

## RELATIONSHIP BETWEEN ORAL READING FLUENCY MEASURES AND VISUAL ATTENTION SPAN IN BRAZILIAN'S SCHOOLCHILDREN IN PANDEMIC CONTEXT

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### Abstract

The aim of this study was to relate the measures of oral reading fluency and visual attention span in Brazilian students from the 4th grade of elementary school. Eleven students were submitted to three measures of oral reading fluency and the global visual attention span (VAS) for five characters. The reading correct word per minute measure was used with three texts that differed in complexity. The study was carried out after the adoption of remote teaching in the Pandemic. Spearman analysis was performed between fluency and VAS variables, with no significance. The results revealed a greater number of correct words per minute in the third reading time compared to the first two times, revealing that the real reading performance of 4th grade students is the average of 39 to 40 words per minute and average of fixation of 50% of the characters. These findings indicate academic losses due to low reading fluency rate, fewer characters per fixation and lack of relationship between the variables. These results pointed out to the decrease in reading practices during the Pandemic. As conclusion, there is a need for further studies about this theme.

**Keywords:** *Reading fluency, visual perception, learning, education, educational measurement.*

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### 1. Introduction

In early March 2020, with the worsening caused by the new coronavirus COVID-19 pandemic, and to minimize the impacts of the disease, the suspension of face-to-face classes was decreed, replacing them with non-face-to-face activities and remote teaching (Sampaio, 2020). The return to face-to-face activities only occurred in August 2021, when this study had begun.

A fluent reader will have the ability to read aloud quickly, accurately and expressively. Reading can be understood as a visual-perceptual task that requires string processing of several letters that make up words. Readers need to pay attention to each letter of the word, successively, for its identification (Laberge, Samuels, 1974). The involvement of attention in the visual processing of letter sequences was formalized by Bundesen (1990). Thus, in Bosse et al. (2007) the visual-attentional interval (VA) was defined as the number of distinct visual elements that can be processed simultaneously at once.

Thus, a fluent reader is expected to present adequate accuracy in decoding words, automatic processing (speed) and prosody during reading and it is consolidated in the third school year, with readers who have achieved the automation of reading processes. (Barth et al., 2014). In this way, it becomes important to measure and observe reading performance for schoolchildren from this school year and in subsequent years.

### 2. Objectives

The aim of this study was to relate the measures of oral reading fluency and visual attention span in Brazilian schoolchildren from the 4<sup>th</sup> grade of elementary school.

### 3. Methods

This is a prospective, cross-sectional study. The procedures of this study were applied face-to-face during the Covid-19 Pandemic, following the recommendations of the World Health Organization (WHO). The study was approved by the research ethics committee of the Faculty of

Philosophy and Sciences of the São Paulo State University – UNESP, São Paulo, Brazil, under number 5.050.126. All schoolchildren presented the Free and Informed Consent Term. The schoolchildren were indicated by the teachers, who mentioned reading and learning difficulties. They underwent the followed procedures.

-Reading Fluency Text (ADFLU, Martins; Capellini, 2018). Each student performed reading fluency measurements of a 4<sup>th</sup> grade's text, three texts that differed in complexity. For each text, measures were taken, such as the number of words read correctly per minute (WCPM) and the measure of words read incorrectly per minute (WIPM) were measured. Therefore, for WCPM, words pronounced correctly, words corrected by oneself, repeated words, words mispronounced due to the accent and inserted words were considered. For WIPM, mispronounced words, words substituted for others, omitted words, words read out of order, addition or omission of morphemes and hesitations were considered errors (if a student hesitated with a word for 3 seconds, he was told the word and marked as incorrect). For the quantification of errors, punctuation rules were also used for unique situations, such as: lines or several words omitted, reading numbers, words with hyphens that can exist independently and abbreviations. (Good; Kaminski, 2002).

-Visual Attentional Span Tasks - Global Report (Whole report condition), (Bosse et al, 2007; Valdois et al, 2014) – notebook version. The visual attention test is a software in which the stimulus will be presented on the notebook screen, aiming to verify the number of characters captured by eye fixation movements, during eye movement. A sequence of five aleatory consonants was displayed for 200ms in the center of the computer screen. The student should verbally report the name of the letters identified, with a score in total percentile of correct answers.

The results were analyzed statistically, adopting the value  $p < 0.05$  for the statistically significant values, being indicated with an asterisk ( $*p < 0.05$ ). Application of the Friedman Test, to verify possible differences between the variables of interest, when compared concurrently. The Spearman Correlation was also used to verify two variables without any restriction regarding the distribution of values.

#### 4. Results

Table 1 presents the comparison for the reading fluency measures of the number of words read correctly per minute (WCPM) and words read incorrectly per minute (WIPM), three texts that differed in complexity, and one measure of Visual attentional span tasks (%VAS).

Table 1. Comparison of read correctly per minute (WCPM) and words read incorrectly per minute (WIPM).

Variables	Mean (standard deviation)	p-value	Variables	Mean (standard deviation)	p-value
WCPM 1	39,18 (31,37)		WIPM 1	6 (2,32)	
WCPM 2	37,45 (26,89)	0,005*	WIPM 2	6(5,35)	0,839
WCPM 3	47,73 (30,56)		WIPM 3	13,73 (31,33)	
%VAS	55,9 (11,2)				

Caption: WCPM: number of words read correctly per minute; WIPM: words read incorrectly per minute; %VAS: Visual attentional span tasks.  
Friedman Test ( $*p < 0.05$ ).

Table 2 presents the analysis of Spearman's Correlation between the Visual attentional span tasks (%VAS) and the fluency measures.

Table 2. Correlation between the Visual attentional span tasks (%VAS) and the fluency measures.

Variables	Statistic	%VAS	Variables	Statistic	%VAS
WCPM 1	correlation coefficient	0,527	WIPM 1	correlation coefficient	-0,266
	p-value	0,095		p-value	0,429
WCPM 2	correlation coefficient	0,397	WIPM 2	correlation coefficient	-0,261
	p-value	0,226		p-value	0,438
WCPM 3	correlation coefficient	0,478	WIPM 3	correlation coefficient	-0,303
	p-value	0,137		p-value	0,365

Caption: WCPM: number of words read correctly per minute; WIPM: words read incorrectly per minute; %VAS: Visual attentional span tasks.

The results revealed a greater number of correct words per minute in the third reading time compared to the first two times, revealing that the real reading performance of 4th grade schoolchildren is the average of 39 to 40 words per minute and average of fixation of 50% of the characters.

## 5. Discussion

These findings indicate academic losses due to low reading fluency rate, fewer characters per fixation and lack of relationship between the variables.

The development of reading fluency is essential for schoolchildren, especially when they move from learning to read to reading to learn. To perform any activity automatically, it is necessary to carry out, for example, activities with some properties, such as reading without conscious attention, without effort, with speed and with autonomy (LaBerge; Samuels, 1974). Automatic decoding allows that conscious attention and memory, previously dedicated entirely to the word level, can be used in cognitive processes at the sentence level and in the meaning itself, specifically. (LaBerge; Samuels, 1974).

The schoolchildren in this study had visual-attentional difficulties, which were not related to reading fluency. This finding may be related to the fact that the visual-attentional interval plays an important role in reading acquisition, since it outlines the amount of orthographic information that can be processed at each stage of the reading process (Valdois et al., 2004). A larger VA range encompasses an entire string of letters in a word, allowing each letter to be accurately identified, in parallel, so that the word can also be identified, quickly. The schoolchildren in this study presented 50% of this interval, suggesting a deficit in visual processing capacity, since they were unable to capture the entire visual-attentional interval, resulting in slow decoding (Bosse et al., 2007). Reading practice is necessary for the development of fluency, which will be stagnant and may compromise the student's opportunity to learn academic content, which also consecutively depends on good reading (Rasinski, 2017).

However, it is noteworthy that such findings may have been influenced by the lack of reading practices, aggravated by the pandemic. In the school context, Brazilian education has adopted social distancing and remote teaching, which have led to unfavorable situations for both professionals and families, such as forced digitization, lack of preparation for handling technological tools and greater elaboration and availability of academic rather than social content (Hoofman; Secord, 2021;).

## 6. Conclusion

These findings indicate academic losses due to low reading fluency rate, fewer characters per fixation and lack of relationship between the variables. Thus, it is important to measure and observe reading performance for schoolchildren from this grade onwards, since the impacts of low reading performance will be reflected in academic performance.

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