

Unpacking the Science of Reading: A Collaborative Exploration of Research and Theories

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Engaging in Constructive Dialogue Around the Science of Reading

The Science of Reading (SOR) Movement has gained significant traction in recent years, significantly influencing literacy education discourse and policymaking. At its core, the SOR Movement is grounded in research investigating specific processes related to literacy acquisition. To engage in meaningful dialogue and advance understanding of the SOR Movement, it is essential to critically examine the primary source research that forms the foundation of the movement.

Therefore, the authors formed a workgroup of a diverse group of professionals, teachers, leaders, academics, and graduate students with a shared vision: to create a collaborative community that encourages intellectual courage in evaluating and discussing the SOR research and theory. By engaging in careful reading, open dialogue, and constructive critique, the workgroup sought to deepen their collective understanding of the SOR Movement.

The workgroup's stance was one of genuine inquiry, seeking to "understand their understandings" rather than engaging in polarized debates of "right" versus "wrong." The field

of literacy research encompasses a diverse range of perspectives and research traditions, each contributing valuable insights. By focusing on the substance of the research and the evidence presented, the authors aimed to facilitate a rich, nuanced exchange of ideas that acknowledges the complexity inherent in studying reading acquisition.

The purpose of this article is to describe a workgroup's initial efforts to critically examine the SOR Movement's foundational research and theory. The importance of citations in SOR literature is explained, followed by a description of the processes used for identifying influential research and theories. Next, an overview of key SOR theories is presented. Preliminary observations on how reading is conceptualized in published SOR research articles follows. Finally, the authors discuss how teachers can engage in critical, nuanced dialogue about literacy instruction, moving beyond simplistic right or wrong perspectives.

Role of Citations in Understanding the SOR Movement

Central to understanding the SOR Movement is the role of citations in tracing the perspectives and theories that inform it. When authors make

claims about reading acquisition and instruction, they build credibility and warrant their assertions by citing specific research articles. These citations, typically found in parentheses after a claim, serve multiple purposes. The citations

- position the author's ideas within existing theoretical frameworks,
- connect current work to previous research, and establish a chain of reasoning supported by evidence.

For the purposes of this analysis, the authors considered publications as "highly cited" when referenced by 100 or more authors in subsequent publications. This threshold, while not a universal standard, serves as a useful guideline to identify influential works within the SOR Movement. By analyzing these foundational works, the authors aimed to uncover the underlying assumptions and theoretical perspectives that form the basis of the SOR Movement — an approach which allowed us to do the following:

1. Trace the evolution of key ideas in literacy research.
2. Identify the most influential publications reporting research and theoretical outcomes.

- Critically examine the evidence base supporting SOR claims.

By focusing on highly cited works and their interconnections, the authors aimed to understand the intellectual foundations of the SOR Movement, facilitating more informed and nuanced discussions in our workgroup.

Identifying Key Research Supporting the SOR Movement

The authors employed a systematic approach to identifying influential research articles supporting the SOR. We began by searching for and cross-referencing peer-reviewed primary source research articles using the Web of Science citation analysis feature and Google Scholar. Then, we reviewed The Reading League’s website for overt references to those research articles. The Reading League’s mission is “to advance the understanding and use of evidence-aligned reading instruction through the science of reading” (The Reading League, 2024). The triangulation of sources helped us capture the most frequently cited and influential research articles.

The authors created a shared spreadsheet to facilitate the selection process and ensure consistency. We independently reviewed and cross-checked the identified articles to verify their relevance and centrality to the SOR Movement. We focused our attention on three time periods: highly cited theoretical articles published after 1980, articles published within the past 25 years (1999–2024), and finally, articles published within the past decade (since 2014–2024). This allowed us to consider the evolution of key ideas and theories over time.

During monthly meetings, the workgroup systematically followed three steps to review the articles identified by the authors. First, each workgroup member independently identified key features of the research study — purpose, research questions and methodology, supporting theories, findings, implications, connections, and critiques. Then, the workgroup engaged in conversation and deliberation during monthly Zoom meetings to reach consensus and collected individual and small-group responses on a Google Form. Finally, the authors compressed the group’s responses into an ongoing

feature chart for later consideration and dialogue in Zoom meetings. Figure 1 represents the progression and focus of each phase of the work.

As the workgroup delved into the selected articles, an interesting pattern emerged. Authors frequently cited meta-analyses and research syntheses to support SOR claims, rather than primary source research articles, that reported on direct observation of children reading. Although meta-analysis is a valuable research method, the goal was to identify the original published empirical research reports or articles. Thus, the review process was expanded to include the most highly cited meta-analyses to address the identified pattern. Then, the references were cross-checked to identify primary source research studies, reported in published articles, that were consistently cited across multiple syntheses. In March, as illustrated in Figure 1, meta-analyses were incorporated into the workgroup’s collaborative reading process.

The authors found that in the 10 most highly cited meta-analyses, there was a small set of commonly cited empirical research articles.

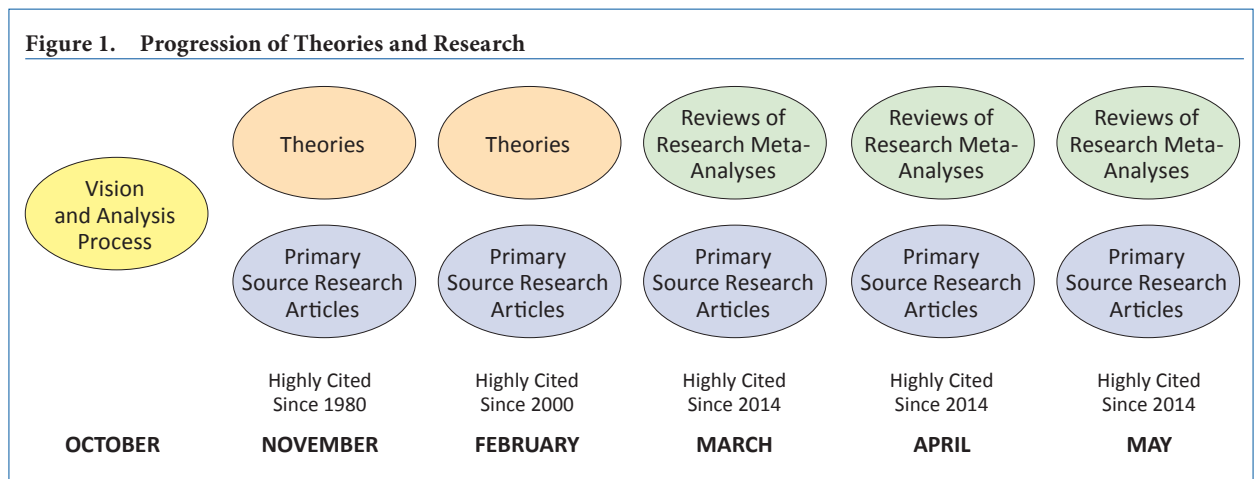


Table 1. Number of Citations Per Source: Research Articles

Date Accessed	Research Article	Number of Citations	Source	Reading League Reference
November	Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. <i>Remedial and Special Education</i> , 7(1), 6–10.	2,087	WS	X
	Scarborough, H. S. (2009). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In F. Fletcher-Campbell, J. Soler, & G. Reid (Eds.), <i>Approaching difficulties in literacy development: Assessment, pedagogy and programmes</i> (pp. 23–38). Sage Publications.	2,215	GS	X
February	Juel, C., Griffith, P. L., & Gough, P. B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. <i>Journal of Educational Psychology</i> , 78(4), 243–255.	890	WS	X
	Ouellette, G. P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. <i>Journal of Educational Psychology</i> , 98(3), 554–566.	1,405	GS	
March	Nation, K., & Snowling, M. J. (2004). Beyond phonological skills: Broader language skills contribute to the development of reading. <i>Journal of Research in Reading</i> , 27(4), 342–356.	406	WS	X
	Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. <i>Psychological Science in the Public Interest</i> , 2(2), 31–74.	520	WS	X
April	Kim, Y. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). <i>Scientific Studies of Reading</i> , 21(4), 310–333.	175	WS	
	Landerl, K., Freudenthaler, H., Heene, M., De Jong, P., Desrochers, A., Manolitsis, G., Parrila, R., & Georgiou, G. (2019). Phonological awareness and rapid automatized naming as longitudinal predictors of reading in five alphabetic orthographies with varying degrees of consistency. <i>Scientific Studies of Reading</i> , 23(3), 220–234.	164	WS	
May	Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. <i>Remedial and Special Education</i> , 39(5), 260–273.	109	WS	
	Connor, C. M., Morrison, F. J., Fishman, B., Crowe, E. C., Al Otaiba, S., & Schatschneider, C. (2013). A longitudinal cluster-randomized controlled study on the accumulating effects of individualized literacy instruction on students' reading from first through third grade. <i>Psychological Science</i> , 24(8), 1408–1419.	105	WS	X

NOTE: WS = Web of Science; GS = Google Scholar

Despite the different purposes of these meta-analyses, one might anticipate a shared core of high-quality research articles among them. However, the authors did not observe this commonality. An in-depth analysis of the frequency of individual articles across meta-analyses is beyond the scope of this article, but remains an area of future inquiry.

Table 1 on the previous page provides a list of the articles the workgroup read, along with their citation counts from the Web of Science. Web of Science seemed to have a more restrictive algorithm, resulting in the need to sometimes use Google Scholar as the source for the number of citations as those citation counts were higher.

Identifying Theories of the SOR Movement

As part of the workgroup's ongoing collaboration, the authors identified highly cited foundational theories at the heart of the SOR Movement. Theories—published in many forms including books, chapters, peer-reviewed articles—provide well-substantiated explanations of phenomena, whereas research studies, reported in peer-reviewed research articles address specific questions through systematic investigation. Although the list is not comprehensive, the identified theories are often cited in policy documents and research articles. Theories explored with the workgroup are highlighted in Table 2 with citations according to Google Scholar.

The Simple View of Reading (Gough & Tunmer, 1986) and Scarborough's Reading Rope (Scarborough, 2001) are influential theories often

referenced in science of reading nonpeer reviewed publications, shaping discussions on effective reading instruction. Some nonpeer-reviewed publications, often used by policy or curriculum advocates, selectively emphasize certain aspects of theory to support their instructional claims. One example of selectively applying the Simple View of Reading (Gough & Tunmer, 1986) is prioritizing phonemic awareness instruction over time spent reading real books in classrooms. The resulting curriculum implications may hinder rather than support reading development by removing books from classrooms to emphasize isolated phonemic awareness instruction in the absence of books.

To make well-informed decisions and engage in meaningful professional dialogue, it is crucial for teachers to engage directly with the original theories, rather than relying on oversimplified interpretations from presenters linked to companies with vested interests in curriculum or professional development adoptions. Furthermore, critical reading of research articles employing theories will support teachers' decision making and professional judgment as they interpret findings and design instruction that supports all students' unique paths to literacy.

Units of Language and Definitions of Reading

The workgroup continues to collaborate and aims to create innovative forms of publication to share in a broader context. The preliminary analysis revealed that most research articles in the SOR Movement focused on the linguistic units of sound, letter, and word and assessed

reading comprehension using standardized tests. Notably absent from the reviewed literature are research studies, published in peer-reviewed articles, that observe children engaging with real books, or authentic, continuous texts in a classroom setting. Instead, all the research, published in articles, examined the processing of isolated linguistic units and relied on multiple-choice questions to measure reading comprehension after reading.

This finding highlights a potential disconnect between how reading is operationalized in research and the actual process of reading as it occurs in real-world contexts. By focusing on decontextualized linguistic units or standardized test performance, the authors of the research articles may not fully capture the complex, multifaceted nature of reading as it unfolds when children actually read and problem solve continuous text.

This preliminary observation points to discrepancies in how "reading" is defined and represented in published research articles, which can have significant implications for the transferability of the outcomes to actual curriculum and instructional decision making. As the work continues, it is crucial to consider the limitations of research that relies primarily on isolated linguistic units or standardized tests and to advocate for more "ecologically valid" (Bronfenbrenner, 1977) approaches that better reflect the realities of reading in classroom settings. Ecologically valid refers to the degree to which research methods, conditions, and findings reflect or approximate the real-world situation being studied (Bronfenbrenner, 1977). To influence instructional

Table 2. Theories and Science of Reading

Theory	Author(s)	Key Concepts	GS Citations
Simple View of Reading	Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. <i>Remedial and Special Education, 7</i> (1), 6–10.	Decoding, language comprehension, reading comprehension	6,887
Scarborough's Reading Rope	Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. B. Neuman, & D. K. Dickinson (Eds.), <i>Handbook of early literacy research volume 1</i> (pp. 97–110). Guilford Press.	Word recognition, language comprehension, skilled reading	2,215
Chall's Stages of Reading Development	Chall, J. S. (1983). <i>Stages of reading development</i> . McGraw-Hill.	Developmental stages, decoding, meaning-making, systematic instruction	5,079
Ehri's Phase Theory	Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. <i>Scientific Studies of Reading, 9</i> (2), 167–188.	Phases, automaticity, grapheme-phoneme connection, phonics instruction	2,281
Psycholinguistic Grain Size Theory	Goswami, U., & Bryant, P. (2016). <i>Phonological skills and learning to read</i> . Routledge.	Phonological awareness, language, orthographic structure	3,825
Four Processors Theory	Adams, M. J. (1994). <i>Beginning to read: Thinking and learning about print</i> . MIT Press.	Phonological processor, orthographic processor, meaning processor, context processor, interconnectedness, interaction, phonological awareness, alphabetic knowledge	13,132

practices, published research articles need to include detailed observations of children reading in classroom settings as a central methodological tool.

Fostering Informed Dialogue: Beyond Right and Wrong in SOR Discussions

The aim of our critical examination of the SOR Movement research articles and published theories was to empower our workgroup to navigate the complexities of the SOR Movement. The reliance on citing

meta-analyses, readings the key theories related to the SOR Movement, and understanding how reading is defined and operationalized within published research articles were key insights that moved us beyond a right or wrong perspective.

Although the debate around the science of reading is often polarized, moving beyond simplistic judgments is essential. Educators need to be empowered to critically engage with claims made in published works by actively exploring and questioning how those claims relate to their own professional experiences. This more nuanced

approach not only enhances our collective understanding but also equips teachers to make informed, context-sensitive decisions that best support student learning. Such a perspective is particularly crucial when confronting directives and “truths” from non-educators, such as journalists and legislators, who may lack direct teaching experience.

By understanding the foundations, strengths, and limitations of the SOR Movement highly cited research and theory publications, the workgroup engaged in critical, evidence-based discussions while applying our unique perspectives.

Collectively the group resisted the right or wrong stances and dismissive tones often found on social media. The authors and the workgroup continue to embrace the challenge of constructively engaging with research and theory to extend our understandings, improve our teaching, and ultimately help more children become literate.

References

- Adams, M. J. (1994). *Beginning to read: Thinking and learning about print*. MIT Press.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513–531. <https://doi.org/10.1037/0003-066X.32.7.513>
- Chall, J. S. (1983). *Stages of reading development*. McGraw-Hill.
- Connor, C. M., Morrison, F. J., Fishman, B., Crowe, E. C., Al Otaiba, S., & Schatschneider, C. (2013). A longitudinal cluster-randomized controlled study on the accumulating effects of individualized literacy instruction on students' reading from first through third grade. *Psychological Science*, 24(8), 1408–1419.
- Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading*, 9(2), 167–188.
- Goswami, U., & Bryant, P. (2016). *Phonological skills and learning to read*. Routledge.
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6–10.
- Juel, C., Griffith, P. L., & Gough, P. B. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. *Journal of Educational Psychology*, 78(4), 243–255.
- Kim, Y. (2017). Why the simple view of reading is not simplistic: Unpacking component skills of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, 21(4), 310–333.
- Landerl, K., Freudenthaler, H., Heene, M., De Jong, P., Desrochers, A., Manolitsis, G., Parrila, R., & Georgiou, G. (2019). Phonological awareness and rapid automatized naming as longitudinal predictors of reading in five alphabetic orthographies with varying degrees of consistency. *Scientific Studies of Reading*, 23(3), 220–234.
- Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. *Remedial and Special Education*, 39(5), 260–273.
- Nation, K., & Snowling, M. J. (2004). Beyond phonological skills: Broader language skills contribute to the development of reading. *Journal of Research in Reading*, 27(4), 342–356.
- Ouellette, G. P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. *Journal of Educational Psychology*, 98(3), 554–566.
- Rayner, K., Fooman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest*, 2(2), 31–74.
- Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. B. Neuman, & D. K. Dickinson (Eds.), *Handbook of early literacy research volume 1* (pp. 97–110). Guilford Press.
- Scarborough, H. S. (2009). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In F. Fletcher-Campbell, J. Soler, & G. Reid (Eds.), *Approaching difficulties in literacy development: Assessment, pedagogy and programmes* (pp. 23–38). Sage Publications.
- The Reading League. (2024). <https://www.thereadingleague.org/>

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