

## A SCOPING REVIEW OF INFERENTIAL READING COMPREHENSION RESEARCH IN THE PRESENT DECADE

### UM MAPEAMENTO DA PESQUISA EM COMPREENSÃO LEITORA INFERENCIAL NA DÉCADA ATUAL

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**Abstract** Inferential comprehension has had a notable role in reading comprehension research, with many studies investigating the process in different contexts. Several researchers have proposed models of reading comprehension where inference generation has great prominence (GAGNÉ; YEKOVICH; YEKOVICH, 1993; KINTSCH; VAN DIJK, 1978; VAN DEN BROEK et al., 1999). That said, the objective of this study was to conduct a scoping review that proposed to discover the focus of studies about inferential reading comprehension in the present decade through the *Periódicos da Capes* platform. This study consisted of bibliographical research (GIL, 2017), comprising a sample of twelve studies. To analyze the articles, we explored the following aspects: inference types, offline and online methods of measuring comprehension, narrative and expository text types, individual differences, and L1 and L2 research. We presented a summary and critical appraisal of each one according to the topics outlined. The results showed that English was the prevalent language investigated considering L1 and L2, most studies used offline methods to measure comprehension, and narrative texts were the most popular in inferential reading research. It was out of the scope of this study to include research with cognitively impaired participants, studies conducted in graduate courses not published in peer-reviewed journals, and articles available only on other platforms, such as *Web of Science*, *ResearchGate*, and others. Despite the limitations, this study offered insight regarding future research in inferential reading comprehension. We suggest future studies employ online and offline measures, distinguish differences in inferential processes between text types, and explore individual differences in inference generation.

**Keywords:** Inferential comprehension; Reading research; Scoping review.

**Resumo:** A compreensão inferencial tem um papel notável na pesquisa em compreensão leitora, com muitos estudos investigando esse processo em diferentes contextos. Diversos pesquisadores têm proposto modelos de compreensão leitora nos quais a geração de inferências tem grande destaque (GAGNÉ; YEKOVICH; YEKOVICH, 1993; KINTSCH; VAN DIJK, 1978; VAN DEN BROEK et al., 1999). Isto posto, o objetivo deste estudo foi conduzir um mapeamento para descobrir o foco dos estudos sobre compreensão inferencial leitora nesta década, por meio da plataforma *Periódicos da Capes*. Este estudo consistiu em uma pesquisa bibliográfica (GIL, 2017), composta por uma amostra de doze estudos. Para analisar os artigos, nós exploramos os seguintes aspectos: tipos de inferência, métodos offline e online para medir a compreensão leitora, textos narrativos e expositivos, diferenças individuais e pesquisa em L1 e L2. Foram apresentados um resumo e uma avaliação crítica de cada estudo conforme os tópicos delineados. Os resultados mostraram que o inglês foi a língua predominantemente

*investigada, considerando L1 e L2, a maioria dos estudos utilizou métodos offline para medir a compreensão leitora, e os textos narrativos foram os mais populares nas pesquisas com inferências. Excluiu-se do escopo do estudo os artigos que os participantes tinham impedimentos cognitivos, as pesquisas conduzidas em cursos de pós-graduação que não foram publicadas em periódicos revisados por pares, e artigos disponíveis somente em outras plataformas de pesquisa, como Web of Science, ResearchGate e outras. Apesar das limitações descritas, o presente estudo possibilitou vislumbrar futuras pesquisas em compreensão leitora inferencial. Sugerem-se estudos futuros que utilizem medidas online e offline de verificação da compreensão leitora, que estabeleçam uma distinção entre os processos inferenciais envolvidos na leitura de diferentes tipos de texto, e que examinem diferenças individuais na geração de inferências.*

**Palavras-chave:** *Compreensão inferencial; Pesquisa em leitura; Mapeamento.*

## 1. Introduction

Inferential comprehension is an ability required to understand and interpret daily life scenes, from personal conversations to problem-solving situations (PROCAILO; WOELFER; TOMITICH, 2020). To make sense of the world, people must infer how the pieces of information available form a meaningful whole according to their background knowledge. In reading, drawing an inference involves accessing “...the implicit meaning of a written text on the basis of two sources of information: the propositional content of the text (i.e., the information explicitly stated) and prior knowledge of the reader” (CHIKALANGA, 1992, p. 697). Inferential comprehension has had a prominent role in reading research, with several studies investigating the process in various contexts. In what follows, we present some relevant aspects regarding reading models, inference taxonomies, measures of inferential comprehension, text types, individual differences, and first (L1) and second language (L2) research.

Several researchers have proposed models of reading comprehension where inference generation has great prominence (GAGNÉ; YEKOVICH; YEKOVICH, 1993; KINTSCH; VAN DIJK, 1978; VAN DEN BROEK et al., 1999). For instance, according to Gagné and colleagues (1993), inferential comprehension is a highly demanding cognitive task that involves three subprocesses. In the first one, integration, two or more propositions are joined together to create a representation of the ideas in the text. Secondly, in summarization, readers extract the main idea from the text and its highlights. In the third subprocess, known as elaboration, readers

use their prior knowledge to elaborate on what they read. These subprocesses occur at the same time during reading. Integration and summarization help create a coherent mental image of the macrostructure of the text (KINTSCH; VAN DIJK, 1978). Concurrently, elaboration brings background knowledge to support comprehension and build a memorable representation (GAGNÉ et al., 1993). From a similar perspective, Kintsch and van Dijk (1978) state bridging inferences integrate propositions creating the textbase, and elaborative inferences use previous knowledge, which is necessary for filling in the gaps and making the text coherent. Besides, they integrate information at the local level (sentence) with that at the global level (the text as a whole or textbase). Chikalanga's (1992) taxonomy of inferences has three major categories that follow a related approach. Resolving lexical inferences involves deciding on pronominal and ambiguous/unfamiliar word meanings. Propositional inferencing derives from the semantic content of the text, similar to bridging inferences. Finally, pragmatic inferences rely on readers' previous knowledge, as the elaborative type mentioned above.

Measures of inferential comprehension can be offline or online. When research in the area was in its infancy, the focus was on what readers could remember from the texts (VAN DEN BROEK et al., 1999). Thus, the methods to assess comprehension used at the time reflected their memory representations. Such measures are known as offline because they are taken after participants read a text. Thus, they are concerned with comprehension as a product or final result. Examples of offline assessments are open-ended and multiple-choice comprehension questions, true-or-false items, cloze items, oral and written free recall, primed recall, summarization, preparing a presentation, and writing a critical review (VAN DEN BROEK; KENDEOU, 2022). After that, the focus shifted to approaches that sought to investigate how readers and listeners constructed mental representations during comprehension (VAN DEN BROEK et al., 1999). Methods that evaluate their understanding of the texts while it is in progress are named online measures; they verify the process of constructing meaning from text. Examples of online assessments are reading times, lexical decision, probing and naming tasks. Also, with the advancement of technology, other manners of examining comprehension online include eye-tracking and neuroimaging procedures like an

electroencephalogram (EEG) and functional magnetic resonance imaging (fMRI) (VAN DEN BROEK; KENDEOU, 2022). Other online measures encompass think-aloud protocols and questions answered during reading or listening, which may alter the developing representation of the text (TOMITCH, 2007). For this reason, researchers emphasize the need to combine these methods to capture the various dimensions involved in inferential comprehension (VAN DEN BROEK; KENDEOU, 2022).

Research on inference making has mainly focused on two text types: narrative and expository. Narrative texts, for instance, have a clear and familiar structure, with events progressing through chronological order (BERMAN; NIR-SAGIV, 2007). In contrast, expository texts communicate about a specific topic; their objective is to inform rather than entertain (MEDINA; PILONIETA, 2006). Generally, readers are more familiar with the narrative structure, thanks to their prior knowledge, which supports inference generation (SHAPIRO, 2004). On the other hand, readers are less familiar with expository texts; the educational system usually expects students to learn about new concepts by reading this type of text based on little prior knowledge. Additionally, Cohn (2019) has described many techniques for inference generation on visual texts. He explains that readers also fill in information across images, generating inferences while comprehending visual stories. In a more comprehensive stance, Kendeou and colleagues (2020) posit that inference skills can transfer across media, reinforcing the multimodal nature of texts.

Another prevalent branch of research in inferential comprehension is how people differ in their capacity to generate inferences. Individual differences in inference making include working memory capacity (WMC), domain and specific previous knowledge, vocabulary, and speed of lexical access. Studies that investigated how readers with low and high WMC generate bridging and elaborative inferences are decidedly the most abundant (for example, ALPTEKIN; ERÇETIN, 2010; 2011; BARREYRO et al., 2017; CALVO, 2001, to cite a few). Generally, they have found that comprehenders with higher WMC generate more inferences than those with a lower working memory span. Regarding domain and specific previous knowledge, fewer studies have been carried out. For instance, Fincher-Kiefer (1992) examined how readers'

domain knowledge of baseball influenced local and global inference generation. In another study, Barreyro and colleagues (2017) investigated whether readers' previous knowledge of climate change and astronomy could influence their answers to questions concerning elaborative inferences. In both studies, participants who were more knowledgeable also had better inferential comprehension. Vocabulary knowledge and lexical access are other two individual differences that positively affect inference making when reading (ESTEVEZ; CALVO, 2000).

Language skills facilitate the generation of inferences, especially vocabulary knowledge (PRIOR et al., 2014). In a study about comprehension skills, Silva and Cain (2015) found that vocabulary was the unique predictor of narrative comprehension compared to grammar knowledge. Good inferential skills can improve general reading comprehension in both L1 and L2. Nevertheless, reading in L2 may be more complex than in L1 when readers' proficiency level in the L2 is below a specific threshold, which is usually determined by their vocabulary knowledge (HATAMI; TAVAKOLI, 2012). For this reason, some studies on inferential generation focus on lexical inferencing, which is the ability to infer the meaning of unknown words (GRABE, 2009). For instance, Karlsson (2014) investigated differences in L1 and L2 inference generation among advanced foreign learners. He found that learners had similar scores in L1 and L2. In a different study, Lee (2014) investigated other inference types with primary school students of English as an L2. He reported participants had low performance in bridging and global inferencing. Also, studies on inferences in L1 show a strong relationship between successful reading comprehension and inference-making ability (OAKHILL; CAIN, 2012). According to Carlson and colleagues (2014), struggling readers generate fewer related knowledge-based inferences than skilled comprehenders. These findings were consistent with earlier studies involving inference generation and reader goals and interests (previous knowledge) (CLINTON, 2011; VAN DEN BROEK et al., 2001). Clinton (2011) found a positive association between inference generation, interest, and learning from texts. Moreover, Van den Broek and colleagues (2001) revealed that topic interest was positively associated with inference generation.

Having laid the foundation of inferential comprehension research, we propose to review studies regarding the topic. Thus, the objective of this article is to present a scoping review we conducted to discover what has been the focus of studies published in this decade through *Periódicos da Capes*. The remainder of the text is organized as follows. First, we introduce the method used to select the reviewed studies. Then, in the subsection entitled *Results and Discussion*, we present a summary of the main findings of each study together with our critical appraisal. After that, based on our analysis, we bring some final remarks.

## 2. Method

The present study consists of bibliographical research (GIL, 2017), and it was carried out in two parts. First, we conducted a scoping review, a quick limited review aimed at describing the nature of a research field (NEWMAN; GOUGH, 2020). Our goal was to find studies investigating inferential comprehension published from 2020 on, that is, in this decade. Due to the ease of accessibility for Brazilian scholars, we used the *Periódicos da Capes* platform. Also, this platform allowed the search to include only articles published in peer-reviewed journals. We applied the descriptors *inference*, *inferential*, and *infer*, between inverted commas with the Boolean operator *OR*, and the descriptors *generation* and *comprehension*, also between inverted commas with the same operator, for the title of the articles. We also used the descriptor *reading* for all fields and our search, conducted in April 2022, returned twenty-one results.

The second part of the bibliographical research was to select the studies that conformed to the following eligibility criteria: pursue their general objective through an exploratory, descriptive, or explanatory perspective; involve collection and analysis of primary data either through experimental research, cohort study, case study, action, or intervention research; investigate inferences in reading, and have participants without cognitive impairments. Based on these criteria, we excluded nine studies from the initial pool: three were excluded because they investigated inferential reading for cognitively impaired readers; two studies were about

inferential listening comprehension; two other articles were related to information technology; one was a theoretical article, and another one was a review article. Thus, the final sample comprised twelve studies. In the following subsection, we present a summary of the articles we found and our critical appraisal.

### 3. Results and Discussion

From the twelve studies that comprised our final sample, six of them investigated L1 inferential reading comprehension. The other half focused on L2 inference generation. In this section, we first summarize the main findings of the L1 studies considering the points discussed in the introduction, namely inference type, comprehension measures, text type, and individual differences. After reviewing each study, we outline the collective findings regarding the previously mentioned points. Then, we proceed to the studies in L2 following the same organization.

Ahmed and colleagues (2021) analyzed a sample of elementary school students in the United States (English as an L1) through intervention research and exploratory study. They were randomized to treatment types: text processing with foundational skills, text processing without foundational skills, and business as usual (control). They evaluated five reading comprehension skills through the Direct and Inferential Mediation (DIME) model (background knowledge, inference, reading strategies, decoding, and vocabulary). The measure of inferential comprehension was offline (multiple-choice comprehension questions). The authors analyzed bridging inferences that integrate propositions, creating the textbase. Their findings suggested that higher-order (inferencing and background knowledge) skills had more relevance in higher grades. The authors also found that students in the treatment groups had significant differences (background knowledge, vocabulary, and inferencing) in comprehension at the posttest. Inferencing was a significant predictor for older students, which suggests it becomes more important in later grades. It is worth mentioning that the authors did not investigate the relationship between inference and previous knowledge in this study (elaborative inferences),

which are relevant since they integrate information at the local level with information at the global level.

In another exploratory study about comprehension and story retelling skills with elementary school students, Freed and Cain (2021) used an assessment that compared whole narrative texts versus segmented presentation and contrasted reading versus listening in English as an L1. They analyzed three categories of inferences: local coherence (bridging), global coherence (elaboration), and summarization during retelling, in which readers extracted the main idea from the text and its highlights. The inferential comprehension measures were online (think-aloud protocol) and offline (open-ended questions). The results showed that older children obtained significantly higher scores than younger children in inference generation, as in the previously analyzed study (AHMED et al., 2021), which supports Gagné and colleagues' (1993) proposition about inferential comprehension being a highly demanding cognitive task. The results also suggested that segmentation may help answer comprehension questions across modalities for younger children. Moreover, children obtained higher scores for reading than for listening comprehension; and for global coherence than local coherence when reading. One possible reason is that they did not assess children's previous knowledge when they failed during inferential generation. The authors concluded that younger and older children could make the necessary coherence inferences to understand short narrative texts.

Tonks and colleagues (2020) explored the association between reading competence beliefs and task value with inference generation through intervention research and an exploratory study with college students in English (L1). The research focused on expository texts, bridging inferences, and elaborative inferences. The researchers collected data through online (think-aloud protocols) and offline (open-ended comprehension questions) tasks: Inference strategies (a variant of RSAT, the RSAT-Inference Processes); Reading comprehension proficiency (RSAT-Comprehension); Competence beliefs and task values (a variant of the Experience Sampling Method - ESM); Foundational reading skills (based on the Study Aid and Reading Assessment - SARA) and Literacy task (The Global, Integrated, Scenario-based Assessment - GISA). The results indicated that elaborative inferences were



significantly and positively associated with task value while bridging inferences were significantly and positively associated with task value and competence beliefs. The authors explain that when students are motivated and engaged, they read deeply to satisfy their comprehension needs, consistent with Van den Broek and colleagues' research (2001), which revealed that topic interest was positively associated with inference generation. Moreover, the literacy task had a significant positive association with foundational reading skills, elaborative, bridging inferences, and competence beliefs. Therefore, the associations between the reading motivation constructs and comprehension performance were modest, suggesting further exploration.

Pinto and Ferreira (2021) studied a case of an elderly student to investigate his inferential reading comprehension in Portuguese as an L1. They used one interview script based on Marcuschi (1989) and two reading sessions, during which he read *Cordel* literature and a poem. The method was online; a text divided into parts with pre-established pauses and inferential questions asked immediately after reading. The researchers found a relationship between the participant's life story, reading background, and text comprehension. The participant commented on most inferences using the text as his constant and primary reference during the sessions. The inference types were illocutionary assessments, particularizations, and reconstruction. According to Marcuschi (2008), the first type corresponds to inferences of a lexical, semantic, and pragmatic nature. Particularizations consist of taking a lexical-based general element or an element based on personal experiences and knowledge, individualizing or contextualizing it to specific content with an individual lexeme, that is, lexical, semantic, and pragmatic inferences. The participant also used the reconstruction inference type, which consists of totally or partially reformulating text elements. The poem demanded a more complex inference type than the *Cordel*, a task in which memory – at least retaining information during the reading process – plays an essential role. This study's results suggested that schools have not effectively ensured the development of competencies to elaborate inferences, which is only possible by valuing reflection and reconstruction of knowledge.

In another study conducted in Portuguese as an L1, Pereira, Baretta, and Borges (2022) investigated the inferential reading comprehension of elementary school students using a narrative text. Inferential comprehension was necessary to answer three categories of open-ended questions: intratextual relations, extratextual relations, and text macrostructure. The first category involves integrating information stated in different propositions. The second category compels readers to use their background knowledge, and the last one demands that they create a macrostructure for the text by establishing global relations. The authors report that, in general, students' scores in the inferential questions showed an incremental improvement as they progressed from one grade to the other. They also observed that intratextual relations questions were easier to answer than the extratextual ones. They pointed out that, except for the 7th graders, students performed better at identifying the text macrostructure than relating it to their previous knowledge. Pereira and colleagues conclude that grade, task type, and inference category can influence students' reading comprehension and suggest that teachers use different tasks to explore information from different angles.

In a study conducted with French speakers, Désiron, Bétrancourt, and Vries (2021) examined how text cohesion and cross-representational signaling (CRS) affected inferential comprehension of multimodal texts. In their first experiment, the researchers asked teenage participants thirteen questions: five text-based, four local coherence, and four global inferences. They found the effect of high cohesion on local bridging inferences approached significance. Also, signaling had a substantial positive impact on comprehension, notably for those participants who read multimodal texts with CRS when answering local (positive trend) and global inferences questions. However, the authors did not find an interactive effect of cohesion and signaling. In a second experiment with undergraduate students, they used online (eye-tracking) and offline measures (open-ended questions and a drawing task) to assess the effect of CRS on motivation and cognitive load. The researchers found readers who read the text with CRS had better comprehension scores; however, the treatment effect did not reach significance. It also did not impact motivation and cognitive load. The authors attribute the absence of a consistent impact of CRS across the two experiments to differences in the samples concerning

age range and reading ability. Also, they found participants had low prior knowledge but average to high verbal reasoning, which could diminish the positive impact of CRS on comprehension according to the Integrated Model of Text and Picture Comprehension (ITPC model).

On the whole, of the six L1 studies in our sample, three of them were conducted in English (AHMED et al., 2021; FREED; CAIN, 2021; TONKS et al., 2020), two in Brazilian Portuguese (PEREIRA; BARETTA; BORGES, 2022; PINTO; FERREIRA, 2021), and one in French (DÉSIRON; BÉTRANCOURT; VRIES, 2021). In four of them (AHMED et al., 2021; FREED; CAIN, 2021; PINTO; FERREIRA, 2021; TONKS et al., 2020), the researchers implemented a reading intervention program in exploratory studies: two focused on elementary school students (AHMED et al., 2021; FREED; CAIN, 2021), one investigated college students' inferential reading comprehension (TONKS et al., 2020), and another examined an elderly student's inference generation (PINTO; FERREIRA, 2021). Regarding inference type, one focused on bridging inferences (AHMED et al., 2021), and four investigated both bridging and elaborative inferences (DÉSIRON; BÉTRANCOURT; VRIES, 2021; FREED; CAIN, 2021; PEREIRA; BARETTA; BORGES, 2022; TONKS et al., 2020), and one other used a different taxonomy (PINTO; FERREIRA, 2021). Concerning comprehension measures, three studies used online and offline methods (DÉSIRON; BÉTRANCOURT; VRIES, 2021; FREED; CAIN, 2021; TONKS et al., 2020), two studies used only offline measures (AHMED et al., 2021; PEREIRA; BARETTA; BORGES, 2022), and another study used only online methods (PINTO; FERREIRA, 2021). Regarding text type, three studies focused on narrative texts (AHMED et al., 2021; FREED; CAIN, 2021; PEREIRA; BARETTA; BORGES, 2022), one study investigated expository texts (TONKS et al., 2020), another used literary texts (PINTO; FERREIRA, 2021), and another examined multimodal texts (DÉSIRON; BÉTRANCOURT; VRIES, 2021). None of this research investigated individual differences in inference generation. We now turn to the studies that examined L2 inferential reading comprehension.

Aini, Laksono, and Ridwan (2021) conducted a qualitative study to investigate what type of knowledge-based inferences B1 Indonesian students of German generate during reading

comprehension. The researchers asked participants to read a bicultural narrative text. After reading, they had to answer a comprehension test and interview questions. The authors coded the answers according to a multidimensional representation model and inference type, based on the framework proposed by Graesser, Singer, and Trabasso (1994). The findings indicated that participants engaged in seven inferential processes: superordinate goal, instantiation of noun category, causal antecedent, reader emotion, referential, thematic, and character emotional reaction. They concluded that students' previous knowledge of cultural aspects and vocabulary influence their inferential comprehension. It is not clear though whether researchers measured their participants' prior knowledge.

Roscioli and Tomitch (2022) explored the relationship between EFL Brazilian pre-intermediate students' L2 reading comprehension, inference generation, and working memory capacity. The researchers employed one online (pause protocol) and one offline measure (open-ended comprehension questions). They analyzed participants' pause protocols according to the following inference categorization: (a) explanations, (b) associations, (c) predictions, (d) evaluations, (e) text-based coherence breaks, (f) knowledge-based coherence breaks, (g) repetitions, (h) incorrect translations, and (i) translation attempts (NARVAEZ; BROEK; RUIZ, 1999; ZWAAN; BROWN, 1996). Generally, they found a significant positive correlation between reading comprehension and WMC, as in most other studies. Also, there was a meaningful positive association between explanations and WMC. Specifically, the researchers found that more skilled readers - determined by the results of the comprehension questions - generated more type (a) and (b) inferences; meanwhile, less skilled readers had more types (c) through (i) inferences. They also found some significant negative correlations: reading comprehension and type (i) inferences; reading comprehension and types (d), (h), and (i) inferences. The authors concluded that explanations aid readers in constructing coherence and enhancing their mental representation of the text, whereas evaluations, translation attempts, and incorrect translations may have obstructed their reading flow.

Hall and colleagues (2020) conducted an exploratory study with elementary school students who were below-average readers. They investigated the effects of instruction on

inference generation and reading comprehension in L2 English. Participants should notice gaps and lack of coherence in a narrative text, identify clue words or phrases, and integrate previous knowledge with text information. The researchers analyzed two inference types: local coherence (integration, propositions joined together to create a text representation) and global coherence (elaboration, integration of text information with background knowledge). They collected data offline using three multiple-choice questionnaires: the Clinical Evaluation of Language Fundamentals, the Fifth Edition Metalinguistics [CELF-5 Metalinguistics] Making Inferences subtest, the Researcher-developed Making Inferences Reading Test, and the Stanford Achievement Test, 10th Edition [SAT-10]. Results showed the intervention did not significantly affect inferential comprehension, which depended on participants' previous knowledge and initial inference skills. However, the results of the subset of the SAT-10 Reading Vocabulary subtest approached significance. The researchers also found that the intervention improved participants' literal comprehension and ability to make text-connecting inferences but not gap-filling inferences. Moreover, the study demonstrated that participants benefited from an intervention focused on oral language/academic vocabulary development (lexical inferencing). The researchers attributed this finding to students' limited English proficiency, who may use more cognitive capacity on word-level processes than passage-level integration.

Lin, Lam, and Tse (2021) explored the relationship between motivational strategies, language learning strategies, and literal and inferential comprehension in Chinese as L2. They conducted an intervention study with upper-intermediate international students using multiple-choice questionnaires (offline): the Strategy Use Questionnaire (motivational strategies) and the Chinese Reading Comprehension Test (literal and inferential comprehension of a narrative text). The authors categorized the questions following Pearson and Johnson's (1978) taxonomy. Regarding inference generation, results showed no indirect interaction between motivational strategies and inferential comprehension. The authors explain that drawing inferences is more complex than literal comprehension, especially for L2 learners. The authors concluded that L2 Chinese learners needed to compensate for their lack of lexical and grammatical knowledge and used lower-level processing during language learning strategies. These findings are similar

to the previously analyzed study (HALL et al., 2020), which supported Hatami and Tavakoli's (2012) proposition about reading in L2 being more complex when proficiency level (usually determined by vocabulary knowledge) is below a specific threshold. Moreover, these findings suggest that learning strategies are better to enhance L2 Chinese reading performance on literal comprehension, which was fundamental to inferential comprehension.

Plata-García, Castro-Manzano, and Reyes-Meza (2020) conducted an exploratory study to analyze the interactive effect of text properties and test-takers' attributes (strategies, metacognitive awareness, and academic field knowledge) on the reading comprehension of Spanish as an L1 and Italian as an L2. The expository text properties were length, complexity, and inference type required (deductive and non-deductive). The researchers measured intermediate undergraduate students' comprehension with two multiple-choice questionnaires (offline): the Inferential Reading Comprehension Test and the Metacognitive Awareness of Reading Strategies Inventory (MARSİ). Regarding inferential comprehension, results showed that when texts are long and complex, and the trigger inference is inductive, performance in L1 is better than in L2. The researchers explain this may be due to participants having more lexical and previous knowledge of the native language. When texts are short and simple, and the trigger inference is inductive (non-deductive), participants perform similarly in L1 and L2. When texts are short but complex, and the trigger inference is abductive (non-deductive), there is a different performance in both languages: better in L2 than in L1. The researchers concluded there was an interactive effect of text properties and students' traits on inferential reading comprehension, especially when reading short texts to generate inferences in L2. However, the difference between the inference types investigated was not clear.

Further, in the context of EFL, Sarkeshikian, Aliasgharzadeh, and Banayazdi (2020) investigated the effects of the implementation of two strategies in the reading classroom: inference (IS) and false correction (FCS). Using a pretest/posttest design, the researchers conducted a quasi-experimental study with intact classes of second-semester paramedical students from the Medical University of Kashan in Iran. The IS treatment consisted of practice with three steps: lexical training, formulating wh-questions about the texts and making

predictions about the upcoming information in each paragraph. For the FCS treatment, some sentences from the passages were paraphrased and falsified. Intermediate participants answered a twenty-five multiple-choice reading comprehension test. Then, they received treatment with the IS, the FCS, or conventional reading instruction (control group) for five weeks, during which they practiced with eleven experimental passages. After that, they answered posttest questions, similar to the pretest. Additionally, the researchers surveyed students' attitudes towards the implemented treatments. The authors did not find significant differences among the three groups in the pretest. In the posttest, the researchers found that the IS group outperformed the FCS and control groups. Moreover, the difference between the treatment and control conditions was significant. The researchers also found that the IS led to more positive attitudes and more participants thought this strategy was beneficial to their academic needs. They conclude that the inferential strategy treatment motivated students to process the knowledge learned from the texts more deeply. They also state that inferential skills support the improvement of reading comprehension as a whole.

In sum, of the six L2 studies in our sample, three of them were conducted in English (HALL et al., 2020; ROSCIOLI; TOMITCH, 2022; SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020). One study investigated German as an L2 (AINI; LAKSONO; RIDWAN, 2021), another examined inferential comprehension in Chinese as an L2 (LIN; LAM; TSE, 2021), and one compared inference generation in Spanish as an L1 and Italian as an L2 (PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020). In five of them (HALL et al., 2020; LIN; LAM; TSE, 2021; PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020; ROSCIOLI; TOMITCH, 2022; SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020), the researchers implemented a reading intervention program in exploratory studies: two investigated college students' inferential reading comprehension (PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020; SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020), one focused on elementary school students (HALL et al., 2020), another recruited technical school students (ROSCIOLI; TOMITCH, 2022), and one more examined international students' inference generation (LIN; LAM; TSE,

2021). Regarding inference type, one study focused on local and global inferences (HALL et al., 2020), another one investigated lexical, bridging, and elaborative inferences (SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020), and four used different categorizations (AINI; LAKSONO; RIDWAN, 2021; PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020; ROSCIOLI; TOMITCH, 2022). Concerning comprehension measures, only one study used online and offline methods (ROSCIOLI; TOMITCH, 2022). The other five studies employed only offline measures, mostly multiple-choice comprehension questions (AINI; LAKSONO; RIDWAN, 2021; HALL et al., 2020; LIN; LAM; TSE, 2021; PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020; SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020). Regarding text type, three studies focused on narrative texts (AINI; LAKSONO; RIDWAN, 2021; HALL et al., 2020; LIN; LAM; TSE, 2021), two studies investigated expository texts (PLATA-GARCÍA; CASTRO-MANZANO; REYES-MEZA, 2020; SARKESHIKIAN; ALIASGHARZADEH; BANAYAZDI, 2020), and another compared students' inferential comprehension of narrative and expository texts (ROSCIOLI; TOMITCH, 2022). Only one study examined individual differences in inference generation (ROSCIOLI; TOMITCH, 2022).

#### 4. Final Remarks

The objective of this scoping review was to discover the focus of inferential comprehension research. We explored the following aspects: reading models and inference taxonomies, offline and online methods of measuring comprehension, narrative and expository text types, individual differences, and L1 and L2 research. Subsequently, we reviewed the twelve studies we found on *Periódicos da Capes*, published from 2020 on, following the criteria described. Also, we presented a summary of the collective findings according to the topics outlined. Altogether, our review showed that English was the prevalent language investigated, whether as L1 or L2, most studies used offline methods to measure comprehension, and narrative texts are the most popular in inferential reading research.



The present research has several limitations. First, we did not include studies with cognitively impaired participants, which could have contributed to understanding the current scene of inferential comprehension reading research. Second, we limited the scope of our inquiry to studies published in peer-reviewed journals. For instance, including theses and dissertations in the sample could have enriched our view of the presented topics. One final limitation is that we searched for articles using only *Periódicos da Capes*. If we had used other platforms, such as *Web of Science*, *ResearchGate*, and others, our results could have been different.

Despite the limitations above, this scoping review offered insight regarding future research in inferential reading comprehension. First, we found three studies that used both online and offline measures in L1 and only one in L2. Future studies could use both methods to improve our understanding of inference generation. Second, we only found one study that compared inferential comprehension of expository and narrative texts. Other studies are necessary to distinguish differences in inferential processes between text types. Finally, only one of the studies we reviewed investigated individual differences in inference generation. Future research could explore whether readers differ in their ability to draw inferences depending on their background knowledge.

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