# The Mediator Effect of Motivation in the Relationship Between Reading Comprehension and Word Problem Solving of Junior High School Students: A Systematic Literature Review

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## ABSTRACT

This systematic literature review aims to summarize the empirical data currently available on this mediation effect of motivation in the connection between word problem solving and reading comprehension in order provide light in this field and identify any gaps that should guide future research. In finding relevant articles published between 2015 and 2025, a thorough search was performed using a number of scholarly databases together with programs like ERIC and PsycINFO. Following PRISMA guidelines, inclusion and exclusion criteria were applied. Titles, abstracts, and full texts were all assessed during the screening phase, and the results of relevant literature were compiled using thematic synthesis. Following full-text evaluation, no articles satisfied all inclusion requirements, indicating a large empirical evidence gap on the study. Empirical gap is shown by the lack of relevant studies, highlighting the urgent need for focused empirical study on the how motivation specifically influences or mediates this relationship.

**Keywords:** Reading Comprehension, Motivation, Word Problem Solving and Junior High School Students

## INTRODUCTION

In secondary education, especially for Junior Highschool students, mastering word problem solving requires not only cognitive abilities but also affective factors such as motivation. Reading comprehension, a cognitive skill, has been shown to play a vital role in students' ability to solve mathematical word problems, which require students to interpret and translate textual information into mathematical expressions (Fuchs et al., 2019). Current literature suggests that motivation may act as a mediator that enhances or diminishes the relationship between these two competencies, influencing students' performance in solving word problems (Can, 2020). Emerging research suggests that motivation may play a pivotal role in mediating the relationship between students' reading comprehension capacities and their ability to solve mathematical word problems efficiently. The purpose of this systematic review is to synthesize existing empirical evidence on this mediation effect, thereby clarifying the role of motivation within this context and identifying gaps to inform future studies.

Motivation emerges as a critical yet underexplored affective mediator in this interplay. While in the study of Li and Wang (2022), intrinsic motivation and self-efficacy in reading positively predicted comprehension outcomes, mathematics-specific motivation mediated relationships between mindset, teaching quality, and performance in Arthur et al. (2022). However, few studies have systematically tested motivation's mediating role specifically between reading comprehension and word problem-solving, particularly among adolescents transitioning to more abstract mathematical demands.

Guided by the research question formulated under the PICOT framework, PICOT stands for Population (or Patient/Problem), Intervention (or Exposure), Comparison, Outcome, and Time(frame). It helps researchers identify key variables, refine searches for evidence, and design systematic reviews by breaking down complex inquiries into searchable elements. This review focuses on Junior Highschool students (Population), investigating motivation as the mediator (Intervention/Exposure) in the relationship between reading

comprehension and word problem solving (Outcome). The inclusion criteria emphasize empirical studies including quantitative, qualitative, and mixed-methods research that analyze mediation effects (Type of study). The question driving this review is: "How does motivation mediate the relationship between reading comprehension and word problem solving in Junior Highschool students?" Addressing this question can provide actionable insights into optimizing motivation-centered interventions to improve mathematical word problem solving through enhanced reading comprehension.

**Purpose of the study**

The purpose of this systematic literature review is to investigate whether motivation serves as a mediator in the pathway linking reading comprehension to mathematical word problem solving among junior high school students. Existing studies demonstrate robust connections between reading comprehension and word problem-solving, often positioning reading as a partial mediator alongside logical reasoning, yet empirical evidence remains scarce on motivation's specific mediating role within educational and cognitive theoretical frameworks. To address this gap, the review synthesizes relevant empirical studies using the PRISMA 2020 guidelines for transparency and rigor, offering insights into pedagogical implications for mathematics education.

This systematic literature review aims to answer the question: *Among junior high school students, how does motivation mediate the relationship between reading comprehension and mathematical word problem-solving performance in empirical studies published between 2020 and 2025?*

## METHODOLOGY

This study employed a systematic literature review design to examine whether motivation functions as a mediator in the relationship between reading comprehension and mathematical word problem-solving among junior high school students. The review followed established guidelines for transparency and rigor, including the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) provides standardized guidelines for transparent reporting in systematic literature reviews, including flow diagrams and checklists for study selection, eligibility, and synthesis.

Building on educational and cognitive theories, the approach integrated empirical studies to thoroughly assess how motivation mediates the connection between reading comprehension and mathematical word problem solving in this population.

Studies were eligible if they utilized empirical quantitative, qualitative, or mixed-methods approaches to investigate mediation processes, or if they were theoretical/review articles providing relevant data on motivation, reading comprehension, or word problem-solving results. Publications were limited to those from 2015 to 2025 and required to be in English. Studies were excluded if they were editorials or opinion articles lacking empirical data, predated 2020, failed to focus on junior high school students, not related to mathematical word problem-solving, reading comprehension or did not credibly connect to the motivation as mediator.

Data sources comprised peer-reviewed journals alongside credible academic repositories. The literature search spanned education and psychology databases (e.g., ERIC, PsycINFO), publisher platforms, open-access repositories for multidisciplinary-indexed journals (e.g., Google Scholar, Scopus), and specialized mathematics education outlets. Hand-searching of bibliographies from selected studies yielded further records. Search terms integrated mediation concepts, core topics, cognitive/affective variables, and outcome measures, applying 2020–2025 date restrictions and filters for "junior high" OR "middle school." The primary Boolean search string, modified for each database, read: ("motivation" OR "intrinsic motivation" OR "self-efficacy" OR "affective factors") AND ("reading comprehension" OR "reading skills" OR "literacy") AND ("word problem solving" OR "mathematical word problems" OR "math problem solving") AND ("mediation" OR "mediator effect" OR "moderator") AND ("junior high" OR "middle school" OR "grades 7-9" OR "adolescents").

## Inclusion and Exclusion Criteria

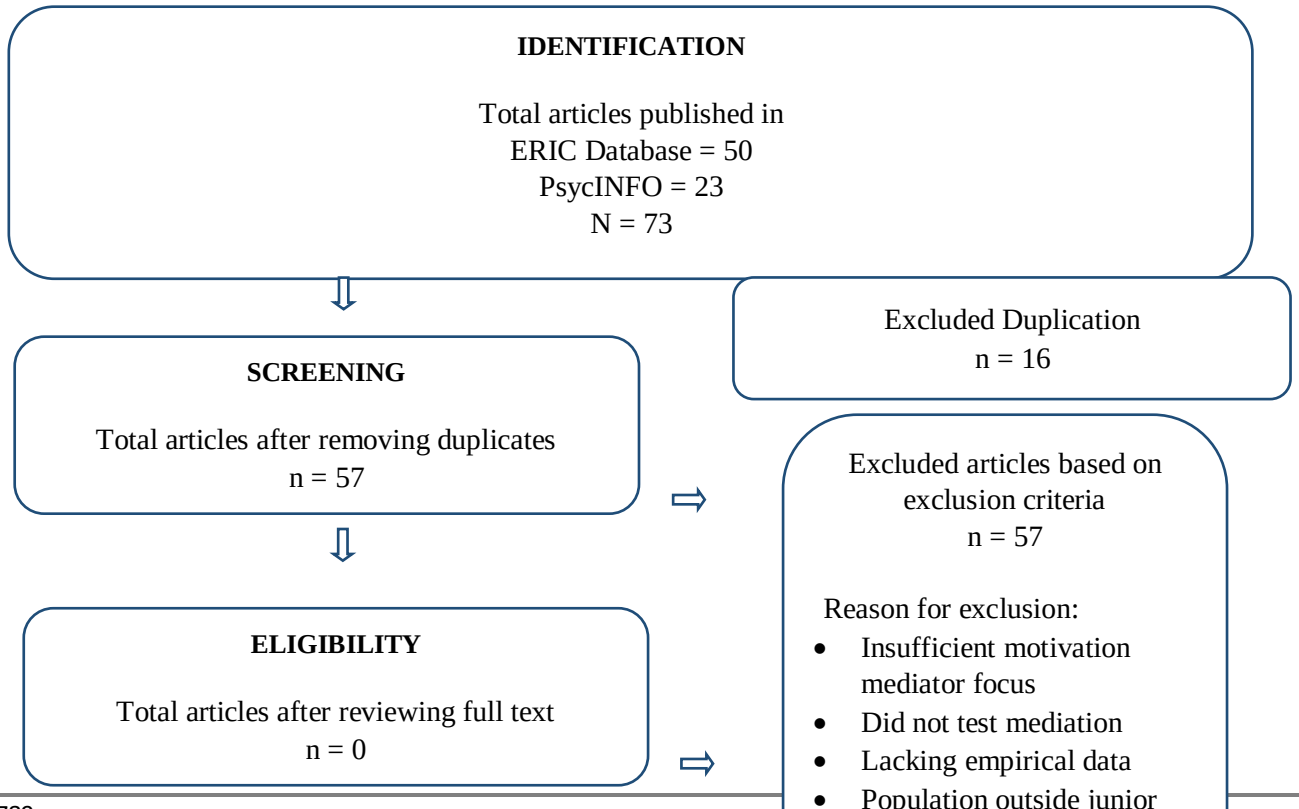
The inclusion and exclusion criteria for this study were carefully established to ensure the selection of relevant and high-quality research. Studies included in this review were published between 2015 and 2025, focused on junior high school students, and investigated the mediator effect of motivation in the relationship between reading comprehension and word problem solving within formal educational settings.

| Criteria | Inclusion Criteria | Exclusion Criteria |
|---|---|---|
| Population | Studies involving junior high school students (typically Grades 7–10) | Studies involving students outside junior high school age or different educational levels |
| Variables | Research examining motivation as a mediator between reading comprehension and word problem solving | Studies that do not explore motivation as a mediator or focus on unrelated variables |
| Study Design | Empirical studies including quantitative, qualitative, and mixed-methods research | Theoretical papers, opinion pieces, editorials, or studies lacking empirical data |
| Language | Studies published in English | Studies published in languages other than English |
| Publication Date | Research published within the last 10 years | Studies published before 2015 or after 2025 |
| Educational Context | Research conducted in formal education settings relevant to junior high school | Studies in informal or non-educational settings |
| Type of publication | Authentic scholarly reports, theses, dissertations, conference proceedings, and peer-reviewed journal publications. | Non-academic publications such as magazine articles, newsletters |

**Table 1. Inclusion and Exclusion Criteria**

## Search Strategy

This systematic literature review adhered to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, promoting transparency and replicability in the study selection process.



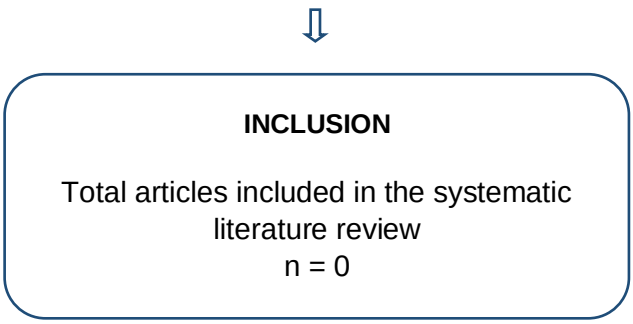



**Figure 1. Data Selection Process Using PRISMA**

The four main stages of the PRISMA flow diagram—identification, screening, eligibility, and inclusion of studies—were adhered to during the review process. Databases like ERIC and PsycINFO was used for literature searches, with an emphasis on theses, dissertations, and journals with peer review. In the identification stage, all possible studies were gathered using keywords associated with junior high school students, reading comprehension, motivation, and word problem solving. Based on titles and abstracts, duplicates and research unrelated to the mediator effect of motivation were eliminated throughout the screening process. Then, using predetermined criteria, a full-text eligibility assessment was performed out with an emphasis on the population, mediator and outcome factors, and educational setting.

The search used the keywords "relationship between reading comprehension and word problem solving, motivation as mediator, junior high" which initially produced 73 papers, 50 from ERIC and 23 from PsycINFO, including journals, articles, and books. This broad search ensured that a wide range of relevant literature was captured, and the studies were screened systematically using the inclusion and exclusion criteria, reducing the pool to 57 articles that met the criteria of focusing on the word problem, reading comprehension skills and motivation. A full-text eligibility review was then conducted on these 57 articles to assess the studies' quality and relevance in more detail, and none of the studies met all criteria that can be included in the final synthesis.

| **Author** | **Reason for Exclusion** |
|---|---|
| Shao, J., Chen, C., & Wang, Y. (2025) | Population outside junior high school |
| Can, 2020 | Population outside junior high school |
| Fung et al. (2014) | Pre-2015 publication |
| Sigus, H., & Mädamürk, I. (2025) | Population outside junior high school |
| Cartwright et al. (2022) | Did not test mediation |
| Berninger et al. (2023) | Insufficient motivation mediator focus |
| Boonen et al. (2016) | Lacking empirical data |
| Goodrich, J. M., & Namkung, J. M. (2019) | Population outside junior high school / Did not test mediation |
| Ng, W.-S et al. (2021) | Population outside junior high school |
| Hasselgreen, A. B. (2014) | Did not explore motivation as a mediator |
| Caballero et al. (2025) | Did not explore motivation as a mediator |
| Fuchs et al. (2024) | Population outside junior high school / Did not explore motivation as a mediator |
| Hadianto et al. (2021) | Did not explore motivation as a mediator |
| Macugay et al. (2024) | Population outside junior high school |
| Cho et al. (2022) | Did not explore motivation as a mediator |
| Boonen et al. (2015) | Population outside junior high school |
| Sukoco, A. (2020) | Population outside junior high school |
| Hegarty et al. (2019) | Lacking empirical data |
| Zk, M., Mailizar, M., & Elizar, E. (2025) | Did not explore motivation as a mediator |
| Kwok, Y., & Kwan, C. (2025) | Did not explore motivation as a mediator |
| Norberg, K., et al. (2025 | Did not explore motivation as a mediator |

| | |
|---|---|
| Pavón, V., & Ávila, M. (2019) | Did not explore motivation as a mediator |
| Ulu, M. (2017) | Population outside junior high school |
| Gedik, O., & Akyol, H. (2022) | Did not explore motivation as a mediator |
| Williams, K. J., et al. (2023) | Did not explore motivation as a mediator |
| Agbo, I. I. (2019) | Did not explore motivation as a mediator |
| Bagci, H. (2020) | Did not explore motivation as a mediator |
| Maskar, S., & Herman, T. (2024) | Did not explore motivation as a mediator |
| Okwudishu, A. U. (2017) | Did not explore motivation as a mediator |
| O'Reilly, T., & Sabatini, J. (2019) | Did not explore motivation as a mediator |
| Alsamiri, J. (2016) | Did not explore motivation as a mediator |
| Putri, O. R. U., et al. (2023) | Did not explore motivation as a mediator |
| Rochaminah et al. (2022) | Did not explore motivation as a mediator |
| Hayati, H. A. (2022) | Did not explore motivation as a mediator |
| Uyen, B. P., et al. (2021) | Did not explore motivation as a mediator |
| Indrayadi, R. (2020) | Did not explore motivation as a mediator |
| Capone et al., (2021) | Population outside junior high school |
| Björn, P. M. (2019) | Did not explore motivation as a mediator |
| Kurshumlia, A., & Vula, E. (2021) | Did not explore motivation as a mediator |
| Powell, S. R., & Fuchs, L. S. (2019) | Population outside junior high school |
| Indriyana, B. S. (2019) | Did not explore motivation as a mediator |
| Astuti et al. (2019) | Did not explore motivation as a mediator |
| Ghaith, G. (2019) | Did not explore motivation as a mediator |
| Minarni & Napitupulu, E. (2016) | Did not explore motivation as a mediator |
| Fadzil et al. (2025) | Did not explore motivation as a mediator |
| Ulu (2017b) | Did not explore motivation as a mediator |
| Wang et al. (2017) | Population outside junior high school |
| del Prado Hill et al. (2016) | Did not explore motivation as a mediator |
| Orosco, M. J. (2017) | Population outside junior high school / Did not explore motivation as a mediator |
| Bates, E. T., Latham, N., & Kim, J. (2004) | Population outside junior high school / Did not explore motivation as a mediator |
| Orosco et al. (2013) | Pre-2015 Publication |
| Egodawatte, G. (2011) | Pre-2015 Publication |
| Zhang, L. J. (2009) | Population outside junior high school / Did not explore motivation as a mediator / Pre-2015 Publication |
| Nahdi et al. (2023) | Population outside junior high school / Did not explore motivation as a mediator |
| Elazzabi, A., & Kaçar, A. (2020) | Did not explore motivation as a mediator |
| Sumarmo, et al. (2017) | Did not explore motivation as a mediator |
| Crosson, A. C., & McKeown, M. G. (2016) | Did not explore motivation as a mediator |

**Table 2. Studies Excluded After Full-Text Review**

The table shows exclusions from a systematic review on motivation's mediating role between reading comprehension and math word problem solving in junior high students. From an initial pool of screened studies, numerous articles were systematically excluded based on five primary reasons: population mismatch targeting non-junior high learners, absence of empirical testing for motivation as a mediator, pre-2015 publication dates preceding key curricular shifts, lack of original empirical data, and insufficient emphasis on motivation mediation.

**Did Not Test/Explore Motivation as Mediator**

The majority of exclusions occurred because studies failed to statistically test or conceptually explore

motivation as a mediating variable between reading comprehension and mathematical word problem solving performance. Mediation analysis requires demonstrating that motivation partially or fully explains the comprehension-performance link (e.g., via structural equation modeling or PROCESS macro), which was absent in works like Cartwright et al. (2022), Hadianto et al. (2021), and del Prado Hill et al. (2016). This maintained analytical rigor for the review's core hypothesis.

**Population Outside Junior High School**

Studies were excluded when their participant groups did not align with junior high school students (typically grades 7-9, ages 12-15), such as those focusing on elementary, primary, senior high, college, or adult learners. This criterion ensured relevance to the developmental stage where abstract word problem solving and motivation mediation become critical transitions from concrete arithmetic to algebraic reasoning. Examples include Shao et al. (2025), Can (2020), and Orosco (2017), prioritizing age-specific cognitive and motivational dynamics in mathematical contexts.

**Pre-2015 Publication**

Publications dated before 2015 were excluded to emphasize contemporary research reflecting current curricula, pedagogical standards, and empirical methods post-Common Core adoption and digital learning shifts. This temporal cutoff captured evolving insights into motivation mediation amid rising ELL populations and STEM emphases, excluding earlier works like Fung et al. (2014), Orosco et al. (2013), Egodawatte (2011), and Zhang (2009) despite their foundational contributions.

**Lacking Empirical Data**

Studies without original quantitative or qualitative empirical findings—such as reviews, theoretical pieces, or position papers—were excluded to prioritize primary data-driven evidence on motivation's mediational role. Boonen et al. (2016) and Hegarty et al. (2019) fell into this category, as the review demanded testable models from controlled experiments, interventions, or surveys rather than synthesized or conceptual discussions.

## RESULTS AND DISCUSSION

The systematic review revealed that, after applying the inclusion criteria, none of the 73 identified studies qualified for inclusion. While no studies have examined full mediation in this context, Nahdi et al. (2023) established a significant association between reading comprehension and students' mathematical problem-solving abilities. Similarly, Can (2020) reported significant positive correlations among logical reasoning (including syllogistic reasoning), reading comprehension, and word problem-solving performance in a sample of 158 fourth-grade primary school students. Reading comprehension exhibited a partial mediating effect, whereby it partly explains the influence of logical reasoning on word problem solving: logical skills directly predict enhanced problem-solving outcomes, with reading comprehension further strengthening this pathway through improved text interpretation and inference process.

The absence of qualifying studies in the systematic review arises from methodological shortcomings, including prevalent cross-sectional designs that limit causal mediation analysis and small sample sizes, which fail to meet rigorous criteria like longitudinal tracking or robust SEM with adequate power. Theoretically, this gap reflects incomplete synthesis of cognitive models of logical reasoning and linguistic frameworks like the simple view of reading, with studies like Can (2020) and Nahdi et al. (2023) documenting only partial mediation or associations rather than full pathways, often overlooking confounders such as multilingualism or working memory. Future research should conduct a longitudinal study with higher number of participants, baseline-testing logic, reading, and word problems; apply a 6-month intervention; and test mediation via SEM.

## CONCLUSION

Due to the lack of relevant research on the role of motivation as a mediator in the relationship between junior high school students' reading comprehension and word problem solving, the review recommends expanding search criteria in the following studies or investigating related areas and wider contexts to guide practice in the meantime.Furthermore, this gap emphasizes how vital it is to start conducting empirical research on the motivational factors affecting junior high students' reading comprehension–problem solving dynamic.

**Recommendations for Future Studies**

Based on the synthesis of findings, several actionable recommendations are proposed:

1. Design empirical research explicitly testing motivation as a mediator between reading comprehension and word problem solving in junior high students.

2. Explore specific motivational constructs (intrinsic motivation, self-efficacy, task value) and their influence on cognitive processes.

3. Examine contextual factors in the Philippine educational setting, including teacher support, curricular design, socio-economic variables, and assessment practices.

4. Investigate interactions between these contextual elements, student motivation, comprehension, and problem-solving outcomes.

5. Align with global trends emphasizing motivation's role in deeper cognitive engagement and achievement

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