

Characterization of reading fluency in elementary school students

Caracterização da fluência de leitura em escolares do Ensino Fundamental II

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ABSTRACT

Purpose: The purpose of this study is to investigate the development and progress of reading fluency of secondary elementary school pupils in schooling grades that were selected for the study programme. **Methods:** 232 elementary school pupils with ages ranging from 11 to 15 years of age, from both public and private schools were recorded reading a text aloud. None of the students selected had learning difficulties or any other forms of linguistic, sensory or cognitive problems. The pupils were asked to complete a questionnaire that was based on the text that they had previously read. The final grades in Portuguese were provided by each educational institution, in order to establish an indicator of academic performance. **Results:** In general there was an increase in reading accuracy, except for the seventh and eighth year pupils attending the private school that only managed the same average of word accuracy per minute, and the seventh year of the public school pupils who's result was poorer than that of the sixth year. The results of the questionnaire that was given to the pupils showed a good level of comprehension of the textual content, and the measurements of fluency levels the pupils achieved showed that they understood the meaning of the text. The correlations between reading fluency and academic performance of both schools are weak to moderate. **Conclusion:** The results of this study show that reading fluency and accuracy rates increased gradually along with the progress in secondary elementary schooling, giving an estimation of the expected values for each school year studied, that participated by reading an easy level text.

Keywords: Reading; Comprehension; Fluency; Students; Learning.

RESUMO

Objetivo: Investigar o desenvolvimento da fluência leitora nos escolares do Ensino Fundamental II a fim de conhecer a evolução dessa habilidade no decorrer das séries pesquisadas. **Métodos:** Gravação da leitura oral de um texto por 232 escolares oriundos do ensino público e privado, com média de idade entre 11 e 15 anos, cursando do 6º ao 9º ano, sem alterações de aprendizagem, linguagem, problemas sensoriais ou cognitivos. Na sequência foi aplicado questionário referente ao texto lido. As notas finais de Português foram obtidas junto a secretaria de cada instituição de ensino, a fim de se obter um indicativo do desempenho acadêmico. **Resultados:** Houve evolução crescente da acurácia em leitura, exceto para o 7º e 8º anos da escola privada, que obtiveram a mesma média de palavras corretas lidas por minuto, e o 7º ano da escola pública, que obteve resultado inferior ao 6º ano. Os resultados do questionário aplicado indicam que texto foi lido de forma a permitir boa compreensão do conteúdo e as medidas de fluência obtidas são indicadoras de uma leitura com acesso ao significado do texto lido. As correlações existentes entre fluência de leitura e desempenho acadêmico de ambas as escolas são de fraca a moderada. **Conclusão:** Os resultados deste estudo permitiram evidenciar que as taxas de fluência e acurácia em leitura aumentaram gradativamente com o avanço da escolaridade no Ensino Fundamental II, fornecendo uma estimativa dos valores esperados para cada ano escolar pesquisado, mediante leitura de um texto de nível fácil.

Palavras-chave: Leitura; Compreensão; Fluência; Estudantes; Aprendizagem.

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INTRODUCTION

Fluent reading is usually defined as the ability to read with speed, accuracy and good prosody, in an easy, smooth and spontaneous manner, without word recognition problems. In conclusion fluency is essential for effective reading and comprehension. A fluent reader can read quickly and recognise words automatically and read with correct phrasing and pronunciation, i.e. the ability to read using appropriate intonation and appropriate tonic markings for words and phrases⁽¹⁻⁵⁾.

The neurobiological process of reading is a complex network that involves several brain areas forming connections between groups of cells that are located in various areas of the human brain. To explain in a linear fashion, the brain reads almost simultaneously, the text being processed initially in the visual cortex, which then sends the information to the area of the brain responsible for language processing. The visual recognition area of words is responsible for making subtle visual distinctions, being able to recognise written text, while the auditory cortex allows the reader to recognise every word written by sound. After visual recognition, Broca's area links the written word to the spoken word. The temporal lobe concludes the process by aiding in the link between words and meanings by evoking memories from the hippocampus^(1,2). It is evident that there is a hierarchy in the reading process. However learning the same thing does not always utilise identical circuits in all brains and it is quite possible that different cerebral areas may be used, as in the case of readers who suffer from dyslexia⁽⁶⁻⁸⁾.

Reading is a neuro psycholinguistic ability that plays a decisive role in personal and social development, it influences the development of both oral and written language skills, enriches the individual's vocabulary and increases his / her level of information and general knowledge, develops critical sense and reasoning, besides making one capable of increasing one's own level of knowledge⁽⁵⁾.

However, children, teenagers and young people in general who suffer from difficulties with reading fluency are not motivated to develop their levels of information and knowledge, because they have difficulties to acquire good reading habits. Such a lack of reading fluency implies impairment in textual comprehension and content assimilation, which can lead to failure in their social, academic and professional futures⁽¹⁾. It is evident that proper reading, as well as understanding, is fundamental to one's progress.

Reading comprehension is when one can give meaning to something that has been read, relating to what is already known with what one desires to know. Whilst reading a text, a model of mental understanding is produced regarding the content read. This requires the reader to utilise several cognitive processes that act in a complex manner, leading to proper textual comprehension by the reader⁽⁹⁾.

Reading is not simply about the decoding of written symbols, the ultimate goal amongst several objectives is understanding, or rather, having the ability to comprehend the meaning of the text which has been read and making appropriate sense of what has been read. Consequently, reading comprehension can not be measured accurately, for it does not represent a given amount of anything. Reading comprehension is defined as the process by which the text is interpreted. For a fluent reader this is an extremely complex ability that triggers a series of processes involving word recognition, general linguistic skills, prior knowledge about the subject being read, memory, inference, anticipation and the development of clear and organised expression of ideas. Readers who have the ability to read

fluently tend to possess better skills of understanding of what they have previously read^(1,10).

Evidence shows that the characteristics of a good reader involve fast and accurate word recognition, and that textual comprehension provokes critical thinking, helps with mastering standard language and helps to provoke metalinguistic thinking^(11,12).

Considering the importance of reading in our society and the impact of its performance on our academic lives it is surprising to see a lack of studies that evaluate how fluency development in reading aloud in elementary school pupils occurs, the present study seeks to investigate the development of reading fluency skills of secondary elementary school pupils in order to understand the development of this ability during the course of the school years studied.

METHOD

The present study was approved by the Research Ethics Committee; protocol number CAAE 38861914.4.0000.5096.

With the objective of studying the relationship between reading fluency and academic performance, recordings were made of 232 pupils reading aloud. The pupils were from the sixth to ninth grades of two secondary elementary schools in the metropolitan area of Belo Horizonte - Minas Gerais, one of the schools was a state school and the other a private school. 114 students were recorded reading in the state school and 118 in the private school, 96 of them were girls and 136 were boys, aged from 11 to 15 years old.

It was decided to choose both public and private schools because of the diversity of teaching, however without any form of contradiction or comparison between the two schooling systems. The public school is a member of a network of schools that achieve good results in national school evaluations and also achieves good results in the Index of Development of Basic Education (Ideb). Both public and private schools are institutions with similar levels of education in the region surveyed.

To be included in the programme, the pupils had to fulfil the following criteria. They had to be enrolled in the school and present at the time of the research and their ages had to be appropriate to their schooling grades and not have had any previous school year failures or changes in ability of linguistic learning or suffer from any sensory or cognitive problems. The legal representatives of the students were informed of the research programme and then asked to sign a consent form. (Free Informed Consent Form) and the participating students additionally signed a consent form. (Free Informed Consent Form for Children).

In order to ensure that there were no complaints about the programme requirements as mentioned above, the pedagogical coordinators, teachers and parents (via a questionnaire attached to the Free Informed Consent Form) indicated which pupils did not fulfil the programme requirements due to one or more problems of the afore mentioned criteria. These pupils usually performed the reading, writing and exercises about the text, but the audios were not considered for inclusion in the research so as not to influence the results of the pupils who fulfilled all the programme requirements.

The recordings were carried out individually in the schools themselves, in a room isolated from external noise, at a convenient time which did not impact on their normal lesson times or school routines. A unidirectional microphone was connected to a portable computer running Praat which is a software package for the scientific analysis of speech in

phonetics. A rough explanation was given to the pupils and any, queries or doubts answered, they were then asked to read aloud in a natural manner, an easy level text of 210 words⁽¹³⁾. This simple text was chosen because it contained balanced and high frequency words, which minimised the effort of decoding, and with the other objective of helping the pupils to achieve a good level of reading fluency with a standard text more suited to lower school levels.

Next, a reading comprehension questionnaire containing ten multiple choice questions was given to the pupils for completion. There was only one correct alternative for each question⁽¹³⁾. Correct answers were scored as one and incorrect answers as zero with a maximum of ten points.

The aim of the research was to measure the pupils reading fluency by ensuring that the text read was quite simple and did not contain any difficult words that the pupils may have problems recognising, for this purpose a text more appropriate to primary elementary school was chosen, since the intention was to ensure good ability to decode words and automatic recognition of words. Because of this the pupils required a lower cognitive effort giving them the possibility to achieve the fluency levels that they were capable of. Similarly, the questionnaire given out to the pupils to fill in was also more appropriate to a primary elementary school level. It should be emphasised that the methodology used is not ideal for testing comprehension, and that this was not the objective, but it was decided to evaluate their comprehension only to see if the pupils had paid attention to what they were reading and if they were capable of recalling literal and inferential facts about the text (and not an automatic decoding, without understanding the meaning).

The final scores of the pupils Portuguese ability were obtained from the administration of each school in order to arrive at an average mark of academic performance.

The number of words per minute (WPM) - fluency rate, correct words per minute (CWPM) - accuracy rate⁽¹⁴⁾, were counted and additionally the number of correct answers in the comprehension questionnaire. Academic performance was calculated by means of their final marks in Portuguese. Although not the objective of the research, a performance comparison was made between the male and female pupils and also between the schools that took part in the survey. These comparisons were not the purpose of the research and serve more as a complementary analysis and to provide a more in-depth profile of the pupils surveyed.

To calculate the word and accuracy rates, each recording was analysed by listening to the first minute and counting the number of words (WPM) and the word accuracy (CWPM) i.e. words read correctly. To ensure a high level of accuracy, the analysis was carried out by two different people.

The data was analysed by means of descriptive statistics (Mean, median and standard deviation.), by comparing student's tests t-test samples with a significance level of 5% and Pearson's test for correlation between the variables, reading rates and Portuguese grades. Pearson's correlation was used in order to verify the direction (if the variables reading speed and notes tend to increase or decrease together) and resistance (strength of the relationship between reading speed variables and notes) considering the linear relationship of variables chosen. Considering:

- a. Direction: A positive result when the trend is to increase or decrease together and negative result when the trend is of an increase in one variable with a decrease in the other;
- b. Resistance: value 1 indicates a perfect relationship between variables and 0 indicates that there is no correlation between the variables.

At the end of the research, the coordinator of each school was given feedback about the performance of each class that had participated in the study, showing the development of the pupils reading fluency, in comparison to the development of the class, and indicating those pupils who required more attention and stimulation.

RESULTS

The results were analysed by counting the WPM, CWPM, and the number of correct answers of the comprehension questionnaire and the final scores of the Portuguese language ability of the 232 pupils, 114 from a public school and 118 of them from a private school.

Table 1 presents the mean values registered for each year and school referring to the number of correct WPM, CWPM, and the final score. The table shows that fluency and accuracy

Table 1. mean and standard deviation of the measures comparing school years between private and public schools

| | School year | n | Measures | WPM | CWPM | Correct answers | Final scores |
|---------|-------------|------|----------|-------|-------|-----------------|--------------|
| Private | 6 | 28 | Mean | 134.9 | 131.7 | 9.1 | 71.2 |
| | | | sd | 23.7 | 24.6 | 1.1 | 9.1 |
| | 7 | 36 | Mean | 148.3 | 143.8 | 9.4 | 73.4 |
| | | | sd | 21.6 | 21.8 | 0.9 | 8.5 |
| | 8 | 32 | Mean | 148.0 | 144.4 | 9.8 | 73.7 |
| | | | sd | 26.3 | 26.8 | 0.6 | 7.5 |
| 9 | 18 | Mean | 152.6 | 149.9 | 9.3 | 70.4 | |
| | | sd | 17.3 | 17.4 | 1.7 | 4.7 | |
| Public | 6 | 28 | Mean | 138.4 | 137.3 | 9.6 | 71.2 |
| | | | sd | 18.5 | 18.7 | 0.7 | 9.6 |
| | 7 | 28 | Mean | 135.8 | 132.0 | 9.0 | 65.9 |
| | | | sd | 22.0 | 22.1 | 1.4 | 6.0 |
| | 8 | 29 | Mean | 144.6 | 142.6 | 9.4 | 76.3 |
| | | | sd | 23.6 | 23.7 | 0.9 | 7.0 |
| | 9 | 33 | Mean | 145.8 | 143.8 | 9.2 | 66.4 |
| | | | sd | 19.3 | 20.4 | 1.3 | 6.2 |

Subtitle: n = number of students; WPM = words per minute; CWPM = correct words per minute; sd = standard deviation

increased as school years increased and that the standard deviation remained relatively stable throughout the series studied, except for the seventh and eighth years of the private school that only achieved the same mean WPM, and the seventh year of the public school that had results lower than the sixth year in the measurements of WPM, CWPM, correct hits and final score.

Table 2 shows the difference between the school years of the private and public schools. The analysis shows that in the private school, the comparison of the results of fluency of the sixth year with all the other school years was significant, and for the accuracy results there was a significant comparison between the sixth, seventh and the ninth years. The public school results revealed only a significant difference between the seventh and ninth years in both fluency and accuracy measurements.

Regarding the correct interpretation of the text, the most significant results were from the sixth to eighth and seventh to eighth years of the private school and only the sixth to seventh years of the public school. The sixth year achieved the highest score of all the years surveyed in the public school.

Although the statistical results show significant differences for the public school in relation to the final scores in all the years surveyed, except for the comparison of the seventh to the ninth years (Table 2), the analysis of the averages indicates that there was no gradual evolution of the scores but that they fluctuate from year to year. In the private school, there were no significant differences in the comparison between the school years for the final scores, except between the sixth and seventh years.

Table 3 shows the p values for the comparison between private and public schools. It can be seen that only the seventh year had a significant p-value for WPM and CWPM. Note that the seventh and ninth years presented significant scores when compared with the final scores. As for the correct interpretation of the text, only the sixth year scored significantly.

As can be seen in Table 4, the analysis did not show a significant statistical difference in the comparison between the male and female pupils, but it did show a significant difference in relation to the final scores of the private school, where the female pupils from the sixth and eighth years particularly stood

Table 2. p value of the difference between the years of private and public schools

| t test | Private | | | | Public | | | |
|--------|-------------|-------------|-----------------|--------------|-------------|-------------|-----------------|--------------|
| | WPM | CWPM | Correct answers | Final scores | WPM | CWPM | Correct answers | Final scores |
| 6x7 | 0.02 | 0.05 | 0.18 | 0.01 | 0.60 | 0.28 | 0.05 | 0.01 |
| 6x8 | 0.05 | 0.07 | 0.00 | 0.91 | 0.26 | 0.34 | 0.61 | 0.02 |
| 6x9 | 0.01 | 0.01 | 0.56 | 0.46 | 0.12 | 0.19 | 0.21 | 0.02 |
| 7x8 | 0.97 | 0.92 | 0.02 | 0.41 | 0.13 | 0.07 | 0.15 | 0.00 |
| 7x9 | 0.43 | 0.27 | 0.85 | 0.17 | 0.05 | 0.03 | 0.54 | 0.76 |
| 8x9 | 0.46 | 0.38 | 0.23 | 0.58 | 0.83 | 0.84 | 0.45 | 0.00 |

Subtitle: WPM = words per minute; CWPM = correct words per minute; Student's t test with significance of 5%

Table 3. Difference between private and public schools

| School year | WPM | CWPM | Correct answers | Final scores | Age |
|-------------|-------------|-------------|-----------------|---------------|-----|
| 6 | 0.5 | 0.3 | 0.05 | 0.9 | 0.5 |
| 7 | 0.02 | 0.03 | 0.2 | 0.0001 | 0.3 |
| 8 | 0.6 | 0.8 | 0.06 | 0.2 | 0.2 |
| 9 | 0.2 | 0.3 | 0.8 | 0.03 | 0.7 |

Subtitle: WPM = words per minute; CWPM = correct words per minute. t student test with significance of 5%

Table 4. Mean and standard deviation of the measures comparing the feminine and masculine genders between private and public schools

| Escola | School year | Gender | Measures | WPM | CWPM | Correct answers | Final scores |
|---------|-------------|--------|----------|-------|-------|-----------------|--------------|
| Private | 6 | F | Mean | 137.6 | 135.6 | 9.2 | 76.3 |
| | | | sd | 25.5 | 25.8 | 1.0 | 9.6 |
| | | M | Mean | 132.3 | 128.1 | 8.9 | 66.1 |
| | | | sd | 22.6 | 23.7 | 1.2 | 4.9 |
| | 7 | F | Mean | 143.2 | 138.9 | 9.3 | 72.7 |
| | | | sd | 24.5 | 25.0 | 1.0 | 7.7 |
| | | M | Mean | 153.3 | 148.6 | 9.6 | 74.1 |
| | | | sd | 17.4 | 17.4 | 0.8 | 9.6 |
| | 8 | F | Mean | 149.2 | 144.9 | 10.0 | 77.8 |
| | | | sd | 21.7 | 23.5 | 0.0 | 6.8 |
| | | M | Mean | 146.9 | 143.9 | 9.7 | 69.3 |
| | | | sd | 30.8 | 30.4 | 0.8 | 5.5 |
| | | p | 0.8 | 0.9 | 0.1 | 0.002 | |

Subtitle: F = female; M = male; WPM = words per minute; CWPM = correct words per minute; p = statistical difference considering $p < 0.05$; sd = standard deviation

Table 4. Continued...

| Escola | School year | Gender | Measures | WPM | CWPM | Correct answers | Final scores |
|--------|-------------|--------|----------|-------|-------------|-----------------|--------------|
| Public | 6 | F | Mean | 137.6 | 137.4 | 9.6 | 71.9 |
| | | | sd | 19.8 | 19.1 | 0.7 | 9.2 |
| | | M | Mean | 139.5 | 137.1 | 9.5 | 70.3 |
| | sd | | 17.9 | 19.5 | 0.6 | 10.7 | |
| | p | | 0.8 | 1.0 | 0.5 | 0.6 | |
| | 7 | F | Mean | 140.4 | 136.6 | 9.2 | 67.1 |
| | | | sd | 22.2 | 23.8 | 0.9 | 6.5 |
| | | M | Mean | 133.2 | 129.3 | 8.9 | 65.2 |
| | sd | | 22.4 | 21.6 | 1.7 | 5.8 | |
| | p | | 0.3 | 0.3 | 0.4 | 0.4 | |
| | 8 | F | Mean | 152.2 | 149.9 | 9.0 | 79.1 |
| | | | sd | 23.6 | 24.6 | 1.2 | 7.0 |
| | | M | Mean | 138.4 | 136.6 | 9.8 | 74.0 |
| | sd | | 23.2 | 22.8 | 0.4 | 6.5 | |
| | p | | 0.1 | 0.1 | 0.04 | 0.06 | |
| | 9 | F | Mean | 145.6 | 144.1 | 9.0 | 66.2 |
| | | | sd | 16.4 | 17.3 | 1.8 | 6.0 |
| | | M | Mean | 145.9 | 143.4 | 9.4 | 66.4 |
| sd | 21.3 | | 22.5 | 0.8 | 6.5 | | |
| p | 1.0 | | 0.9 | 0.5 | 0.9 | | |

Subtitle: F = female; M = male; WPM = words per minute; CWPM = correct words per minute; p = statistical difference considering $p < 0.05$; sd = standard deviation

Table 5. Correlations between words per minute, correct words per minute, and academic performance of private and public schools

| PRIVATE SCHOOL | | | | | |
|----------------|-------|--------|-------|-------|---------------|
| | 6 | 7 | 8 | 9 | Total Private |
| WPM | 0.485 | 0.436 | 0.235 | 0.354 | 0.381 |
| Final score | | | | | |
| CWPM | 0.492 | 0.455 | 0.226 | 0.350 | 0.384 |
| Final score | | | | | |
| PUBLIC SCHOOL | | | | | |
| | 6 | 7 | 8 | 9 | Total Public |
| WPM | 0.333 | -0.054 | 0.613 | 0.459 | 0.240 |
| Final score | | | | | |
| CWPM | 0.346 | -0.018 | 0.604 | 0.464 | 0.263 |
| Final score | | | | | |
| TOTAL | | | | | |
| | 6 | 7 | 8 | 9 | Total |
| WPM | 0.369 | 0.247 | 0.395 | 0.449 | 0.305 |
| Final score | | | | | |
| CWPM | 0.383 | 0.266 | 0.393 | 0.450 | 0.318 |
| Final score | | | | | |

Subtitle: WPM = words per minute; CWPM = correct words per minute. Pearson's test

out. Furthermore when it came to correct interpretation of the text, the eighth year boys of the public school were better in relation to the girls.

As can be seen in Table 5, the data indicates a weak to moderate correlation between WPM, CWPM and academic performance for the years and school types that were analysed.

DISCUSSION

In general the results of the research indicated progress in reading fluency ability during secondary elementary school, which is in agrees with existing studies that show increased

fluency with advancement of school years^(2,3,12,15,16). Particularly the results presented by the private school which showed very good progress, as can be seen by the significant statistical figures between the comparisons of WPM of the 6th year, which is the initial year of secondary elementary school, with all subsequent years.

Additionally, the study provides the expected parameters for this range of schooling, with very little national literature studied. The shortage of research about teenagers who speak Brazilian Portuguese is particularly noteworthy, especially the areas of oral and written language skills. This study revealed that values between 135 and 153 words per minute and between 132 and 150 words per minute that were read correctly can be

expected for this specific school period and that the results are consistent with those pointed out in⁽¹⁷⁾ national literature but below the values for European Portuguese speakers⁽¹⁶⁾.

These values gradually increased between the sixth and ninth years, indicating an increase in reading fluency proficiency, except for the seventh year of the public school whose results were lower than the sixth year. Academics in seventh through eighth years of the private school remained static in terms of fluency because they maintained the same average of 148 WPM.

The lower results by the seventh year of the public school seem to reflect some specific lag in this school year in the school which was researched, since all the results of this year were significantly lower in relation to the private school. This was the only group where significant differences were found between schools, where more than one skill was investigated (Table 3).

It must be emphasised that it was not the intention of this study to compare the public and private schooling systems. The comparisons were carried out between the two school systems with the objective of better understanding the context studied and to improve the results of the research as highlighted by the unexpected result of the seventh year of the public school.

As expected, the statistic showed no significant difference in the comparison between the schools, and as previously mentioned the public school that was studied is not a typical public school because it is a member of a state wide educational network and recognised for good results in national exams. The lower performance of public school children, compared to private schools, has been seen in studies within the Brazilian reality. Our findings do not corroborate the idea that educational practices, sociocultural conditions and social environment, among others of pupils from public schools negatively influence the pupils learning⁽¹⁸⁻²⁰⁾. Such findings should be viewed with caution and cannot be viewed as any form of generalization without looking at the educational scenario and educational indicators of the schools surveyed. Studies of school pupils should be conducted in a way that is guided by context, educational indices and other variables, without stigmatising the brand or the educational network to which they belong.

Diversity among different schools in Brazil is huge. In a study to research the reading and writing abilities at five public schools, researchers found significant statistical differences between groups, showing a high variability of performances⁽²¹⁾.

Studies undertaken as a reference confirm that there are strong links between reading fluency, decoding and comprehension^(2-4,12,22,23). When reading rates are slowed down, working memory is impaired resulting in poorer understanding of the text read and reducing levels of reading fluency and comprehension, which in turn lead to lower academic performance^(24,25).

Development in reading fluency and understanding increases with a pupils advance in school years. School pupils are expected to develop and improve their reading skills year by year because there is an automatic development in word recognition which of course is important for their development in understanding⁽²⁵⁾.

When the skills of reading fluency and understanding are interlinked, when there is a development in such skills academic performance also tends to progress. It can be seen that pupils who are in the later years of school show better performance than the initial years⁽²⁶⁾. The same study corroborates the results of this research, in which there is a growing development of reading comprehension in years 6 to 8, and in years 7 to 8 of the private school, and in years 6 to 7 of the public school. There was a progression in reading and comprehension of the text

which was read at the private school as well as improvements in reading fluency and academic performance at the public school from the early years to the later years. One should however look at this with caution, specifically in relation to the development of the ability of reading comprehension, which was not seen for all school years in the present study.

These results can be attributed to the level of difficulty of the text, very easy for the more advanced pupils and reasonable for primary elementary school pupils. Since the aim of the study was not to evaluate reading comprehension, but to utilise the test to monitor the ability of pupils to absorb the general content of the text after reading it aloud. (i.e. if the pupils paid attention when reading the if the text was read in a way that allowed a good level of understanding of the general content.) As an indication of how well the pupils understood the content of the text can be seen by the results of the questionnaire this showed a good performance by all pupils, since the average accuracy rate of questions answered for all of the school years tested was above 9 (out of 10 questions), as expected. i.e. the text was read in a manner that allowed good understanding of the content, and the fluency measures indicated the pupils had understood the meaning of the text.

When analysing the data it was found to a certain degree that the sixth year of the public school excelled in interpretation of the text compared to the private school and also in interpretation of the text as well as excelling in relation to all subsequent school years. Even though there was no significant statistical difference, the sixth year of the public school was slightly better in relation to reading fluency and accuracy. It is worth noting that a reader who has good reading fluency has a better chance of obtaining better performance in textual comprehension^(4,25).

According to the results of the research, we can say that generally both boys and girls develop their reading skills equally, however, the academic performance of the sixth and eighth year girls in the private school was higher than that of the boys. Interestingly foreign studies have found that girls outperform boys in Portuguese because of their greater verbal competency⁽²⁷⁾. Another Brazilian study that researched the performance of schoolchildren in relation to formal evaluations considered that boys are more favoured by educational standards when inferior academic performance is more easily accepted. However, there is a recommendation in the research that when it comes to academic performance the genetics between the sexes should be better investigated, by attributing the boys poor school performance to a genetic load that points to a greater occurrence of difficulties in academic performance⁽²⁸⁾. The results of this research do not allow us to confirm that girls are better students than boys, not even when it comes to academic performance, since the research only investigated the final score in Portuguese. In addition there are other variables, this was a small sample of a specific situation.

No evidence was found of a study that could justify the superior performance of the boys of the eighth year of the public school in relation to reading interpretation. However, the unequal number of participants may have influenced the result, because the number of boys was much higher than girls in the years and schools that were researched.

It is known that during the course of the school years, students focus their efforts on gaining knowledge through understanding written material rather than making an effort to read. Because of this reading becomes indispensable to school performance⁽¹⁷⁾. The results of our analysis of academic

performance measured by means of the final score in Portuguese did not show any significant tendency, since the grades oscillated during advancement in school years. The correlation between reading rate and school performance through marks in Portuguese (Table 5) points to a weak correlation. In principal one would expect, a strong correlation, since reading fluency is a strong indicator of reading comprehension^(4,9,10,24,25). However, it is also known that school marks are more than isolated textual comprehension and also objective and dissertation tests (which require skills such as text structuring, syntactical, morphological and orthographic abilities) a wide variety of evaluated activities, such as for example classroom exercises, seminars and group work. In addition, the question of academic performance is broader, as it is also part of school content of other subjects that are also interpretive. As a consequence, this indicator should be further analysed so that precise conclusions can be reached and discussed. The choice of this performance indicator was a weakness of the study and should be reconsidered in later studies.

The study presented the development of the fluency ability of secondary elementary school pupils and shows the expected values for this level of education through an easy-to-read text without major decoding demands. Subsequent studies with texts appropriate to each school year should be developed so that performance in fluency can be verified through a greater degree of difficulty. The greatest obstacle to future research is the scarcity of evaluation methods that are validated in Brazilian Portuguese and aimed at the teenage population which was the focus of this research. Continued work with the aim of developing specific evaluation methods for this age group are essential and urgently required for future studies.

CONCLUSION

The results of this study showed that reading fluency and accuracy rates gradually increased along with the progress in schooling in almost all the school years studied in the secondary elementary school providing an estimate of the expected values for each school year surveyed, by reading an easy level text. The results of the questionnaire indicated that the text was read with good results in levels of understanding of the content, and that the measures of fluency reached showed that the meaning of the text was understood.

There was no significant difference in the comparison between the genders and the schools surveyed. The correlations between reading fluency, textual comprehension, and academic performance are poor to moderate. The study emphasises the need to expand the research into the reading skills of the teenage population as well as the proposal of appropriate assessment methods for this range of schooling.

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