

# READING AND WRITING PARAMETERS AND STRATEGIES USED BY CHILDREN FROM PUBLIC AND PRIVATE SCHOOLS

## *Parâmetros e estratégias de leitura e escrita utilizados por crianças de escolas pública e privada*

Vanessa Laís Pontes<sup>(1)</sup>, Natália Lisce Fioravante Diniz<sup>(2)</sup>, Vanessa de Oliveira Martins-Reis<sup>(3)</sup>

### ABSTRACT

**Purposes:** to compare the performance of good and bad readers and writers of public and private schools in reading aloud and writing under dictation regarding the parameters of writing and reading fluency, besides to verify the reading and writing strategies used by these children. **Method:** 61 students of the 4th and 5th grade from a public (GPu) and a private (GPr) elementary school were submitted to a School Performance Test, for classification into good and bad reader and writer; and to reading aloud and writing words and pseudo words in order to verify their performance regarding the total number of successes in reading and writing, rate and accuracy in reading and accuracy in writing, as well as strategies for reading/writing used. **Results:** in a general overview, the performance of participants from private school was higher than from public school. There was better performance in reading than in writing; in words than in pseudo words; in high frequency words than in low-frequency words; in regular words than in irregular words. The effects found in reading and writing were the same for public and private schools. **Conclusion:** social and pedagogical aspects influence the performance of reading and writing. In the group studied, it was observed the effects of lexicality, regularity and frequency; it was not showed the preferential use of one or another route of reading and writing. The type of school does not seem to interfere in the strategy of reading / writing used by these children.

**KEYWORDS:** Speech, Language and Hearing Sciences; Language; Reading; Learning; Evaluation

### ■ INTRODUCTION

Reading and writing involve countless mental processes and neuropsychological functions, and are thus considered to be highly complex activities.

In view of this complexity, the learning of the written language has been studied by a number of different fields, such as developmental psychology, cognitive psychology, linguistics, and speech, language and hearing sciences<sup>1</sup>. Given the importance of reading as a means to access new knowledge and writing as a form of expression and use of the language, the reading and writing difficulties of children who are learning these skills are also a matter of multi-disciplinary interest<sup>1,2</sup>.

Approximately one-seventh of the United States population shows some degree of learning disability, which accounts for 15% of that population<sup>3</sup>. Despite the lack of data on the prevalence of learning disabilities in Brazil, over the last twenty years, a rise in the number of schoolchildren with reading difficulties has been observed in the Brazilian educational setting<sup>4</sup>. It is estimated that around 40% of the Brazilian students have difficulty learning the written

<sup>(1)</sup> Speech-language Pathologist and Audiologist; Health Resident at the Hospital das Clínicas of the Federal University of Minas Gerais (UFMG), Belo Horizonte, MG, Brazil.

<sup>(2)</sup> Speech-language Pathologist and Audiologist, Belo Horizonte, MG, Brazil.

<sup>(3)</sup> Speech-language Pathologist and Audiologist; Adjunct Professor, Speech-language Pathology and Audiology Department of the Federal University of Minas Gerais (UFMG) School of Medicine, Belo Horizonte, MG, Brazil; Ph.D. in Linguistics by the University of São Paulo School of Philosophy, Literature and Humanities.

Institution where the study was conducted: Speech-language Pathology and Audiology Department of the Federal University of Minas Gerais School of Medicine

Conflict of interest: non-existent

language – a reality to be found both in public and private schools. With regard to the illiteracy rate, 54% of the Brazilians between 15 and 64 years of age who attended school up to the 4th grade achieved a rudimentary level of literacy at best. This means that more than half of the Brazilian population in that age range can merely locate a piece of explicit information in short and familiar texts, read and write usual numbers and perform simple operations<sup>5</sup>. In addition, 10% of these Brazilians can be regarded as absolute illiterates, despite having completed one to four years of elementary school<sup>5</sup>. In view of this scenario, attention must be given to the difficulties with the written language by means of scientific investigations as well as government policies<sup>1</sup>.

The chief objective of reading is the comprehension of written material. This is dependent on a number of factors, word identification being a necessary condition<sup>6</sup>. Reading competence can be assessed from the routes used for reading<sup>7,8</sup> and the fluency of reading<sup>9,10</sup>. There is no consensus as yet in the literature regarding reading fluency, which can be defined as the translation of text into spoken language at good speed without decoding errors<sup>9</sup>. According to the authors reviewed, error analysis does not seem sufficient to distinguish between groups of readers, while measures involving processing speed seem to be more sensitive. Similarly, the analysis of speed alone is not satisfactory, since children who read too fast and make many mistakes show impaired reading comprehension. In that sense, reading fluency can be measured as the number of words correctly read per minute<sup>9-11</sup>. This measure is deemed to be a hybrid one, as it integrates speed and precision in decoding the written material<sup>12,13</sup>.

In a nationwide study, the measure of precision of reading was denominated reading accuracy and analyzed along with the reading rate, defined as the number of words read per minute<sup>10</sup>. These measures have been the most widely used to analyze reading fluency; however, they should be interpreted as ancillary tools for the understanding of learning problems and of the functioning of mechanisms and processes connected to reading competence, considering that other skills and forms of knowledge have an impact on reading fluency<sup>10</sup>. The reading rate is more closely related to the speed of reading, since it counts the number of words read per minute, whereas accuracy is related to the flow of information, as it measures the number of words read correctly per minute. Therefore, the lower the accuracy, the higher the number of incorrections produced in recognizing words.

The analysis of the route used in the processing of isolated words has relied on measures of reaction

time and proportions of correct words (matches) and errors in distinct classes of stimuli, words and pseudowords varying in frequency of occurrence in the language, extension and regularity<sup>8,14</sup>. Measuring reaction times can provide important information on the speed of the reading processing, yet it is more difficult to use in clinical practice. A simpler alternative to analyze the routes of reading could be the use of rate and accuracy measures, as adopted in the present study.

Furthermore, considering that reading and writing disabilities also comprise social, affective, cognitive and pedagogical aspects<sup>15</sup>, which manifest themselves diversely in each child, it is necessary to investigate, from the pedagogical and social standpoints, the variations between public and private school students<sup>2,16,17</sup>.

Therefore, the objectives of the present study were to compare the performance of good and poor readers and writers of public and private schools in oral reading and writing to dictation in relation to the parameters of writing and reading fluency, and also, to assess the reading and writing strategies used by these children through accuracy analysis.

## ■ METHOD

The present cross-sectional, observational study was developed with a convenience sample. Sixty-one students participated in the study, all of them regularly enrolled in either the 4th or 5th grade of elementary education at a public school and a private school in the metropolitan region of Belo Horizonte. All students were at the beginning of the school year. All the children who signed and presented the informed consent document signed by their parents or legal guardians were included. The present study was approved by the Ethics Committee of the University under the registry no. 617-10.

The exclusion criteria were: history of any alteration in the neurological and psychomotor development; untreated hearing and/or visual deficits, and children who were not able to complete the dictation and reading subtests of the Scholastic Performance Test (TDE, in Portuguese)<sup>18</sup>. For the evaluation of the exclusion criteria, parents and legal guardians were sent a questionnaire inquiring, among other aspects, on the child's neurological and psychomotor development, the development of oral language, reading and writing skills, and the status of the child's hearing and vision. The questionnaire was devised by the authors for this study.

The participants were allocated into two groups: G<sub>Pu</sub> (public school students), composed by 15 male students and 20 female students; and G<sub>Pr</sub> (private

school students), composed by 14 male and 12 female students.

All the students selected went through two modalities of evaluation:

- **Scholastic Performance Test (Teste de Desempenho Escolar – TDE)<sup>18</sup>**: This test was used to rank the participants as good or poor readers and/or writers. The writing subtest was performed collectively in the students' classroom, while the reading subtest was conducted individually in a classroom made available by the school.
- **Oral reading and writing to dictation from the Balanced List of Words and Pseudowords<sup>7</sup>**: This test was administered with the aim of assessing the performance of each student considering the total of matches in reading and writing, rate and accuracy of reading, and writing accuracy, as well as the effects to be found in reading and writing. The list comprises 96 words and 96 pseudowords. The words vary in frequency of occurrence, orthographic regularity and length, while the pseudowords vary in length; these were constructed using the same orthographic structure and number of syllables as the stimuli that were used in the word list. The task of writing to dictation was applied collectively in a classroom and the oral reading task was given individually in a classroom made available by the school. In the oral reading task, the child was instructed to read the items as rapidly as he or she could. The lists were printed on an A4 white sheet, in black ink, uppercase, Arial 14 font and double spacing between the stimuli arranged vertically in columns. The reading was recorded with the aid of a digital voice recorder with a microphone for analysis.

All evaluations were conducted during class time, as previously established by the school coordination and faculty.

In order to place the students as good or poor readers/writers, each child's TDE results were compared with the standardized test score for the 2nd and 7th grades of elementary school<sup>18</sup>. The students who had higher or average TDE scores were ranked as good readers/writers, and those having lower scores were ranked as poor readers/writers.

The analysis of writing was conducted by computing the total number of matches in words and pseudowords and the number of matches in high and low frequency words, and regular, irregular and

rule words. Writing accuracy was represented by the percentage of matches for each of the psycholinguistic variables considered.

In the analysis of reading, the words and pseudowords read were transcribed, thereby enabling the computation of the total number of matches in words and pseudowords, as well as the number of matches in high and low frequency words, regular, irregular and rule words. In addition, the time spent on reading each list was measured with the aid of a stopwatch. The parameters of reading fluency were obtained by computing the reading rate (number of words or pseudowords read per minute) and reading accuracy (number of words or pseudowords read correctly) for each list (words and pseudowords) using formulas proposed in a previous study<sup>10</sup>.

All the data were tabulated and compared between the groups (good and poor readers, and public and private school). The correlations between the variables were analyzed subsequently.

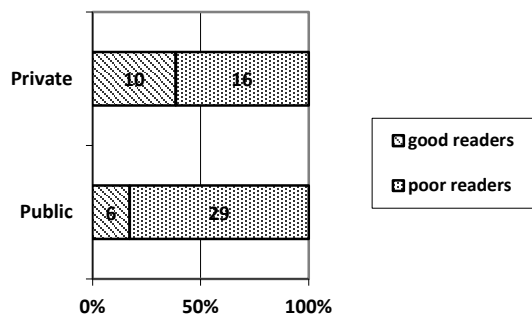
To determine the occurrence of lexicality, regularity and frequency effects, the accuracy values were considered. Thus, the presence of a lexicality effect was considered when the accuracy values for words were greater than those for pseudowords; a regularity effect was identified when the accuracy of regular words was higher than that of irregular words, and an effect of frequency was considered when the values of accuracy for high frequency words were greater than those for low frequency words.

The statistical analysis of the data was performed using the following nonparametric tests: chi-square with the Monte Carlo method, Wilcoxon, Mann-Whitney and Friedman. The level of significance was set at 5%.

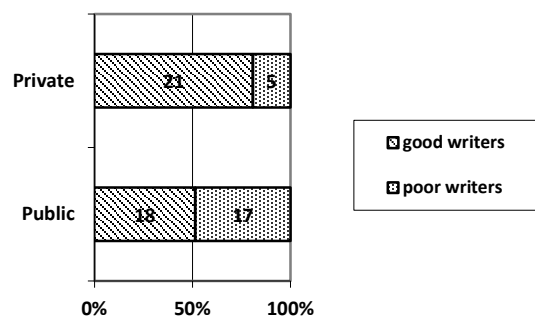
## ■ RESULTS

The statistical analysis showed that the schools were not different in relation to the distribution of the students by grade ( $X^2= 0.035$ ; d.f.= 1;  $p= 0.852$ ) and gender ( $X^2= 0.722$ ; d.f.= 1;  $p= 0.395$ ). Likewise, the series were not different regarding the distribution of the students by gender ( $X^2= 0.842$ ; d.f.= 1;  $p= 0.359$ ).

The schools were statistically different with regard to the distribution of good and poor readers ( $X^2= 12.752$ ; d.f.= 1;  $p< 0.001$ ) and distribution of good and poor writers ( $X^2= 5.570$ ; d.f.= 1;  $p= 0.018$ ), with higher frequency of poorer TDE performance for the public school children (Figures 1 and 2).



**Figure 1 – Distribution of good and poor readers by school**



**Figure 2 – Distribution of good and poor writers by school**

### Effect of the type of school on the reading and writing parameters

The results of the comparisons between the public and private school students for each of the psycholinguistic variables analyzed for oral reading are shown in Table 1. A statistically significant difference was found with regard to word rate and accuracy, low frequency words and irregular words. The performance of the private school participants was superior in all comparisons.

Regarding the influence of the type of school on writing accuracy, the results shown in Table 2

demonstrate such influence in all instances with the exception of regular words and pseudowords. In the latter case, a trend was noted ( $p < 0.10$ ). Except for the irregular words, the performance of the private school students was superior in the psycholinguistic variables. It is worth noting that the writing of two private school students was disregarded, since they gave up writing during the dictation.

### Oral reading of good and poor readers

Table 3 portrays the results of the comparison between good and poor readers in the oral reading test, in which inferior performance was seen for the poor readers in all the psycholinguistic variables of the reading items.

### Writing to dictation of good and poor writers

Regarding the performance of good and poor writers in the task of writing to dictation, the latter performed statistically worse across the psycholinguistic variables of the writing items (Table 4).

### Reading and writing strategies and type of school

For the analysis of the effects in reading and writing, the following comparisons were carried out for each type of school: accuracy of words vs. pseudowords (lexicality effect); accuracy of high frequency vs. low frequency words (frequency effect); accuracy of regular words vs. rule words vs. irregularity (regularity effect).

As shown in Table 5, all the effects (lexicality, regularity and frequency) were detected in reading and in writing for both groups of children. These effects suggest the use of the lexical and phonological routes in reading and writing.

An interesting finding was that, in the group of public school children, a difference was found in writing regular words vs. rule words.

Table 1 – Comparison between schools for each psycholinguistic variable in reading

	School	Minimum	Maximum	Mean	Standard Deviation	CV
<b>Rt-wds*</b>	Public	25.26	97.63	59.84	15.93	0.26
	Private	42.99	97.63	72.07	15.76	0.21
<b>Rt-pseudo</b>	Public	19.53	60.0	40.04	8.89	0.22
	Private	31.30	55.0	43.67	7.59	0.17
<b>Acc-wds*</b>	Public	18.16	94.58	56.43	17.28	0.30
	Private	38.89	97.63	69.81	16.63	0.23
<b>Acc-pseudo#</b>	Public	7.32	55.0	31.56	10.43	0.33
	Private	18.43	47.66	35.81	9.05	0.25
<b>Rt-HF#</b>	Public	28.80	115.20	67.35	16.17	0.24
	Private	45.0	106.67	75.71	17.11	0.22
<b>Rt-LF*</b>	Public	22.50	84.71	55.19	16.66	0.30
	Private	41.14	102.86	65.70	16.00	0.24
<b>Acc-HF#</b>	Public	25.20	115.20	65.32	16.72	0.25
	Private	44.06	106.67	74.10	17.37	0.23
<b>Acc-LF*</b>	Public	14.46	79.41	50.65	18.58	0.36
	Private	25.85	94.29	62.98	16.97	0.26
<b>Rt-R</b>	Public	29.09	112.94	63.32	16.36	0.25
	Private	43.64	106.67	70.99	15.61	0.21
<b>Rt-I*</b>	Public	19.01	96.0	56.34	16.18	0.28
	Private	42.67	91.43	66.19	14.50	0.21
<b>Rt-Ru#</b>	Public	29.09	87.27	61.39	16.72	0.27
	Private	40.85	106.67	71.46	16.97	0.23
<b>Acc-R*</b>	Public	23.61	112.94	60.58	17.73	0.29
	Private	42.27	106.67	68.96	15.60	0.22
<b>Acc-I</b>	Public	13.66	96.0	54.45	17.44	0.32
	Private	36.00	91.43	64.24	15.51	0.24
<b>Acc-Ru#</b>	Public	23.64	87.27	58.17	18.70	0.32
	Private	33.33	106.27	68.93	18.67	0.27

Mann-Whitney Test. \* $p < 0.05$ ; # $p < 0.10$ ;

Legend: Rt=rate; Acc=accuracy; wds=words; pseudo=pseudowords; HF=high frequency; LF=low frequency; R=regular; I=irregular; Ru=rule; CV=coefficient of variation.

Table 2 – Comparison between schools for the accuracy of each psycholinguistic variable in writing

	School	Mean	Minimum	Maximum	SD	CV
<b>Words*</b>	Public	79.08	27.08	94.79	15.91	0.20
	Private	88.29	56.25	98.96	7.83	0.08
<b>Pseudowords#</b>	Public	69.38	15.63	92.71	18.58	0.26
	Private	77.46	38.54	89.58	12.17	0.15
<b>High frequency*</b>	Public	87.80	35.42	100.0	15.02	0.17
	Private	93.58	64.58	100.0	8.59	0.09
<b>Low frequency*</b>	Public	70.36	18.75	89.58	17.85	0.25
	Private	82.08	39.58	97.92	11.19	0.13
<b>Regular</b>	Public	89.55	37.50	100.0	14.40	0.16
	Private	92.88	68.75	100.0	6.28	0.06
<b>Irregular*</b>	Public	84.73	15.63	100.0	18.28	0.21
	Private	81.63	40.63	96.88	11.17	0.13
<b>Rule*</b>	Public	79.20	28.13	96.88	16.57	0.20
	Private	91.13	59.38	100.0	8.82	0.08

Mann-Whitney test. \* $p < 0.05$ ; # $p < 0.10$ ; SD= standard deviation; CV=coefficient of variation.



Table 3 – Comparison between good and poor readers for each psycholinguistic variable in reading

	TDE	Minimum	Maximum	Median	SD	CV
<b>Rt -wds*</b>	good reader	45.00	97.63	72.85	14.97	0.20
	poor reader	25.26	97.63	60.66	16.44	0.65
<b>Rt- pseudo*</b>	good reader	34.08	60.00	46.12	7.09	0.15
	poor reader	19.53	54.86	39.03	8.21	0.21
<b>Acc- wds*</b>	good reader	44.06	97.63	71.70	15.05	0.20
	poor reader	18.16	94.58	56.73	17.64	0.31
<b>Acc- pseudo*</b>	good reader	26.98	55.00	40.58	6.51	0.16
	poor reader	7.32	44.35	29.30	9.37	0.31
<b>Rt- HF#</b>	good reader	48.00	106.67	75.94	16.48	0.21
	poor reader	28.80	115.20	68.10	16.78	0.24
<b>Rt- LF*</b>	good reader	48.00	106.67	75.28	15.99	0.21
	poor reader	25.20	115.20	65.56	17.41	0.26
<b>Acc-HF*</b>	good reader	42.35	90.00	67.03	12.73	0.18
	poor reader	22.50	102.86	55.52	17.96	0.32
<b>Acc-LF*</b>	good reader	40.59	90.00	65.46	13.22	0.20
	poor reader	14.46	94.29	50.52	19.49	0.38
<b>Rt-R#</b>	good reader	46.83	106.67	71.76	15.35	0.21
	poor reader	29.09	112.94	63.68	16.39	0.25
<b>Rt-I*</b>	good reader	46.83	106.67	70.60	15.07	0.21
	poor reader	23.61	112.94	60.51	17.48	0.28
<b>Rt-Re#</b>	good reader	40.85	91.43	68.07	12.24	0.17
	poor reader	19.01	96.00	56.29	16.64	0.29
<b>Acc- R*</b>	good reader	40.85	91.43	67.00	12.63	0.18
	poor reader	13.66	96.00	53.88	17.79	0.33
<b>Acc-I*</b>	good reader	40.85	106.67	71.92	16.06	0.22
	poor reader	29.09	101.05	62.18	17.38	0.27
<b>Acc- Ru*</b>	good reader	40.85	106.67	70.77	16.30	0.23
	poor reader	23.64	101.05	58.24	19.59	0.33

Mann-Whitney Test: \* $p < 0.05$ ; # $p < 0.10$ ;

Legend: Rt=rate; Acc=accuracy; wds=words; pseudo=pseudowords; HF=high frequency; LF=low frequency; R=regular; I=irregular; Ru=rule; TDE= Scholastic Performance Test; SD= standard deviation; CV=coefficient of variation.

Table 4 – Comparison between good and poor writers for each psycholinguistic variable in writing

	TDE	Mean	Minimum	Maximum	SD	CV
<b>Words*</b>	good writer	89.04	81.25	98.95	4.22	0.04
	poor writer	71.53	27.08	90.63	17.95	0.19
<b>Pseudowords*</b>	good writer	94.17	64.58	100.00	6.18	0.06
	poor writer	82.84	35.42	97.92	18.33	0.18
<b>High frequency*</b>	good writer	83.33	68.75	97.92	6.59	0.06
	poor writer	60.22	18.75	83.33	18.57	0.22
<b>Low frequency*</b>	good writer	94.87	84.37	100.00	3.54	0.03
	poor writer	83.63	37.50	100.00	17.26	0.17
<b>Regular*</b>	good writer	88.14	68.75	100.00	8.24	0.08
	poor writer	74.70	15.63	93.75	21.74	0.23
<b>Irregular*</b>	good writer	91.19	75.00	100.00	6.24	0.06
	poor writer	71.13	28.13	93.75	17.76	0.18
<b>Rule*</b>	good writer	79.78	59.38	92.71	8.18	0.08
	poor writer	59.67	15.63	89.58	20.23	0.22

Mann-Whitney Test \* $p < 0.05$ ; # $p < 0.10$ ; TDE= Scholastic Performance Test; SD= standard deviation; CV=coefficient of variation.

**Table 5 – Comparison between psycholinguistic variables in reading and writing by school**

School	Comparison	Writing		Reading	
		Z	p-value	Z	p-value
Public	words vs. pseudowords	-4.207	<0.001*	5.159	<0.001*
	high frequency vs. low frequency	-5.167	<0.001*	-4.727	<0.001*
	regular vs. rule	-4.780	<0.001*	-1.572	0.116
	regular vs. irregular	-4.202	<0.001*	-3.717	<0.001*
	rule X irregular	-3.224	0.001*	2.175	0.030*
Private	words vs. pseudowords	-4.232	<0.001*	-4.457	<0.001*
	high frequency vs. low frequency	-3.773	<0.001*	-3.670	<0.001*
	regular vs. rule	-1.160	0.246	-0.057	0.954
	regular vs. irregular	-4.299	<0.001*	-2.629	<0.001*
	rule vs. irregular	-3.998	<0.001*	2.171	0.030*

Wilcoxon Test: \* $p < 0.05$ ; Z = Z-Score

## ■ DISCUSSION

Reading and writing disabilities are known to be affected by a variety of factors: social, affective, cognitive and pedagogical, reflected in different manifestations in each individual child<sup>2</sup>. Because it is necessary to examine, from the pedagogical and social standpoints, the variations between students of public and private schools, the present study compared the performance of good and poor readers of a public and a private school in tasks of oral reading and writing to dictation, in addition to assessing the parameters of writing and reading fluency of these students so as to relate these measures to the routes of reading in order to evaluate reading competence.

In this comparison between schools, a greater number of students who were poor readers and poor writers based on their TDE performance was found in the public school. This result is not in line with the findings of the TDE validation study, in which the author found slight differences between municipal, state and private schools, and concluded that it was not necessary to establish rules for the test according to the type of school<sup>18</sup>. As expected, the performance of the poor readers and writers was inferior in all the studied reading and writing parameters, thus showing an impairment in the use of reading and writing strategies as reflected in the number of errors and slowness in decoding and encoding words.

The schools were different with respect to the tasks of oral reading and writing to dictation. In the reading task, the difference occurred in word rate and accuracy, low frequency words, and irregular words. In the writing task, the difference between

schools was significant across the variables, except for regular words and pseudowords. In general, the performance of the private school participants was superior to that of the public school students, with the exception of the writing of irregular words. These results reinforce what some authors argue with regard to the influence of the family and school environment on the development of reading and writing<sup>2,16,19,20</sup>. In a study conducted with children of 7 to 10 years of age from public and private schools evaluating the difficulties in learning writing, the author found a difference between the groups, and suggested that the better performance of the private school children was due to the fact that they lived in more favorable environments, with more adequate conditions for learning<sup>13</sup>. Therefore, according to that author, the acquisition of the written language was not only influenced by the instruction received in school<sup>21</sup>. It is known that the children who attend public schools in Brazil come from families with fewer resources than those attending private schools; this situation is closely linked to family income. Additionally, among the determinant factors that foster the habit of reading, the UNESCO highlights being born to a family of readers and having spent the youth in a school system concerned with promoting the habit of reading<sup>22</sup>. In Brazil, most children are only initiated in the world of reading in school<sup>22</sup>, which places an even heavier burden on the teachers, who in most cases do not cultivate the habit of reading themselves, and ignore the purpose of reading in the classroom<sup>23</sup>.

Therefore, the greater number of poor readers in the public school and the differences in rate and accuracy of low frequency words between schools, with public school pupils performing worse, adds

strength to the “exposure to reading” factor, since the more frequent the contact with those words through reading, the more easily their representations are established and can be retrieved.

It is worth noting that the schools were no different with regard to the rate of pseudowords, while they differed as to their accuracy. This may have occurred due to the fact that the reading rate only measures speed. On the other hand, accuracy seems to be a more precise measure of fluency, as it takes into account correctness and speed of reading/writing<sup>9,11-13</sup>. In addition, this effect may have occurred solely with pseudowords because, regardless of the type of school, the children will employ the same route (phonological) to decode the item.

In the analysis of the reading and writing parameters, the results obtained indicate that, in both tasks, performance was better with words than it was with pseudowords as far as rate and accuracy values are concerned. The findings of the present study indicate lexicality<sup>6,7,24</sup> and frequency<sup>6,7,24-26</sup> effects. Because words have pre-stored orthographic, semantic and phonological representations in the lexicon, they tend to be read and written more rapidly and correctly compared with pseudowords, in which pronunciation and spelling are constructed by the phonological route, since their representations cannot be found in the lexicon<sup>14</sup>. Similarly, the processing advantage for the high frequency words occurs because, with schooling, the increased frequency of contact with the written word and the learning of orthographic rules allow for the phonological, orthographic, and semantic representations to be established and start to require less activation, thereby enabling increasingly faster, automatized and correct reading of the written word<sup>14,25</sup>.

According to the literature<sup>25,27</sup>, these two effects (lexicality and frequency) point to the use of the lexical route by the 4th- and 5th-grade students in the present study; this demonstrates the beginning of the most advanced stage of reading acquisition, which ensures speed and precision in this task.

It is worth stressing that it is not possible to affirm a preferential use of either route by the 4th- and 5th-graders from the findings of the present study. The reason for this is that after the analysis of the psycholinguistic features of the items on the Balanced List of Words and Pseudowords had been conducted, a regularity effect was noted for reading, with worse performance for irregular words. The same was observed in the values found for writing accuracy, in which the performance with regular words was superior. These results indicate the presence of a regularity effect both in the reading and writing of the 4th- and 5th-grade students,

which also suggests the use of the phonological route in decoding and encoding some items – since using this route leads to correct regular words along with regularization errors with irregular words and does not ensure matches for rule words, as these depend on learning and memorizing orthographic rules<sup>7,24,28</sup>. Thus, the present study showed that, for the studied age range, the predominance of either route will depend on the familiarity of the item presented for reading and writing, with both routes being used during these tasks<sup>8</sup>. An important finding was that the children are already employing lexical processes both for reading and writing by the 4th grade, which contributes to greater reading speed.

Another noteworthy aspect is that, although the results regarding the regularity effect are consistent with those reported by another author, who found that this effect occurred more markedly in writing low frequency words, and is limited to the early years (1st and 2nd grade) in the group with reading and writing competence, while it persists even in 4th-grade children in the group with disabilities. Thus, the regularity effect cannot be generalized to the population of items, and should only be attributed to a few of them<sup>7</sup>. To that end, a multivariate analysis including the assessment of the type of errors and an increase in the study sample size could provide more detailed results with respect to the regularity effect as well as the other effects. Error analysis could provide important information, since the errors produced by a lexical or a phonological reading/writing are different<sup>29</sup>.

The hypothesis advanced to account for the difference in writing regular words and rule words in the public school group of children is the teaching methodology, which seems to be inadequate for these learning goals in those schools<sup>30</sup>. However, since the teaching methodology was not a variable of interest in the present study, such claim lacks support.

When the students' performance in the TDE and in the reading and writing tasks of the Balanced List of Words and Pseudowords was compared, it was found that the students who were regarded as poor readers by the TDE placement showed inferior performance across the psycholinguistic variables of the reading and writing items. This result suggests an association between student performance and matches in words and pseudowords, in the tasks of oral reading and writing to dictation<sup>31</sup>.

## ■ CONCLUSION

The design and findings of the present study warrant the following conclusions:



- Children from public schools show inferior performance in reading and writing fluency; in addition, the frequency of poor readers and writers is higher in this type of school;
- The poor readers and writers perform worse in reading and writing fluency;
- The type of school does not seem to influence the reading/writing strategies used by the older children;
- The measures of reading and writing accuracy can be used in determining the strategies used in reading and writing.

## RESUMO

**Objetivos:** comparar o desempenho de bons e maus leitores e escritores de escola pública e privada na leitura em voz alta e escrita sob ditado quanto aos parâmetros de escrita e fluência de leitura, além de verificar as estratégias de leitura e escrita utilizadas por essas crianças. **Método:** 61 escolares, do 4º e 5º ano do Ensino Fundamental de uma escola da rede pública (GPU) e outra de ensino privado (GPr) foram submetidos ao Teste de Desempenho Escolar, para classificação em bom e mau leitor e escritor; e à leitura em voz alta e escrita de palavras e pseudopalavras, para verificação do desempenho quanto ao total de acertos em leitura e escrita, taxa e acurácia de leitura e acurácia de escrita, bem como as estratégias de leitura/escrita utilizadas. **Resultados:** de maneira geral, o desempenho dos participantes de escola privada foi superior aos de escola pública. Observou-se melhor desempenho na leitura que na escrita; em palavras que em pseudopalavras; em palavras de alta frequência que em palavras de baixa frequência; e em palavras regulares que em irregulares. Os efeitos encontrados na leitura e na escrita foram os mesmos para escola pública e privada. **Conclusão:** os aspectos sociais e pedagógicos influenciam no desempenho de leitura e escrita. No grupo estudado foram observados os efeitos de lexicalidade, regularidade e frequência, não evidenciando o uso preferencial de uma ou outra rota de leitura e escrita. O tipo de escola não parece interferir na estratégia de leitura/escrita usada pelas crianças.

**DESCRIPTORIOS:** Fonoaudiologia; Linguagem; Leitura; Aprendizagem; Avaliação

## ■ REFERENCES

1. Salles JF, Parente MAMP. Avaliação da leitura e escrita de palavras em crianças de 2ª série: abordagem neuropsicológica cognitiva. *Psicol Refl Crít.* 2007;20(2):220-8.
2. Fernandes GB, Crenitte PAP. O conhecimento de professores de 1ª a 4ª série quanto aos distúrbios da leitura e escrita. *Rev CEFAC.* 2008;10(2):182-90.
3. Sparks RL, Lovett BJ. College students with learning disability diagnoses: who are they and how do they perform? *J Learn Disabil.* 2009;42:494-510.
4. Andrade OVCA, Prado PST, Capellini SA. Desenvolvimento de ferramentas pedagógicas para identificação de escolares de risco para a dislexia. *Rev Psicopedag.* 2011;28(85):14-28.
5. Instituto Paulo Montenegro e Ação Educativa. Relatório INAF Brasil 2009: Indicador de Analfabetismo Funcional Principais Resultados. [acesso em 2012 Jul 17]. Disponível em: [http://www.ipm.org.br/download/inaf\\_brasil\\_2009\\_relatorio\\_divulgacao\\_revisto\\_dez-10\\_a4.pdf](http://www.ipm.org.br/download/inaf_brasil_2009_relatorio_divulgacao_revisto_dez-10_a4.pdf)
6. Salles JF, Parente MAPP. Processos cognitivos na leitura de palavras em crianças: relações com compreensão e tempo de leitura. *Psicol Refl Crít.* 2002; 15(2):321-31.
7. Pinheiro AMV. Leitura e escrita: Uma abordagem cognitiva. 1ªed. Campinas: Editorial Psy; 1994.
8. Pinheiro AMV, Lúcio PS, Silva DMR. Avaliação cognitiva de leitura: o efeito de regularidade grafema-fonema e fonemagrafema na leitura em voz alta de palavras isoladas no português do Brasil. *Psicol Teoria Prát.* 2008;10(2):16-30.
9. Fuchs LS, Fuchs D, Hosp MK, Jenkins JR. Oral reading fluency as a indicator of reading competence: a theoretical, empirical, and historical analysis. *Scientific studies of reading.* 2001;5(3):239-56.
10. Kawano CE, Kida ASB, Carvalho CAF, Ávila CRB. Parâmetros de fluência e tipos de erros na leitura de escolares com indicação de dificuldades para ler e escrever. *Rev Soc Bras Fonoaudiol.* 2011;16(1):9-18.
11. Grant A, Gottardo A, Geva E. Measures of reading comprehension: do they measure different

skill for children learning English as a second language? *Read Writ.* 2012;25:1899-928.

12. Albuquerque CP. Rapid naming contributions to reading and writing acquisition of European Portuguese. *Read Writ.* 2012;25:775-97.

13. Landerl K, Wimmer H. development of word reading fluency and spelling in a consistent orthography: an 8-year follow-up. *J Educ Psychol.* 2008;100(1):150-61.

14. Pinheiro AMV, Rothe-Neves R. Avaliação cognitiva de leitura e escrita: as tarefas de leitura em voz alta e ditado. *Psicol Refl Crít.* 2001;14(2):399-408.

15. Wilson SB, Lonigan CJ. Identifying children at risk of later reading difficulties: evaluation of two emergent literacy screening tools. *J Learn Disabil.* 2010;43:62-76.

16. Suehiro ACB. Dificuldade de aprendizagem da escrita num grupo de crianças do ensino Fundamental. *PSIC.* 2006;7(1):59-68.

17. Cunha NB, Santos AAA. Habilidades linguísticas no ensino fundamental em escolas públicas e particulares. *PSIC.* 2008;9(1):35-4.

18. Stein ML. TDE – Teste de desempenho escolar: manual para aplicação e interpretação. 1ed. São Paulo: Casa do Psicólogo; 1994.

19. Ferreira SHA, Barrera SD. Ambiente familiar e aprendizagem escolar em alunos da educação infantil. *Psico.* 2010;41(4):462-72.

20. Duursma E, Augustyn M, Zuckerman B. Reading aloud to children: the evidence. *Arch Dis Child.* 2008;93(7):554-7.

21. Connor CMD, Morrison FJ, Schatschneider C, Toste J, Lundblom E, Crowe EC, et al. Effective classroom instruction: implications of child characteristics by reading instruction interactions on first graders' word reading achievement. *J Res Educ Eff.* 2011;4(3):173-207.

22. Bomeny H. Leitura no Brasil, Leitura no Brasil. *Sociol Probl Prát.* 2009;60:11-32.

23. Barros TN, Gomes E. O perfil dos professores leitores das séries iniciais e a prática de leitura em sala de aula. *Rev CEFAC.* 2008;10(3):332-42.

24. Coltheart M, Rastle K, Perry C, Langdon R, Ziegler J. DRC: A Dual Route Cascaded model of visual word recognition and reading aloud. *Psychol Review.* 2001;108(1):204-56.

25. Stivanin L, Scheuer CI. Tempo de latência para a leitura: influência da frequência da palavra escrita e da escolarização. *Rev Soc Bras Fonoaudiol.* 2007;12(3):206-13.

26. Paolucci JF, Avila CRB. Competência ortográfica e metafonológica: influências e correlações na leitura e escrita de escolares da 4ª série. *Rev Soc Bras Fonoaudiol.* 2009;14(1):48-55.

27. Richlan F, Kronbichler M, Wimmer H. Functional abnormalities in the dyslexic brain: a quantitative meta-analysis of neuroimaging studies. *Human Brain Mappin.* 2009;30:3299-308.

28. Lúcio OS, Pinheiro AMV, Nascimento E. A influência de fatores sociais, individuais e linguísticos no desempenho de crianças na leitura em voz alta de palavras isoladas. *Psicol Reflex Crít.* 2010;23(3):496-505.

29. Pinheiro AMV, Cunha CR, Lúcio PS. Tarefa de leitura de palavras em voz alta: uma proposta de análise dos erros. *Rev Port Educ.* 2008;21(02):115-38.

30. Meireles E, Correa J. A relação da tarefa de erro intencional com o desempenho ortográfico da criança considerados os aspectos morfossintáticos e contextuais da língua portuguesa. *Est Psicol.* 2006;11(1):35-43.

31. Tonelotto JMF, Fonseca LC, Tedrus GMSA, Martins SMV, Gibert MAP, Antunes TA et al. Avaliação do desempenho escolar e habilidades básicas de leitura em escolares do ensino fundamental. *Aval Psicol.* 2005;4(1):33-43.

Received on: July 08, 2012

Accepted on: March 01, 2013

Mailing Address:

Vanessa de Oliveira Martins-Reis

Av. Prof. Alfredo Balena, 190 – Faculdade de

Medicina sala 251

Santa Efigênia

CEP: 30130-100

E-mail: vomartins@ufmg.br