

Chapter #14

PERFORMANCE OF BRAZILIAN MIDDLE AND HIGH SCHOOL STUDENTS IN READING PROCESSES: COMPARATIVE STUDY BETWEEN PUBLIC AND PRIVATE EDUCATION

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ABSTRACT

This chapter discusses the following question: Is there a difference in the assessment for reading processes between students in public or private middle and high school? To answer these questions, this chapter aims to compare the performance of middle and high school students of public and private schools using tests from the Brazilian Adaptation of Reading Processes Assessment Battery - PROLEC-SE-R. The Reading Processes Assessment Battery - PROLEC-SE-R, individual version, was applied to 436 students: 221 from public school and 215 from private school, in the following order: 1) Reading Words, 2) Reading Pseudowords, 3) Grammatical Structures II, 4) Punctuation Marks, 5) Reading Comprehension I, 6) Reading Comprehension II, e 7) Oral Comprehension. A cross-sectional study was performed using descriptive and bivariate analysis. Based on these results, the answer to the initial question is affirmative. Private school students do indeed achieve a higher mean score when compared to public school students in word reading, showing that spelling helps in the reading processes. When knowledge of the use of the word in a sentence, extraction of meaning and its understanding is required, the difficulty of accessing the mental lexicon of the population studied becomes evident.

Keywords: education, middle school, high school, reading, comprehension, evaluation, adolescent.

1. INTRODUCTION

The expectation of both parents and children, upon entering school, is to learn to read and write. Every school day they will be asked to carry out activities, which they still do not have all the necessary skills to develop them, but reading will be the essential tool for later learning. Reading is fundamental with regard to school issues, performance in college, in the profession, in participation in society. It also influences the health, financial life and also the next generation of the individual (Azizifar, Roshani, Gowhary, & Jamalinesari, 2015; Denton et al., 2015; Hjetland, Brinchmann, Scherer, Hulme, & Melby-Lervåg, 2020; Okkinga et al., 2018; Sánchez, Garcia, & Pardo, 2012; Ter Beek, Brummer, Donker, & Opdenakker, 2018).

When talking about reading, we talk about two major components, decoding and comprehension, which use different mental operations. Decoding is located in the first mental operation, called the lower level, and concerns the mechanics of reading. It encompasses word recognition and its automatism, which is nothing more than transposing printed words into speech, regardless of their meaning, quickly and accurately. Visual analysis, grapheme-phoneme conversion and vocabulary skills are also involved. The process of word recognition and the attribution of meaning have a strong influence on the final result of

reading, which is comprehension (Holmes, 2009; Hjetland et al., 2020; Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; Sánchez et al., 2012; Tiffin-Richards & Schroeder, 2015).

In 2015, 23,141 students from state and private schools participated in the Program for International Student Assessment (PISA). Considering the overall panorama, of the three areas evaluated (mathematics, reading and science), Brazil ranked 63rd, while in reading, the Country occupies 59th place. The percentage of students at level 2, considered by the Organisation for Economic Co-operation and Development (OECD) to be the minimum necessary for the exercise of citizenship, is 25%, with 50.99% below level 2. In other words, five out of ten Brazilian schoolchildren have not reached the necessary skills for reading and comprehension (Brasil, 2016a).

The latest international assessment, with data published in 2019 (PISA 2018), revealed that 50.1% of students aged 15 years are below the minimum level of reading necessary for the exercise of citizenship. This means that Brazilian students did not reach the minimum skills necessary for reading (Brasil, 2019; OECD, 2019).

In the National Secondary Education Examination (ENEM), which assesses student performance at the end of basic education and is used as a selection mechanism for admission to Higher Education, it was observed that in 2015, 5,642 candidates failed in at least one of the four objective or essay tests. The graduates, in this case, came from 376 private institutions and 5,266 from state schools. The areas they failed most frequently were mathematics and its technologies by 4,899 students and writing by 3,045 students (Brasil, 2016b).

In the study by Oliveira and Capellini (2010), in which the reading processes of middle school students in state and private educational institutions were evaluated, the students attending private education presented superior performance when compared to state education in the evaluation tests for letter identification, lexicon, as well as syntactic and semantic process. The most outstanding data was the very low average score of students from the state education system regarding phoneme knowledge, which explicitly reveals the absence (or failure) of teaching grapheme-phoneme relationship in state school classrooms.

The gaps generated in literacy hinder the development of basic skills necessary for reading, such as acquisition of the mental lexicon and the decoding process that enables word recognition. This will have ongoing negative repercussions in the teaching-learning process throughout middle to high school.

Based on the above, the following question was raised: Is there a difference in the assessment for reading processes between children studying in state or private sector middle and high schools?

Thus, this chapter aims to compare the performance of students attending middle and high schools in state and private education using tests from the Brazilian Adaptation of Reading Processes Assessment Battery - PROLEC-SE-R.

2. METHOD

A cross-sectional study, approved by the Institution's Research Ethics Committee (resolution no. 1,125,746).

In accordance with the National Health Council resolution CNS 196/96, the Free and Informed Consent Form was signed by the parents or guardians and the Assent Form by participating students.

2.1. Participants

A total of 436 students were evaluated, randomly selected from the reference population, 221 (50.69%) from state education and 215 (49.31%) from private education; of these, 263 were female (145 state education and 118 private education) and 173 male (76 state education and 97 private education). The students were then subdivided into the following groups:

- **State schools** (221 students)
 - G1:** 6th year middle school (n = 30, mean age 11.2 yrs)
 - G2:** 7th year middle school (n = 33, mean age 11.9 yrs)
 - G3:** 8th year middle school (n = 35, mean age 12.8 yrs)
 - G4:** 9th year middle school (n = 31, mean age 13.9 yrs)
 - G5:** 1st year high school (n = 32, mean age 14.8 yrs)
 - G6:** 2nd year high school (n = 30, mean age 16.0 yrs)
 - G7:** 3rd year high school (n = 30, mean age 17.1 yrs)
- **Private schools** (215 students)
 - G8:** 6th year middle school (n = 31, mean age 11.1 yrs)
 - G9:** 7th year middle school (n = 31, mean age 12.6 yrs)
 - G10:** 8th year middle school (n = 30, mean age 12.9 yrs)
 - G11:** 9th year middle school (n = 31, mean age 13.9 yrs).
 - G12:** 1st year high school (n = 30, mean age 15.1 yrs)
 - G13:** 2nd year high school (n = 31, mean age 16.2 yrs)
 - G14:** 3rd year high school (n = 31, mean age 17.2 yrs)

2.2. Selection criteria

The inclusion criteria were: 1) signing the Informed Consent Form by parents or guardians; 2) signing the Assent Form by students; and 3) be regularly enrolled in middle school or high school at the participating schools.

The exclusion criteria were: 1) students who refused to participate, even though their parents or guardians had signed an informed consent form; 2) students with an interdisciplinary diagnosis of learning disorder, dyslexia and Attention-Deficit / Hyperactivity Disorder; 4) learning complaint; 5) language or speech alteration; 6) impairment of visual and hearing acuity; 7) diagnosis of genetic or neurological syndromes; 8) history of repeated school year; and 9) low intellect.

2.3. Instruments

Application of the Reading Processes Assessment Battery - PROLEC-SE-R (Oliveira, 2017), individual version, in the following order:

1) Reading Words: The task consists of reading aloud four word lists (RW1 to RW4). Each list contains 24 words, distributed as follows: LW1 short and high frequency words, LW2 long and high frequency words, LW3 short and low frequency words and LW4 long and low frequency words. The time spent on reading the lists is noted;

2) Reading Pseudowords: The task is to read aloud the two lists (RPW1 and RPW2). The pseudowords were divided into short (disyllabic pseudowords – RPW1) and long (trisyllable and polysyllable pseudowords – RPW2). Noting the time spent on reading the lists;

3) Grammatical Structures II: In this test, the task is to identify the drawing that corresponds to the one indicated by the sentence, it comprises 24 stimuli and one example.

4) Punctuation Marks: The task is to read the text aloud. The examiner must pay attention to the correct intonation of the highlighted punctuation marks. The reading time in seconds is recorded;

5) Reading Comprehension I: The task is to read the text aloud. The text is expository type with ten literal and inferential questions. The student can consult the text to answer the questions;

6) Reading Comprehension II: The task is to read the text silently. The text is expository and the ten questions are literal. The student cannot consult the text to answer the questions;

7) Oral Comprehension: In this test, the examiner reads aloud a text to the student twice, then asks ten comprehension questions one at a time.

2.4. Procedures

Data collection was carried out in the school environment, at the students' usual period of attending school and in a single session. The schedule for the assessments having been previously arranged with the coordinators and teachers. The following procedures were adopted:

- a) Signing the Free and Informed Consent Form by those responsible for the students;
- b) Signature of the Assent Form by the students evaluated;
- c) Application of Reading Processes Assessment Battery - PROLEC-SE-R (Oliveira, 2017);
- d) Survey of Portuguese grades and all other subjects, except physical education.

2.5. Data analysis

STATA /SE (Version 13) software, was used for statistical treatment. Descriptive statistical tools (absolute and relative frequency, standard deviation and median) were applied to characterize the population. Bivariate analysis was performed in order to identify associations between variables, tested in pairs. For all tests applied, a significance level of $\alpha = 0.05$ was adopted. To compare means, Student t-test (one-tailed) was used with regard to the time variables, according to the school year and type of education. The Wilcoxon test (Mann-Whitney test) was used to compare the performance of students in the PROLEC-SE-R tests, according to education sector (state or private).

3. RESULTS

Regarding the Portuguese grades and the general average of all academic subjects, there is evidence that the average for the Portuguese grade for the 6th year of private education is higher than that of the 6th year of state education ($p = 0.009^*$, state: $\bar{x} = 6.70$, $SD = 1.45$, 95% CI: 6.15; 7.24; private: $\bar{x} = 7.57$, $SD = 1.32$, 95% CI: 7.03; 8.05). For the remaining years of Middle School and High School, Student t-test did not indicate evidence that one mean is lower than the other for Portuguese grades nor for all the years considering an overall average grade (Table 1).

Table 1.
Distribution of Portuguese and overall average grades of marks from all disciplines of the 1st semester, 2015.

	Groups	Mean (score)	SD	CI 95%	<i>p</i> -Value	
Portuguese grades	Middle school					
	G 1	6.70	1.45	6.15	7.24	0.009*
	G 8	7.57	1.32	7.03	8.05	
	total	7.14	1.45	6.77	7.51	
	G 2	6.83	1.72	6.22	7.44	0.114
	G 9	7.29	1.27	6.82	7.76	
	total	7.05	1.53	6.67	7.44	
	G 3	7.30	1.39	6.81	7.78	0.112
	G 10	7.66	0.91	7.32	8.00	
	total	7.46	1.20	7.17	7.76	
	G 4	6.50	1.93	5.79	7.21	0.509
	G 11	6.49	1.27	6.02	6.96	
	total	6.49	1.62	6.08	6.91	
	High School					
G 5	6.70	1.83	6.03	7.36	0.947	
G 12	6.11	0.69	5.85	6.37		
total	6.41	1.42	6.05	6.78		
G 6	7.39	1.32	6.90	7.89	1.000	
G 13	5.80	1.12	5.39	6.21		
total	6.58	1.45	6.21	6.96		
G7	8.21	1.20	7.76	8.66	1.000	
G 14	5.82	1.23	5.37	6.27		
total	7.00	1.70	6.56	7.43		
Overall average grades	Middle school					
	G 1	7.18	1.36	6.67	7.69	0.132
	G 8	7.56	1.30	7.08	8.04	
	total	7.37	1.33	7.03	7.72	
	G 2	7.74	1.21	7.31	8.17	0.952
	G 9	7.19	1.38	6.68	7.69	
	total	7.47	1.31	7.14	7.80	
	G 3	7.24	1.45	6.74	7.74	0.193
	G 10	7.51	0.96	7.15	7.87	
	total	7.37	1.25	7.05	7.68	
	G 4	6.85	1.59	6.27	7.44	0.723
	G 11	6.63	1.37	6.12	7.13	
	total	6.74	1.47	6.36	7.11	
	High School					
G 5	7.01	1.16	6.60	7.43	0.999	
G 12	5.93	0.90	5.59	6.27		
total	6.49	1.17	6.19	6.79		
G 6	7.48	1.19	7.04	7.93	1.000	
G 13	6.18	1.18	5.74	6.61		
total	6.82	1.34	6.47	7.17		
G7	7.06	1.02	6.68	7.44	1.000	
G 14	5.52	1.21	5.07	5.96		
total	6.28	1.36	5.93	6.63		

Student t-test. * Statistical evidence of an association ($p < 0.05$)

Evidence was identified that the mean time spent in minutes is higher for private school students from the 2nd year of high school ($p = 0.025^*$, 95% CI state school: 28.79; 33.27/ 95% CI private education: 32.12; 35.29). For the other school years, it appears that there was no evidence that one average is lower than the other, for the execution of the tests.

In Reading Words 1, evidence of a difference for the average of correct answers was identified for the 7th year students ($p = 0.025$) (Table 2); no evidence of a difference in time in seconds was identified for this list.

In Word List 2 (Table 2), the Wilcoxon test indicated evidence of a difference for the 7th year ($p = 0.045$) and 1st year ($p = 0.029$) for correct answers and for the 2nd year (state: $\bar{x} = 19.43$, $SD = 5.27$; private: $\bar{x} = 16.83$, $SD = 3.53$, $p = 0.024$) in the mean time in seconds.

For Reading Words 3 (Table 2), evidence of a difference in relation to the mean score of correct answers was not found; however, in relation to the mean time in seconds, there is evidence of a difference for the 6th year (state: $\bar{x} = 25.76$, $SD = 7.72$; private: $\bar{x} = 22.70$, $SD = 9.67$, $p = 0.027$); 9th year (state: $\bar{x} = 20.96$, $SD = 4.87$; private: $\bar{x} = 17.32$, $SD = 3.59$, $p = 0.004$); 1st year (state: $\bar{x} = 21.62$, $SD = 5.10$; private: $\bar{x} = 18.06$, $SD = 4.03$, $p = 0.005$) and 2nd year (state: $\bar{x} = 18.50$, $SD = 4.03$; private: $\bar{x} = 16.32$, $SD = 3.54$, $p = 0.017$).

In Word List 4 (Table 2), evidence of a difference was found for the 7th year ($p = 0.037$) and 9th year ($p = 0.007$) for the mean number of correct answers; and, in relation to the mean time in seconds, for the 6th year (state: $\bar{x} = 41.16$, $SD = 14.11$; private: $\bar{x} = 35.61$, $SD = 15.65$, $p = 0.028$); 9th year (state: $\bar{x} = 31.12$, $SD = 6.61$; private: $\bar{x} = 24.41$, $SD = 5.35$, $p < 0.001$); 1st year (state: $\bar{x} = 30.46$, $SD = 8.28$; private: $\bar{x} = 24.10$, $SD = 4.12$, $p = 0.001$) and 2nd year (state: $\bar{x} = 27.00$, $SD = 5.30$; particular: $\bar{x} = 22.22$, $SD = 4.80$, $p < 0.001$).

Table 2.
Description and comparison of correct answers in the tests Reading Words (RW) 1, 2, 3 and 4.

Groups	Mean	SD	Median	p-Value
RW 1 - correct				
G 1	23.63	0.61	24.00	0.487
G 8	23.74	0.51	24.00	
total	23.68	0.56	24.00	
G 2	23.54	0.51	24.00	0.025*
G 9	23.87	0.34	24.00	
total	23.70	0.55	24.00	
G 3	23.80	0.40	24.00	0.124
G 10	23.93	0.25	24.00	
total	23.86	0.34	24.00	
G 4	23.64	0.66	24.00	0.439
G 11	23.80	0.40	24.00	
total	23.72	0.54	24.00	
G 5	23.81	0.39	24.00	0.332
G 12	23.90	0.43	24.00	
total	23.85	0.35	24.00	
G 6	23.86	0.43	24.00	0.282
G 13	23.96	0.17	24.00	
total	23.91	0.33	24.00	
G7	23.93	0.25	24.00	0.145
G 14	23.80	0.40	24.00	
total	23.86	0.34	24.00	

RW 2 - correct				
G 1	23.56	0.85	24.00	0.608
G 8	23.54	0.76	24.00	
total	23.55	0.80	24.00	
G 2	23.45	1.03	24.00	0.045*
G 9	23.77	0.92	24.00	
total	23.60	0.98	24.00	
G 3	23.77	0.49	24.00	0.256
G 10	23.90	0.30	24.00	
total	23.83	0.41	24.00	
G 4	23.90	0.39	24.00	0.974
G 11	23.95	0.24	24.00	
total	23.91	0.32	24.00	
G 5	23.71	0.58	24.00	0.029*
G 12	23.96	0.18	24.00	
total	23.83	0.45	24.00	
G 6	23.90	0.18	24.00	0.966
G 13	23.90	0.30	24.00	
total	23.90	0.30	24.00	
G7	23.96	0.18	24.00	0.309
G 14	24.00	0.00	24.00	
total	23.98	0.12	24.00	
RW 3 - correct				
G 1	22.43	2.32	23.00	0.820
G 8	22.77	1.54	23.00	
total	22.60	1.96	23.00	
G 2	22.78	2.21	23.00	0.455
G 9	23.25	1.26	24.00	
total	23.01	1.82	24.00	
G 3	23.57	0.65	24.00	0.154
G 10	23.30	0.87	23.00	
total	23.44	0.77	24.00	
G 4	23.41	0.92	24.00	0.586
G 11	23.51	0.92	24.00	
total	23.46	0.91	24.00	
G 5	23.21	1.66	24.00	0.615
G 12	23.60	0.77	24.00	
total	23.40	1.31	24.00	
G 6	23.56	0.77	24.00	0.261
G 13	23.80	0.40	24.00	
total	23.68	0.62	24.00	
G7	23.76	0.50	24.00	0.398
G 14	23.58	0.84	24.00	
total	23.67	0.70	24.00	
RW 4 - correct				
G 1	21.56	2.71	22.50	0.112
G 8	22.29	2.45	23.00	
total	21.93	2.58	23.00	
G 2	22.06	1.91	22.00	0.037*
G 9	22.96	1.37	23.00	
total	22.50	1.72	23.00	

Performance of Brazilian Middle and High School Students in Reading Processes: Comparative Study between Public and Private Education

G 3	22.94	1.32	23.00	0.137
G 10	23.43	0.93	24.00	
total	23.16	1.18	24.00	
G 4	22.96	0.91	23.00	0.007*
G 11	23.48	1.02	24.00	
total	23.22	0.99	24.00	
G 5	22.84	1.95	24.00	0.154
G 12	23.56	0.72	24.00	
total	23.19	1.52	24.00	
G 6	23.53	0.86	24.00	0.436
G 13	23.74	0.51	24.00	
total	23.63	0.70	24.00	
G7	23.70	0.70	24.00	0.232
G 14	23.90	0.30	24.00	
total	23.80	0.54	24.00	

Wilcoxon test. * Statistical evidence of an association ($p < 0.05$)

Regarding Reading Pseudowords (Table 3), there was no evidence of a difference between school years by type of education, for the mean number of correct answers. This suggests that the mean performance of students, by type of education, in Reading Short and Long Pseudowords does not differ.

Regarding Reading Time in seconds, for Pseudoword List 1, evidence of a difference was suggested for the 6th year (state: $\bar{x} = 32.10$, $SD = 8.27$; private: $\bar{x} = 25.45$, $SD = 6.19$, $p = 0.002$); 1st year (state: $\bar{x} = 28.34$, $SD = 9.01$; private: $\bar{x} = 21.43$, $SD = 4.06$, $p < 0.001$) and 2nd year (state: $\bar{x} = 23.73$, $SD = 5.10$; private: $\bar{x} = 20.29$, $SD = 5.23$, $p = 0.010$), and for the 6th year (state: $\bar{x} = 52.00$, $SD = 14.03$; private: $\bar{x} = 43.45$, $SD = 12.32$, $p = 0.014$); 7th year (state: $\bar{x} = 46.63$, $SD = 13.70$; private: $\bar{x} = 39.45$, $SD = 5.91$, $p = 0.031$); 9th year (state: $\bar{x} = 43.77$, $SD = 10.50$; private: $\bar{x} = 35.09$, $SD = 7.44$, $p < 0.001$); 1st year (state: $\bar{x} = 42.71$, $SD = 11.42$; private: $\bar{x} = 31.90$, $SD = 7.20$, $p < 0.001$) and 2nd year (state: $\bar{x} = 38.83$, $SD = 8.04$; private: $\bar{x} = 32.83$, $SD = 5.75$, $p = 0.002$) in Pseudoword List 2.

Table 3.
Description and comparison of correct answers in the tests for Reading Pseudowords 1 and 2 and of the tests for the Syntactic Process Grammatical Structures and Punctuation Marks.

Groups	Mean	SD	Median	p-Value
Pseudoword 1 - correct				
G 1	21.90	2.42	22.50	0.639
G 8	22.22	2.02	23.00	
total	22.06	2.22	23.00	
G 2	22.27	2.51	23.00	0.780
G 9	22.41	1.94	23.00	
total	22.34	2.24	23.00	
G 3	22.40	1.81	23.00	0.050
G 10	23.10	1.49	24.00	
total	22.72	1.70	23.00	
G 4	22.93	1.54	24.00	0.430

G 11	22.64	1.74	23.00	
total	22.79	1.64	23.00	
G 5	22.34	2.47	23.00	0.167
G 12	23.03	1.49	24.00	
total	22.67	2.07	23.00	
G 6	22.40	1.97	23.00	0.038
G 13	23.25	1.06	23.00	
total	22.83	1.62	23.00	
G7	23.13	0.93	23.00	0.512
G 14	23.12	1.43	24.00	
total	23.13	1.20	23.00	
Pseudoword 2 - correct				
G 1	19.20	4.45	21.00	0.499
G 8	20.35	3.03	21.00	
total	19.78	3.81	21.00	
G 2	20.60	3.72	22.00	0.956
G 9	20.93	3.16	22.00	
total	20.76	3.43	22.00	
G 3	21.31	2.43	22.00	0.883
G 10	21.43	2.41	22.00	
total	21.36	2.40	22.00	
G 4	21.19	2.74	22.00	0.869
G 11	21.45	2.24	22.00	
total	21.32	2.49	22.00	
G 5	21.09	3.56	23.00	0.333
G 12	22.30	1.85	23.00	
total	21.67	2.91	23.00	
G 6	22.13	2.25	22.50	0.625
G 13	22.06	1.84	23.00	
total	22.09	2.03	23.00	
G7	21.90	2.52	22.50	0.546
G 14	21.61	2.40	22.00	
total	21.75	2.44	22.00	
Grammatical Structures				
G 1	16.00	3.68	17.00	0.782
G 8	16.25	2.73	16.00	
total	16.13	3.21	16.00	
G 2	16.87	2.38	17.00	0.467
G 9	17.58	2.59	17.00	
total	17.21	2.49	17.00	
G 3	17.42	2.35	18.00	0.005*
G 10	19.30	2.38	19.00	
total	18.29	2.52	19.00	
G 4	17.38	2.87	17.00	0.013*
G 11	19.06	2.12	18.00	
total	18.22	2.64	19.00	
G 5	17.15	2.51	17.00	0.032*
G 12	18.66	2.82	19.00	
total	17.88	2.75	17.50	

Performance of Brazilian Middle and High School Students in Reading Processes: Comparative Study between Public and Private Education

G 6	17.96	2.05	18.00	0.057
G 13	19.19	2.61	19.00	
total	18.59	2.41	19.00	
G7	18.46	2.64	18.00	0.722
G 14	18.61	3.15	19.00	
total	18.54	2.89	18.00	
Punctuation Marks				
G 1	29.38	2.13	30.00	0.128
G 8	28.18	3.20	29.00	
total	28.85	3.04	30.00	
G 2	28.18	3.20	29.00	<0.001*
G 9	29.93	2.64	31.00	
total	29.03	3.05	30.00	
G 3	27.88	3.44	29.00	0.000*
G 10	30.46	1.16	31.00	
total	29.07	2.93	30.00	
G 4	28.25	3.28	30.00	<0.001*
G 11	30.67	0.54	31.00	
total	29.46	2.63	30.50	
G 5	29.46	1.77	30.00	0.686
G 12	29.63	1.62	30.00	
total	29.54	1.69	30.00	
G 6	29.73	2.01	30.50	0.165
G 13	30.03	2.02	31.00	
total	29.88	2.00	31.00	
G7	29.76	1.75	30.00	0.635
G 14	29.77	1.70	31.00	
total	29.77	1.71	30.00	

Wilcoxon test. * Statistical evidence of an association ($p < 0.05$)

Regarding the Syntactic Process evaluation tests (Table 3), evidence of a difference was found in the Grammatical Structures II test for the 8th year ($p = 0.005$), 9th year ($p = 0.013$) and 1st year ($p = 0.032$). In the Punctuation Marks test score signs, average of correct answers, for the 7th year ($p < 0.001$), 8th year ($p = 0.000$), and 9th year ($p < 0.001$).

As for the assessment of the semantic process (Table 4), in the Reading Comprehension I test, there is evidence of a difference regarding the number of correct answers for the 6th year ($p = 0.045$), 7th year ($p = 0.003$), 8th year ($p = < 0.001$) and 1st year ($p = 0.013$). According to the mean score, in the years in which there was evidence of a difference, private school students presented a superior performance in relation to those students at the state schools.

In the Reading Comprehension II test, there was evidence of difference for all school years; a fact that indicated superior performance of students in private education, except for the 3rd year ($p = 0.162$). In the Oral Comprehension test, evidence of a difference was found only among students in the 6th year ($p = 0.004$), 8th year ($p = 0.000$), 9th year ($p = 0.002$) and 1st year ($p = 0.004$). From the mean score, superior performance was verified by students in private education when compared to their peers in state schools.

Table 4. Description and comparison of correct answers in the tests of Semantic Process: Reading Comprehension I, Reading Comprehension II and Oral Comprehension.

Groups	Mean	SD	Median	p-Value
Reading Comprehension I				
G 1	3.00	1.92	3.00	0.045*
G 8	4.19	2.15	4.00	
total	3.60	2.11	4.00	
G 2	3.57	1.85	3.00	0.003*
G 9	5.06	1.91	5.00	
total	4.29	2.01	4.00	
G 3	3.60	1.78	4.00	<0.001*
G 10	5.36	1.71	6.00	
total	4.41	1.95	5.00	
G 4	4.00	2.08	4.00	0.257
G 11	4.64	2.00	4.00	
total	4.32	2.05	4.00	
G 5	4.03	2.34	4.00	0.013*
G 12	5.33	1.86	5.50	
total	4.66	2.20	4.00	
G 6	4.66	1.88	5.00	0.095
G 13	5.41	1.82	6.00	
total	5.04	1.87	5.00	
G7	4.63	2.00	5.00	0.468
G 14	5.19	1.72	5.00	
total	4.91	1.87	5.00	
Reading Comprehension II				
G 1	2.66	2.30	2.00	0.002*
G 8	4.61	2.33	5.00	
total	3.65	2.50	3.00	
G 2	3.57	2.43	3.00	<0.001*
G 9	5.77	1.82	6.00	
total	4.64	2.41	4.00	
G 3	4.25	2.21	4.00	<0.001*
G 10	6.33	1.86	6.00	
total	5.21	2.29	5.00	
G 4	3.74	2.60	3.00	0.000*
G 11	6.93	2.42	7.00	
total	5.33	2.96	5.50	
G 5	4.46	3.02	4.50	0.015*
G 12	6.43	1.95	6.50	
total	5.41	2.73	6.00	
G 6	5.16	2.73	5.50	<0.001*
G 13	7.41	1.82	8.00	
total	6.31	2.55	7.00	
G7	6.33	2.00	6.00	0.162
G 14	6.74	3.06	8.00	
total	6.54	2.58	7.00	

Oral comprehension				
G 1	2.66	2.32	2.50	0.004*
G 8	4.41	2.23	4.00	
total	3.55	2.42	3.00	
G 2	4.09	2.68	4.00	0.180
G 9	4.96	2.45	5.00	
total	4.51	2.59	4.00	
G 3	3.88	2.63	3.00	0.000*
G 10	6.80	1.84	7.00	
total	5.23	2.71	6.00	
G 4	3.70	2.11	3.00	0.002*
G 11	5.83	2.70	6.00	
total	4.77	2.63	5.00	
G 5	4.06	2.58	4.00	0.004*
G 12	6.03	2.05	6.00	
total	5.01	2.53	5.00	
G 6	5.13	2.99	5.50	0.127
G 13	6.32	2.28	7.00	
total	5.73	2.70	6.00	
G7	5.73	2.25	6.00	0.286
G 14	6.29	2.01	7.00	
total	6.01	2.14	6.00	

Wilcoxon test. * Statistical evidence of an association ($p < 0.05$)

4. DISCUSSION

On analyzing the mean age of the students, no difference was identified between the groups, except for the 1st year of high school. This is due to the fact that the variables of repeating a school year and late admission, diagnoses of learning disorders and/or other comorbidities were controlled, which practically eliminates any discrepancy in relation to age and year. The INEP [National Institute of Educational Studies and Research] reports that the age-grade gap represents a serious problem, as many students are not in the appropriate year for their age (Brasil, 2016a; Fritsch, Vitelli, & Rocha, 2014).

Regarding the average grades of Portuguese in the 1st semester and the overall average of grades in all academic subjects, there was a difference between the education sectors only for Portuguese in the 6th year of school. In the study by Oliveira (2017), in which all middle school students were compared with state and private high school students, this difference was not found either, a fact that certainly occurred because the variables were controlled, as described in the inclusion and exclusion criteria.

However, in the study by Sampaio and Guimarães (2009), in which the performance of state and private high school students was compared, it was found that the grades of state school students were lower than those of private school students, as well as the maximum efficiency of students from private schools, followed by students from federal state education and state education. Thereby corroborating this study, regarding the superior performance of students from private education, when considering the mean number of correct answers in the PROLEC-SE-R tests.

National studies, with students from middle school, also reported superior performance of those from private education in relation to state schools, for tests that assess reading and writing skills (Bicalho & Alves, 2010; Gonçalves, Neves, Nicolielo, Crenitte, & Lopes-Herrera, 2013; Oliveira & Capellini, 2010; Oliveira, Germano, & Capellini, 2016; Pontes, Diniz, & Martins-Reis, 2013).

Likewise, studies carried out with middle school students indicated that state school students have difficulties with words that depend on phonological processing for their decoding and with words that depend on knowledge of spelling rules. Thus, indicating that the use of the grapheme-phoneme conversion mechanism is more effective among private school students, and that, from the 4th year onwards, the mental representation of words aids in the correct decoding (Cunha & Capellini, 2010; Oliveira & Capellini, 2010; Oliveira et al., 2016; Oliveira, 2017; Psyridou, Eklund, Poikkeus, & Torppa, 2018; Silva & Pereira, 2019). Despite being students in middle and high school, little is known about their performance in these skills. At the individual word level, it was found that the difference observed between students in state and private education lies in long infrequent words, in which the use of spelling helps reading, and in long pseudowords, in which their length increases the degree of difficulty in reading through the phonological route.

In tasks requiring the syntactic and semantic process, it is necessary to automate the basic reading processes for dedicating cognitive resources to understanding and extracting meaning. However, although fundamental, they are not sufficient. The relationship between the words, the understanding of how they are grouped in the sentence, the interrelationships between the sentences, lexical richness, prior knowledge, knowledge about the topic, macro and microstructure of the text – each of these steps must be taught systematically, including the critical-reflective consideration of the written material. With experience, these skills develop and improve (Capellini, Oliveira, & Cuetos, 2014; Cuetos, 2010; Cunha & Capellini, 2009; 2010; Marques & Marandino, 2018; Sánchez et al., 2012; Silva & Pereira, 2019; Snellings et al., 2009).

Furthermore, the superior performance of students in private education may result from differences between teaching methodologies and educational practices used by the different schools. We also emphasize the influence of family support with better sociocultural conditions, access to information, reading for pleasure outside the school context, stimulating social environment, in addition to better teacher preparation and school facilities. All of these directly affect the students' learning process (Bicalho & Alves, 2010; Gonçalves, et al., 2013; Sampaio & Guimarães, 2009). It is worth highlighting that these factors, added to the pressure from parents demanding quality of teaching and the administration of the school aimed at the market and competitiveness (Demo, 2007), all favor the acquisition of vocabulary, subject to influences and interferences from the environment in which the school is inserted and social relationships established, as well as the student's personal relationship with language (Gaskell & Ellis, 2009).

The superior performance of students from private education, when compared to students from state education in the Oral Comprehension test is in line with poor performance in Reading Comprehension tests. It is known that difficulties in reading comprehension can originate from oral language, in that it has a reciprocal relationship with the development of reading comprehension. General reading comprehension skills increase with reading experience and with spoken language developing reciprocally with reading practice and experience (Cuetos, 2010; Morais, 2013; Perfetti, Landi, & Oakhill, 2013; Sánchez et al., 2012).

Faced with these results, the answer to the initial question – “Is there a difference in the assessment for reading processes between children studying in state or private sector middle and high schools?” the answer is affirmative. Private education students do indeed achieve a higher mean score when compared to state education students in word reading, showing that spelling helps in the reading processes. When knowledge of the use of the word in a sentence, extraction of meaning and its understanding is required, the difficulty of accessing the mental lexicon of the population studied becomes evident.

5. CONCLUSION

The answer to the initial question was confirmed. Private school students do indeed achieve a higher mean score when compared to public school students in word reading, showing that spelling helps in the reading processes. When knowledge of the use of the word in a sentence, extraction of meaning and its understanding is required, the difficulty of accessing the mental lexicon of the population studied becomes evident.

At the individual word level, it was found that the difference observed between students in public and private education in long infrequent words, in which the use of spelling helps reading, and in long pseudowords, in which their length increases the degree of difficulty in reading through the phonological route.

It was found superior performance of students from private education, when compared to students from state education in the syntactic and semantic process and oral comprehension tests.

The differences between the public and private education systems are present in the Brazilian educational reality and this makes the opportunities for social and even educational insertion discrepant, which further aggravates the social inequalities in our country.

In this way, the results of this study reveal the need for an equalization in the education system, regardless of whether it is public and private, and thus, provide students with the same teaching-learning conditions that guarantee them an equal social and professional insertion, arising from a real education and quality for all.

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