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Relation between oral reading fluency and reading comprehension

Relação entre fluência de leitura oral e compreensão de leitura

Maíra Anelli Martins[1]
Simone Aparecida Capellini[1]

Keywords

Reading
Reading Comprehension
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ABSTRACT

Purpose: Relate oral reading fluency performance to reading comprehension in students of the Elementary School. **Methods:** The study included 97 students, distributed in three groups: Group I (GI): composed by 32 students from 3rd grade level; Group II (GII): composed by 28 students from 4th grade level and Group III (GIII): composed by 37 students from 5th grade level. The oral reading of a text was recorded and analyzed observing the pauses made by the students, auditory perceived by judges, speed reading measured by the number of words correctly read and reading comprehension assessment. **Results:** Students of Group I and III presented relation between reading comprehension and number of words correctly read per minute, which did not occur with the students from Group II. The GII and GIII showed negative relation, not significant between the number of pauses and reading comprehension. **Conclusion:** The data showed that oral reading rate is related to the reading comprehension, however, the number of pauses showed no significant differences between reading comprehension for most grade level analyzed.

Descritores

Leitura
Compreensão de Leitura
Avaliação
Educação
Aprendizagem
Escolaridade
Ensino Fundamental

RESUMO

Objetivo: Relacionar o desempenho na fluência de leitura oral com a compreensão de leitura de escolares do Ensino Fundamental I. **Método:** Participaram deste estudo 97 escolares, distribuídos em três grupos: Grupo I (GI): composto por 32 escolares do 3º ano; Grupo II (GII): composto por 28 escolares do 4º ano; e Grupo III (GIII): composto por 37 escolares do 5º ano. A leitura oral de um texto foi gravada e analisada, observando-se as pausas realizadas pelos escolares, percebidas auditivamente por juízes, medidas a velocidade de leitura, por meio do número de palavras lidas corretamente, e realizada também a avaliação da compreensão de leitura. **Resultados:** Para os escolares do Grupo I e III, o desempenho na compreensão foi relacionado com os escores de palavras lidas corretamente por minuto, o que não ocorreu com os escolares do Grupo II. O GII e GIII apresentaram relações negativas não significantes entre o número de pausas e a compreensão. **Conclusão:** Os dados demonstraram que a taxa de leitura oral tem relação com a compreensão de leitura, entretanto, o número de pausas não demonstrou diferenças significantes em relação à compreensão de leitura para a maior parte dos anos escolares analisados.

Correspondence address:
Maíra Anelli Martins
Universidade Estadual Paulista – UNESP
Av. Hygino Muzzi Filho, 737, Mirante, Marília (SP), Brasil, CEP: 17525-000.
E-mail: maira.anelli@gmail.com

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[1] Universidade Estadual Paulista – UNESP - Marília (SP), Brasil.

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INTRODUCTION

Fluency has called the attention of researchers all over the world for the effect it can cause at the end of school year in its global performance. This is so, because if the student gets to the end of the cycles of the Elementary School without reading fluency, probably his reading comprehension can be adversely affected. Because of lack of reading fluency over the academic years, it can be noticed negative consequences related to the amount of reading performed by the student. The lack of fluency generates reading demotivation and makes the individual read less and less, placing him in a cycle of little reading. It is necessary to practice reading to achieve fluency development, otherwise reading will be stagnant and can compromise the student opportunity to learn the academic content, which also consecutively depends on good reading[1].

In the national literature[2-4], it is possible to observe the diversity of studies that discuss the low academic results in reading, addressing subjects related to learning of reading such as metalinguistic skills, phonological and morphological awareness, decoding, vocabulary and comprehension strategies. Despite the efforts of teachers, psychologists, psychoeducators, speech language therapists and other professionals involved with education, to understand the causes of the difficulties in reading and comprehension, there are few articles that discuss the relation between fluency and comprehension.

For the reader to be considered fluent, he should necessarily properly develop the three dimensions of reading fluency, which are: accuracy in decoding words, automatic processing (speed) and prosody during the reading. In other words, a fluent reader has the ability to read aloud on a fast, accurate and expressive way[5].

Throughout schooling years, the reader with no difficulties progresses through the development of the automaticity by recognizing the words, and on being exposed to reading, increases together with the speed, the decoding and recognition of letters to words of low frequency, which makes the reading progressively faster, accurate and fluent.

The reading, called intermediary, is consolidated at the third school year, with the objective of reaching the automation in a way that the reading becomes a pleasant activity, motivating, not only in the recreational, leisure sense, but also in the informative and functional one. It is at this moment that the amount of written content significantly increases inside the classroom, with higher demands of cognitive resources such as attention and memory, making it more difficult the text comprehension[6-9].

To assess the reading fluency, it is observed in the literature[1,5,7] measures described such as the decoding accuracy (through the percentage calculation of words that a reader can correctly read), and the automaticity (through reading rate, calculated by the number of words correctly read in a minute). The automaticity is connected to the performance in the skills of decoding and recognizing words quickly and without effort. This way, a product from the automatic word recognition is a faster reading. Thus, reading rate/speed is also frequently used as an automaticity measure.

One of the most used ways to evaluate oral reading fluency is by the number of words correctly read per minute, of a text that is adequate to the student schooling level. It is a quick and valid assessment, tested in many studies as an efficient way for tracking students at risk of reading difficulty and for fluency monitoring, indicating the general performance of the student's reading. Yet, at reading fluency assessment, it is investigated the prosody, which can be evaluated by the reading quality (related to aspects of expression, wording, regularity and speed); or yet, by means of acoustic analysis, with the help of speech software (related to prosodic characteristics such as tone, fundamental frequency, intensity, pauses, syllable and expressions duration). It is possible to find in the literature scales that assess speed, accuracy and pauses while the student reads a text for a minute. These multidimensional scales of fluency are largely used in the educational field[10,11].

In a study performed with Brazilian students, one of the objectives was to investigate the relation between reading fluency and comprehension as well as how these two skills are related to the level of education; as of groups formed by students of the 2nd year of the Elementary School I, 2nd year of the Secondary School and individuals with higher level of education. The results showed that the higher the education, the higher the reading fluency, and the higher the fluency, the higher will also be the level of comprehension, what generates implications for the teaching of reading and comprehension inside the classrooms[12]. The same can be found for Brazilian students of the 9th grade of Elementary School II, who, with the highest grades (better academic performance), read more words per minute, varying the speed according to the text and to the way of reading - oral and in silence[13].

In addition, in another Brazilian study performed with students of the 1st grade of Elementary School I, the results suggested that the variations at reading fluency play an important role at reading comprehension since the beginning of learning of reading. This is so, because the fluency is significantly correlated to comprehensive skill being the decoding (accuracy) and the fluency (accuracy and speed) evaluated at the end of the 1st grade, and the reading comprehension evaluated a year later, at the end of the 2nd grade[14].

Once the decoding becomes automatic, simultaneously the attention and memory resources are released for the use of higher order functions at reading. By the moment of the reallocation of these resources, the performance in prosody at oral reading, with adequate pauses and intonation, supplies feedback for the reader about the main syntactic and semantic units involved in the reading processing, producing, as a result, a better comprehension. The hypothesis of this study is that there is a relationship between reading fluency and the performance at reading comprehension.

Based on the above, this study has as objective to relate the performance at oral reading fluency to the reading comprehension of students of Elementary School I.

METHODS

This study was performed after the approval of the Committee on Ethics in Research of Faculdade de Filosofia e Ciência de Marília-SP - UNESP under the protocol nº 0096/2011 of 3/5/2011.

Participants

104 students of both genders from 3rd to 5th grade of Elementary School, of a public municipal school were evaluated. After the assessment the students of 3rd and 4th grades were excluded because they did not present satisfactory level of reading domain for the observation of the variables proposed in the study (students with slow and/or spelling level of reading) and the data in which were observed audio recording errors (cuts or interruptions in the audio file). Six students of 3rd grade, one student of 4th grade and none of 5th grade were excluded, this way the final sample was formed by 97 students.

The choice for the population of this research was because of the alphabetization level, once it is expected that students from 3rd grade to be alphabetized and, consequently, it would be possible the performance of the described procedure. For this reason, this study did not include students from the 1st grade and 2nd grade because they are on going the literacy process.

The students were distributed in three groups, as shown below:

Group I (GI): composed by 32 students from 3rd grade, being 68.76% of the male gender and 31.25% of female gender;

Group II (GII): composed by 28 students from 4th grade, being 35.71% of the male gender and 64.28% of female gender;

Group III (GIII): composed by 37 students from 5th grade, being 56.75% of the male gender and 43.24% of female gender;

The inclusion criteria for the sample selection were:

- The signature of the Informed Consent Form by the parents or the responsible ones for the students;
- Students with visual and hearing acuity and cognitive performance within normal standards, according to the description at the school records and teachers' reports.

The exclusion criteria for the sample selection were:

- The presence of genetic or neurological syndromes in the students;
- Students that did not present a satisfactory reading domain level for the observation of the variable proposed in the study; and
- Students that presented recording errors in their respective audio files.

Materials and procedures

Data collection made with the recording of reading oral production of the students was performed in their school, individually, at the class hours in a room offered by the school director.

The text used for the oral reading recording and for the comprehension test was "The Umbrella". This selected text belongs to the "Protocol of Reading Comprehension Assessment" for students from 3rd to 5th grade of Elementary School[15]. The choice for using this protocol occurred by the careful assessment and development that the procedure presents, once its issues were built from the rules for the psychometric tools elaboration described by The Federal Council of Psychology. This is an official body that studies and establishes criteria and rules in Brazil for the construction of an evaluation tool that assures accuracy and validity, which defines, as reliable procedures, those in which the accuracy be understood as the level of consistency of the tool and its validity, the ability to reach the objectives for which it was built.

Moreover, the texts in the procedure were adapted following criteria of grammar, language, coherence and casual relations among the ideas of the text. The protocol is formed by four texts, two narrative and two expository ones. The choice of a text of a narrative gender protocol occurred due to the students being more exposed to them, since childhood, and during the education process, what would make it easier the fluency evaluation without cultural issues of the text interfering in the reading results of the students of different schooling levels.

Among the narrative texts of the protocol, the choice for the text "The Umbrella" for this research occurred because it presents a greater variation of intonation curves from the punctuation and text style. In the selected text we can find: dash indicating a character talk, commas, interrogation mark, exclamation mark, period and ellipsis points, increasing, this way, the quantity of possibilities for analyzing pauses, one of the items to be evaluated at reading fluency.

The choice for the use of the protocol also occurred because it presents texts that were selected to reach students from the 3rd, 4th and 5th grade with the same representativeness of the level of difficulty for all the school years; turning it possible to use a single text for the application in all school years and obtaining more reliable results for comparison.

The protocol procedure of reading comprehension includes questions of micro and macro structures, literal and inferential, based on the mental representation model of comprehension, and the comprehension is verified by means of eight multiple-choice questions. The protocol was built both for collective application, within the educational context and for individual form, within the clinic context. The application for this study followed the guidelines for individual application.

In the room reserved for the recording procedure, the researcher explained how the reading activity would be performed. Thus, the student was instructed to silently read the story "The Umbrella" and after that to read it aloud, with the help of a microphone connected to a notebook for subsequent analysis of the audios.

It was requested to the student to perform the silent reading of the text prior to the oral reading recording, aiming at minimizing the appearance of difficulties at decoding during the recording, once the difficulties could interfere in the pause analysis. Soon after the readings, the multiple choice questions of the comprehension protocol selected were handed to the students.

The equipment used for recording was a *karsect* microphone, headlong, one-way (cardioid). The microphone was connected to an Acer notebook, with an Intel Core processor, 3 GB memory, and operational system of 32 bits. The recording was performed by *Praat* program, version 5.1.05, with an entry of 16 bits of quantization and sampling frequency of 22050 Hz.

Measurements

- Pause analysis

The pauses performed by the students were observed by means of hearing judgement. For this purpose, a team of three judges, two educational speech language therapists and one pedagogical coordinator of the Elementary School of a private school performed the judgement. For pauses, it was considered the silence at speaking between words or sentences.

The judges were invited to judge and mark the pause moments at the reading, from hearing the oral reading of the students, who were presented in audio files. The judges received a pen drive containing the audios and a protocol according to which, all of them should proceed equally, regarding the judgement and on marking the points in which for them there were pauses. This protocol contained the steps, which the judges should follow, guided to listen to each reading twice. The first hearing should happen for them to mark the pauses with a blue pen. At the second hearing, they should proceed with the confirmation of the marked pauses and, with a red pen, they could mark the pauses not perceived previously.

At the protocol, it was also indicated that the pauses they should mark, could be short or long, provided they considered the silence in the speaking, performed between words or sentences.

Each judge also received 97 printings of the text "The Umbrella" in order to make the marks of the pauses judged by each one, during the hearing of the students' reading. In order to avoid any visual clues that could influence the judgement of the pauses by the judges, the format of the text was modified regarding its original punctuation, namely, characteristic graphic marks were excluded, such as period, exclamation mark, interrogation mark, ellipsis points, paragraph demarcation blanks, capital letters, etc.

For data analysis purposes, were considered the pauses aurally perceived by the judges that were marked in the received texts, and only when these pauses were marked by at least two or more judges. This way, for this study, were accepted the pauses considered with high significant index (agreement equal or higher than 70%)

- Speed/reading rate

For the analysis of reading speed, it was observed the number of words correctly read per minute (CWPM). For such, were marked as mistakes: mispronounced words, words replaced by others, omitted words, words read out of order, addition or omission of morphemes and hesitations (if the student hesitated with one word for 3 seconds, he was told the word and it was marked incorrect). For the quantification of errors, it was also used punctuation rules for exclusive situations, such as: lines or many words omitted, reading of numbers, words with hyphen that can exist independently and abbreviations. Yet, the following items indicate all the situations that were marked as CWPM: words pronounced correctly, words corrected by themselves, repeated words, mispronounced words due to accent and inserted words[16].

- Reading comprehension

For this study, the performance in reading comprehension was evaluated according to the number of incorrect answers presented by the student through the criteria based on the domain of the comprehension skills on the read text. This way, it will be considered as performance the following criteria: 8 incorrect answers = without comprehension; from 5 to 7 incorrect answers = little comprehension; from 3 to 4 incorrect answers = partial comprehension; from one to two incorrect answers = almost total comprehension; none incorrect answer = total comprehension of the reading.

- Statistical analysis

To obtain and confirm the results, the statistical analysis was performed by the program *Statistical Package for Social Sciences* (SPSS), in its 19.0 version and the *MS-Excel* electronic spreadsheet was used in its version *MS-Office 2010* for the data organization. It was adopted the level of significance of 5% (0.050) for the application of the statistical tests, that is, when the value of calculated significance (p) was less than 5% (0.050).

The normality was verified by the *Shapiro-Wilk* test. For the variables that presented normal distribution, it was used the *Pearson* correlation test and, for those without normal distribution, the *Spearman* correlation test. The magnitude of the correlations was evaluated using the proposed criteria in the literature[17]:

- 0 to 0.25 – inexistent to low correlation;
- 0.25 to 0.50 – low to moderate correlation;
- 0.50 to 0.75 – moderate to high correlation;
- ≥ 0.75 – high correlation.

It was also taken into consideration that the level of correlation between variables can be positive, indicating that there is a linear relation, when one of the variable increases the other increases too, or can be negative, that is, when one of the variables increases, the other decreases.

It was performed descriptive analysis, with the average calculation and standard deviation of the following variables: CWPM, comprehension and number of pauses.

RESULTS

Chart 1 presents the description of the average and standard deviation for GI, GII and GIII of the number of words correctly read per minute, number of mistakes in the comprehension test and number of pauses performed during the students' reading. It is possible to observe that the average of the reading rate

Chart 1. Correct words read per minute, comprehension mistakes and number of pauses at GI, GII, GIII%

	N	CWPM		Comprehension Mistakes		Number of Pauses	
		Average	DP	Average	DP	Average	DP
GI	32	67.09	25.09	3.75	1.80	49.06	28.64
GII	28	77.96	24.47	2.96	1.35	36.64	8.11
GIII	37	96.43	34.14	1.95	1.41	37.62	8.48

Caption: DP = standard deviation

(CWPM) is different for each school year, demonstrating the progression at the fluency development and also a decrease on the number of mistakes, made by the students, as they move schooling forward. Mainly the students of GIII, presented almost total comprehension, while students of GI and GII presented average performance with partial comprehension at reading.

At GI, the average of the pause number is much higher than GII and GIII, demonstrating that these students – at the end of the literacy process – can present difficulties at reading decoding and automation, performing a slower reading and with more pauses.

Tables 1, 2 and 3 present the results of the correlation between the measuring of fluency and reading comprehension for the students of the three groups of this study.

On applying the *Spearman* correlation test, it is possible to observe that the results found for GI (Table 1) show a negative correlation coefficient with magnitude from low to moderate between the variables CWPM and the number of wrong answers and between the number of pauses and CWPM, with statistically significant differences. This way, as the CWPM score increases (that is, the reading rate improves), indicating the speed increase, the number of mistakes made in the comprehension test and the number of pauses performed decreases.

The findings in GII (Table 2) show, from the application of *Pearson* Test, that when compared: the CWPM variables, the number of mistakes in the comprehension test and the number of pauses at reading, data suggest that the reading time and the number of pauses performed will not always be a reference for textual comprehension (as suggested for the students of GI). This is because, despite it has been found a negative correlation among these variables, it was not identified a statistically significant difference.

The results found for GIII (Table 3) show that, like GI and GII, negative correlation occurred between CWPM score and the number of mistakes made in the comprehension test with magnitude from moderate to high and statistically significant difference.

Regarding the number of pauses, the behavior of GIII was similar to that one of GII, that is, when correlated to the CWPM score and the number of wrong answers, the correlation was negative, that is, a behavior inversely proportional, however it was not highlighted a statistically significant correlation.

Table 1. Correlation among the scores of correct words read per minute, the number of wrong answers and the number of pauses of GI

Variable	NWA	NP
CWPM	-0.368*	-0.406*
NWA		-0.038

*p≤0.05 significant correlation by *Spearman* Test
Caption: CWPM = Correct Words read Per Minute; NWA = Number of Wrong Answers; NP = Number of Pauses. Elaborated by the authors

Table 2. Correlation among the scores of correct words read per minute, the number of wrong answers and the number of pauses of GII

Variable	NWA_	NP_
CWPM	-0.314	0.270
NWA		-0.222

Caption: CWPM = Correct Words read Per Minute; NWA = Number of Wrong Answers; NP = Number of Pauses. Elaborated by the authors

Table 3. Correlation among the scores of correct words read per minute, the number of wrong answers and the number of pauses of GIII

Variable	NWA	NP
CWPM	-0.550*	0.050
NWA	1.000	-0.121

*p≤0.05 significant correlation by *Spearman* Test
Caption: CWPM = Correct Words read Per Minute; NWA = Number of Wrong Answers; NP = Number of Pauses. Elaborated by the authors

DISCUSSION

The data of this research showed that the students of GI and GIII presented relation between the reading rate (CWPM) and the number of mistakes made in the comprehension test. This result corroborates the performed study with Portuguese students, in which, at the first initial grades of Elementary School (1st, 2nd and 3rd grades), measures for reading fluency (like the fluency at text reading) were related to reading comprehension. The correlation coefficients between reading comprehension and oral reading fluency obtained in our study are similar to the ones found for readers of transparent orthography. The reason is, at that study, students of 1st, 2nd and 3rd grades presented high correlation between the variables, while, at the present research, students of GI presented negative correlation coefficient with magnitude from low to moderate, and the students of GIII presented correlation coefficient from moderate to high. For the last school years (4th, 5th and 6th grades), this relation became moderate, with attention to the correlations of multiple

regression being significant for all the grades between the text reading fluency and reading comprehension[18].

There are studies in the literature that do not find correlation between reading speed and reading comprehension, such as the one performed with Italian students from 1st to 5th grade[19], in which were found relations only between accuracy at decoding and reading comprehension. Despite this, we should take into consideration that different evaluation methodologies can lead to different results between the relation of reading fluency with comprehension, even when the studies are performed with populations with similar orthography, such as the case of the Portuguese and Italians (more transparent orthography than English, for example).

Currently, there are different ways of assessment used in studies, such as: comprehension evaluations that can be performed by the *cloze* technique, multiple choice questions, open questions or retelling, which analyze different ways of comprehension with influence of variables, such as extension of text and time proposed for evaluation[20]. Another assessment way is the reading fluency, which can also consider different aspects of evaluation such as: oral or silent reading evaluation, of texts or isolated words/pseudo words, accuracy rate/speed, besides the prosody evaluation[21].

For the present research and the one performed with Portuguese students, it was considered the text reading rate. This measure is mostly used in other studies not only with more transparent orthography, but also in the ones with intermediary orthography and less transparent (opaque); the findings in these researches show more similar results of relations between the number of words correctly read per minute and reading comprehension[18].

While for GI and GIII were observed relations between the reading rate and comprehension, for GII there was no statistically significant difference, contrary to results of other researches, which observe that dimensions of reading fluency are related and are direct predictors for comprehension. Likewise, another study evaluated fluency measures and reading comprehension in Portuguese students too, of the 2nd grade and, later, of the 4th grade of the Elementary School[22]. It is assumed that possibly other cognitive skills (variables not controlled in this experiment) can also have interfered at reading comprehension, influencing the relation among the measures. Even so, the relation between the two variables for GII was presented negative, indicating that, as far as the CWPM scores increase, with fluency improvement, the number of mistakes decreases, indicating some improvement at comprehension. Therefore, other cognitive skills that have effects at reading comprehension can also be controlled in the tested models in future studies.

However, it was verified in recent literature a study performed with Dutch students of the 4th grade, in which the reading rate of the text has also demonstrated weak correlation and not significant with reading comprehension. This corroborates the present research and demonstrates that there still are not solid results about how reading fluency and comprehension relate to each other, being reading a complex activity and with several skills involved[23].

In general, it was demonstrated a relation between reading fluency and comprehension, in a more transparent orthography such as the Brazilian Portuguese, and suggesting that fluency measures can partly explain differences at reading comprehension, depending on the grade the student is.

These findings support that reading fluency, that is, a fast and accurate reading of a text, with expression, should be the aim at reading evaluations, considering fluency measures in both evaluations and interventions that have as objective to promote reading comprehension.

Although correlations were not observed between the pause variable evaluated in this study and the reading comprehension for GI, GII and GIII, this data permeates results described in a study performed with students of the 4th and 6th grade of the Elementary School. In that study were found correlations between prosody and comprehension only for older students, in other words, of 5th and 6th grade of the Elementary School, suggesting that reading with expression needs to be developed in a stable way, before starting to make it easy the reading comprehension[24]. This is a hypothesis that can clarify why students from the beginning of Elementary School do not present correlation between comprehension and the number of pauses.

The only relation statistically significant observed between the number of pauses and reading rate was found for the students of GI (3rd grade), demonstrating that, for the students who are at the end of the alphabetization process, more pauses can indicate more decoding difficulties[25]. This makes them spend more time performing the reading of a text and, at the end, this reflects in comprehension difficulty, not primarily caused by lack of prosody, but by lack of accuracy and automaticity at reading.

Recent studies were not found that could relate the prosody, specifically the pauses aurally evaluated, to reading comprehension. This is mainly due to the evaluation ways that have been used, what makes interpretations and comparisons of results to be a challenge. For example, in a study performed with Dutch students of the 4th grade of Elementary School, the prosody was evaluated by means of a multidimensional scale, in which the evaluator performs a perceptive judgement in relation to expressivity and volume, phrasing, reading rhythm and softness. It was verified that there was moderate correlation with the reading comprehension tests[23], what anyway does not permit more comparisons, once in the present research only the pauses performed by students were evaluated.

The results of this study reinforce the theory that explains the relation between fluency and comprehension. In the processing theory described since the 70s, reading fluency development is essential for the students, mainly at the moment when they move from learn to read to read to learn. To perform any activity in an automatic way, it is necessary to perform, for example, activities with some properties, such as reading without conscious attention, without effort, with speed and autonomy[26].

From the moment when the reader gets to perform any activity, as reading, with decoding automaticity, his conscious attention and memory previously totally dedicated to the level of word, can be used in the cognitive processes at the level of sentences and the meaning itself, specifically at the semantic of the written message, improving this way, processes involved in comprehension, as the performance of interferences[1,5].

This study partly confirmed the hypothesis that there is a relation between reading fluency and the performance in reading comprehension. The analyzed data demonstrate that the isolated fluency aspect cannot indicate the reader competence for the reading comprehension. However, together in a wider evaluation, it is possible that they can identify and help to characterize the type of difficulty of this student; with the objective of the fluency evaluation to be used as a tracking procedure to identify them as possible readers, that need higher attention with the competences of reading and comprehension viewing, as final objective, a proficient reading.

The data demonstrate that the oral reading rate has relation with reading comprehension, however the number of pauses did not demonstrate significant differences in relation to reading comprehension.

This study allows us to reflect about the importance, for future analyses, of the researches not approaching only a single fluency measure, but a set of measures that characterize the fluency, allowing generating new perceptions about the relation between fluency and comprehension.

CONCLUSION

The findings of this study permit to meet the proposed objective – to verify if there is relation between the performance in reading rate, the number of pauses and the number of wrong answers in the face of the evaluation of the textual comprehension of Elementary School I students.

Limitations

Taking into consideration these types of findings, studies have deepened in subjects related to reading fluency, analyzing, for example, the influence of students' individual characteristics (such as the efficiency of visual processing during the reading of words, speech language decoding, verbal knowledge, vocabulary, the level of reading skill) and also text resources (such as the level of difficulty of a text, its length, gender, language and speech attributes) about oral reading fluency[6]. To deepen the understanding of the found result, it would be necessary comparisons with other variables.

It is also noticeable a significant increase of researches concerned with all the aspects related to reading fluency, and not only with those more researched (speed, decoding and automaticity). They are researches worried in studying the aspects related to prosody, and to other ways of fluency, such as the silent reading fluency[8,21].

New studies are necessary to identify or develop valid and reliable tools to evaluate the fluency from its subcomponents, in this case, the prosody. Currently besides prosody evaluation by means of acoustic analyses and the help of speech software, which is not a practical measure to use in the classroom, the available prosody measures are not presented with reliable data. Without a reliable and valid prosody measure, the oral reading fluency cannot be accurately measured. The documentation of the reliability in a prosody measure would be essential for future researches about reading fluency, as well as for the functional use of the evaluation in the classroom, as described in a previous publication[27]. It is here suggested further studies with a broader range of measures with the use of multidimensional scales, besides a higher number of subjects.

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Author contributions

MAM main researcher, conducted the research and the schedule, selected the participants, collected and analyzed data, made bibliographic search, wrote the article, and was responsible for the submission and procedures of the article; SAC guided the study, cooperated with the data analysis, discussion and with the preparation of the article.