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# Relation between reading assessments in schoolchildren and complaints reported by guardians

## Relação entre avaliações de leitura em escolares e queixas relatadas pelos responsáveis

## Relación entre evaluaciones de lectura en escolares y denuncias reportadas por tutores

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***Abstract***

**Introduction:** Reading means processing information and transforming written material into speech and meaning. People who have learned to read will have developed a mental information processing system capable of carrying out these transformations. **Objective:** To correlate reading skills and reading-related complaint of third year elementary school students. **Method:** a total of 40 students of both genders, mean age 8.16 years. Decoding, fluency and textual comprehension were evaluated, and reading-related complaints were raised. **Results**: there was a 37.5% incidence of at least one reading-related complaint, with slow reading prevailing; hits on regular stimuli were statistically superior to other stimuli; fluency scores ranged from 0 to 45, reading comprehension performance was high, with no statistical difference between inferential and literal questions; There was a correlation between reading skills among themselves, and between the complaint "not reading" with these skills. **Conclusion:** the incidence of reading-related complaints was high, and slow reading prevailed. It was confirmed that the best decoding favors fluency, which optimizes reading comprehension; the "not reading" complaint correlated with all reading assessments, indicating parents sensitive to their children's reading.

**Keywords:** Reading; Child Development; Learning.

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**Authors' contributions:**
MVR: idealized the study, carried out the data collection, participated in the statistical analysis and writing.
HBM and VAVSF: participated as supervisor and reviewer of the manuscript.
LAN: participated in the writing and revision of the manuscript.

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## Resumo

**Introdução:** Ler significa processar informações e transformar material escrito em fala e em significado. As pessoas que tiverem aprendido a ler terão desenvolvido um sistema mental de processamento de informações capaz de realizar essas transformações. **Objetivo:** correlacionar as habilidades de leitura e as queixas relacionadas à leitura de estudantes do terceiro ano do ensino fundamental. **Método:** 40 escolares de ambos os gêneros, idade média de 8,16 anos. Avaliou-se decodificação, fluência e compreensão textual, e as queixas relacionadas à leitura foram levantadas. **Resultados:** houve 37,5% de incidência de pelo menos uma queixa relacionada à leitura, prevalecendo a leitura lenta; acertos nos estímulos regulares foram estatisticamente superiores aos demais estímulos; os acertos na fluência variaram entre 0 e 45, o desempenho na compreensão leitora foi alto, sem diferença estatística entre questões inferenciais e literais; houve correlação entre as habilidades de leitura entre si, e entre a queixa "não lê" com estas habilidades. **Conclusão:** confirmou-se que a melhor decodificação favorece a fluência, que otimiza a compreensão leitora; a queixa "não lê" correlacionou-se com todas as avaliações de leitura, indicando os pais sensíveis à leitura de seus filhos.

**Palavras-chave:** Leitura; Desenvolvimento infantil; Aprendizagem.

## Resumen

**Introducción:** Leer significa procesar información y transformar el material escrito en habla y significado. Las personas que han aprendido a leer habrán desarrollado un sistema de procesamiento de información mental capaz de realizar estos cambios. **Objetivo:** correlacionar las habilidades de lectura y las quejas relacionadas con la lectura de los estudiantes en el tercer año de la escuela primaria. Método: 40 estudiantes de ambos sexos, edad media 8,16 años. Se evaluaron la decodificación, fluidez y comprensión textual, y se plantearon quejas relacionadas con la lectura. **Resultados:** hubo una incidencia del 37,5% de al menos una queja relacionada con la lectura, prevaleciendo la lectura lenta; los golpes en estímulos regulares fueron estadísticamente superiores a otros estímulos; la fluidez correcta varió entre 0 y 45, el rendimiento de comprensión de lectura fue alto, sin diferencias estadísticas entre preguntas inferenciales y literales; existía una correlación entre las habilidades de lectura entre ellos y entre la queja "no leer" con estas habilidades. **Conclusión**: se confirmó que la mejor decodificación favorece la fluidez, lo que optimiza la comprensión de lectura; la queja "no lee" se correlacionó con todas las evaluaciones de lectura, lo que indica que los padres son sensibles a la lectura de sus hijos.

**Palabras clave:** Lectura; Desarrolo infantil; Aprendizaje.

## Introduction

Although reading is a frequent activity in everyday life and seems simple, it is a complex process with high cognitive and perceptual demands[1]. Reading means processing information, and transforming written material into speech and meaning. People who have learned to read will have developed a mental information processing system capable of carrying out these transformations[2].

Among reading skills, decoding or word recognition is more associated to phonological development, and textual understanding, more related to linguistic development[3]. Still, recently reconceptualized, reading fluency has gained prominence in national research[4-6], being defined as the speed and precision that the subject decodes the word[7].

The reading of a word may imply that the graphemes are recognized one by one, configuring the reading by phonological route, or by direct recognition, whose access to the lexicon happens directly, called reading by lexical route. This reading model is called a dual route model[1].

As language is studied, especially the complexity that surrounds this process, it is considered that most children, when they start attending school, already speak the native language, and reading is developed on this basis. However, learning to read is not simple, since, at least, it involves breaking down a code that maps the spoken language to transform it into writing. How difficult it is to

decompose the code and how much remains to be learned before reaching an adult level of proficiency are things that depend on a wide variety of factors, some intrinsic and others extrinsic to the child[3].

The objective of this study was to correlate the decoding, fluency and reading comprehension skills, and these with the reading complaints presented by the parents/guardians of third year students of public elementary school.

## Methodology

An experimental and descriptive study was carried out using a quantitative analysis method. This study is linked to the research project considered by the Ethics and Research Committee (ERC) of the Federal University of Santa Maria registered under number 87637718.3.0000.5346 in the respective ERC, following the regulation of resolution 466/2012. All the parents/guardians of the participants signed the Free and Informed Consent Form, and the participants signed the term of informed assent.

Auditory (airway), visual (Snellen Scale) and language screening were performed, as well as non-verbal intelligence-R2[8] and impedance testing. Auditory, visual and language changes, borderline scores of non-verbal intelligence (score of 25 or lower)[9] and middle ear impairments were ruled out. Schoolchildren diagnosed with neurological and/or cognitive déficits, in speech therapy and psychopedagogical and/or school reinforcement were excluded.

The sample consisted of 40 students from the third year of public elementary school, with an average age of 8.16 years (standard deviation 0.50), 23 girls and 17 boys, all native speakers of Brazilian Portuguese and literate in public school.

For the evaluation of reading, the evaluations Isolated Words Reading -IWR[10], Reading Fluency Test -RFT[5] and Textual Reading Comprehension - TRC[11] were performed.

The Isolated Word Reading-IWR is made up of 59 stimuli, divided into 3 lists: regular words (19), irregular words (20) and pseudowords (20). The test has two presentation books: Volume I (for children in the first year) and Volume II (for children/adolescents in other school years). For this sample, the book Volume II was used, following the sequence of presentation proposed in the book. The stimuli are in Arial font, size 24, black color and white sheet.

The student was asked to read the stimulus out loud as soon as it was presented, as soon as possible. The reading was recorded (Splend Apps application) and later transcribed. Each stimulus read correctly counted one (01) point.

From the total reached in this evaluation, the score in the total IWR was classified as normal (score above 16), alert for deficit (score 10 to 16), suggestive of deficit (score 7) and moderate to severe deficit (score 2.5 or less). The criterion "complete years of schooling for public school" [10] was used.

To assess reading fluency, the Reading Fluency Test (RFT) proposed by Justi and Roazzi (2012)[5] was applied. The test consists of 60 words typed in Arial font, size 12, Black color and printed on white A4 sheet, all regular from a grapheme-phoneme point of view, and of medium occurrence.

The students were instructed to read the words on the card, from left to right, out loud and as quickly as possible until they heard the signal. This sign indicated the end of the 30-second time (regulated by a stopwatch), which was set by a countdown timer (triggered by the examiner immediately after saying the phrase "can start"). The evaluation included a training session (list of words proposed by the test) before the test.

The test was recorded (audio recording with the Splend Apps application) for later transcription and analysis. One point is assigned to each word read correctly. At the end, the score consisted of the number of words read correctly in the established interval. This score was used only to quantify the reading fluency of this sample, and to correlate fluency with word reading and textual comprehension.

To assess the of Textual Reading Comprehension- TRC the student was instructed to read a text of approximately 200 words typed in Arial font, size 14, black color and printed on white A4 sheet. Subsequently, students answered 10 multiple-choice questions: five related to memory for events and facts described in the story itself (literal questions) and five related to inferential understanding (inferential questions). One (01) point is assigned for each question answered correctly, counting the total value in the RC and in each type of question (literal and inferential).

The score in the total of the TRC was classified as normal (score above 20), alert for deficit (score

15 to 16), moderate to severe deficit (score 7) and major severity deficit (score 2.5 or lower) [12] . The criterion "complete years of schooling in a public school" was used.

To raise reading-related complaints, an anamnesis was prepared which contained questions related to reading in a way that met the objectives of the study. The possibilities "can not read" were presented, representing the difficulty in reading words, "read, but do not understand", which was associated with the difficulty of textual understanding, "delay in reading" was attributed to poor reading fluency. The interest (or not) for reading was added among the complaints because it is considered that this interferes with reading performance.

To classify performances, criteria proposed by the authors of RC[12] and IWR[13] were used. Reading fluency was not classified, being only quantified.

After collecting the results, the data were tabulated in Excel, receiving statistical treatment using Statistica 9.1. The Shaphiro-Wilk test was applied to study the normality of the data, which did not present a normal distribution. Therefore, Kruskal-Wallis and Mann-Whitney non-parametric tests were used to compare stimuli and questions, respectively. For the correlations, Pearson (nominal data) and Spearman (ordinal data) were used.

## Results

Initially, the results of the reading evaluations and reading-related complaints will be presented, and then the proposed correlations.

Table 1 shows the means and standard deviation for each IWR stimulus, in the literal and inferential questions of TRC and FR. Also, the table shows the result of the comparison among the types of stimuli by Kruskal-Wallis and among the questions by Mann-Witney.

**Table 1.** Means and standard deviations in, assessment of Textual Reading Comprehension and Reading Fluency Test (n = 40)

| | READING | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Isolated Word Reading | | | | Textual Reading Comprehension | | | FRT |
| | R | I | P | Total | L | In | Total | --- |
| Mean | 16.82[a] | 13.70[b] | 14.90[b] | 40.45 | 4.10 | 4.02 | 7.87 | 20.35 |
| SD | 5.83 | 5.56 | 5.82 | 16.54 | 1.46 | 1.40 | 2.98 | 12.41 |

R=regular stimuli, I=irregular stimuli, P = pseudowords, L = literal questions, In = inferential questions, TFL = total correct answers in the Reading Fluency Test, SD = standard deviation, a, b numbers accompanied by equal superscript letters do not differ statistically from each other and accompanied by different superscript letters differ statistically from each other (Kruskal-Wallis test). Source: Own

Figure 1 shows the complaints reported by parents and/or guardians regarding their children's reading.

Table 2 shows the Person's correlation between reading assessments, specifying the correlations between all IWR stimuli and the total in this assessment, all types of questions and the total of the TRC, and the FR.

Table 3 shows the correlation between reading assessments and complaints related to reading.

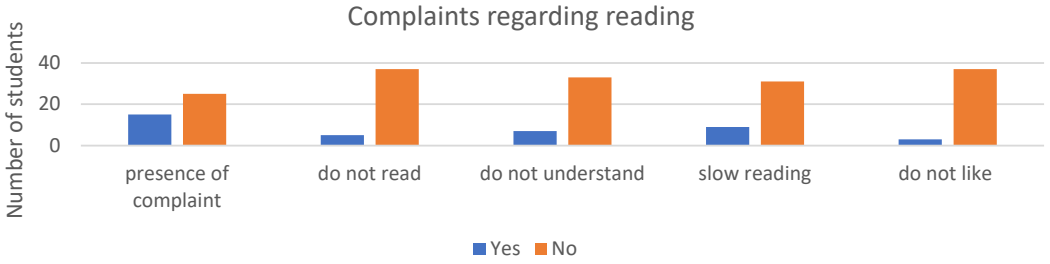


**Figure 1.** Number of students with and without reading-related complaints (N = 40).

**Table 2.** Correlations between Isolated Word Reading, Textual Reading Comprehension and Reading Fluency Test (n = 40)

| Var | READING | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | | I | | P | | IWR | | L | | In | | RC | | RFT | |
| | R | p | r | p | r | p | r | p | r | P | r | p | r | p | r | p |
| R | | | ,88 | ,000* | ,92 | ,000* | ,96 | ,000* | ,70 | ,000* | ,68 | ,000* | ,91 | ,000* | ,66 | ,000* |
| I | | | | | ,89 | ,000* | ,95 | ,000* | ,77 | ,000* | ,58 | ,000* | ,86 | ,000* | ,80 | ,000* |
| P | | | | | | | ,97 | ,000* | ,73 | ,000* | ,65 | ,000* | ,88 | ,000* | ,77 | ,000* |
| IWR | | | | | | | | | ,76 | ,000* | ,66 | ,000* | ,92 | ,000* | ,76 | ,000* |
| L | | | | | | | | | | | ,79 | ,000* | ,81 | ,000* | ,61 | ,000* |
| In | | | | | | | | | | | | | ,80 | ,000* | ,42 | ,000* |
| RC | | | | | | | | | | | | | | | ,64 | ,000* |

Var = variable, R = regular stimuli, I = irregular stimuli, P = pseudowords, IWR= total in the reading test of isolated words, L = literal questions, In = inferential questions, RC = total in the evaluation of text reading comprehension, RFT = total of correct items in the reading fluency test, r = Pearson's correlation coefficient, p = p value (significance level p <0.05), * statistical significance (p <0.05).

**Table 3.** Correlation between reading assessments and reading-related complaints (n = 40)

| | Isolated Word Reading | | | | | | | | Textual Reading Comprehension | | | | | | ---- | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | | I | | P | | Total | | L | | In | | Total | | RFT | |
| | R | p | r | p | r | p | r | p | r | P | r | p | r | p | r | p |
| PC | ,46 | ,002* | ,63 | ,000* | ,43 | ,004* | ,56 | ,000* | ,39 | ,012* | ,38 | ,014* | ,47 | ,002* | ,66 | ,000* |
| NR | ,37 | ,001* | ,31 | ,045* | ,32 | ,025* | ,33 | ,035* | ,44 | ,004* | ,36 | ,009* | ,40 | ,008* | ,37 | ,015* |
| NU | ,17 | ,291 | ,40 | ,008* | ,46 | ,020* | ,37 | ,017* | ,14 | ,370 | ,24 | ,122 | ,32 | ,039* | ,46 | ,002* |
| SR | ,41 | ,008* | ,45 | ,002* | ,30 | ,055 | ,41 | ,007* | ,36 | ,019* | ,30 | ,055 | ,30 | ,054 | ,49 | ,001* |
| NL | ,11 | ,463 | ,21 | ,191 | ,05 | ,741 | ,14 | ,388 | ,19 | ,225 | ,89 | ,956 | ,10 | ,513 | ,17 | ,274 |

R = regular stimuli, I = irregular stimuli, P = pseudowords, L = literal questions, In = inferential questions, RFT = total of correct items in the reading fluency test, PC= presence of complaint, NR = do not read, NU = do not understand, L = slow reading, NL = do not like to read, r = Spearman's correlation coefficient, p = p value (significance level p <0.05), * statistical significance (p <0.05). Source: Own

## Discussion

There was a superior performance in reading the regular words, which is possibly an effect of the preferential use of the phonological route. This corroborates what has been widely reported in the literature[14,15], that initially the child makes preferential use of this route, and with the school progress starts to make use of direct recognition, given by the use of the lexical route[15,16].

Maintaining the exclusive or even preferential use of the phonological route can lead to difficulties in understanding what is read[17,18]. Thus, the fact that the sample presents the reading of regular words significantly better than the reading of the other stimuli, can serve as an alert to accompany these students, helping them to also develop reading through the lexical route. Using strategies to promote access to the lexicon can optimize semantic and conceptual processing, expanding textual understanding, which is the objective of reading[18-20].

Regarding the comprehension of textual reading, it was found that, in general, the performance was high in the total of the evaluation, with a mean percentage of 78.7% of correct answers in the questions. Still, it was found that there was no statistical difference when comparing the correctness of literal and inferential questions, again corroborating previous studies[14,21].

FR performance ranged from zero (0 hits) to 45 hits, averaging 20.35 hits. This reflected an important heterogeneity among students, even within the same school context, which would not be expected[22]. Possibly, the differences found resulted from the differences also identified in word recognition, since less proficient readers demand more time in word recognition, implying less fluency[23].

It was found that 15 (37.5%) students were identified by their parents/ guardians as having at least one reading-related complaints a percentage higher than that found in study[24]. This difference is possibly due to the fact that these authors study schoolchildren from the first to the fifth year, while in the present study, it was with the parents of the third year. In the initial levels, it is considered that the child is still in literacy, and even if reading

difficulties already exist, they are probably not presented as complaints by parents, as they are still waiting for the end of the literacy period to achieve them.

The prevalent reading-related complaint was slow reading (nine students, 22.5%), possibly linked to the still predominant use of the phonological route in this sample, expected for the age group and school level studied[18]. The complaint that prevailed after slow reading was the lack of reading comprehension (seven students, 17.5%) and lastly with the same prevalence, the complaint "does not read" and "does not like" (both with three students, 7.5% each).

Considering that reading has implications for other academic skills[21,25], the present study pointed out relevant data in view of the school context, since these complaints possibly have an impact on the academic life of these students. This is probably reflected in the low indices in mathematics and Portuguese presented by Brazilians at the end of high school, according to a survey carried out by the Basic Education Assessment System in 2017[26].

By analysis of Table 2, a positive and significant correlation was found between all results. Therefore, these results confirmed the hypothesis that the best result in reading isolated words correlates with the highest performance in the fluency test, which in turn, correlates with better textual understanding[16,17]. This contributes greatly to the pedagogical and rehabilitation issues of reading, guiding both teaching and speech therapy interventions.

The interpretation of these results shows that the better the word reading, the more fluent the reader is, who better understands what he/she reads. Similar results were found, which concluded that there was a simultaneous improvement in word recognition, fluency and understanding during academic progress, showing the association between these aspects[7].

The results indicated a positive correlation between the absence of reading complaint and performance in all assessments, as well as in another study[24] that, despite evaluating textual production in students from the third year, also found a correlation between this assessment and the complaint presented by the students' parents.

Analyzing Table 3, it was found that the complaint "does not read" (NR) correlated with all stimuli (regular, irregular and pseudoword), all types of questions from the TRC and the FR. From these results, it can be inferred that the parents of this sample were sensitive to reading their children, because the superior result in the evaluations correlated with the absence of complaints, favoring and reinforcing the role of parents in the education of their children, which is highly recommended[27].

The textual reading comprehension, in turn, was shown to be correlated to the complaints "do not read" and "do not understand", indicating that the parents' perception was adequate or close to being adequate. Literal questions correlated with the complaint "do not read" and "slow reading", while inferential questions correlated only with "do not read". These results seem to reinforce that inferential issues are more related to semantic and prior knowledge issues, thus representing more subjective issues. In this sense, it may be more difficult for parents to identify this subjectivity, implying the absence of correlation, that is, it was not possible to infer that better results in inferential issues were associated with the absence of the complaint.

In sum up, there was a significant lack in national and international literature that establishes the correlation between reading assessments and reading-related complaints submitted by parents and/or guardians. However, the results presented here serve as a stimulus for further research on the topic, with larger samples and investigation of other aspects.

## Conclusion

It was concluded that there was a high incidence of at least one reading-related complaint in this sample, with the complaint of slow reading prevailing, possibly due to the predominant use of the phonological route for reading, which was true when analyzing the reading of isolated words and reading fluency.

The correlation found between the reading evaluations confirmed what was exposed in the literature that better word recognition favors reading fluency, freeing cognitive demands for textual comprehension.

The parents/guardians of the students in this sample were sensitive to their children's reading, and the complaint "does not read", despite not being the prevalent complaint, correlated with all reading assessments.

For new research, studies with larger samples and with different school levels are suggested, reinforcing the need for specific investigation of the reading-related complaint, as this is the basis for the other subjects.

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