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Creative thinking and reading competence. A systematic review

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Abstract

Traditionally, the relationship between creativity and numerous variables such as personality and intelligence has been studied. However, the relationship between creative thinking and reading comprehension has not been the subject of interest. The main objective of this article is to develop a systematic review of the relationships between creative thinking and reading comprehension between the ages of five and 18. The PRISMA methodology was used to conduct this systematic review. The article selection process was carried out in several stages, resulting in 12 articles that were systematically analysed. The analysis revealed weak and moderate relationships between reading comprehension and creativity. These relationships were also found for different indicators of creativity, including elaboration, and for certain dimensions of reading comprehension. In conclusion, the study allows us to guide future educational work by adopting the necessary approaches to create learning situations in which students at different educational levels can combine reading and creative literacy.

Keywords: Creativity; creative thinking; reading comprehension; educational research; systematic reviews.

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Pensamiento creativo y competencia lectora. Una revisión sistemática

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Resumen

Tradicionalmente, se ha estudiado la relación entre la creatividad y numerosas variables como la personalidad y la inteligencia. Sin embargo, la relación entre el pensamiento creativo y la comprensión lectora no ha sido objeto de interés. El objetivo principal de este artículo es desarrollar una revisión sistemática de las relaciones entre el pensamiento creativo y la comprensión lectora entre los 5 y los 18 años. Para realizar esta revisión sistemática, se utilizó la metodología PRISMA. El proceso de selección de artículos se llevó a cabo en varias etapas, dando como resultado 12 artículos que fueron analizados sistemáticamente. El análisis reveló relaciones débiles y moderadas entre la comprensión lectora y la creatividad. Estas relaciones también se encontraron para diferentes indicadores de creatividad, incluida la elaboración, y para determinadas dimensiones de la comprensión lectora. En conclusión, el estudio permite orientar la futura labor educativa adoptando los enfoques necesarios para crear situaciones de aprendizaje en las que los alumnos de distintos niveles educativos puedan combinar la lectura y la alfabetización creativa.

Palabras clave: Creatividad; pensamiento creativo; comprensión lectora; investigación educativa; revisión sistemática.

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INTRODUCTION

Creativity, as well as reading competence, are fundamental skills of the 21st century for the insertion in the socio-labor world and for the adaptation to its changes and complexities (González-Salamanca et al., 2020). For this reason, educational establishments should direct all their efforts to the development of these skills through practice and social interaction (Cignetti & Fuster, 2023). Reading competence is usually approached in schools from the point of view of reading comprehension, although there are differences between them, while creative thinking is the great forgotten one since it implies the change from traditional methodologies to active methodologies.

According to the PIRLS definition, reading comprehension is the ability to understand and use the linguistic forms required by a community and/or valued by the subject to extract meaning from texts (Mullis & Martin, 2019). On the other hand, PISA uses the concept of reading literacy to refer to "understanding, using, evaluating, reflecting on, and engaging with texts to achieve one's goals, develop knowledge and personal potential, and participate in society" (Organisation for Economic Co-operation and Development [OECD], 2019, p. 28). The difference lies in the fact that literacy involves the practical application of reading comprehension in society (Jiménez-Pérez, 2014). Therefore, the three main components involved in reading proficiency are the text, the task, and the reader (Durda et al., 2020), which means giving way to its dynamics.

According to Jiménez-Pérez (2015), reading comprehension comprises several distinct levels:

— Literal level: the decoding of information corresponding to the exact meaning of words. Phonological awareness is essential for identifying speech sounds, while reading decoding enables the conversion of graphemes into sounds. As the speed of these processes increases, reading speed also improves, a phenomenon known as reading fluency.

— Representational level: the connection between what is read in the text and personal experiences or prior knowledge, thereby reconstructing its meaning.

— Inferential level: assumptions are made and hypotheses are formulated regarding events or facts.

— Critical level: the reader makes value judgments about what has been read and may challenge the views of others.

— Emotional level: the interaction between the reader and the text elicits an emotional response.

— Creative level: the stage at which the reader becomes a creator, and comprehension evolves into competence, such that the reader's acts may be appreciated by other readers.

— Metacognitive level: the stage at which the reader reflects upon the intention and usefulness of the text.

On the other hand, creativity is an ability characterised by potential originality and effectiveness in a dynamic context (Corazza et al., 2022). The main indicators of creativity are as follows: fluency, defined as the number of ideas generated; flexibility, understood as the number of distinct categories represented by those ideas; originality, defined as the uniqueness of the ideas; and elaboration, referring to the level of detail developed within an idea (López-Martínez et al., 2024). Additional factors, depending on the assessment instrument employed, may include abstractness of titles, measured according to the degree of implicit ideas conveyed in the title of a figure; resistance to premature closure, which enables less conventional solutions (Torrance, 2008); and insight, understood as the number of problems solved that require reinterpretation (Iannello et al., 2020).

In particular, we should highlight verbal creativity, which is a specific domain defined as divergent thinking present in tasks of verbal type (Artola et al., 2004; Portnova et al., 2020). This specific domain is manifested in narrative tasks such as those produced in literature, reading, writing and language. In

language, it allows the circumvention of common communication practices and pre-established models, being a tool available to all (Pope & Swann, 2011). This ability in the linguistic framework, allows the creation of original and aesthetically embellished works of linguistic productions.

Creative thinking is associated with the skills required for writing and reading (McVey, 2008; Sturgell, 2008). These skills converge in the degree of complexity of elaborated language in a production that embellishes an original idea (Wang, 2012a, Zabihi et al., 2013). With regard to this idea, it is the so-called elaboration that is an indicator of creative thinking. At the same time, the habit of reading and writing promotes this elaboration ability (Mareque et al., 2019; Wang, 2012b). Thus, the elaboration of ideas from verbal details occurs.

Reading comprehension has been identified as one of the best predictors of creativity (Mourgues et al., 2014). Similarly, there are characteristics that reading, writing, and creativity have in common and that serve to promote them. These features are attention to the individual (Sánchez-Macías et al., 2021), emphasis on discovery (Amabile, 2018), and freedom and ability to communicate ideas (Acar & Runco, 2023; Jończyk et al., 2020; Wang, 2012b). This last feature is related to the idea that creativity is a process immersed in language that contributes to the production of meaning (Torres, 2021), which is present in communicative exchanges and is key in interpersonal communication (Suárez Ramírez et al., 2021).

Narrative tasks, due to their open-ended nature, require students to develop a story, either real or fictional, about a series of events, which allows the activation of divergent thinking (Justice et al., 2010). The reason lies in the nature of writing as an unlimited process that stimulates the creative capacity of the individual (García-Roca, 2021), since the circumstances of freedom necessary to awaken the creative potential of the subject are given. Therefore, these tasks are quite relevant at the creative level, since students should tell a story based on some stimuli (Zabihi et al., 2013).

Similarly, the practice of creativity makes it possible to generate a large number of ideas and enrich personal knowledge from writing (Nashville Community Education, 2016). Therefore, reading is conceived as rewriting and writing as rereading, since different interpretations are possible in one mind from the same production (Pope & Swann, 2011). In this sense, it can be affirmed that creative thinking facilitates this process of rewriting and rereading.

Similarly, studies (Ketabi et al., 2013; Sturgell, 2008; Wang, 2012b) have shown that students with better reading habits and higher levels of reading comprehension and reading speed are the ones who demonstrate higher creative performance. This is partly because students with consolidated reading habits have a greater number of verbal resources to express in their narratives. In this sense, creative performance in reading allows for the development of cognitive and metacognitive skills, communicative competence, reading comprehension, freedom of expression, imagination, and play (Jończyk et al., 2020; Preiss et al., 2019).

Creative thinking in reading comprehension allows individuals to connect and integrate different elements of knowledge (Karwowski, 2017). These findings support the theory of creative reading, which defends the idea that for reading to be of quality, it must be based on creativity (Popov, 1992). This theory states that reading comprehension is subordinate to learning new concepts, and this learning is one of the competencies of creativity. For this reason, creative thinking allows reading with a higher level of comprehension since it is key in establishing relationships between different concepts and in elaborating inferences during the reading process. In this regard, creative thinking fosters a new world of possibilities in the comprehension of a text.

Therefore, the aim of this study was to develop a systematic review of the relationships that occur between reading competence and creative thinking in individuals aged five to 18 years enrolled in their respective educational stages, and the nature of these relationships when they occur.

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METHODOLOGY

To conduct this systematic review, we used the methodology of the PRISMA 2020 statement (Page et al., 2021), which facilitates the organisation and qualitative analysis of the selected studies resulting from the application of the different research phases described below.

Search strategies

The search for studies was conducted in September 2023 in the following databases: the main collection of Web of Science (WoS), Scopus and ERIC. In order to perform an updated systematic review, only articles published in journals between 2004 and 2023 were searched, excluding book chapters, books, reports and scientific conference proceedings. Also, in order to find as many articles as possible, the words entered in the search engines were in English; therefore, all articles found had English indicators, even if the language in which they were written was not English. Since the aim of the study was to analyse the relationship between creativity and reading competence, a series of keywords were used as follows: ("creativity" OR "creative thinking" OR "creative ability" OR "divergent thinking" OR "originality") AND ("reading comprehension" OR "reading literacy" OR "reading competence" OR "reading skills").

In WoS the keywords had to appear as subject. In Scopus, the keywords were found in the title, abstract and keywords. Finally, in ERIC, the keywords appeared in the abstracts of the various articles.

Eligibility Criteria

In addition to the above search strategies, the following inclusion criteria were used to conduct the search:

— Empirical studies.

— Articles published in scientific journals.

— Samples consisting of participants between the ages of 5 and 18, i.e., students in elementary, middle, high school, or equivalent.

Once the inclusion criteria were established, it was necessary to develop a set of exclusion criteria for the studies found, which are presented below:

— Literature review articles.

— Results that do not determine the relationship between creativity and reading comprehension.

— Samples with adult participants.

— Samples with participants younger than five years old, as they have not yet acquired and consolidated literacy.

Sample selection process

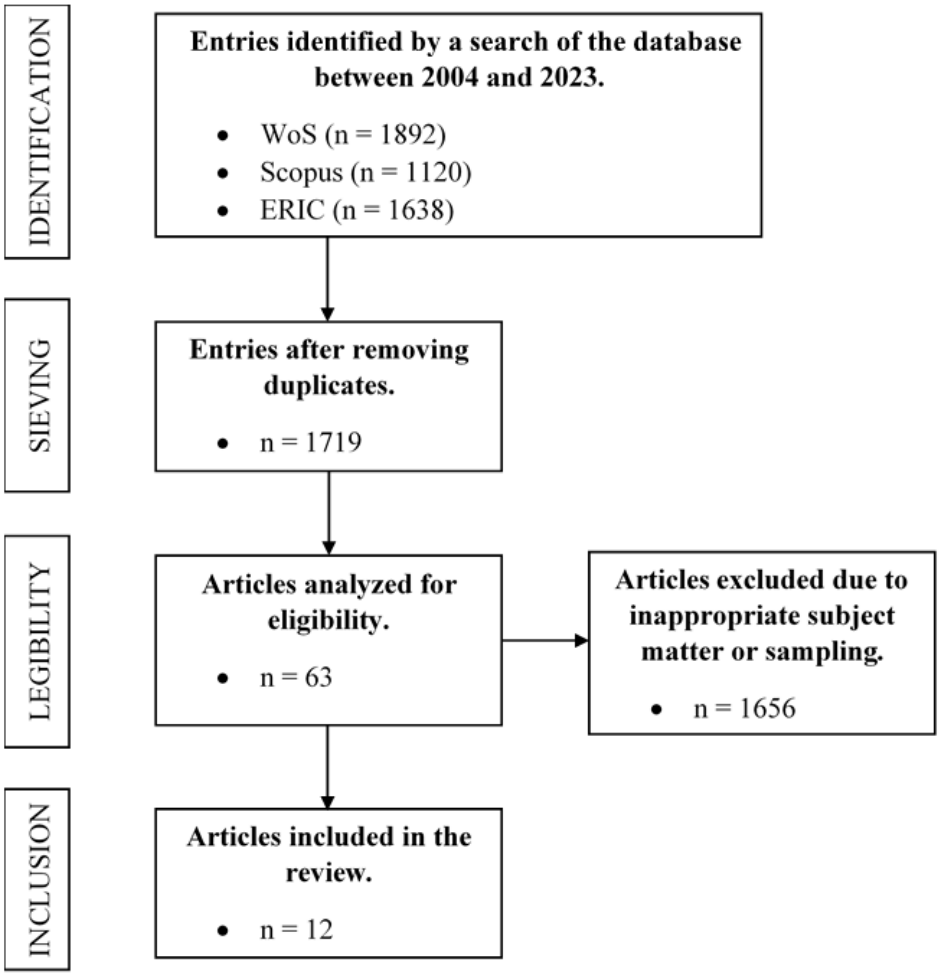
The study selection process included several stages to adjust the sample to facilitate the subsequent selection of papers that met the objectives of the present study. Initially, 5319 articles were identified in the WoS (n = 1952), Scopus (n = 1209) and ERIC (n = 2158) databases. However, restricting the search to articles published between 2004 and 2023, i.e., in the last 20 years, 4650 articles were found, distributed as follows: 1892 in WoS, 1120 in Scopus and 1638 in ERIC. All these bibliographic references were exported to Excel and duplicates were eliminated (n = 2931), leaving a total of 1719 articles for review.

According to the inclusion and exclusion criteria mentioned above, the titles and abstracts of the different studies were analysed. This screening limited the number of articles to a total of 63. However,

following a full-text review of the articles, a number of studies were excluded because they did not directly relate the study variables, namely creative thinking and reading comprehension; merely alluded to these variables without examining them in depth; or were not conducted in educational contexts, leaving 12 articles to be included in the review. This entire selection process is detailed in a flow chart (Figure 1).

Figure 1

Flow diagram of the systematic review



RESULTS AND DISCUSSION

To facilitate the process of analysis and discussion of the results, the studies are grouped in ascending order by the educational level in which the age of the sample falls. Similarly, within studies that target the same age sample, the studies are arranged in reverse chronological order. A summary of the selected studies is presented below, including the sample, the instruments used to collect the information, and the main findings and conclusions (Table 1).

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Table 1

Summary of analysed studies

Study	Sample	Instruments	Results and conclusions
Rubenstein et al. (2022)	141 niños. Ages: 5-7. Grades: First 2 grades of elementary school. Country: United States.	Torrance Tests of Creative Thinking-Figural (TTCT-F) (Torrance, 2008). NWEA-MAP-Growth.	Weak to moderate statistically significant correlations (.172-313) were found between reading and overall creativity, fluency, originality, elaboration, abstraction, and resistance. On the second measure, these relationships were reduced, and only statistically significant correlations (.186-.264) were shown between reading and overall creativity, originality, elaboration, and resistance.
Bezerra et al. (2022)	75 children. Ages: 6-9. Grades: 1st, 2nd, and 3rd. Country: Brazil.	Teste de Criatividade Figural Infantil, TCFI. CONFIAS. WASI. Avaliação de Palavras e Pseudo-palavras Isoladas – LPI (Salles et al., 2017).	In grades 1 and 2, there were few significant and weak correlations between creativity, reading decoding, and phonological awareness. In grade 3, strong and moderate correlations were found between these variables. The maturation of students in the early years and their low levels in these skills explain the weak and scarce correlations.
Martínez-Álvarez et al. (2020)	82 children. Age: 8-9. Grade: 3rd grade of elementary school. Country: Spain.	Academic grades. Individualised assessment test. Creative Intelligence Test. CREA (Corbalán et al., 2003). ACL-3 (Catalá et al., 2001). BES-A: Basic Empathy Scale Abbreviated. Self-concept questionnaire.	In reading comprehension in general and in the various components of reading comprehension, no relationships with creativity are found, except for critical comprehension, which shows a significant and weak correlation with creativity ($r = .24$, $p < .05$). No statistically significant differences were found between the high and low creativity groups in reading comprehension.
Bayley (2022)	306 children. Age: 7-11. Grade: 1st and 4th grade. Country: Rwanda.	Dimension Change Card Sort. Flexible Item Selection Task (FIST). Object-based Pattern Reasoning Assessment (OPRA; Zuilkowski et al., 2016). Early Grade Reading Assessment and the Oral Reading Fluency Assessment of Rwandan Schools (Education Development Center, Inc, 2017). Personal characteristics questionnaire.	Cognitive flexibility is a critical skill for creativity and problem solving. On the one hand, cognitive flexibility predicted nonverbal reasoning and reading fluency in 1st grade. However, there is no evidence of a relationship between cognitive flexibility and reading fluency in grade 4 or in combination. However, there is no relationship between cognitive flexibility and reading comprehension.
De-Vink et al. (2023)	746 students. Ages: 8-12. Grade: 4th and 5th grade. Country: The Netherlands.	Test for Creative Thinking – Drawing Production. TCTT. Lion game (Van-de-Weijer- Bergsma et al., 2015). Monkey game (Van-de-Weijer-Bergsma et al., 2016). The mathematical test and the reading comprehension test from the National Institute for Educational Measurement (CITO).	Visual divergent thinking was positively and statistically significantly correlated with reading comprehension ($r = .21$, $p < .01$). However, there was no such correlation between verbal divergent thinking and reading comprehension ($r = .09$, $p > .05$).
Arán-Filippetti & Krumm (2020)	112 children. Ages: 8-12. Grades: 3rd, 4th, 5th, and 6th. Country: Argentina.	Reading comprehension subtest of ENI Battery (Matute et al., 2007). PROESC, battery for the assessment of writing processes (Cuetos_Vega et al., 2004). Wisconsin Card Sorting Task (WCST). Trail Making Test. Semantic Verbal Fluency (SVF) and Phonological Verbal Fluency (PVF) (FAS fluency test). Five-point test. WISC-IV. Stroop color and word	Spontaneous flexibility turned out to be a significant predictor of reading comprehension. In fact, spontaneous flexibility is related to the creativity part, which is oriented to the ability to generate a variety of responses that are the result of the occurrence of internal stimuli. It was also a significant predictor of writing.

Study	Sample	Instruments	Results and conclusions
		test. D2, attention test. NEPSY knock and tap. KBIT, Kaufman brief intelligence test.	
Sur & Ateş (2022)	380 children. Ages: 12-13. Grade: 7th grade. Country: Turkey.	Reading Comprehension Achievement Test, RCAT. Listening Comprehension Achievement Test, LCAT. TCTT in its form A (Torrance, 1974).	There are positive and statistically significant correlations between reading comprehension and creativity (r = .266, p < .01), and between reading comprehension and fluency, flexibility, and originality, ranging from .217 to .324, which are weak to moderate correlations.
Mourgues et al. (2016)	1165 students and a subsample of 315. Ages: 12-13. Grade: 8th year. Country: United Kingdom	The Aurora battery. Key Stage 2 tests (KS2). General Certificate of Secondary Education (GCSE).	In a large sample of students, the relationship between creativity and reading was shown to be moderate and significant correlations (r = .486, p < .01). On the other hand, in the subsample, the correlation between creativity and reading is moderate, although it took lower values (r = .348, p < .01).
Solano et al. (2016)	118 students. Ages: 12-13. Grade: 1st ESO. Country: Spain.	Academic Grades. Learning Strategies Questionnaire (CEA in Spanish; Beltrán et al., 2006). Reading comprehension control (CCL in Spanish).	Proficient readers demonstrated higher creative thinking scores than nonproficient readers, with statistically significant differences between the groups. There are moderate and statistically significant correlations (r = .301, p < .01) between creative thinking and reading comprehension.
Danesh & Nourdad (2017)	70 male students. Ages: 13-14. Grade: 2nd grade of secondary school. Country: Iran	TTCT. Reading Comprehension Test ad hoc.	Statistically significant moderate positive correlations were found between reading comprehension and creative problem solving (r = .48, p < .01), originality (r = .38, p < .01), and elaboration (r = .51, p < .01).
De-Vicente-Yagüe et al. (2022)	154 students. Ages: 12-16. Grades: 1st and 4th of ESO. Country: Spain.	Battery for the Evaluation of Reading Processes in Secondary and High School - Revised, PROLEC-SE-R (Cuetos-Vega et al., 2016). CREA.	Significant positive correlations (.198-.307) in 5 of the 6 dimensions of reading comprehension (lexical selection, semantic categorisation, grammatical structures, grammaticality judgments, and expository comprehension), as well as with the lexical index, the syntactic index, the semantic index, and the general reading index.
Magenes et al. (2022)	180 students. Ages: 14-17. Course: Vocational courses. Country: Italy.	Word and non-word reading tasks of the DDE-2 (Sartori et al., 2007). MT Reading test. Advanced MT reading battery. Developmental Dyscalculia Battery. Progressive Matrices. TTCT. Insight Problem Solving task (Iannello et al., 2020). GSE.	There are weak and significant correlations between reading comprehension and fluency (r = -.202, p < .05) and flexibility (r = -.199, p < .05). On the other hand, a positive and significant correlation was found between reading comprehension and insight (r = .193, p < .05). Reading comprehension was found to be a positive predictor of elaboration.

First, it should be noted that, unlike the relationships between creativity and other variables such as intelligence, personality, and emotions, the relationships between creative thinking and reading comprehension have been little studied. This is evidenced by the small number of articles that analyse these relationships in the context of the different stages of non-university education, where reading and writing are already mastered. Specifically, only 12 empirical articles were found that aimed to explore this relationship in depth. In fact, De-Vink et al. (2023) reported that they did not find any previous studies investigating the relationship between divergent thinking and reading comprehension.

Considering the age and educational level of the participants in the different studies, six studies were found in the early years of schooling, i.e., from the beginning of primary school to the end of primary school. At this stage, weak and moderate statistically significant correlations between creative thinking and reading achievement were generally found (Aran-Filippetti & Krumm, 2020; Bezerra et al.,

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2022; De-Vink et al., 2023; Rubenstein et al., 2022). Furthermore, in the study of schoolchildren by Bayley (2022), no relationships were found between these variables, and in the work of Martínez-Álvarez et al. (2020), no relationships were found between these variables in a general way, although it was found to be related to the part of reading comprehension called critical.

In the next stage of development, after the end of primary education, in secondary education and in equivalent courses corresponding to the ages of 12 to 17 years, six more studies were found. In all studies at these ages, relationships were found between reading comprehension and the different variables of creative thinking (Danesh & Nourdad, 2017; Magenes et al., 2022; Mourgues et al., 2016; Solano et al., 2016; Sur & Ateş, 2022; De-Vicente-Yagüe et al., 2022). Indeed, as in the previous stage, the described correlations are statistically significant, weak, and moderate.

It should be noted that a wide variety of instruments are used in these studies. Most of the instruments used are specific to the country in which the research is carried out or are adaptations of widely used international tests. Most of the studies analysed are carried out with a Spanish sample, so that instruments of Spanish origin predominate (Martínez-Álvarez et al., 2020; Solano et al., 2016; De-Vicente-Yagüe et al., 2022), although these studies do not use the same instruments to collect information. Considering the origin of the sample, the remaining countries are only represented in one study each: United States (Rubenstein et al., 2022), Brazil (Bezerra et al., 2022), Rwanda (Bayley, 2022), Netherlands (De-Vink et al., 2023), United Kingdom (Mourgues et al., 2016), Argentina (Aran-Filippetti & Krumm, 2020), Turkey (Sur & Ateş, 2022), Iran (Danesh & Nourdad, 2017), and Italy (Magenes et al., 2022).

Traditionally, the test to measure creativity that has been most used in different research on creativity is the test called TTCT by Torrance (1974; 2008), in its different versions. In fact, in three of the studies (Danesh & Nourdad, 2017; Magenes et al., 2022; Rubenstein et al., 2022), this test is used to measure creativity in individuals and is the most used to explore the existing relationships between creativity and reading competence. The correlations provided by this test with reading comprehension range from weak to moderate, considering creativity from a general point of view, as well as with the different indicators of creative thinking.

Similarly, the second most used test was the Creative Intelligence Test (CREA) (Corbalán et al., 2003), which is of Spanish origin and provides data on an estimate of creative potential based on the individual's ability to elaborate questions based on a picture. This test is widely used because of its short administration time and easy correction. For this reason, two Spanish articles (De-Vicente-Yagüe et al., 2022; Martínez-Álvarez et al., 2020) out of a total of three choose to use this test. These articles, although using the same creativity test, use different tests to measure reading comprehension: the PROLEC-SE-R and the ACL-3, respectively. With the former, weak to moderate relationships are found with the different indicators of reading comprehension, including general reading comprehension, with which the highest correlations are found (De-Vicente-Yagüe et al., 2022). In contrast, general creativity was not related to general reading comprehension, and only the level of critical comprehension was correlated with creative thinking, since this level can lead to the reformulation of ideas to improve creative performance (Martínez-Álvarez et al., 2020).

Regarding the tests used to assess individuals' reading comprehension, it should be noted that studies use a variety of instruments that are not consistent across studies, with each study using a different test to obtain a reading comprehension score. Most studies use validated and reliable psychometric instruments to collect this information (Arán-Filippetti & Krumm, 2020; Bezerra et al., 2022; Magenes et al., 2022; Martínez-Álvarez et al., 2022; Rubenstein et al., 2022; Sur & Ateş, 2022; De-Vicente-Yagüe et al., 2022). To a lesser extent, data on reading comprehension are collected using proprietary instruments (Bayley, 2022; Danesh & Nourdad, 2017; De-Vink et al., 2023). On the other hand, evidence regarding reading comprehension is obtained from instruments or records to collect student' academic performance (Mourgues et al., 2016; Solano et al., 2016). This is the form in which the relationships are more stable and higher, as they are significantly moderated with creative thinking.

Considering the different indicators of creativity, reading comprehension is related to the following indicators: fluency (Magenes et al., 2022; Rubenstein et al, 2022; Sur & Ateş, 2022), since the increase in

comprehension capacity would lead to a greater number of ideas; flexibility (Aran-Filippetti & Krumm, 2020; Magenes et al., 2022; Sur & Ateş, 2022), since individuals with higher levels of comprehension have a greater number of response alternatives, which causes them to be able to move more easily from one set of ideas to others that are unrelated to the first; and originality, which is an indicator that allows students to interpret the information in a text by connecting more distant aspects to each other and avoiding common relationships (Danesh & Nourdad, 2017; Rubenstein et al., 2022; Sur & Ateş, 2022). Other less relevant indicators that show relationships with reading comprehension are abstraction (Rubenstein et al., 2022), insight (Magenes et al., 2022), resilience (Rubenstein et al., 2022), and creative problem solving (Danesh & Nourdad, 2017).

At this point, it should be noted that the indicator of creative thinking most often associated with reading comprehension is elaboration (Mareque et al., 2019; Wang, 2012a; 2012b; Zabihi et al., 2013). In fact, reading proficiency has been identified as a positive predictor of elaboration and the relationship between them has been revealed (Danesh & Nourdad, 2017; Magenes et al., 2022; Rubenstein et al., 2022). Elaboration allows to embellish and make an idea more complex, that is, to improve an idea by including more details, so that understanding a text at its highest level is key to manifesting a higher degree of elaboration. The explanation lies in the fact that at the highest levels of comprehension, the reader is not limited to the literal information of the text, but also makes the effort to imagine and connect this literal information with previous experiences.

In terms of the different components and dimensions of reading comprehension, creative thinking has been correlated with reading decoding, which is key to word recognition and naming (Bezerra et al., 2022), critical comprehension -which requires a certain reading habitus to be able to make value judgments without the barriers of literal comprehension (Martínez-Álvarez et al, 2020)- and with lexical selection, semantic categorisation, grammatical structures, grammaticality judgments, expository comprehension, lexical index, syntactic index, and semantic index-which are dimensions specific to the instrument for collecting information on reading comprehension (De-Vicente-Yagüe et al., 2022).

Finally, it should be specified that the study by De Vink et al. (2023) highlights the discrepancies between the specific domains of creativity, so that visual domain-specific creative thinking was correlated with reading comprehension, while verbal domain-specific creativity (Artola et al., 2004; Portnova et al., 2020) was not correlated with reading comprehension. This finding is of interest because verbal creative thinking is that which is found in narrative tasks in both reading and writing.

CONCLUSION

The aim of this systematic review was to highlight the relationship between creativity and reading comprehension, which are essential skills for 21st century society (González-Salamanca et al., 2020). At this point, it can be affirmed that the studies analysed confirm the existing relationship between both variables, which is positive and directly proportional, although it is not very high. These studies are consistent in the relationship between creative thinking and its components and reading ability and its indicators, with recent studies that shed light on this relationship (Aran-Filippetti & Krumm, 2020; Bezerra et al., 2022; Danesh & Nourdad, 2017; De-Vink et al., 2023; Magenes et al., 2022; Martínez-Álvarez et al., 2020; Mourgues et al., 2016; Rubenstein et al., 2022; Solano et al., 2016; Sur & Ateş, 2022; De-Vicente-Yagüe et al., 2022).

In fact, only the findings of one study (Bayley, 2022) contrast the others, but it should be noted that this research does not show that there are no relationships between reading comprehension and creativity, but rather that these relationships do not exist between reading comprehension and what would be one of the indicators of creativity, such as flexibility.

Although these studies are recent, they reinforce the theory of creative reading (Popov, 1992), which states that quality reading is based on creativity, since this creativity is the one that allows to reach the highest levels of reading comprehension (Jiménez-Pérez, 2015), since it allows to integrate the different

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knowledge, the experiences of the reader and what is established in the text, in order to increase the level of comprehension achieved by the text (Karwowski, 2017).

This finding allows directing educational efforts towards the implementation of programs that improve both skills. In the educational field, they should be developed through interaction and practice, implemented through some active methodologies such as cooperative learning (Cignetti & Fuster, 2023; Sánchez-Macías et al., 2021). Likewise, as previously indicated, reading comprehension shows a relationship with creative problem solving that allows individuals to adapt in the best possible way to different situations in their environment (Danesh & Nourdad, 2017).

In fact, the process of applying reading comprehension knowledge to a situation can facilitate its solution as long as there is some verbal content in the situation. However, there is evidence that in situations that require visual creative thinking, the higher the level of reading comprehension, the better the performance (De-Vink et al., 2023). This may be because the individual has fully acquired and consolidated skills that are common to both reading and creative thinking (McVey, 2008; Sturgell, 2008).

One of the main limitations of this study is that the articles reviewed were extracted from the WoS, Scopus and ERIC databases. Although these databases are the most important and relevant, future work could include articles from scientific journals indexed in other national or international databases that contain research not included in this study, so that articles from other sciences and disciplines can be considered.

Furthermore, the other limitation of the study is inherent to the use of the systematic review methodology, since it is subject to publication bias and does not allow us to address the discrepancies and contradictions between studies, since they cannot be combined into a single global measure based on statistical techniques, leading to somewhat biased conclusions. As a prospective, it should be noted that an empirical study could be conducted to explore these relationships with a representative sample administered different instruments to measure creativity and reading comprehension in different ways. Similarly, it would be possible to explore in greater depth the relationships that creative thinking, in its various specific domains, may have with reading comprehension.

AUTHORS' CONTRIBUTIONS

Antonio José Lorca-Garrido: Project management; Formal analysis; Conceptualisation; Data curation; Writing - original draft; Writing - revision and editing; Research; Methodology; Resources; Software; Supervision; Validation; Visualisation.

Olivia López-Martínez: Conceptualisation; Writing - revision and editing; Methodology; Resources; Supervision; Validation; Fundraising.

María-Isabel De-Vicente-Yagüe-Jara: Conceptualisation; Writing - revision and editing; Methodology; Resources; Supervision. All authors contributed to the article and approved the submitted version.

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