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# Is there a difference between reading comprehension and oral comprehension at the end of elementary school?

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**Abstract**

Oral comprehension has been largely overlooked compared to written comprehension, not only in research but also in teaching, especially in Brazil. To address this gap, the present study compared the comprehension of oral (OC) and written (WC) texts in 336 8th-grade students (average age = 14 years, 192 girls). The texts were balanced for complexity and length and followed by multiple-choice questions targeting literal or inferential understanding. Students were divided into groups according to their reading performance: low (LPR) (64 = 19%), medium (MPR) (197 = 58.6%), and high (HPR) (75 = 22.3%). Results showed that students achieved higher scores on written modality (WM) questions than on oral modality (OM) questions, and lower scores on inferential questions compared to literal ones, with the LPR group performing worst overall. Similar results emerged in the within-subject analysis. These findings suggest that distinct profiles of written and oral comprehension exist among students at the end of elementary school. Moreover, implicit content appears to pose a greater challenge in OM than in WM. Understanding the relationship between these two skills can provide insights into the origins of reading and listening comprehension difficulties to inform both pedagogical and clinical interventions.

**Keywords:** Reading comprehension. Oral comprehension. Reading assessment.

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**Resumo**

**Há diferença entre a compreensão leitora e a oral ao final do ensino fundamental?**

A compreensão oral tem sido negligenciada em comparação à escrita, tanto na pesquisa quanto no ensino, especialmente no Brasil. Visando contribuir para suprir essa lacuna, o presente estudo comparou a compreensão de textos em modalidade oral (MO) e escrita (ME) em 336 alunos da 8ª série (idade média = 14 anos; 192 meninas). Os textos, equilibrados quanto à complexidade e à extensão, foram seguidos de questões de múltipla escolha de caráter literal ou inferencial. O desempenho foi analisado em três grupos de leitores: com baixo desempenho em leitura (BDL; 64 alunos, 19%), médio desempenho (MDL; 197 alunos, 58,6%) e alto desempenho (ADL; 75 alunos, 22,3%). Os resultados indicaram maiores pontuações nas questões da ME em comparação às da MO. Questões inferenciais apresentaram menores índices de acerto do que as literais, com destaque para o pior desempenho no grupo BDL. Resultados semelhantes foram observados na análise intrassubjetiva. Conclui-se, portanto, que há perfis distintos de compreensão escrita e oral entre estudantes ao final do ensino fundamental, e que conteúdos implícitos constituem maior desafio à compreensão quando apresentados na MO do que na ME. O conhecimento sobre os processos comuns e específicos de compreensão em ambas as modalidades pode lançar luz sobre a origem das dificuldades de compreensão leitora e auditiva, contribuindo para orientar intervenções pedagógicas e clínicas..

**Palavras-chave:** Compreensão leitora. Compreensão auditiva. Avaliação da compreensão.

**Resumen**

**¿Hay diferencia entre lectura y comprensión oral al finalizar la escuela primaria?**

La comprensión oral ha sido ignorada, en detrimento de la comprensión escrita, no sólo en la investigación sino también en la enseñanza, especialmente en Brasil. Para ayudar a llenar este vacío, este estudio comparó la comprensión de textos orales (MO) versus escritos (ME) en 336 estudiantes de 8º grado (edad promedio = 14 años, 192 niñas). Los textos, equilibrados en complejidad y longitud, iban seguidos de preguntas literales o inferenciales de opción múltiple. Se analizó el desempeño en tres grupos de lectores: de bajo desempeño (BDL; 64 alumnos, 19%), medio desempeño (MDL; 197 alumnos, 58,6%) y alto desempeño (ADL; 75 alumnos, 22,3%). Los resultados indicaron puntajes más altos en las preguntas ME en comparación con las preguntas MO. Las preguntas inferenciales tuvieron índices de precisión más bajos que las preguntas literales, y el grupo BDL mostró un peor desempeño. Se observaron resultados similares en el análisis intrasubjetivo. Por lo tanto, se puede concluir que existen perfiles distintos de comprensión escrita y oral entre los estudiantes al final de la escuela primaria, y que el contenido implícito supone un mayor reto para la comprensión cuando se presenta en MO que en ME. El conocimiento sobre los procesos de comprensión comunes y diferenciados en ambas modalidades puede arrojar luz sobre el origen de las dificultades de comprensión lectora y auditiva para orientar las intervenciones pedagógicas y clínicas.

**Palabras clave:** Comprensión lectora. Comprensión oral. Evaluación de la comprensión.

## Introduction

> *Hearing is a sense; listening is a skill. Listening can be thought of as applying meaning to sound: allowing the brain to organize, establish vocabulary, develop receptive and expressive language, learn, and internalize concepts. Indeed, listening is where hearing meets the brain. Extraordinary listening appears to be a uniquely human characteristic.*
> Beck and Flexer (2011, p. 30)

Complaints about students' lack of reading habits and their difficulties in understanding written texts are recurrent among teachers across different levels of schooling in Brazil. Teachers often attribute these comprehension problems to students' limited reading habits and to the quality of the reading material available to them. However, it is worth considering whether underlying cognitive or linguistic factors may contribute to students' reduced interest in reading, since enjoyment of reading presupposes the ability to comprehend what is read.

According to the Simple View of Reading (Gough; Tunmer, 1986; Hoover; Gough, 1990), oral and written comprehension rely on the same linguistic and conceptual system. Consequently, students who struggle with reading also tend to experience difficulties in oral comprehension. Several researchers (Frost *et al.*, 2005; Catts; Adlof; Weismer, 2006; Nation *et al.*, 2010; Elwér, 2014; Spencer; Wagner, 2018) attribute these comprehension deficits to students' weaknesses in language knowledge and processing. Such vulnerabilities may reflect broad subclinical language deficits, which can be detected even before formal literacy instruction (Hulme; Snowling, 2011).

The model proposed by Sticht *et al.* (1974) presents four hypotheses regarding the relationship between reading and listening development: 1) in the early elementary years, oral comprehension surpasses reading comprehension, but by around seventh grade, reading performance reaches the same level as oral comprehension; 2) oral comprehension performance predicts reading comprehension performance; 3) performance on oral and written texts is comparable; 4) training in oral comprehension is transferred to reading comprehension. According to the authors, however, hypotheses 2, 3, and 4 hold true only once decoding skills have been acquired and consolidated.

In line with this perspective, Perfetti, Landi and Oakhill (2005) argue for the reciprocal relationship between reading and oral comprehension, whose performances converge during development and reach high levels of correlation in adult readers. The authors further postulate that experience in one modality can influence development in the other, i.e., oral comprehension practice may enhance reading comprehension regardless of the reader's comprehension level. Similarly, Berninger and Abbott (2010) contend that reading practice contributes to improving the level of oral comprehension and expression, which continue to evolve throughout the school years.

Dias, Montiel, and Seabra (2015) demonstrated that children's academic performance in the early years of schooling is influenced by oral comprehension from the outset, and that both reading and oral comprehension remain the strongest correlates of school achievement as students progress through the school years. Phonological awareness – a foundational skill for the acquisition of reading and writing – begins to develop well before formal schooling (Alves; Finger, 2023). Research on shared reading indicates that children who are frequently exposed to stories read aloud by adults develop stronger emergent literacy skills, which are critical for successful literacy learning (Hutton *et al.,* 2015). Logan *et al.* (2019) examined vocabulary acquisition among children whose families engaged in shared reading versus those who were never read to at home. The latter group exhibited a substantial vocabulary gap, which widened as they advanced in school, in line with the Matthew Effect (Stanovich, 1986). These findings underscore the importance of shared reading from early infancy and highlight the role of oral language development, particularly oral discourse comprehension, in literacy development.

Therefore, if oral comprehension can exert such influence on reading ability in early childhood, should it not be fostered throughout the school years as a means of supporting reading development? This may be especially beneficial for children from low-income families, whose exposure to literacy is often limited, partly due to the lower educational level of their parents (Sousa; Hübner, 2017), which is typically associated with low socioeconomic status.

The studies reviewed suggest that students with comprehension difficulties may benefit from oral comprehension activities. One such difficulty involves understanding implicit content, which requires not only the construction of a coherent text base but also the development of a consistent and complete situational model (Kintsch, 1998). This ability can be assessed, at least in part, through performance on literal and inferential questions. Literal comprehension involves information explicitly stated in the text, while inferential comprehension is more complex, as it entails deriving meaning that is not directly expressed. As Chikalanga (1992, p. 697) notes, inference-making requires access to "the implicit meaning of a written [*or oral - our note*] text based on two sources of information: the propositional content of the text (i.e., the information explicitly stated) and the prior knowledge of the reader [*or listener - our note*]". The ability to draw inferences is fundamental for deep discourse comprehension and, importantly, is a skill that can be taught and trained (Oakhill; Cain; Elbro, 2014) in both oral and written modalities.

Nevertheless, oral text comprehension has been overlooked not only by native language teachers – who may assume that students have already mastered oral comprehension in their mother tongue – but also by researchers, who tend to investigate oral and written comprehension separately, disregarding the fact that both rely on language comprehension and are mutually reinforcing (Berninger; Abbott, 2010). A similar neglect can be observed in the classroom with respect to the

practice of oral proficiency. Pearson and Fielding (1982) noted that research on oral comprehension was strong during the 1950s and 1960s but declined with the growing emphasis on reading and writing. Although their observation is more than three decades old, this scenario has begun to shift in recent years, particularly with the rise of genetic studies (Keenan *et al*., 2006; Harlaar *et al.,* 2010; Christopher *et al.*, 2016) and the use of neuroimaging techniques (Buchweitz *et al.*, 2009).

If we compare the number of tasks available in Brazilian Portuguese to assess reading or listening comprehension, only a few (not all of them are validated) can be mentioned. For reading, examples include the Battery of Assessment of Reading Processes Tests for the Assessment of Reading Processes (*Provas de Avaliação dos Processos de Leitura,* PROLEC*)* by Capellini, Oliveira and Cuetos (2012) and the Task for the Comprehension of Narrative Texts (Corso *et al.*, 2015). With regard to oral text comprehension, the number of available instruments is even smaller. Among the existing ones are the Test of Comprehension of Spoken Sentences (*Teste de Compreensão de Sentença Falada*) by Nikaedo *et al.* (2006) and the Test of Contrastive Comprehension of Speech and Writing (*Teste Contrastivo de Compreensão Auditiva e de Leitura*, TCCAL) by Capovilla and Seabra (2013). In the Brazilian context, the availability of standardized tests and assessment tools for educational and clinical purposes decreases with age, leaving adolescents, adults, and older adults with very limited options for evaluation.

The predominant emphasis on reading and writing skills may be related to the formal nature of the school environment, which demands extensive practice and exposure to written texts. Oral language, in contrast, is acquired naturally and is more frequent in both academic and everyday contexts. However, when considering differences in exposure frequency between modalities, the role of text genre must be acknowledged. Comprehension difficulties often emerge when oral discourse is extended, formal, and structurally complex, displaying linguistic and discursive features similar to written language. Research on such difficulties in oral comprehension remains relatively underdeveloped compared with the extensive literature addressing reading difficulties.

Taken together, these findings highlight a notable gap in the literature regarding the relationship between oral and written comprehension, particularly in terms of how these skills may interact and support each other throughout development. The present study, therefore, aims to:

a) compare eighth graders' discourse comprehension across modalities (oral vs. written), both at the individual level (each participant's performance in oral versus written comprehension), and at the group level (low, average, and high reading comprehension groups).

b) examine comprehension in both modalities among students with low, average, and high reading comprehension.

c) investigate comprehension of literal and inferential content in the two modalities from these same perspectives (individual and group).

d) identify potential subgroups of comprehenders with distinct comprehension profiles (e.g., students with low reading comprehension but high listening comprehension).

Based on these aims, the following hypotheses are proposed:

a) participants' comprehension abilities may differ across oral and written modalities rather than being balanced.

b) the three comprehension groups (low, average and high) may show performance differences that vary by modality (oral x written).

c) inferential content may be more difficult than literal content in both modalities – mainly in the oral modality – at the individual and group levels.

d) analyses of participants' performance across modalities may reveal clusters with different comprehension abilities.

## 2. Method

Two types of analyses were conducted. First, a between-group analysis compared performance in oral versus written comprehension, as well as responses to literal versus inferential questions, across three groups differentiated by reading proficiency: low, average, and high. Second, a within-group analysis examined individual-level performance, comparing oral and written comprehension along with responses to literal and inferential questions within each participant.

### *2.1. Participants*

The sample comprised 336 native speakers of Brazilian Portuguese, including 192 girls (57.1%, *M* age = 14) and 144 boys (42.9%, *M* age = 14), all enrolled in the final years of the elementary school (8$^{th}$ grade) in nine public schools located in a city in the southernmost state of Brazil. Participants were from a middle-to-upper socioeconomic background, as determined by a parent questionnaire. Data were collected only from students who provided written assent and returned signed parental consent forms. The study was approved by the Ethics Committee with protocol no. 24304113.0.0000.5336.

*2.2. Data Collection Tools and Procedures*

Participants completed two sets of tasks: one assessing reading comprehension and another assessing listening comprehension. Each set consisted of three texts, each followed by five multiple-choice questions with five alternatives. The questions targeted both literal and inferential comprehension.

*2.2.1. Task creation procedures*

Due to the lack of standardized tests for assessing reading and oral comprehension in this age group (Oliveira; Lúcio; Miguel, 2016), the tasks were developed by the researchers and evaluated by expert judges, who verified administration time, clarity of instructions, and appropriateness of the questions. The design of the instruments was guided by a review of reading comprehension studies and by internationally validated tools (Sousa; Hübner, 2015). Each task (oral and written) consisted of three texts of comparable readability and length. To ensure suitability for eighth graders, several indices from the Coh-Metrix for Brazilian Portuguese were statistically analyzed, including mean and minimum frequency of words, number of words, frequency of connectors, verbs and nouns, as well as the number and density of propositions (Sousa; Hübner, 2020). Statistical comparisons confirmed the equivalence of the stimuli across oral and written tasks. To minimize potential genre effects on comprehension, given the mixed findings in the literature (Cadime *et al.*, 2017; Best; Floyd; Mcnamara, 2008), three text genres appropriate for each modality were used.

Task construction followed Kintsch's (1998) model of reading comprehension. Accordingly, each text was followed by five multiple-choice questions, two aiming at literal comprehension (to access the text base construction) and three aiming at inferential comprehension (to access the situation-model construction).

Two pilot studies were conducted to refine the instruments. In the first, with 14 students not included in the main sample, some questions were replaced. A second pilot, conducted with eight students, led to further adjustments and resulted in the final version of the instrument (published in Sousa; Hübner, 2020).

*2.2.2. Procedures for evaluating student responses*

The accuracy of participants' responses was evaluated by linguistic specialists. Any discrepancies were discussed until a consensus was reached. Following this process, the final scores were prepared for task assessment.

*2.2.3. Instruments descriptions and procedures for administration*

Reading comprehension tasks: These consisted of three short texts, comparable in length and readability, drawn from these genres: chronicle, tale, and scientific article. Participants received one text at a time, accompanied by its corresponding questions. They were allowed unlimited time to (re)read the texts and could consult them while answering. Once finished, students signaled to receive the next text. Responses were recorded on an answer sheet that included both the written and oral tasks.

Oral comprehension tasks: These consisted of three oral texts, also paired in length and readability, representing the genres of narrative story, science news, and interview. The audio files were stored on a USB drive and played through a portable sound system brought by the researcher. Participants listened to one audio at a time and then received the corresponding questions. After responding, the audio was played a second time, allowing students to review their answers. This procedure was designed to reduce working memory[1] load and approximate the conditions of the written task, where students could reread the text. The six texts (three written, three oral) were balanced for length and readability. Before starting the tasks, the researcher ensured that the sound was clear and audible for all students. These tasks were aimed to simulate realistic conditions (e. g., recording voice at a normal pace), such as listening to a radio interview or podcast. While radio broadcasts cannot be replayed, podcasts and recorded audios can be revisited, offering a more comparable experience to rereading in written tasks. These natural differences in modality reflect the specificity of comprehension processes in oral versus written input.

Administrative procedures: Tasks were administered in the students' classrooms, with the presence of their teachers, in a single 50-minute session or, when necessary, across two sessions. The order of task administration was counterbalanced, i.e., half of the groups began with oral tasks, and the other half with written tasks. Prior to the tasks, instructions were read aloud, and clarifications were provided. Students were informed that they could not consult materials, interact with classmates, or ask questions about the tasks during administration, and that they should remain silent. No time limit was imposed, allowing all participants to complete the tasks.

*2.3. Data Analysis Procedures*

The data were coded for RStudio (https://www.R-project.org/) (Team, 2015). Responses to the 30 comprehension questions were coded dichotomously (1 = correct; 0 = incorrect). The significance level was set at 5% (α 0.05). Non-parametric comparison tests were primarily employed, as specified in the presentation of results.

[1] According to Baddeley (2010), "Working memory refers to the system or systems that are assumed to be necessary in order to keep things in mind while performing complex tasks such as reasoning, comprehension and learning" (p. R136).

## 3. Results

Group-level and individual-level analyses were conducted and are presented below.

### *3.1. Oral versus written comprehension assessment*

Following Berger and Perfetti (1977), readers were analyzed in groups to provide complementary perspectives on comprehension performance across modalities. Grouping was based on performance in the reading comprehension task (see Section 2.2.3). Because this task was not standardized, no normative cut-off scores were available to distinguish proficient readers from those with comprehension difficulties. Furthermore, the literature reveals no consensus on the criteria for defining reading comprehension difficulties (Clarke; Henderson; Truelove, 2010; Keenan *et al.*, 2014). To address this, two grouping approaches were considered.

1. Percentile-based grouping (Catts *et al.*, 2006):
   - Struggling readers = below the 25th percentile (seven correct answers).
   - Good readers = above the 75th percentile (11 correct answers).

2. Standard deviation (SD)-based grouping (Brand-Gruwel; Aarnoutse; Van Den Bos, 1998; Meyer *et al.*, 1998; Elwér, 2014):
   - Readers with comprehension difficulties = 1 SD (3.02) below the mean (9.05), i. e., 6 correct answers or less.
   - Good readers = 1 SD (3.02) above the mean (9.05), i .e., 12 correct answers or more.

Given the distribution of scores, the SD-based criterion was judged more appropriate and was therefore adopted. Table 1 presents the number of participants and gender distribution in each group.

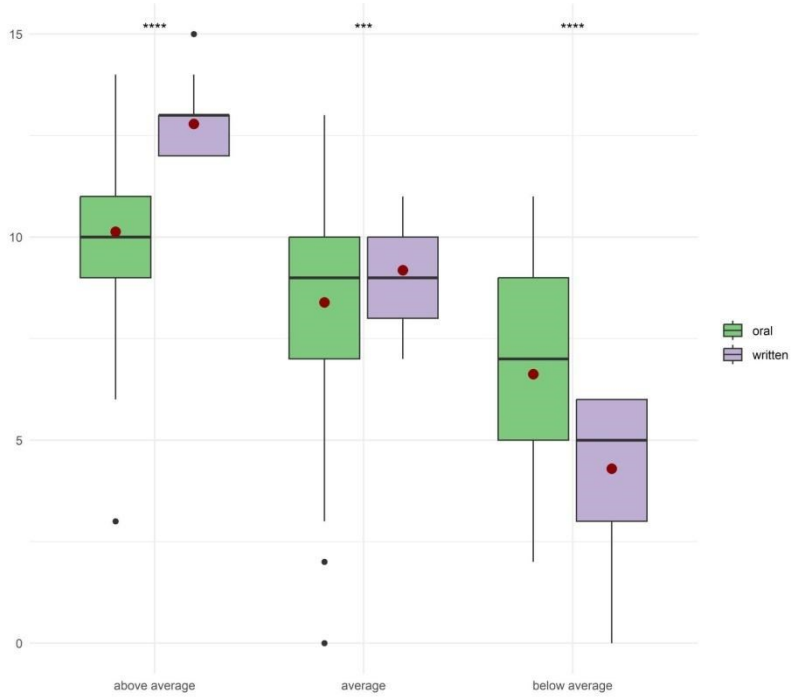
**Table 1 -** Number and gender distribution in each group

| **Group** | **Number (%)** | **Gender** |
|---|---|---|
| | | **(M, F)** |
| Low reading performance | 64 (19.05%) | (31, 33) |
| Average reading performance | 197 (58.63%) | (88, 109) |
| High reading performance | 75 (22.32%) | (25, 50) |

**Source** - The authors (2024).

Graph 1 compares the mean performance of the three groups of participants, expressed as the number of correct answers, across written and oral comprehension tasks.

**Graph 1-** Comparison of mean correct responses across groups in oral and written comprehension tasks




Source - The authors (2024).

Considering the total of 15 questions per modality, students with good comprehension achieved a mean of 12.78 correct answers (SD = 0.88) in reading and 10.13 (SD = 1.97) in orality. Readers with intermediate comprehension scored a mean of 9.18 (SD = 1.31) in reading and 8.39 (SD = 2.28) in listening. Students with low comprehension obtained a mean of 4.29 (SD = 1.67) correct responses in reading and 6.62 (SD = 2.35) in listening. A comparison of group means indicates that students with average and high reading comprehension performed worse in oral than in written tasks.

Graph 1 illustrates the group differences. The Kruskal-Wallis test revealed significant differences among the groups for both oral ($X^2(2) = 69.9$, $p < 0.001$) and written ($X^2(2) = 264$, $p < 0.001$) tasks. Dunn's post-hoc test for multiple comparisons indicated that all groups differed from each other at the 1% significance level for mean correct scores across the two tasks. As expected, the differences were most pronounced between the highest and lowest performing students.

To further investigate students with low comprehension, a cut-off of one SD above and below the mean was applied in both modalities to identify distinct comprehension profiles. This analysis yielded the following configuration: 41 students (12.2%) with low oral comprehension but adequate reading comprehension; 37 students (11%) with adequate oral comprehension (at or above the mean) but low reading comprehension; and 27 students (8%) with low comprehension in both modalities. These results suggest a dissociation between oral and written comprehension among students with low reading proficiency.

In addition to group-level analyses, we examined individual differences in oral and written comprehension. Across both task types (reading and listening), the number of correct answers ranged

from 2 to 28, SD of 4.80, with a mean of 17.50, slightly above half of the total number of questions (30 questions). When analyzed separately, the Shapiro-Wilk test indicated that the distribution of accuracy differences between written and oral texts was non-normal ($p = 0.002$). Table 2 presents the descriptive statistics for eighth graders' performance in reading and listening comprehension.

**Table 2 -** Descriptive Statistics of eighth graders' in reading and listening performance

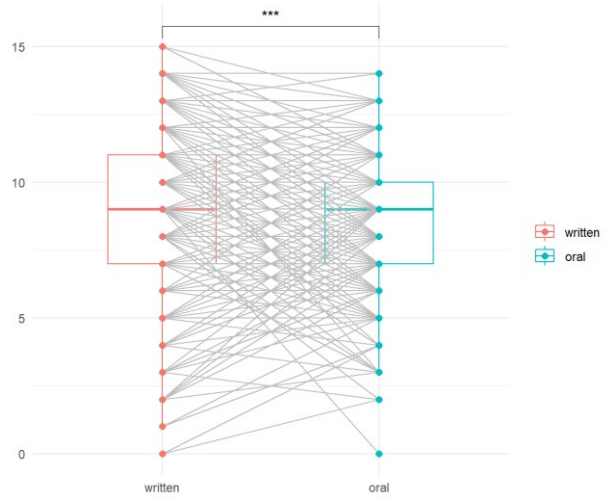
| Task | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| Reading comprehension | 0 | 15 | 9.05 | 3.02 |
| Listening comprehension | 0 | 14 | 8.44 | 2.49 |

Source - The authors (2024).

The paired t-test indicated that the mean score for oral comprehension differed significantly from that for written comprehension ($V = 15{,}632$, $p < 0.001$). On average, students achieved slightly fewer correct responses in oral texts than in written tasks, as illustrated in Figure 1.

Notably, the individual-level analyses revealed heterogeneous performance patterns: some students performed well on certain oral comprehension tasks but poorly on specific written tasks and vice versa. This variability suggests that individual comprehension profiles cannot be fully captured by group-level means and merit further interpretation.

**Figure 1 -** Comparison of performance on written and oral comprehension tasks




Source - The authors (2024).

Finally, we conducted an additional analysis comparing boys and girls. The mean scores were similar for both written comprehension ($W = 126$, $p = 0.170$) and oral comprehension ($W = 143$, $p = 0.556$), indicating no significant gender differences.

*3.2. Comparison of performance on literal and inferential questions in oral vs. written comprehension*

Of the 30 comprehension questions, 12 assessed literal comprehension (6 based on the written text and 6 on the oral text), while 18 assessed inferential comprehension (9 on the written text and 9 on the oral text).

Table 3 presents the performance of each of the three reader groups on literal and inferential questions. Mean accuracy scores are followed by letters indicating group differences ($p < 0.01$) according to Dunn's test for both oral and written texts.

**Table 3 -** Mean Percentage (MP) and Standard Deviation (SD) of Accuracy on Reading and Listening Comprehension Tasks

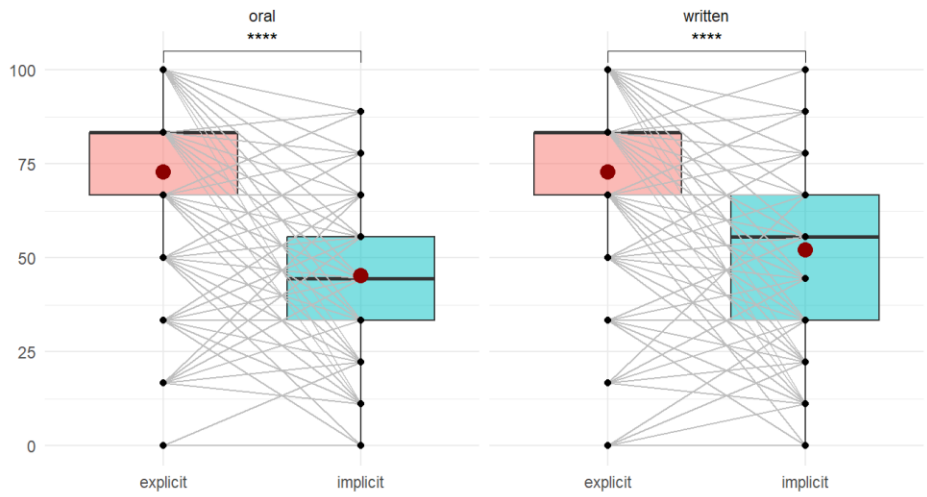
| **Groups** | **Reading comprehension** | | **Listening comprehension** | |
|---|---|---|---|---|
| | Literal M(SD) | Inferential M(SD) | Literal M(SD) | Inferential M(SD) |
| Low reading performance | 39.32 (22.29) [C] | 21.52 (11.69) [C] | 58.59 (26.39) [C] | 34.54 (16.45) [C] |
| Average reading performance | 75.88 (15.91) [B] | 51.43 (14.15) [B] | 73.01 (22.41) [B] | 44.55 (17.2) [B] |
| High reading performance | 93.11 (9.52) [A] | 80.00 (10.80) [A] | 84.66 (14.69) [A] | 56.14 (17.7) [A] |

Source - The authors (2024).

All groups performed better on literal questions than on inferential ones in both the reading and oral modalities. The average reading group showed very similar accuracy percentages across tasks, with greater difficulty on inferential questions, particularly in oral texts. The poor reading group also struggled more with inferential questions, especially in written texts; however, for literal questions, this group performed better in the oral modality than in the written one, where the number of correct answers was less than half of the total questions. Finally, the group with proficient reading skills outperformed the other two groups in the written text modality on both literal and inferential questions. Interestingly, this group showed a marked discrepancy in accuracy on inferential questions between the reading task (80%) and the listening task (56.14%), indicating that even good readers face challenges with inferential questions in listening.

Additionally, analyses were conducted at the individual level, comparing performance across modalities and question types. The Shapiro-Wilk test indicated that the distributions of performance differences between literal and inferential questions were non-normal in both written ($p = 0.027$) and oral comprehension ($p = 0.002$). The paired t-test revealed average differences between literal and inferential performance in both oral ($V = 48128$, $p < 0.001$) and written modalities ($V = 43899$, $p < 0.001$), with higher accuracy on literal questions in both cases. These results are presented in Graph 2.

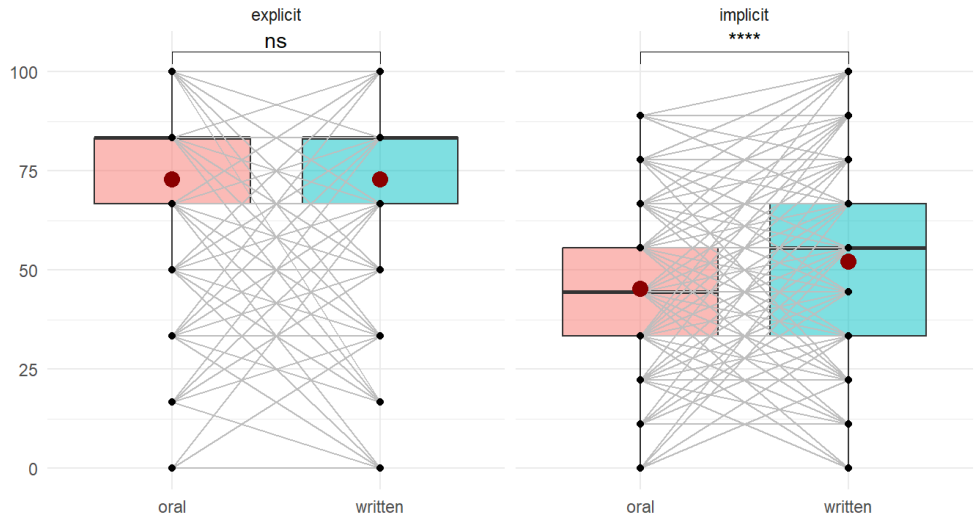
**Graph 2 -** Performance comparison between literal and inferential questions within modalities




Source - The authors (2024).

The paired t-test showed that mean accuracy on inferential questions differed between modalities (V = 12700, $p < 0.001$), with lower performance in oral comprehension compared to written comprehension. By contrast, mean accuracy on literal questions did not differ between modalities (V = 15328, p = 0.814). These results are displayed in Graph 3.

**Graph 3 -** Performance comparison within literal and inferential questions across modalities




Source - The authors (2024).

Taken together, these results indicate that eighth graders performed better on literal than on inferential questions in both oral and written modalities. Moreover, while literal processing was comparable across modalities, inferential comprehension was lower in oral than in written text presentation.

## 4. General discussion of results

### *4.1. Performance in oral x written comprehension*

Performance in both modalities was below 70% of accuracy, which is consistent with the results of reading assessments by the Basic Education Assessment System (*Sistema de Avaliação da Educação Básica,* SAEB) and the Programme for International Student Assessment (PISA). According to Bridon and Neitzel (2014), 73.04% of Brazilian students in the final years of primary school perform below the proficiency level established by the Educational Development Program (*Programa de Desenvolvimento da Educação*, PDE)/SAEB (Brasil, 2008). In PISA, Brazilian students achieved an average reading score of 410 (Organization for Economic Cooperation and Development, 2023), below the Organization mean and corresponding to level two on a six-level proficiency scale. At this level, readers can minimally identify the main idea of moderately long texts, locate explicit information, and reflect on a text's form and purpose (Schleicher, 2018).

The lower mean accuracy in the oral modality compared to the written modality may reflect features intrinsic to spoken language, such as the inability to visualize the text and the speed of processing linguistic input (Nikaedo *et al.*, 2006). Although the audio was repeated after students had read the questions, they could not revisit specific passages when uncertain, unlike in the written modality, where rereading was possible. Diakidoy and colleagues (2005) reported progressive convergence in the performance of the two tasks; and, as in our study, performance in the oral text modality was lower than in the written modality at grade 8. Similarly, among high-achieving students, reading comprehension outperformed oral comprehension in the final year of primary education.

Additional analysis showed no significant gender differences in mean accuracy scores. This aligns with Corso *et al*. (2015), who found no gender-based differences in reading comprehension among first to sixth-grade students in both private and public schools in Brazil. However, other studies indicate otherwise: Oliveira, Boruchovitch and Santos (2007) reported higher scores for girls in grades seven and eight on a cloze test. A similar scenario was found in the PISA reading assessment (OECD, 2023), which consistently shows Brazilian girls outperforming boys in reading. Such trend has been observed in English, as Coley (2001) found girls surpassing boys in reading at both eighth and twelfth grades, regardless of ethnicity. Taken together, findings on gender differences remain inconsistent, suggesting the need for further research, particularly studies that consider text comprehension modality and sample size as important factors for analysis.

This study compared comprehension performance across three reading profiles: low, average, and high reading ability groups. Their performance was examined as a function of modality (oral vs. written). Regarding the task types, students in the average and high reading groups achieved lower means in oral comprehension than in written comprehension, which may reflect their limited familiarity with the former, since such type of activity is rarely practiced and explicitly taught in schools. Furthermore, the auditory task likely placed greater demands on memory than the written task. In contrast, the higher performance of the low reading group in the oral modality compared to the written one may be associated with unresolved difficulties at the word-decoding level.

The three groups differed in their mean number of correct responses in the two task modalities, with the largest gap observed between the low and high performance groups. Durrell (1969) also reported an advantage of reading over listening comprehension among 6$^{th}$- grade readers. He attributed it to two factors: information is accessed more quickly through silent reading than through listening, and written vocabulary is typically broader than auditory vocabulary. The first factor seems particularly convincing, as faster information processing allows greater working memory capacity to be allocated to comprehension.

Our findings are also consistent with those of Miller and Smith (1989), who compared silent, oral reading and listening comprehension among 3rd-to-5th grade students grouped into low, average, and high proficiency levels. Students with low reading proficiency performed similarly in listening and oral reading comprehension, both of which surpassed their silent reading scores. Students with average proficiency showed comparable results in listening comprehension and silent reading, outperforming oral reading. Among high reading proficiency students, silent and oral reading performance was equivalent, but both exceeded listening comprehension. Based on these results, Miller and Smith argued that narrative comprehension is influenced by the interaction between text presentation modality and reading proficiency with improvements in each modality emerging at different stages of children's development.

Text comprehension should be assessed using both written and oral texts, particularly when the goal is to identify readers with comprehension difficulties. Comparing performance across modalities can help reveal the sources of such difficulties (Sticht; James, 1984; Carlisle, 1989), especially when considered in light of the developmental progression through the school years. In our study, analysis of mean accuracy scores indicated that low-achieving readers struggled more with written texts than with oral texts, suggesting the persistence of decoding difficulties. Conversely, Colenbrander *et al.* (2016) found that fewer readers with comprehension difficulties also performed poorly in oral comprehension. Their study revealed diverse patterns of oral language deficits, underscoring the importance of identifying distinct learner profiles in order to design appropriate

intervention strategies. Although our research did not specifically examine such subgroups, we acknowledge the value of addressing them separately in future studies to better capture the specificities of their comprehension difficulties.

Concerned that reading and listening comprehension have been treated as interchangeable, with limited or no attention to modality-specific aspects, Wolf *et al.* (2019) compared these two skills in 85 second and third graders. They framed their investigation around three questions: 1) To what extent do reading and listening comprehension reflect modality-specific skills, distinct skills or an overlapping, domain-general skill?; 2) What is the contribution of the foundational skills (word reading fluency, vocabulary, memory, attention, and inhibition) to each modality? and 3) Can listening comprehension or vocabulary practice serve as a proxy for general comprehension? Using tasks of similar formats, they found that reading comprehension explained 34% of the variance in listening comprehension, while listening comprehension explained 40% of the variance in reading comprehension. Only vocabulary and word reading fluency emerged as shared contributors to both reading and listening comprehension. The authors concluded that only part of the comprehension process is domain-general and not influenced by task modality. Moreover, vocabulary appears to play a large role in this domain-general part. Their findings highlight the need to recognize and investigate modality-specific aspects of both reading and listening comprehension in research and educational practice.

At the individual level, our findings revealed higher performance in reading comprehension than in listening comprehension, converging with the group-level results and suggesting that reading comprehension may become easier than listening in the later schooling years. One plausible explanation is the emphasis of formal education on teaching reading comprehension, with little explicit instruction in oral comprehension. Thus, strategies to support reading comprehension are taught, whereas strategies for oral comprehension receive less attention (if any). Future studies should examine this difference longitudinally, comparing children in the early years of literacy with students in high school to clarify the influence of formal instruction on both modalities.

Another factor, as already discussed, relates to modality-specific characteristics: reading is typically self-paced, whereas oral text comprehension is constrained by the speaker's delivery, including voice pace and volume (Clinton-Lisell, 2022). In our study, we attempted to control for these variables by using recordings at a normal pace, free of background noise, and playing the track twice, accompanied by clear instructions about the task. Even so, oral and written comprehension may recruit different cognitive resources, such as attentional control and distinct memory systems – working, episodic, and semantic (Wolf *et al.*, 2019). The extent to which these processes influence comprehension, both generally and within each modality, should be further investigated.

Individual variation also deserves close attention. Our data revealed dissociations between modalities: some students performed better in oral comprehension than in written comprehension, while others showed the opposite pattern. Because the texts were balanced for length and complexity, such differences may reflect individual factors, including working memory capacity, prior experience with reading and listening, or familiarity with particular text genres.

Taken together, these findings support our first hypothesis, showing that comprehension abilities in oral and written modalities are not necessarily balanced and that individual performance varies according to modality. They also support our third hypothesis, indicating the formation of distinct clusters of comprehenders with different profiles of oral and written comprehension ability.

*4.2 Performance on literal and inferential oral vs. written comprehension questions*

Analyses of performance on literal and inferential questions provided further insights into the characterization of students' comprehension abilities. Accuracy on literal questions was nearly identical across modalities, whereas accuracy on inferential questions was lower in the auditory modality. In other words, students performed better on literal than on inferential questions, regardless of modality. This pattern is consistent with Baretta and Pereira (2018), who found lower performance on inferential questions among students aged 10-13. Conversely, while 6th and 7th graders performed similarly on literal questions, the older group scored significantly higher on inferential questions.

In our study, all three groups of participants demonstrated stronger performance on literal questions in both reading and listening comprehension. For low-achieving students, difficulties likely stem not only from inferential processing but also from persistent problems with decoding and constructing text-based representations (Kintsch, 1998).

Clinton-Lisell (2022) meta-analysis similarly indicated no differences between reading and listening comprehension across ages; however, self-paced reading was easier than listening and gave an advantage on inferential and general comprehension tasks. Besides, the similarity between reading and listening comprehension was greater in transparent orthographies than in opaque ones[2], highlighting the importance of orthographic type. This observation supports expanding research beyond W.E.I.R.D. (Western, Educated, Industrialized, Rich and Democratic) populations (Maia, 2022) and further examining the role of self-paced versus experimenter-controlled presentation.

Brazilian studies echo these results. Corso, Sperb, and Salles (2013) reported modality-based differences between explicit and inferential questions among 4th-6th graders, aligning with SAEB and PISA evidence that inference-making is crucial for reaching higher levels of comprehension, as also

[2] Transparent orthographies, such as Italian and Finnish, are characterized by a clear phoneme-grapheme correspondence, whereas opaque orthographies, such as English, display less clear phoneme-grapheme correspondence.

observed in our study: the low levels achieved by Brazilian readers may be related to their difficulty in making inferences. Similarly, Pinheiro, Vilhena and Santos (2017) analyzed the psychometric characteristics of the Text Comprehension Test (PROLEC-T - *Prova de Compreensão de Texto*), one of the few reading comprehension tests validated and used in the country, and emphasized the lack of inferential questions as a significant limitation of this test.

Research with English-speaking participants has long pointed to inference difficulties as a key source of poor reading comprehension (Oakhill, 1984; Cain *et al.*, 2001; Dewitz; Dewitz, 2003). Yeari, Elentok and Schiff (2017) stated that such difficulties may stem from limitations in working memory, particularly in retaining and reactivating information needed to construct inferences. This could also explain the greater challenge students faced with inference questions in the auditory task, where the absence of the written text increases memory load. Inference-making requires the integration of relevant textual information into a coherent situational model, and identifying what is relevant is a critical prerequisite for making inferences and, consequently, for understanding a text.

In the low-reading ability group, weak performance was observed not only on inferential questions but also on literal questions in the written modality. Interestingly, this group performed better on literal questions in the oral modality than in the written modality. Chang and Avila (2014) likewise reported differences in literal and inferential performance across modalities when comparing Brazilian good and poor readers. However, the results vary depending on the population studied. For example, Bowyer-Crane and Snowling (2005) found that low-achieving readers had specific difficulties with inferential questions but matched skilled readers on literal ones. This suggests that low comprehension may arise from multiple causes and from different reader profiles. Our findings indicate that low reading ability generates difficulties in literal comprehension of written texts, likely reflecting basic decoding deficits, as we observed in previous research (Sousa; Hübner, 2020).

The analyses at the individual student level confirmed higher performance on literal than inferential comprehension in both modalities. While our study showed similar results in literal comprehension regardless of text modality, it highlighted the difficulty 8th graders have in making the inferences and associations necessary to achieve thorough comprehension beyond what is literally stated in the text presented orally or visually. As noted above, explicit instruction in reading strategies for achieving inferential comprehension may support improvements in oral and written presentations (Mokhtari; Reichard, 2002). Thus, our data corroborate the second hypothesis, demonstrating that inferential content may be more difficult than literal content, especially in oral texts.

Closer analyses further suggest that the inferential processing from oral texts at the individual level is particularly complex, as reported in the meta-analyses developed by Clinton-Lisell (2022). This may be shaped by factors such as explicit instruction and individual differences (e.g., working memory, background knowledge).

The assumption of a modality-invariant nature of comprehension versus modality-specific aspects should be further supported by both neuroimaging and behavioral data across age and schooling levels. Neuroimaging studies provide evidence for specific sensory processes for each modality (Buschweitz *et al.*, 2009; Deniz *et al.*, 2019) and shared semantic processing areas for verbal information, regardless of whether stimuli are presented visually or auditorily (Deniz *et al.*, 2019). At the same time, subskills, such as vocabulary and inference making, are equally central to both reading and listening comprehension, and performance in one modality predicts performance in the other (see study with children developed by Wolf *et al.*, 2019).

## 5. Conclusion

This study demonstrated that the reading and listening comprehension skills of students at the end of elementary school are not leveraged, as the performance in oral text comprehension is inferior to that in written text. Differences between modalities varied according to students' reading comprehension level. Low-achieving readers struggled with both literal and inferential questions, whereas average and high-achieving readers showed particular difficulties with inferential questions, especially in the auditory modality. This does not mean, however, that better readers are necessarily better listeners. Our data showed that while some students achieved higher scores in reading comprehension than in listening comprehension, others showed the opposite pattern. Future studies should investigate the origins of this dissociation in greater detail.

It is important to assess not only reading comprehension but also listening comprehension (Carlisle, 1989) in order to deeply understand the nature of comprehension difficulties in elementary school. The assessment of reading comprehension is particularly critical in the early years, as separating decoding from comprehension enables researchers and teachers to determine whether a student's comprehension difficulties are independent of word-reading ability. In most cases, while students with decoding difficulties (word reading) are easily identified, those with specific comprehension difficulties often undergo undetected until later grades, delaying intervention. Early identification of discursive comprehension problems is therefore fundamental for more effective educational interventions.

Assessment of listening (and reading) remains equally relevant in later school years, as it allows for a more detailed characterization of students' comprehension profiles. Pedagogical interventions using oral texts can directly support students with listening comprehension difficulties, while also fostering discursive comprehension (Brand-Gruwel *et al.*, 1998; Hulme; Snowling, 2011; Carretti *et al.*, 2014) among students struggling with decoding and fluency, since oral tasks reduce interference from problems specific to written language.

Despite the limitations of the assessment tools used in this study, it was possible to identify three different subgroups of students with low reading achievement. Such assessments are valuable for helping students in overcoming their difficulties, but they must be conducted with caution, as outcomes are shaped by multiple interacting factors (Cadime *et al.*, 2017): modality (oral x written), discourse genre (e.g., narrative x interview), question type (literal x inferential), and question format (e.g., open-ended, multiple-choice, true or false). Additional studies should also examine the role of foundational skills underlying comprehension: vocabulary, word-reading fluency, memory, attention, and inhibitory control as shared and/or specific modalities (Wolf *et al.*, 2019). For this reason, valid and reliable assessment instruments are needed to enable meaningful comparisons across studies (Sousa; Hübner, 2020).

Finally, it is important to reconsider how comprehension research has been conducted. Reading comprehension in isolation from listening comprehension. Few researchers have investigated the relationship between the main linguistic systems - speaking, listening, writing, and reading - and how they are acquired and developed in an integrated way in the brain, making language a unified system (Berninger; Abbott, 2010). In recent decades, new methods have advanced the study of the relationship between reading and listening comprehension, yielding important findings. Neuroimaging research, though still limited in its ability to capture discursive processes (Sousa; Hübner, 2020), has deepened our understanding of the neural basis of language and opened promising avenues for exploring the nature of the relationships between linguistic and cognitive abilities. These studies have also contributed to clarifying the balance between domain-general and modality-specific comprehension processes. An integrated approach of comprehension across modalities can enrich research on the cognitive aspects of language within a psycholinguistic framework, strengthen theoretical framework for teaching reading and listening, and guide the development of more effective, sensitive pedagogical and clinical assessment and intervention.

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