	0	1	0.30		
	G1	DMUS1	0	1	0.37	0.50	0	<b>0</b>
			G2	0	0	0.00		
	G1	DMUS2	0	1	0.54	0.51	91.000	0.205
			G2	0	1	0.30		
9th	G1	MDNP1	0	1	0.50	0.52	39.000	0.770
			G2	0	1	0.57		
	G1	MDNP2	0	1	0.75	0.45	40.500	0.868
			G2	0	1	0.71		
	G1	DMUS1	0	1	0.33	0.49	26.000	0.118
			G2	0	1	0.71		
	G1	DMUS2	0	1	0.58	0.52	35.500	0.526
			G2	0	1	0.43		

\*Significant values ( $p \leq 0.05$ )

**Caption:** G1 = group with better comprehension; G2 = group with worst comprehension; DMP1 = Directed Monitoring Pseudo-words 1; DMP2 = Directed Monitoring Pseudo-words 2; DMUS1 = Directed Monitoring Ungrammatical Sentences 1; DMUS2 = Directed Monitoring Ungrammatical Sentences 2; SD = Standard Deviation

The accuracy to detect inconsistencies in a text proved to be lower when the G2 was compared to the G1.

On the other hand, not all the tasks designed to assess self-monitoring while reading showed evidence of the expected difference. The assessment of spontaneous self-monitoring at word level showed no differences in the performance of schoolchildren with best and worst comprehension skills<sup>(10)</sup> (Table 1). G1 as G2 presented similar average performance. The vocabulary level of schoolchildren (uncontrolled variable in this experiment) may have influenced this result.

With regard to the investigation of the condition of directed monitoring (Table 2), it was observed that children with best comprehension of the fifth grade identified more sentence-level mistakes than children with worst comprehension, as expected. These results corroborate the literature: schoolchildren with bad comprehension in the fourth grade do not get involved in precise monitoring, especially when directly assessed<sup>(3)</sup>.

Thus, the best performance of the G1 of the fifth and ninth grade in identifying sentence-level mistakes partially corroborates the findings of Oakhill et al.<sup>(10)</sup>, whose experiment demonstrated the superior performance of participants with good reading comprehension, although only at the sentence level.

## CONCLUSION

Schoolchildren with worst reading comprehension had lower performance while monitoring the presence of ungrammatical sentences. In the ninth year, the difference was evidenced under spontaneous self-monitoring and in the fifth grade, under directed monitoring.

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## Author contributions

*GJB participated in the design, collection, bibliographic survey and preparation of the article; CAF participated as co-supervisor of the study, in the bibliographic survey, discussion and elaboration of the article; CRBA participated as supervisor of the study, in the discussion of the data, development of the article and final revision.*