



**KENTUCKY READING
RESEARCH CENTER**



Oral Fluency Interventions for K-3 Students

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The Kentucky Reading Research Center is a partnership between the University of Louisville College of Education and Human Development and the Kentucky Department of Education. Established through Kentucky Revised Statute 164.0207, the center supports educators in implementing evidence-based reading programs and promotes literacy development across the Commonwealth.

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Abstract

Oral reading fluency is key to proficient reading. Students who can read fluently are able to expend more of their energy on comprehending what they are reading. The purpose of this systematic review was to evaluate the research from 2014 to 2025 on oral reading fluency with kindergarten through third grade students. Twenty-eight studies were identified that included 11 different curricula and nine researcher-developed interventions. Results indicate that dosage and the interventionist do not have a bearing on the effect sizes, but grouping, instructional techniques, and fluency components do.

Introduction

According to the National Center for Education Statistics (NCES), a 2024 report from the National Assessment of Educational Progress (NAEP) indicated that most U.S. fourth-grade students are not proficient in reading, with 69% of those assessed scoring below proficient, which is a 2-percentage point decline from the 2022 assessment. This is not a new concern; it has been persistent for multiple decades in the U.S. In 2000, the National Reading Panel (NRP) was established to seek a solution. They identified five components of reading that must be taught for children to become proficient readers. Reading fluency was one of these foundational reading skills (NRP, 2000).

Oral reading fluency is defined as the ability to “read text with speed, accuracy, and proper expression” (NRP, 2000, p. 3-1). It is a necessary component to literacy development (Foorman et al, 2016). Maki and Hammerschmidt-Snidarich (2022) reference the theory of automaticity to support the importance of reading fluency; it states that fluent readers who are able to decode words with ease can dedicate more attention to the text’s meaning. Fluent readers can comprehend what they are reading, navigate complex texts, acquire new vocabulary, and engage with content across disciplines. Dysfluent readers expend more energy identifying the letters, letter sounds, and words, and therefore have less cognitive effort remaining for comprehension (Hudson et al., 2020). As LaBerge and Samuels (1974) described, students who have poor decoding skills and are therefore dysfluent readers experience an interference with their flow of understanding and therefore lack comprehension of what they read. Connections have been made in the research between reading fluency and comprehension (see Hudson et al., 2020). In summary, it is a critical component of proficient reading and serves as the bridge between word decoding and reading comprehension (Pikulski & Chard, 2005; Stevens et al., 2017).

Recent Research

In the past five years, researchers have conducted syntheses (e.g., Hudson et al., 2020) and meta-analyses (e.g., Maki & Hammerschmidt-Snidarich, 2022; Zimmerman et al., 2021) on reading fluency for early grades. Specific topics include non-repetitive reading fluency interventions (see Zimmerman et al., 2021), reading fluency dosage (see Maki & Hammerschmidt-Snidarich, 2022), and the impact of reading fluency interventions for students in grades one-five with reading difficulties on oral reading fluency and comprehension (see Hudson et al., 2020). Zimmerman et al. (2021) identified several components of non-repetitive reading fluency interventions, which resulted in a mean difference of ($d = 0.176$; $SD < .2$). These components included: (a) wide reading interventions ($n = 7$), (b) independent reading interventions ($n = 1$), (c) student groupings/ peer-mediated interventions ($n = 2$), and (d) reading material (i.e., genre, difficulty, length). Maki and Hammerschmidt-Sindarich (2022) found a moderate effect on oral reading fluency for the included studies. Interestingly, their meta-analysis indicated that student characteristics had little impact on reading growth while intervention duration, sample size, and single-case design rigor had a statistically significant effect. Hudson et al. (2020) found 12 studies that resulted in small to large effects on oral reading fluency for students with reading difficulties in grades one through five while eight had similar effects on reading comprehension. They concluded that targeted oral reading fluency interventions can have a positive impact on reading comprehension.

Each of these reviews highlights the importance of fluency instruction, specifically the components of the strategies and interventions used for fluency instruction that can be replicated by teachers, interventionists, parents, and other personnel in classroom and clinic settings to increase the oral reading fluency of students in the early grades.

Oral Reading Fluency Strategies

There are numerous strategies reported in the literature that can be used to support oral reading fluency development. At the most basic level, these strategies all involve reading sentences, connected text, and decodable texts either aloud, silently, or in a whisper voice. The strategies are generally categorized as either multiple readings of text or word drills.

Multiple readings of text include the most common strategy, repeated reading, as well as similar strategies involving multiple participants—referred to as assisted reading (e.g., dyad reading, partner/shared reading, choral reading)—and guided reading strategies (Rasinski, 2010). Repeated reading is when a student reads a passage multiple times to achieve fluency (LaBerge & Samuels, 1974). It is generally accepted that repeated reading increases word recognition skills resulting in automaticity (Therrien & Kubina, 2007). Similar strategies include dyad reading, related to neurological impress, where two students (dyad) or a student and interventionist (neurological impress) simultaneously read the same text aloud (Heckelman, 1969). Similarly, duet reading, also referred to as supported cloze procedure, is an intervention where the student and interventionist alternate reading each word aloud (Rasinski, 2010). Other strategies that require two readers are shared reading and

partner reading. These strategies must have a proficient reader (i.e., an interventionist or teacher for shared reading; a proficient peer for partner reading) reading aloud while the student follows along (Rasinski, 2010). Partner reading is further distinguished as a peer-assisted learning strategy with the proficient reader acting as the model (see Rasinski et al., 2017). In listening passage preview, a student follows along as a proficient reader reads a passage before they attempt to read the passage independently (Daly & Martins, 1994). Similarly, in echo reading, the student listens to their partner's reading and then repeats the phrase or passage with the same prosody (Vadasy, et al., 2005). Sustained reading (i.e., continuous reading, see O'Connor et al., 2007; wide-reading, see Rasinski et al., 2017) is characterized by the student reading non-stop for a given period and engaging in voluntary reading (Mathes & Fuchs, 1993). This is distinguished from choral reading where a group of students reads aloud simultaneously (Rasinski, 2010). Guided reading strategies (e.g., questioning, discussion) and interactive read-alouds (see Strong & Anderson, 2024) are often embedded into shared and partner reading to target comprehension.

Word drill strategies to increase reading fluency include word list training of unknown words or site words. Word lists are presented in a systematic manner before students are asked to read passages with the words embedded (see Levy et al., 1997). Phrase drill provides practice for misread words. Students are asked to read previously misread words and read phrases which contain these words multiple times (e.g., Begeny et al., 2006).

Factors Affecting Fluency

There are multiple student-level factors that influence reading fluency. Students with disabilities and dyslexia may struggle with fluent word reading (see Daane et al., 2006). The NCES (2024b) reported that students with disabilities make up 15% of the school aged students in 2022-2023 school year. Approximately one third of these students are served under the category specific learning disabilities, of which dyslexia is included (NCES, 2024b). Students with specific learning disabilities and dyslexia exhibit patterns of dysfluent reading including slower reading rates and inaccuracies in reading. As evidenced on the NAEP, these students continue to fall behind (NCES, 2024a). Pre-reading skill development has a significant impact on literacy (Gunn et al., 2011), and those who struggle to master these foundational skills in the early grades often experience continued difficulties with reading fluency.

According to Roberts, et al. (2022), English learners represent a larger number of students with reading difficulties than non-English learners. While there are greater amounts of research supporting fluency interventions for students who are native English speakers, much less has been conducted for students who are English learners—perhaps due to complicating demographic factors such as various ethnicities, time in the United States, risk for reading disabilities, or the need for these students to develop oral language skills and listening comprehension before they reach the upper grades (Roberts, et al., 2022). Further, students who are English learners are overrepresented in other risk categories for reading difficulties, such as lower socio-economic status (Roberts, et al., 2022).

Barriers

Since the reauthorization of the Individuals with Disabilities Education Act (IDEA; 2004), response to intervention, and subsequently multi-tiered systems of support as part of Every Student Succeeds Act (ESSA; 2015), have provided the framework for tiered instruction in reading. These tiers increase support based on student need. It is generally accepted that Tier 1 is synonymous with general education evidence-based core instruction; Tier 2 involves small group explicit instruction; and Tier 3 is the most intensive with one-on-one explicit instruction (Novak & Rodriguez, 2023). Progress monitoring at these tiers used to document Response to Intervention (RTI) frequently includes oral reading fluency (Baker et al., 2015). Even so, limited academic time is spent on developing fluency. As Maki and Hammerschmidt-Snidarich (2022) reported, dosage, the amount of time involved in a teaching trial, may be variable and imprecise because of the way the reading fluency intervention is conceptualized. Further, concerns regarding the lack of effectiveness of reading interventions in the early grades led to Gersten et. al. (2020) to postulate that, among other possible reasons, interventions are not implemented to fidelity in the classrooms. This could be due to teacher preparation training. Historically, syllabi and texts from literacy courses did not include science of reading information (see Walsh et al., 2006). Another barrier is the structure of the American school year. Summer reading loss is well documented and is exacerbated by socio-economic status (Nicholson & Tiru, 2019), minority and disability status (Kim & Quinn, 2013). Researchers have concluded that summers result in loss of reading skills (Christodoulou et al., 2017). Kim and Quinn (2013) found that continued classroom-based instruction throughout the summer can lead to large effects on reading fluency.

Present Study

The purpose of this systematic review was to identify peer-reviewed research that was published from 2014 to 2025 on interventions or practices designed to help children in kindergarten through third grade learn to develop foundational reading skills related to fluency.

Research Questions

1. What instructional and intervention characteristics (e.g., use of Elkonin boxes, multicomponent instruction, intervention dosage, group size, implementer, modality) and student characteristics (e.g., age, English Learner, disability status) have been tested as part of fluency interventions?
2. What does the research say about the effectiveness of fluency instruction in improving foundational reading outcomes for readers in grades K-3?
3. What features of instructional interventions (e.g., type of instruction, duration, grade level) are associated with improved outcomes? Do these features differ according to student characteristics?

Method

Study Eligibility Criteria

Study inclusion criteria were grade range/student population, language/location, research design, intervention, and outcome measures. Specifically, the articles had to meet the following inclusion criteria:

- articles published from 2014 to 2025;
- addressed the specific student population grade range between kindergarten and third grade (i.e., ages 5 years 0 months through 9 years 11 months), or in any subset of these grades;
- written in English and took place in school-based locations, schools, classrooms, public schools, private schools, early childhood centers, homes, or clinics in the United States (U.S.) and its territories, Canada, Australia, Ireland, New Zealand, United Kingdom;
- used an experimental design (e.g., experiment, group design, randomized controlled trial, quasi-experimental, regression discontinuity, single case);
- interventions focused on reading fluency instruction; and
- contained at least one outcome measure related to intervention, instruction, strategy, curriculum, program, or treatment on reading fluency achievement.

In this review, the interventions that used curricula or practices were included. Curricula were defined as a set of activities, materials, and/or guidance for working with students in classrooms. A curriculum is defined as having a clearly identified name, including a write-up/description, and is able to be replicated by others based on written guidance, staff training, or technical assistance. A curriculum may be either intended as the primary instructional tool designed to meet children’s learning needs in multiple areas or designed to supplement the classroom material with differentiated instruction or meet children’s learning needs in specific areas. Both types of curricula met the inclusion criteria for this review. A practice was defined as a named approach to promoting children’s fluency development used by implementers when interacting with children and materials in the intervention setting. Named practices that are clearly described, commonly understood, and used in published works by more than one investigator or team of investigators met the inclusion criteria for this review. A named practice may also refer to an array of specific procedures. Further, both “branded” and “non-branded” interventions met the criteria for inclusion in this review. Branded interventions are commercial or published practices that may possess any of the following characteristics: an external developer who provides technical assistance —such as instructions or guidance on implementation— or who sells or distributes the intervention; and trademark or copyright.

Study Exclusion Criteria

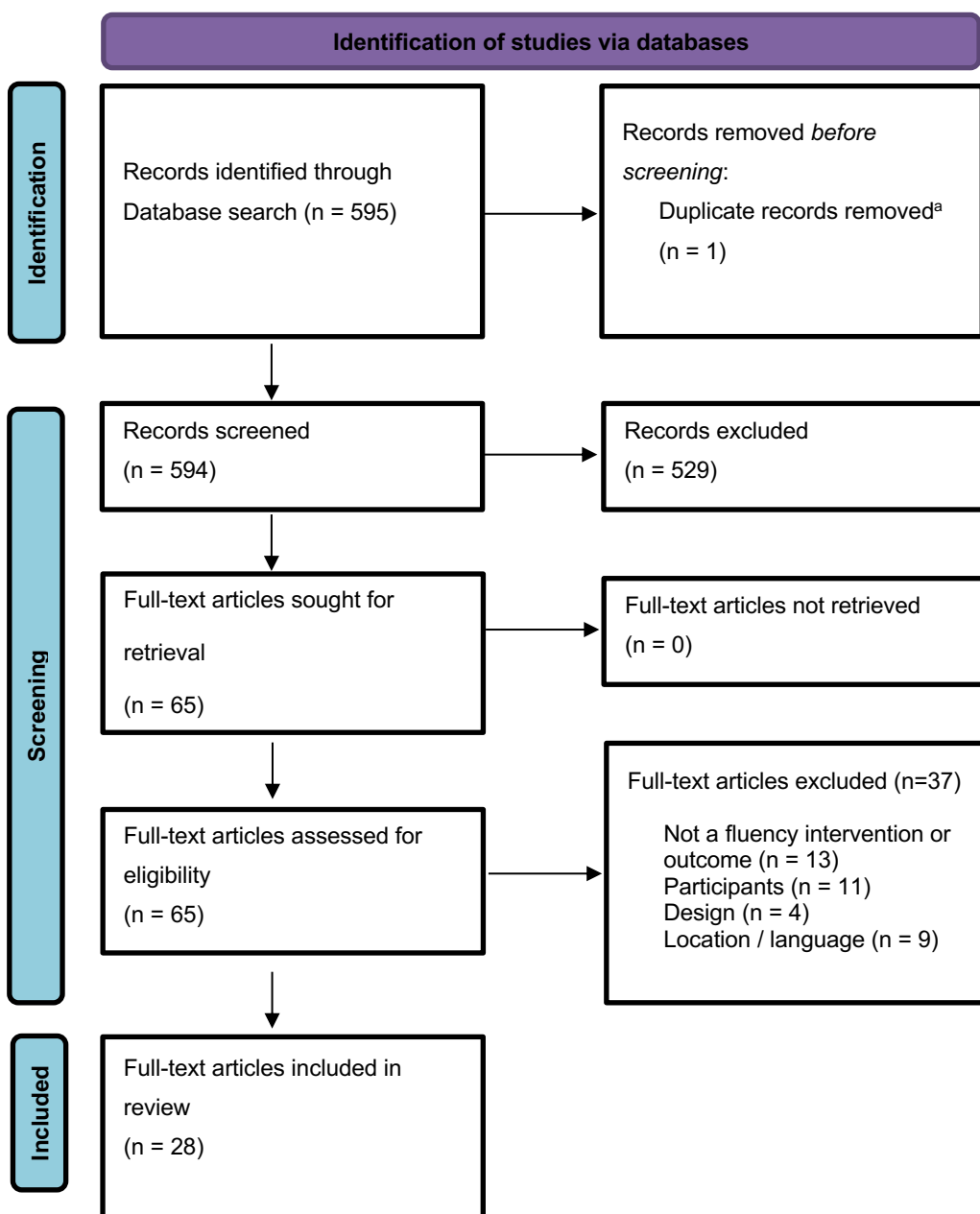
The review excludes (a) conference papers and dissertations, (b) meta-analyses and systematic reviews, (c) practices related to professional development, teacher preparation, and textbook design issues, (d) other interventions not appropriate for a teacher's practice guide on reading, such as comprehensive school reform, (e) studies that contain students in other grades unless the study reports disaggregated results for students in eligible grades, or the students in eligible grades represented the majority of the aggregated mixed-age sample. If the study did not make explicit the number of students in each grade, it was included if 50% or more of the grades included in the sample fell within the eligible grade range. If the study provided only the mean age of the sample without any grade information, the mean age must be larger than 5 years 0 months but smaller than 9.5 years (i.e., 9 years 6 months).

Search Strategy

The search methods utilized for this review were determined by the Kentucky Reading Research Center. The author completed the search as described below. All search procedures were completed from December 2024 to March 2025. An electronic database search of Academic Search Complete, APA Psych Info, ERIC, and Teacher Reference Center was conducted using the Boolean phrases: *(Control group* OR Comparison group* OR Matched group* OR Treatment* OR Random* OR Assign* OR Baseline OR Experiment* OR Evaluat* OR Impact* OR Effectiveness OR Causal* OR Post*test* OR Pre*test* OR Randomized controlled trial OR RCT OR Quasi*experiment* OR QED OR Regression discontinuity OR Changing criterion OR Intrasubject replication OR Multiple baseline OR Multi*element OR Single case OR Single subject OR ABAB OR Alternating treatment OR Simultaneous treatment OR Reversal design OR Withdrawal design) AND ("Reading fluency" OR Word reading fluen* OR Oral reading fluen* OR Prosody OR Automaticity OR Rate OR Accur* OR "Reading with expression" OR "orthograph* map*" OR "Vocab* fluen*") AND (Interven* OR Curricul* OR Program* OR Strateg* OR Instruct* OR Teach* OR Train* OR Approach* OR Monitor* OR Treat* OR Self-regulat* OR transfer) AND (K-3* OR Kindergart* OR Elementary OR "First*grade*" OR "Second*grade*" OR "Third*grade*" OR "Age*5" OR "Age*6" OR "Age*7" OR "Age*8" OR "Age*9" OR "5 year* old" OR "6 year* old" OR "7 year* old" OR "8 year* old" OR "9 year* old") AND (Achieve* OR Improve* OR "Instructional effectiveness" OR Outcome* OR Effect* OR Develop* OR Skill* OR Assess* OR Test* OR Progress OR Aquis*).*

A total of 595 articles were returned which included two duplicates. The results were imported into Rayyan ai (<http://rayyan.qcri.org>; see Ouzzani et al., 2016) which was used for duplicate screening, managing title and abstract screening, and providing an accurate count of the reports sought for retrieval. Using Rayyan.ai (Ouzzani et al., 2016), the author screened the titles and abstracts of each article for potential inclusion. From this, a total of 65 full-text articles were sought and retrieved for a full screening with thirty-seven being excluded due to not meeting the review criteria and twenty-eight articles included. Each included article reported on their own data. See Figure 1 for a PRISMA flow diagram.

Figure 1
PRISMA flow diagram for fluency systematic review



Note. PRISMA flow diagram adapted from Page M.J. (n.d.) BMJ 2021;372: n71. doi:10.1136/bmj.n71. <https://www.prisma-statement.org/prisma-2020-flow-diagram> The PRISMA 2020 flow diagram templates are distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>
^aRayyan used for duplicate and to manage abstract and title screening

Coding Procedure

The author coded a series of variables for each study identified for inclusion. This work was completed using a code book Excel spreadsheet created by the Kentucky Reading Research Center. This spreadsheet was used to organize the studies and identify variables relevant to this review. The first set of codes were directly assigned to the inclusion criteria for the review which has been described above. As previously stated, to be included, studies had to meet the following criteria: (a) published between 2014 and 2025, (b) addressed the specific student population of interest, (c) written in English and implemented in the specified locations as described above, (d) used an experimental design, (e) was an intervention focused on reading fluency instruction, and (f) contained an outcome measure related to reading fluency achievement. Those studies that met each of these criteria were further coded for the following variables of interest: (a) implementer, (b) participant population, (c) intervention location, (d) independent variable, and (e) dependent variable. These codes are described in further detail in the following sections.

- **Implementer:** Information regarding the description of the individual who implemented the intervention was gathered. Codes for implementers included researcher, special education teacher, general education teacher, technology, paraeducator/ aide, and hired interventionist. The author included the description of the implementer in this section.
- **Participant Population:** Participant information included sample size and specific demographics related to grade level (i.e., kindergarten, first grade, second grade, third grade) and the number of students who were multilingual, had disabilities, or were defined as at-risk. The author included the participant sample description in the spreadsheet.
- **Intervention Location:** Information of importance regarding the intervention location included the physical location in which the intervention took place. Specifically, the type of classroom was of interest: general, inclusion, co-taught, small group intervention, self-contained, resource, or other. If other was selected, the author included a description.
- **Independent Variable(s):** The author coded the independent variable(s) with the name of the intervention and a description. If a specific curriculum was used in the study or if the intervention was developed by the researcher, it was indicated here. Additional codes were the unit of delivery of the intervention (e.g., small group, whole group), the duration and intensity (i.e., length and frequency of the sessions), and the fidelity measures and result.
- **Dependent Variable(s):** Each dependent variable (i.e., outcome) was identified and coded for the name, effect, and whether it was assessed via a standardized instrument. A description of the dependent variable was included.

Analysis

After the 28 identified full-text articles were coded, the data were categorized into three Excel spreadsheets as described below and synthesized to answer the research questions. Spreadsheet 1 included the studies' salient demographics (e.g., study design, participants, dosage, curricula name). Spreadsheet 2 was used to code the five pillars of reading instruction (e.g., phonemic awareness, phonics, fluency, comprehension, vocabulary) as well as writing and instructional techniques. Each study was reviewed for these categories and specific components (i.e., strategies and instructional techniques).

Data from Spreadsheet 1 and Spreadsheet 2 were used to answer research question one: *What instructional and intervention characteristics (e.g., use of Elkonin boxes, multicomponent instruction, intervention dosage, group size, implementer, modality) and student characteristics (e.g., age, English Learner, disability status) have been tested as part of fluency interventions?* The author reviewed the data in Spreadsheet 1 using Excel spreadsheet functions to identify the characteristics of student participants and the interventions used and categorize their commonalities. The author categorized the data in Spreadsheet 2 by indicating "yes" in columns denoted with headers that indicated each component. New components were added as each study was reviewed to ensure a comprehensive list of all components. After all studies were reviewed, similar codes were collapsed, and a frequency count was conducted for each of the components in the five pillars plus writing and instructional techniques. Bar graphs were generated from this data to represent the number of times a given strategy was reported in the included studies.

To answer the second research question: *What does the research say about the effectiveness of fluency instruction in improving foundational reading outcomes for readers in grades K-3?* the author recorded demographic information, descriptors for comparison and control, intervention tier, and outcome data for each study in Spreadsheet 3. If not specifically mentioned in the study, intervention tiers were determined as follows: Tier 1 was whole group instruction; Tier 2 was small group instruction; Tier 3 was one-on-one instruction. The author evaluated this data, including any effect sizes reported, to determine effectiveness of fluency instruction across the student population of interest.

The author answered research question three: *What features of instructional interventions (e.g., type of instruction, duration, grade level) are associated with improved outcomes? Do these features differ according to student characteristics?* by analyzing the intervention effectiveness for students with disabilities, English Learners, students identified as at-risk in general education, and interventions conducted in Tiers 1, 2, and 3 for each of the included studies on Spreadsheet 3. Excel spreadsheet features were used to sort the data. Descriptive statistics (i.e., the number of times a given instructional intervention appeared) were used to evaluate the data and compare outcomes.

Results

Characteristics of Reviewed Studies

Research question one asked: *What instructional and intervention characteristics (e.g., use of Elkonin boxes, multicomponent instruction, intervention dosage, group size, implementer, modality) and student characteristics (e.g., age, English Learner, disability status) have been tested as part of fluency interventions?* The results from the 28 included studies are reported in Table 1 and Figures 1-8. Specifically, Table 1 provides demographic information regarding the student participants (i.e., grade, English Learner status, disability status, at risk status) and implementer, as well as study design and dosage, and a description of the curriculum.

As reported in Table 1, six research designs were used across the 28 studies: (a) single case ($n = 7$), (b) quasi-experimental ($n = 9$), (c) pre-test / post-test ($n = 5$), (d) randomized control trial ($n = 4$), (e) regression discontinuity ($n = 1$), (f) multi-level modality ($n = 1$), and (g) between group experimental ($n = 1$). Out of the 28 studies, ten reported on students who were English learners, seven included students with disabilities, and twenty included students at risk for reading difficulties. Implementers included hired interventionists (e.g., trained tutors, trained pre-service teachers, graduate students; $n = 17$), teachers ($n = 11$), researchers ($n = 4$), and parents ($n = 1$). Regarding how students were grouped for intervention, if the study did not explicitly state the tier, the following definitions were used:

- Tier 1 was defined as whole group;
- Tier 2 was defined as small group; and
- Tier 3 was individual instruction.

Studies that included computer interventions were coded as Tier 3. The studies reported intervention dosage in Tier 1 ($n = 2$), Tier 2 ($n = 15$), and Tier 3 ($n = 13$). Some studies grouped students in more than one tier ($n = 4$). Table 1 reports demographic information and dosage at each tier.

Various commercial curricula were used in the interventions (e.g., Sound Partners, Path to Reading Excellence in Schools [PRESS], Seeing Stars: Lindamood-Bell, University of Florida Literacy Institute Tutoring for Students with Dyslexia (UFLI-Intensive), Quick Reads, Reading Corps, SRA Corrective Reading, Differentiated Reading Instruction [DRI], Interactive Read Aloud [IRA], Phonological Awareness and Vocabulary Intensive Intervention [PAVII], Read to Impress). Other studies ($n = 9$) used researcher-created interventions or a combination of commercial curricula and researcher-created interventions.

Table 1
Overview of Studies and Demographics

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Barber et al. (2018)	Single case, concurrent multiple probe across participants	K = 0 F = 3 S = 0 T = 0 ML = 3 SP = 0 AR = 3	HI	Tier 3 20-30 min/ session 1-4 sessions/ week 7-11 weeks	Yes	Reading Relevant and Culturally Engaging Stories (RACES)
Beach et al. (2018)	Pre-test/ post test	K = 0 F = 0 S = 14 T = 18 ML = 14 SP = 7 AR = 32	TI	Tier 2 1 hour/day 15 days	No	Sound Partners
Beach & Tragas (2021)	Pre-test/ post test; Quasi-Experimental	K = 0 F = 0 S = 20 T = 19 ML = 20 SP = 4 AR = 39	TI, HI	Tier 2 (Sound Partners) Tier 3 (Active Reading) 2 hours/ day for 23 days	No (Sound Partners and Active Reading) Yes (writing component)	Sound Partners and Active Reading

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Bennett et al. (2017)	Single case, concurrent multiple probe across participants	K = not reported* F = not reported* S = not reported* T = not reported* ML = not reported SP = not reported AR = 7 *reported age = 7 years old	RI	Tier 3 20-30 min/ session 3-5 sessions/ week 7-13 weeks	Yes	Packaged intervention with culturally relevant material, repeated reading, computer assisted intervention
Burns et al. (2020)	Quasi-experimental	K = 0 F = 0 S = 252 T = 247 ML = not reported SP = not reported AR = 114	HI	Tier 2 20 min/ 4 times per week 18 weeks	No	Path to Reading Excellence in School Sites (PRESS)
Christodoulou et al. (2017)	Randomized controlled trial	K = not reported* F = not reported* S = not reported* T = not reported* ML = 0 SP = not reported AR = not reported (N = 47) *reported age = 6-9 years old	TI	Tier 2 100-120 hours	No	Seeing Stars: Lindamood-Bell

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Contesse et al. (2021)	Regression discontinuity	K = 0 F = 18 S = 21 T = 14 Fo = 5 Fi = 4 ML = not reported SP = not disaggregated AR = 62	HI	Tier 2 SAIL- 4 hours/ day 5 days/ week 3 weeks Tier 3 UFLI- Intensive 1 hour/ day 5 days/ week 3 weeks	No	Summer Adventures in Literacy (SAIL) University of Florida Literacy Institute Tutoring for Students with Dyslexia (UFLI-Intensive)
Didion et al. (2020)	Two single case, multiple baseline	K = 0 F = 0 S = 0 T = 12 ML = 4 SP = 1 AR = 12	RI, HI	Tier 3 Motivation: 8.91 min/ 9.17 sessions 11.69 min/ 7.5 sessions Data Mountain: 5.89 min/ 10.17 sessions	Yes	Data Mountain
Downs et al. (2020)	Quasi-experimental	K = 0 F = 0 S = 0 T = 219 ML = not reported SP = not reported AR = not reported	TI	Tier 2 15 min/ day 90 days	No	Peer Dyad reading

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Fenty et al. (2015)	Quasi-experimental	K = 0 F = 0 S = 0 T = 50 ML = not reported SP = not disaggregated AR = 50	HI, TI	Tier 2, Tier 3 20 min/ session 3 days/ week 10 weeks	No	Quick Reads program
Fien et al. (2015)	Cluster randomized control trial	K = 0 F = 267 S = 0 T = 0 ML = 32 SP = 14 AR = 267	HI, TI	Tier 2 30 min/ day 26 weeks	Yes	Multi-tiered Enhanced Core Reading Instruction (ECRI)
Hall et al. (2024)	Multi-level model	K = 0 F = 0 S = 6277 T = 5566 ML = 1184 SP = not reported AR = 11,843	HI	Tier 3 20 min/ day 5 days/ week	No	Reading Corps

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Hammer-schmidt-Snidarich et al. (2018)	Between group experimental design	K = 0 F = 0 S = 22 T = 18 ML = not reported SP = not reported AR = 40	HI	Tier 3 RR: 31.84/ session 15 sessions/ 5 weeks CR: 30.79 min/ session 15 sessions/ 5 weeks	No	Repeated Reading (RR) Continuous Reading (CR)
January et al. (2017)	Single case, alternating treatments	K = 0 F = 1 S = 3 T = 0 ML = not reported SP = 0 AR = not reported	HI	Tier 3 6-7 min/ session 4 days/ week 4-5 weeks	No	Strategic Incremental Rehearsal (SIR) Incremental Rehearsal (IR)
Jefferson et al. (2016)	Quasi-experimental	K = 0 F = 0 S = 0 T = 83 ML = not reported SP = not reported AR = 0	TI	Tier 1 20 min/ session 5 days/ week 5 months	No	SRA Corrective Reading Decoding Strategies

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Lange (2019)	Pre-test/post test	K = 0 F = 0 S = 0 T = 95 ML = not reported SP = 0 AR = 70	TI	Tier 3 30 min/ 12 weeks	No	Fluency Tutor
McBreen & Savage (2022)	Quasi-experimental	K = 0 F = 0 S = 0 T = 25 ML = not reported SP = not reported AR = 25	HI	Tier 2 45 min/ 2-3 times week for 8 weeks	Yes	Cognitive plus Motivational
McDaniel et al. (2017)	Pre-test/post test	K = not reported* F = not reported* S = not reported* T = not reported* ML = 0 SP = not reported AR = not reported (N = 33) *reported age = 6-7 years old	HI	Tier 2 1 hour/ day 4 days/ week 9 weeks	No	Daily scripted guided reading with Mondo Guided Reading Levels A-G materials

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Rasinski et al. (2017)	Pre-test/post test	K = 0 F = 0 S = 0 T = 37 ML = not reported SP = not reported AR = 37	TI	Tier 2 75 hours 25 sessions/ 7 weeks	Yes	Fluency Development Lesson
Schneider et al. (2016)	Controlled quasi-experimental	K = 0 F = 0 S = 170 T = 0 ML = 64 SP = 21 AR = not reported	TI	Tier 3 30 min/ day 4 days/ week Mid Sept- mid April	No	MindPlay Virtual Reading Coach
Smith et al. (2016)	Cluster randomized controlled trial	K = 0 F = 811 S = 0 T = 0 ML = 159 SP = 60 AR = not reported	TI	Tier 1 90 min/ day Tier 2 90 min + 30 min/ day 36 weeks	No	Enhanced Core Reading Instruction

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Strong & Anderson (2024)	Quasi-experimental	K = 30 F = 30 S = 29 T = 30 Fo = 30 Fi = 30 ML = 6 SP = 18 AR = 179	HI	Tier 2 45 min/ 18 days included: 15 min DRI and 30 min IRA	No	Differentiated Reading Instruction (DRI); Interactive Read Aloud (IRA) adapted from Bookworms K-5 Reading and Writing
Toste et al. (2017)	Randomized controlled trial	K = 0 F = 0 S = 0 T = 39 Fo = 20 ML = not reported SP = not reported AR = 59	HI	Tier 2 40 min/ session 3 sessions/ week 8 weeks	not reported (MWR) yes (MB)	Condition 1: Multisyllabic word reading (MWR) QuickReads passages Condition 2: Multisyllabic word reading + motivational belief (MB)
Vanderwood et al. (2014)	Quasi-experimental	K = 0 F = 105 S = 0 T = 0 ML = 59 SP = not reported AR = 35	HI	Tier 2 5 days/ week 11 weeks	No	Phonological Awareness and Vocabulary Intensive Intervention (PAVII)

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Wu et al. (2018)	Single case, alternating treatments design combined with a multiple baseline	K = 0 F = 0 S = 0 T = 3 ML = not reported SP = 0 AR = 3	RI	Tier 3 20 min/ session 14-23 sessions	Yes	Multi-component listening passage preview, repeated reading, phrase drill, video self-modeling
Young & Daly (2016)	Single case, alternating treatments design	K = 0 F = 0 S = 0 T = 2 ML = not reported SP = 0 AR = not reported	Not reported	Tier 3 15 min/ session 4 sessions/ week	No	Repeated reading
Young et al. (2018)	Comparative pre-post	K = 0 F = not reported S = not reported T = not reported ML = not reported SP = not reported AR = 57	HI	Tier 3 420 min intervention	No	Read to Impress and Neurological Impress Method

Article	Study sign	Participant (n)	Implementer	Tier ^a and Dosage	Researcher Created Intervention?	Curriculum Name or Brief Description
Zhou et al. (2019)	Single case, multiple baseline	K = 0 F = 3 S = 1 T = 0 ML = not reported SP = not reported AR = 4	RI, HI (parent)	Tier 3 3 sessions/ week for several weeks	No	Parent implemented reading fluency intervention

Note. K = kindergarten; F = first grade; S = second grade; T = third grade; Fo = fourth grade; Fi = fifth grade; ML = multilingual/English Learner; SP = special education; AR = at risk; RI = researcher implemented; Tech = technology implemented; TI = teacher implemented; Para = paraeducator implemented; HI = hired interventionist implemented

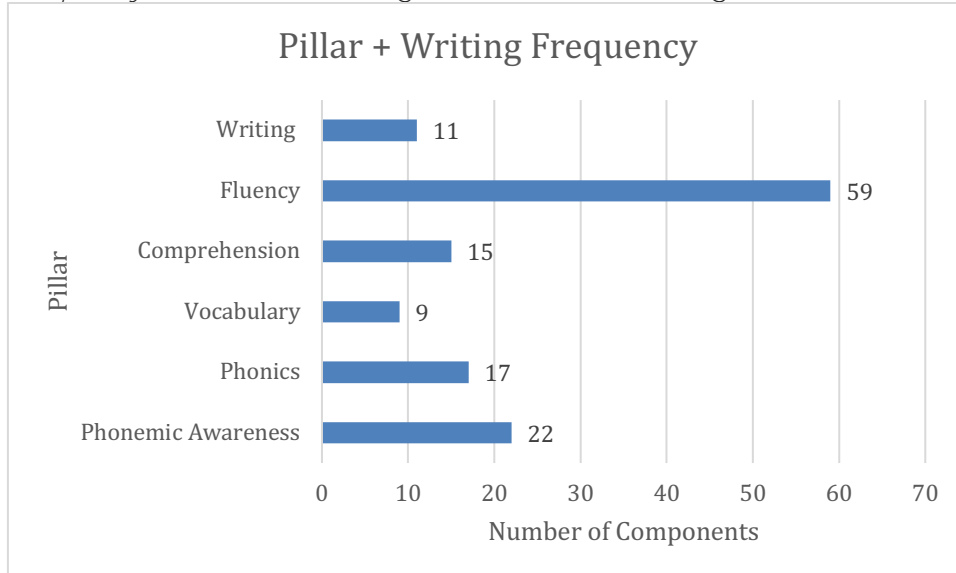
^a Intervention Tier is defined as: 1 = whole group; 2 = small group; 3 = one-on-one

Independent Variables: Components of Interventions Examined in Synthesis

Figures 2-9 break down the components of the interventions as described in the 28 included studies. Seventeen studies were multi-component and included strategies across more than one pillar. Regarding each pillar, 12 studies included phonemic awareness components, 11 included phonics, nine had vocabulary, 12 included comprehension components, and 25 had specific fluency components. Eleven studies reported writing components. Figure 1 reports an overview of the number of times individual components from the five pillars of reading instruction plus writing are represented in the studies. As this systematic review focused on fluency, it is logical that fluency strategies were the most identified intervention components across the studies ($n = 59$).

Figure 2

Frequency of Pillars of Reading Instruction Plus Writing in Included Studies



Figures 3-8 provide data regarding the specific components in the studies as categorized by each pillar plus writing. Specific to the focus on fluency for this systematic review, there were 14 components described; repeated reading was the most common (see Figure 3).

Figure 3
Fluency Components in Included Studies

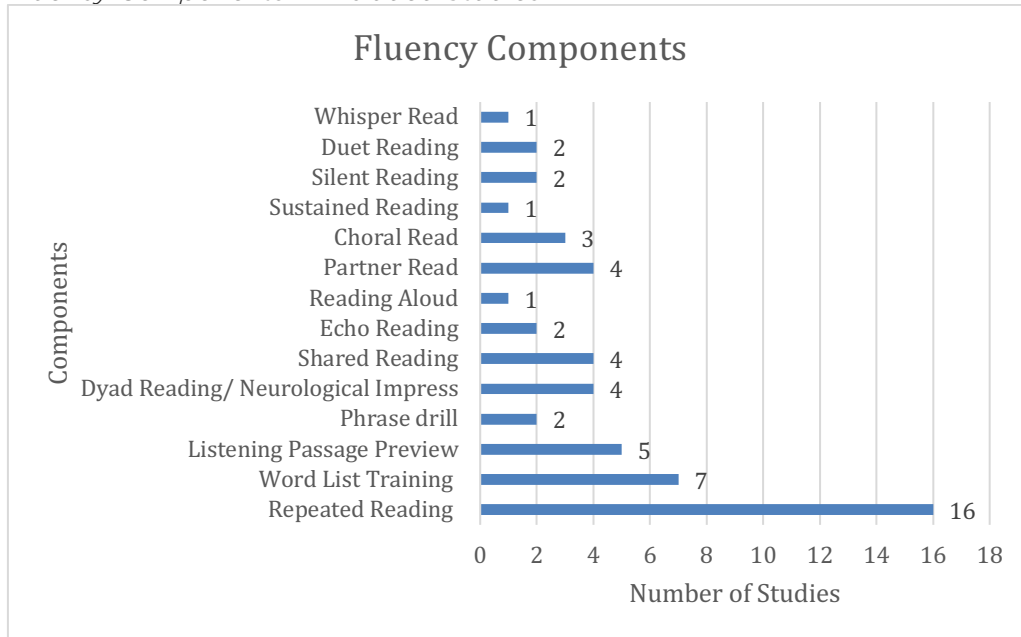


Figure 4 reports data on three phonemic awareness components included in the studies (i.e., rhyming, blending phonemes, segmenting phonemes).

Figure 4
Phonemic Awareness Components in Included Studies

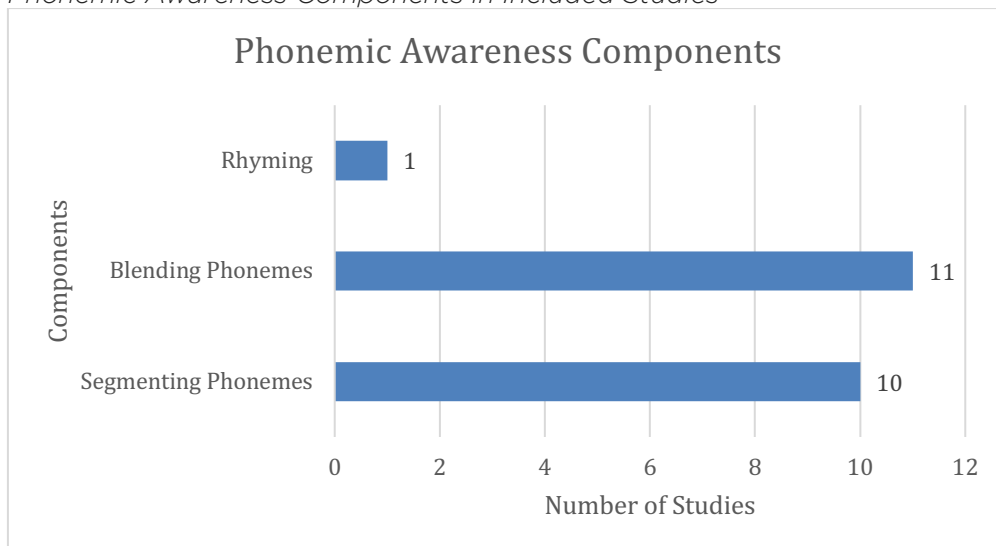
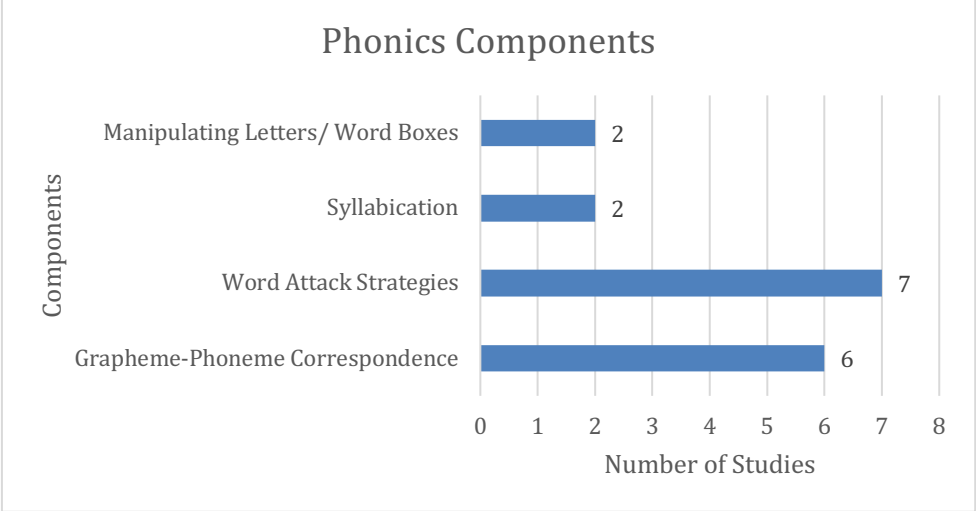


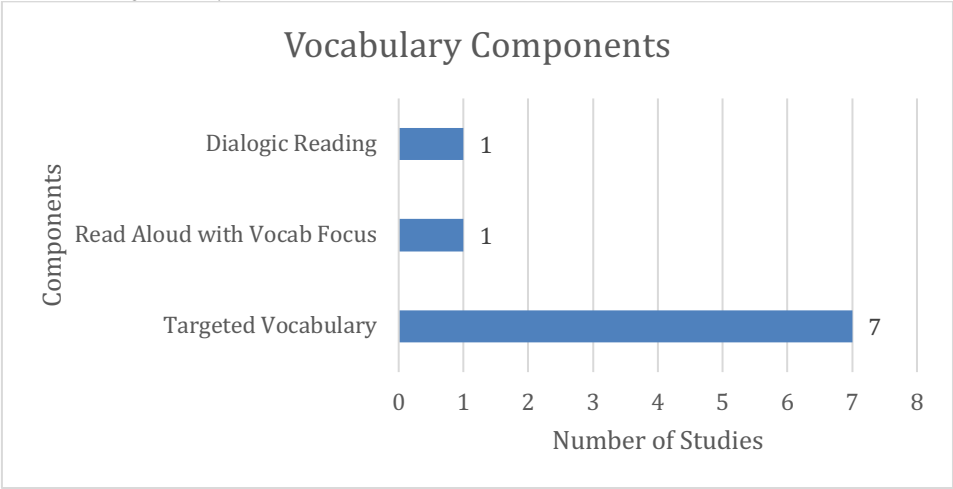
Figure 5 displays the four phonics components that were reported across the 28 studies.

Figure 5
Phonics Components in Included Studies



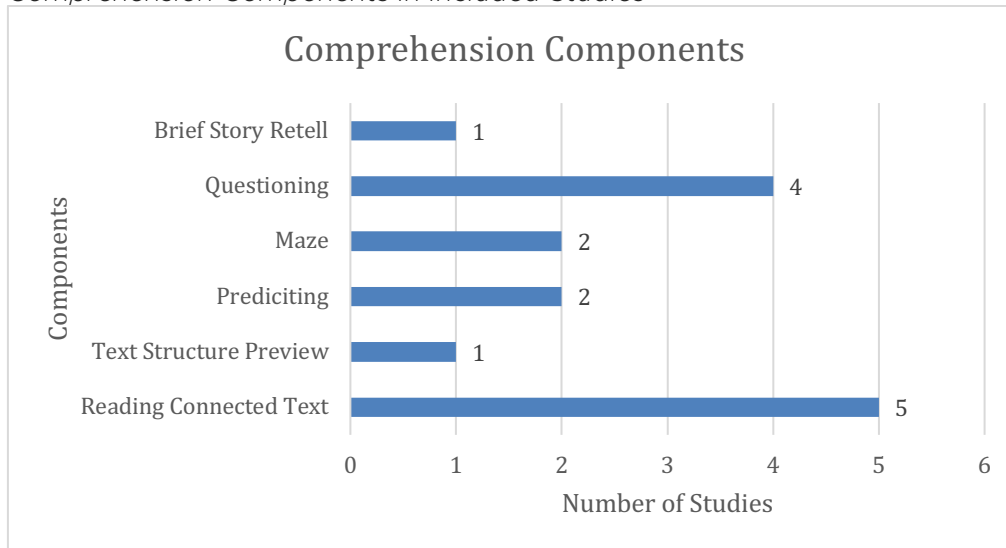
In the 28 studies, the pillar that was included the least was vocabulary components (see Figure 6).

Figure 6
Vocabulary Components in Included Studies



Six comprehension components were reported across the 28 studies as displayed in Figure 7.

Figure 7
Comprehension Components in Included Studies



Four writing components are displayed in Figure 8.

Figure 8
Writing Components in Included Studies

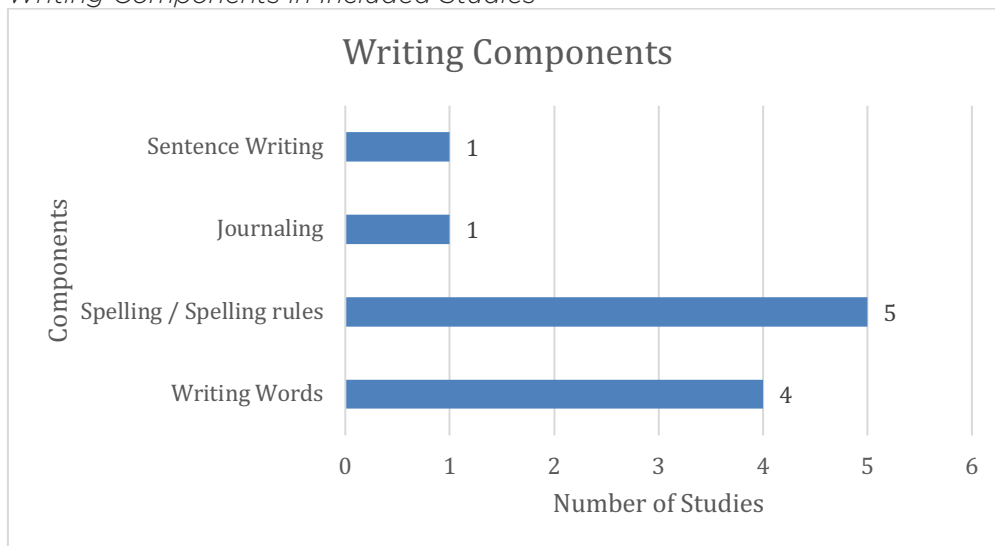
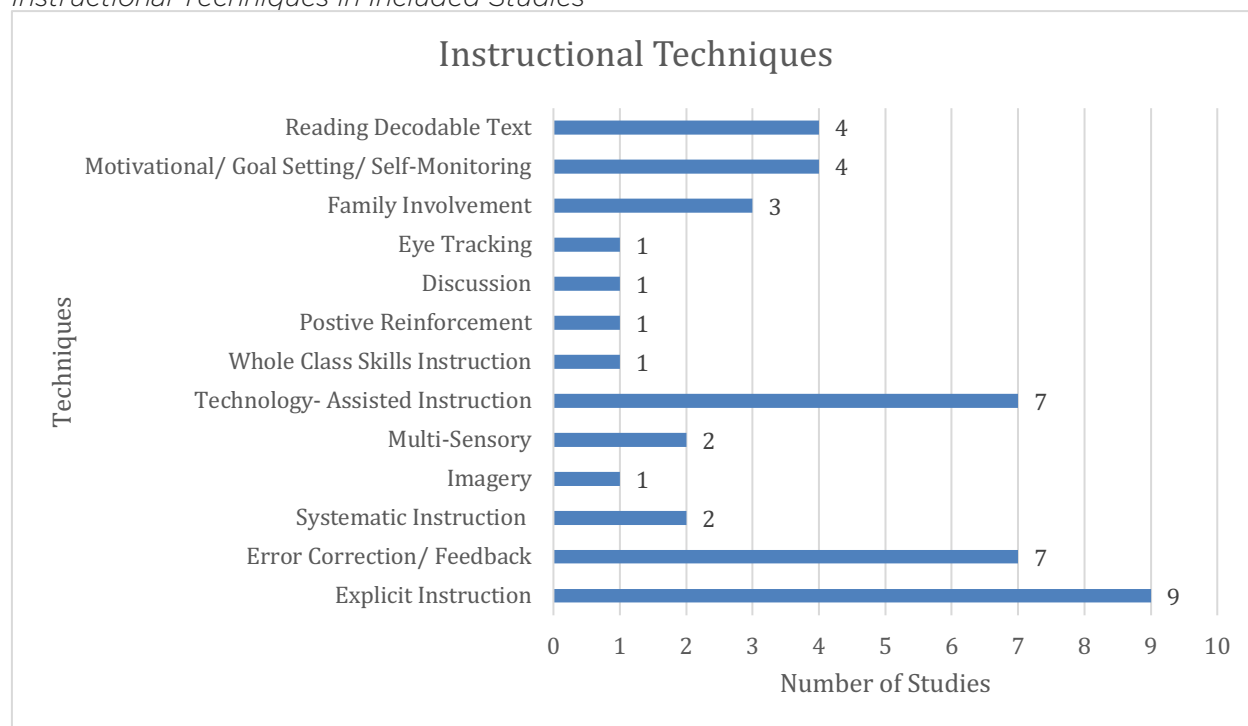


Figure 9 reports the instructional techniques (e.g., explicit instruction, reading decodable text) reported within the reviewed studies. In total, 13 different instructional techniques were coded. Specific to error correction/feedback, if the description of technology-assisted instruction indicated error correction or feedback was provided, a “yes” was coded in this category.

Figure 9
Instructional Techniques in Included Studies



Dependent Variables and Effects

The second research question was: *What does the research say about the effectiveness of fluency instruction in improving foundational reading outcomes for readers in grades K-3?* The synthesis indicated that within the 28 studies, outcomes were reported for: (a) oral reading fluency, including non-sense word fluency, word attack and sight word reading; (b) phonological awareness; (c) letter-sound knowledge; (d) phonemic decoding; (e) phoneme segmentation; (f) comprehension, such as listening, word, passage, and vocabulary; (g) writing and spelling; and (h) reading attitudes and self-efficacy. Table 2 provides an overview of the notable outcomes from the included studies, as reported by the authors.

Table 2

Notable Findings from Included Studies

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Barber et al. (2018)	K = 0 F = 3 S = 0 T = 0 ML = 3 SP = 0 AR = 3	Reading RACES None	Tier 3 20-30 min/ session 1-4 sessions/ 7-11 weeks	ORF, comprehension	gains on ORF and comprehension for continuous reading and generalization passages
Beach et al. (2018)	K = 0 F = 0 S = 14 T = 18 ML = 14 SP = 7 AR = 32	Sound Partners BAU	Tier 2 1 hour/ 15 days	PDE, SWE, ORF	rising 2 nd graders ORF: small effect size (d = .17); PDE: small effect (d = -.23); SWE and accuracy: negligible effect rising 3 rd graders SWE: small to moderate effect, t(17) = 2.37, p = .03, d = .23; ORF, t(17) = 4.40, p < .001, d = .27; ORF accuracy t(17) = 2.90, p = .01, d = .33; nonsignificant small effect for PDE, t(17) = -0.84, p = .412, d = .13.
Beach & Traga Philippakos (2021)	K = 0 F = 0 S = 20 T = 19 ML = 20 SP = 4 AR = 39	Sound Partners and Active Reading BAU	Tier 2 (Sound Partners) Tier 3 (Active Reading) 2 hours/ 23 days	Phoneme segmentation, NWF, ORF, SWE, comprehension, writing	2 nd grade: not significant but moderate effects phonemic awareness (p = .012; d = .64) and NWF (p = .025; d = .55); small effect sizes for SWE, accuracy, and total words written; negligible effects for spelling and comprehension 3 rd grade: significant large effect size in ORF (p < .001; d = 1.16); non-significant effect for correct spelling (p = .06; d = .47)
Bennett et al. (2017)	K = * F = * S = * T = * ML = not reported	Packaged intervention: culturally relevant material, repeated	Tier 3 20-30 min/ session 3-5 sessions/	ORF and comprehension	effect sizes for ORF (.12), word attack (.32), word reading and word ID (not significant = .24), increased maze comprehension scores

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
	SP = not reported AR = 7 *reported age = 7 years old	reading, computer assisted intervention BAU	7-13 weeks		
Burns et al. (2020)	K = 0 F = 0 S = 252 T = 247 ML = not reported SP = not reported AR = 114	Phonics or fluency intervention based on diagnostic reading assessment BAU (Tier 1 and Special Education)	Tier 2 20 min/ 4 times per 18 weeks	ORF	significant effect by comparison group $F(2, 493) = 4.59, p < .05$; nonsignificant effect ($g = 0.22$) for mean scores of the Severe Reading Deficit and Tier 1 groups, $t(475) = 1.83, p = .07$; moderate to large significant effect ($g = 0.74$) between the Severe Reading Deficit and Special Education groups $t(112) = 3.10, p < .017$; moderate significant effect between Tier 1 and Special Education groups ($g = 0.68$), $t(405) = 3.10, p < .017$
Christodoulou et al. (2017)	K = * F = * S = * T = * ML = 0 SP = not reported AR = not reported (N = 47) *reported age = 6-9 years old	Seeing Stars: Lindamood-Bell BAU	Tier 2 100-120 hours	ORF, NWF, symbol imagery	significantly higher post-test scores for symbol imagery, untimed real-word reading and NWF, timed NWF, and ORF; no significant group difference on SWE

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Contesse et al. (2021)	K = 0 F = 18 S = 21 T = 14 Fo = 5 Fi = 4 ML = not reported SP = not disaggregated AR = 62	Summer Adventures in Literacy (SAIL) or University of Florida Literacy Institute Tutoring for Students with Dyslexia (UFLI- Intensive) None	Tier 2 (SAIL) Tier 3 (UFLI) SAIL- 4 hours/ day 5 days/ 3 weeks UFLI- 1 hour/ day 5 days/ 3 weeks	PDE, SWE, ORF	SAIL program: statistically significant growth Consonant Sounds CORE Phonics Survey. SAIL + UFLI-Intensive: statistically significant growth across all measures except TOWRE SWE, the TOWRE PDE; statistically significant, moderate effects for Consonant Blends with Short Vowels and R-controlled Vowels sections of the CORE Phonics Survey
Didion et al. (2020)	K = 0 F = 0 S = 0 T = 12 ML = 4 SP = 1 AR = 12	Data Mountain None	Tier 3 Pilot: 8.91 min/ 9.17 sessions 11.69 min/ 7.5 sessions Data Mountain: 5.89 min/ 10.17 sessions	ORF	Data Mountain: ORF effect size of 0.63 (p < .001), with a standard error of 0.37 and a 95 percent CI of [0.23, 1.37]

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Downs et al. (2020)	K = 0 F = 0 S = 0 T = 219 ML = not reported SP = not reported AR = not reported	Peer dyad reading BAU	Tier 2 15 min/ day 90 days	ORF, comprehension, reading attitude	Comprehension growth for lower-level dyad readers: statistically significant ($p = 0.009$) moderate effect size (0.31); attitudes about dyad reading declined
Fenty et al. (2015)	K = 0 F = 0 S = 0 T = 50 ML = not reported SP = not disaggregated AR = 50	Quick Reads program None	Tier 2 & 3 20 min/ session 3 days/ 10 weeks	ORF, vocabulary, comprehension	ORF: no significant differences across the three groups, $F(2, 49) = 1.08, p = .350$; Comprehension: no significant differences, $F(2, 49) = 1.06, p = .357$; Vocabulary: significant at $F(2, 49) = 3.76, p = .034$ between the text-equivalent and the time-equivalent computer groups ($p = .034$) favoring time-equivalent group
Fien et al. (2015)	K = 0 F = 267 S = 0 T = 0 ML = 32 SP = 14 AR = 267	Multi-tiered Enhanced Core Reading Instruction (ECRI) BAU	Tier 2 30 min/ day 26 weeks	NWF, ORF, WRC, comprehension	NWF WRC: positive effect ($g = +.38$); ORF: positive effect ($g = +.30$); comprehension: small positive effect ($g = +.28$)

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Hall et al. (2024)	K = 0 F = 0 S = 6277 T = 5566 ML = 1184 SP = Not reported AR = 11,843	Reading Corps None	Tier 3 20 min/ day 5 days/ week	ORF, family involvement	ORF: +1 SD family involvement materials returned = one more WCPM per season (b = 1.067, posterior SD = 0.166, 95% CI = 0.743, 1.390); +1 SD hours of tutoring= about 2 more WCPM per season (b = 1.936, posterior SD= 0.400, 95% CI = 1.141, 2.710)
Hammerschmidt-Snidarich et al. (2019)	K = 0 F = 0 S = 22 T = 18 ML = not reported SP = not reported AR = 40	Repeated Reading (RR) or Continuous Reading (CR) None	Tier 3 RR: 31.84/ 15 session 5 weeks CR: 30.79 min/ 15 session 5 weeks	ORF, comprehension	ORF: no significant differences between groups $F(2, 37) = 0.06, p = 0.81$; passage comprehension score: statistically significant $F(1, 38) = 9.99, p < 0.05$, RR mdn = 88% and CR mdn = 73%, large effect size ($d = 0.99$)

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
January et al. (2017)	K = 0 F = 1 S = 3 T = 0 ML = not reported SP = 0 AR = not reported	Strategic Incremental Rehearsal (SIR) Incremental Rehearsal (IR) None	Tier 3 6- 7 min/ session 4 days/ 4-5 weeks	WRC, percent accuracy, average session length, average number of words learned per min	SIR more effective and efficient for 3/4 students than in the IR
Jefferson et al. (2016)	K = 0 F = 0 S = 0 T = 83 ML = not reported SP = not reported AR = 0	SRA Corrective Reading Decoding Strategies	Tier 1 20 min/ session 5 days/ week 5 months Differentiated lessons: 20 min/ session At least 1 day/ week 5 months	ORF	Significant differences prosody, including rate, intonation, stress, and pausing; ORF and comprehension: no statistical increase

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Lange (2019)	K = 0 F = 0 S = 0 T = 95 ML = not reported SP = 0 AR = 70	Fluency Tutor BAU	Tier 3 30 min/ 12 weeks	ORF	treatment group outperformed control group on the Measure My Reading, WCPM, prosody, comprehension (d = .330) ORF: no differences on Gray Oral Reading Test-5th Edition
McBreen & Savage (2022)	K = 0 F = 0 S = 0 T = 25 ML = not reported SP = not reported AR = 25	Cognitive (i.e., DRI) plus motivational reading Cognitive (i.e., DRI) only	Tier 2 45 min/ 2-3 times for 8 weeks	comprehension, phonological awareness, reading accuracy, ORF, listening comprehension, self-efficacy	reading accuracy, ORF, listening comprehension, self-efficacy: no significant differences sentence comprehension: significant effect (p = .024, d = 0.55); Blending: significant effect (p < .01, d = 0.62); Segmenting: significant effect (p < .01, d = 1.76); small effects on reading (d = 0.40), self-efficacy (d = 0.28), and ORF (d = 0.40); medium effect on listening comprehension (d = 0.57)

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
McDaniel et al. (2017)	K = not reported* F = not reported* S = not reported* T = not reported* ML = 0 SP = not reported AR = not reported (N = 33) *reported age = 6-7 years old	Daily scripted guided reading with Mondo Guided Reading Levels A-G materials	Tier 2 1 hour/ day 4 days/ 9 weeks	ORF	rising 1 st graders: mean score of 34.64 at post intervention meets the benchmark of 34 for the middle of 1 st grade rising second graders: mean score of 63.36 is above the cut point for at risk (55) for the beginning of 2 nd grade
Rasinski et al. (2017)	K = 0 F = 0 S = 0 T = 37 ML = not reported SP = not reported AR = 37	Fluency Development Lesson None	Tier 2 75 hours 25 sessions/ 7 weeks	ORF, comprehension	pretest 2 nd -grade word ID accuracy and pretest 2 nd -grade WCPM: moderate correlation (r =.37); pretest 2 nd -grade word ID accuracy and posttest 2 nd -grade WCPM, significant correlation (Post2WCPM; r =.62); posttest 3 rd -grade WCPM, significant correlation (Post3WCPM; r =.56); posttest 3 rd -grade comprehension and Post3WCPM, large significant correlation (r =.66); pretest 2 nd -grade WCPM and Post2WCPM (r =.75), pretest 3 rd -grade WCPM (r =.84), and Post3WCPM (r =.79): very large correlations; Post2WCPM, pretest 3 rd -grade WCPM, very large correlation (r =.70); Post3WCPM, very large correlation (r =.90)

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Schneider et al. (2016)	K = 0 F = 0 S = 170 T = 0 ML = 64 SP = 21 AR = not reported	MindPlay Virtual Reading Coach BAU	Tier 3 30 min/ 4 days/ week Mid Sept- mid April	ORF, spelling	<p>Reading miscues: statistically significant decrease, very large effect, $t(36) = -3.74$, $p < .001$, $d = .72$; ORF: statistically significant increase, moderate effect, $t(36) = 3.73$, $p = .001$, $d = .44$; expressive reading: no significant differences</p> <p>intervention effect size in the large range (multivariate $\eta^2 = 0.332$); ORF effect size (multivariate $\eta^2 = 0.261$); non-word spelling (multivariate $\eta^2 = 0.150$); real world spelling: moderate effect size (multivariate $\eta^2 = 0.090$) was in the moderate range; no significant effects in non-word reading and real word reading</p>

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Smith et al. (2016)	K = 0 F = 811 S = 0 T = 0 ML = 159 SP = 60 AR = not reported	Enhanced Core Reading Instruction BAU	Tier 1 90 min/ day Tier 2 90 min + 30 min/ day 36 weeks	ORF, word attack, receptive vocabulary, self- efficacy	NWF-WRC: effect size (g =.21); Word attack: (g = .32); ORF (g = .12); Word Reading (g =.24); Word ID (g = .24)
Strong & Anderson (2024)	K =30 F = 30 S = 29 T = 30 Fo = 30 Fi = 30 ML = 6 SP = 18 AR = 179	Differentiated Reading Instruction (DRI) program; Interactive Read Aloud (IRA) None	Tier 2 45 min/ 18 days included: 15 min DRI and 30 min IRA	Letter-sound knowledge, decoding, ORF, attitudes	significant gains in letter-sound knowledge, decoding skills for students; nonsignificant for oral reading fluency; no statistically significant difference on academic reading attitudes (p = .10).

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Toste et al. (2017)	K = 0 F = 0 S = 0 T = 39 Fo = 20 ML = not reported SP = not reported AR = 59	Condition 1: Multisyllabic word reading Condition 2: Multisyllabic word reading + motivational belief BAU	Tier 2 40 min/ session 3 sessions/ 8 weeks	ORF, comprehension; motivation	TOWRE-2 SWE: significant ($\beta = 5.04$, $p = .00$, $g = .73$); not significant, moderate effect on PDE ($g = .31$), letter-word identification ($g = .29$), and word attack ($g = .30$). sentence comprehension: significant ($\beta = 5.54$, $p = .00$, $g = .61$); SWE: significant (MWR= $\beta = 5.74$, $p = .01$, $g = .78$, and MWR + MB= $\beta = 4.59$, $p = .01$, $g = .75$).
Vanderwood et al. (2014)	K = 0 F = 105 S = 0 T = 0 ML = 59 SP = not reported AR = 35	Phonological Awareness and Vocabulary Intensive Intervention (PAVII) BAU	Tier 2 5 days/ 11 weeks	PSF, NWF	PSF: significant differences between the mean growths of both groups, $t(103) = 3.94$, $p < .001$, $d = 1.22$; intervention group significantly higher mean growth ($M = 19.67$, $SD = 13.55$) than comparison group ($M = 4.44$, $SD = 12.49$) NWF: no significant differences between the mean growths of the intervention group ($M = 23.58$, $SD = 13.18$) and nonintervention control group

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Wu et al. (2018)	K = 0 F = 0 S = 0 T = 3 ML = not reported SP = 0 AR = 3	Multi-component: listening passage preview, repeated reading, phrase drill, video self modeling None	Tier 3 20 min/ session 14-23 sessions	ORF	ORF= no statistical increase with VSM
Young & Daly (2016)	K = 0 F = 0 S = 0 T = 2 ML = not reported SP = 0 AR = not reported	Repeated readings None	Tier 3 15 min/ session 4 sessions/ week	ORF	no discriminable differences between performance criterion conditions

Article	Participant (n)	Condition: Intervention Comparison	Tier ^a Dosage	Outcome Domain	Notable Findings
Young et al. (2018)	K = 0 F = not reported S = not reported T = not reported ML = not reported SP = not reported AR = 57	Read to Impress (R2I) and Neurological Impress Method (NIM) BAU	Tier 3 420 min intervention	ORF, comprehension	R2I: large effect on expressive oral reading, medium effect on retell, statistically significant effect on comprehension and word recognition accuracy; NIM small effect on retell, statistically significant effect on comprehension and word recognition accuracy
Zhou et al. (2019)	K = 0 F = 3 S = 1 T = 0 ML = not reported SP = not reported AR = 4	Parent implemented reading fluency intervention with repeated reading, listening passage preview, and error correction	Tier 3 3 sessions/ week for several weeks	ORF	immediate increase in WCPM for instructional passages; gradual, consistent upward trend for WCPM on progress monitoring passages

Note. K = kindergarten; F = first grade; S = second grade; T = third grade; Fo = fourth grade; Fi = fifth grade; ML = multilingual/ English Learner; SP = special education; AR = at risk; ORF = oral reading fluency; SWE = sight word efficiency; NWF = nonsense word fluency; PDE = phonemic decoding efficiency; WRC = words read correctly; CLS = correct letter sounds; WCPM = words correct per minute; PSF = phoneme segmentation fluency; TOWRE = Test of Word Reading Efficiency

^a Intervention Tier is defined as: 1 = whole group; 2 = small group; 3 = one-on-one

Subgroup Analysis of Interventions' Effectiveness

The third research question was: *What features of instructional interventions (e.g., type of instruction, duration, grade level) are associated with improved outcomes? Do these features differ according to student characteristics?* Tables 1 and 2 above provide details for each study. Figures 10-12 below provide the results for research question three.

Figure 10 displays the features of the interventions resulting in improved fluency outcomes that included English learners. Dosage for each effect was: large effect = 1-72 hours; medium effect = 65 hours; small effect = 15-360 hours. It should be noted that only two studies (i.e., Barber et al. 2018; Vanderwood et al., 2014) disaggregated for English learner status.

Figure 10
Intervention Features with Effect Sizes for Reading Fluency Development of English Learners

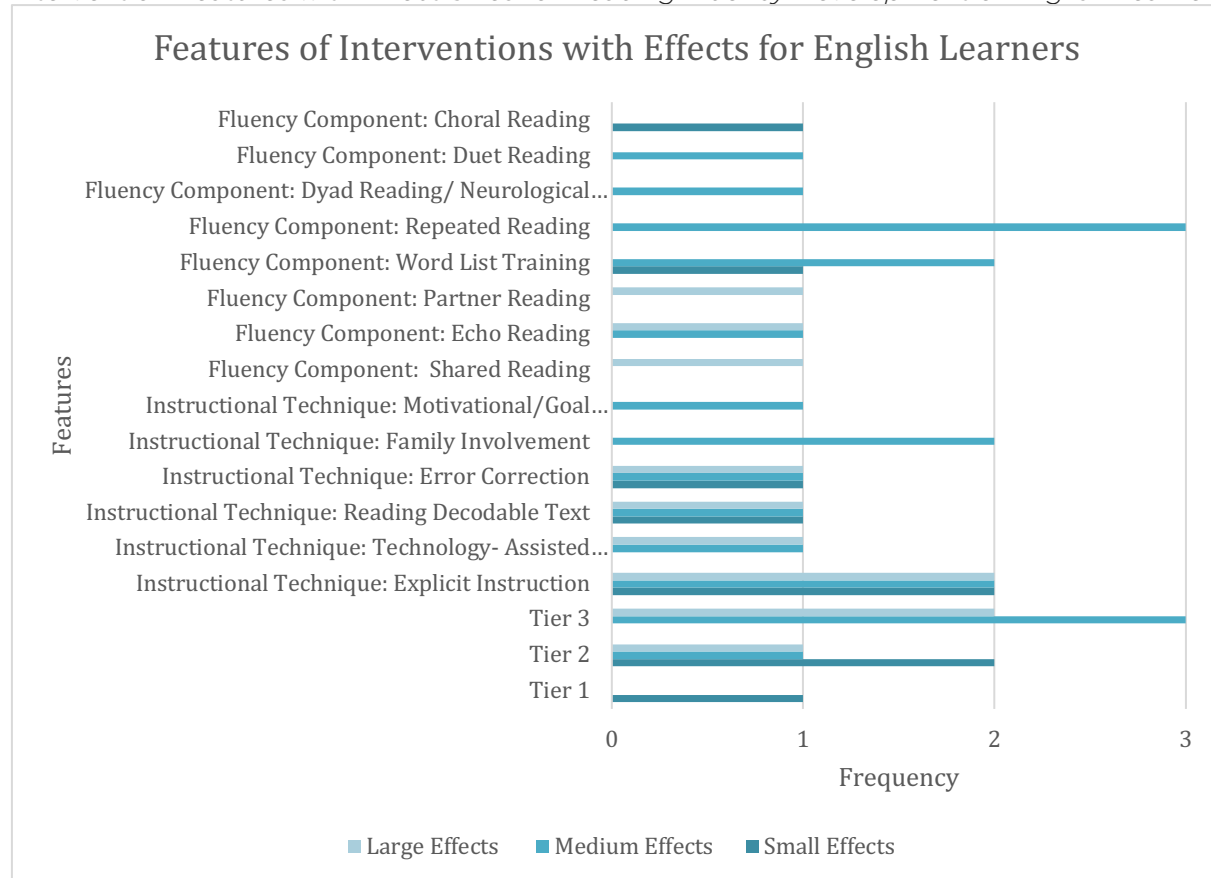


Figure 11 displays the features of the interventions resulting in improved fluency outcomes that included students with disabilities. None of the studies disaggregated results for disability status or identified specific disability labels. Dosage for each effect was: large effect = 1-72 hours; medium effect = 65 hours; small effect = 13.5-360 hours.

Figure 11
Intervention Features with Effect Sizes for Reading Fluency Development of Students with Disabilities

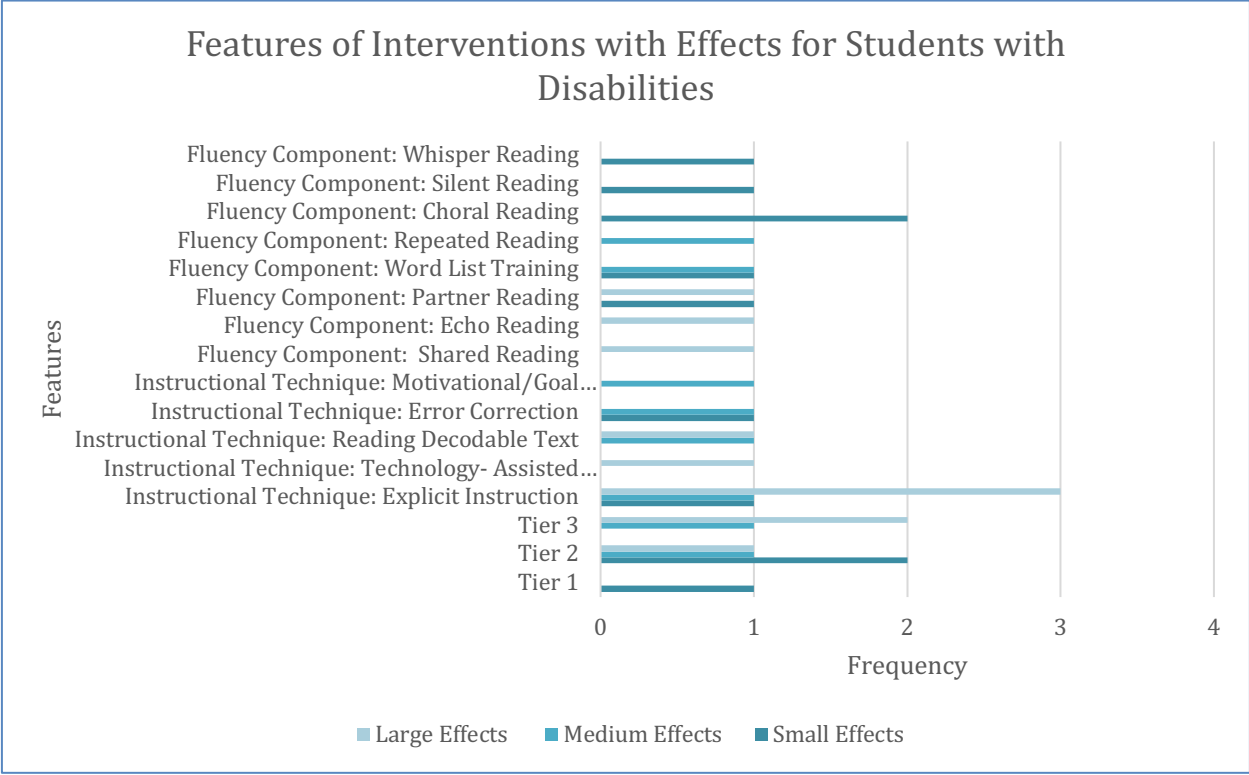
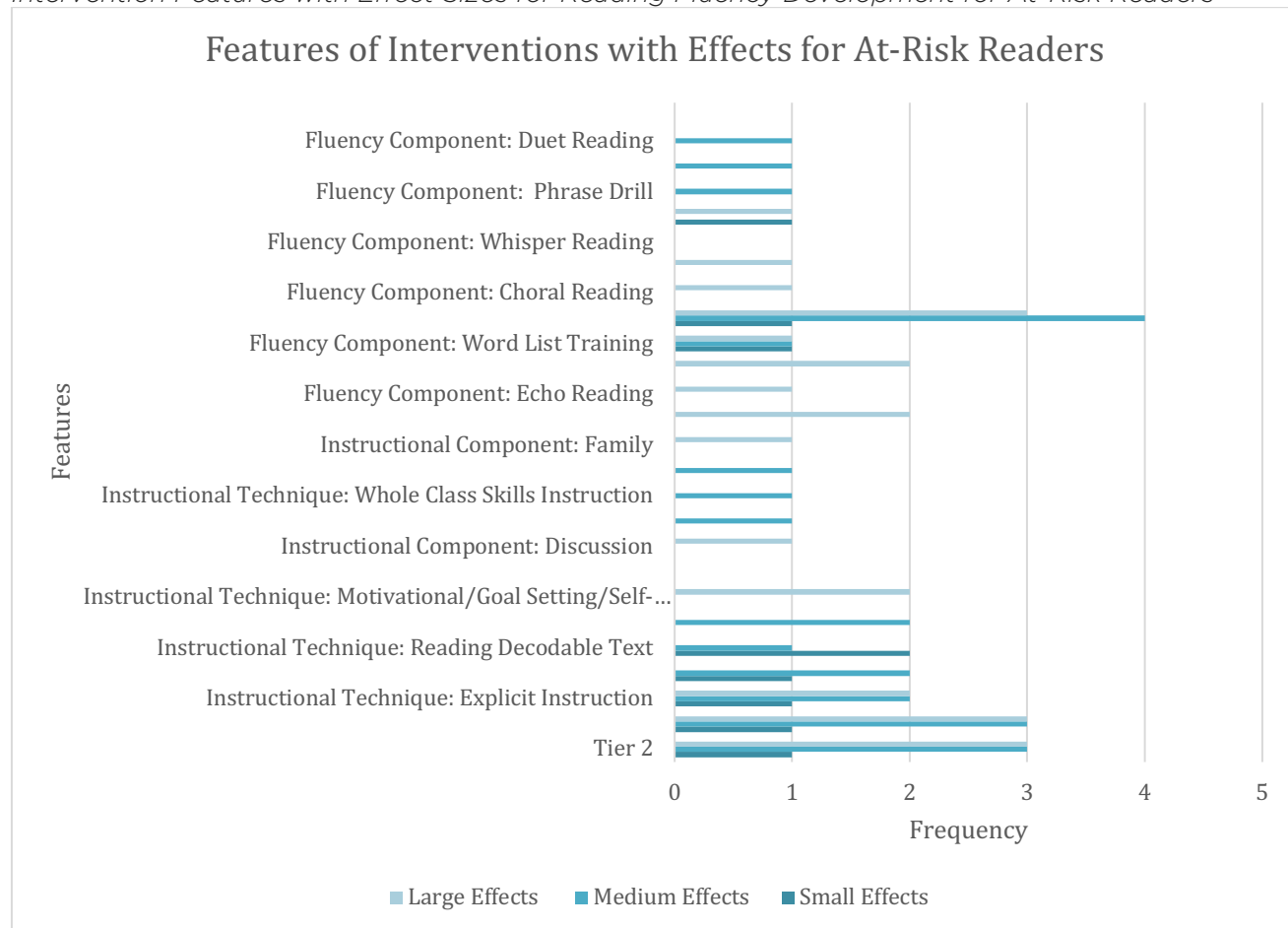


Figure 12 displays the features of the interventions resulting in improved fluency outcomes for at risk readers. Dosage varied as follows: large effect = 1-75 hours, medium effect = 4.6-75 hours, small effect = 7-15 hours.

Figure 12

Intervention Features with Effect Sizes for Reading Fluency Development for At-Risk Readers



Four studies identified general education students as participants. Two reported effect sizes; one showed positive effects (Downs et al., 2020). Downs et al. (2020) used dyad reading at tier 2 for a period of 15 min/ day for 90 days (22.5 hours). The outcomes are reported above in Table 2.

Discussion

Discussion of Overall Independent Variable Effectiveness

Dosage was variable across the studies and did not seem to influence effect size. This may be explained by Maki and Hammerschmidt-Snidarich (2022) who purported that dosage is variable and imprecise because of the nature of the reading fluency intervention. For example, Didion et al. (2020) provided their Data Mountain intervention for approximately 6 minutes on 10 occasions. The intervention consisted of a motivation/goal setting/graphing. In addition, students were asked to read a one-minute oral reading fluency probe. Results from this study showed that participants had an oral reading fluency effect size of 0.63 ($p < .001$, $SE = 0.37$, 95% CI [0.32, 1.37]). In contrast, in a study using repeated reading with two third grade non-struggling readers, lower criterion goals resulted in greater oral reading fluency gains (Young & Daly, 2016). On the other end of the dosage spectrum, Rasinski et al. (2017) implemented Fluency Development Lesson which included various assisted reading strategies (e.g., shared, partner) as well as choral reading and silent reading across 75 hours. They reported a statistically significant decrease, and a very large effect for reading miscues ($t(36) = -3.74$, $p < .001$, $d = .72$), and a statistically significant increase, moderate effect for oral reading fluency ($t(36) = 3.73$, $p = .001$, $d = .44$). Sometimes more is not as effective. Downs et al. (2020) found that dyad reading resulted in early gains that leveled off over time which negatively impacted attitudes. Other independent variables of interest included groupings, implementers, and curricula. Regarding groupings, the largest effect sizes occurred in Tier 3. The implementers did not seem to have bearing on the effect sizes; teachers, researchers, and various hired interventionists were included in studies that resulted in large effects. Various curricula were also represented including: (a) Read to Impress, (b) Multi-syllabic word reading with motivational beliefs, (c) fluency development lesson, (d) Sound Partners and Active Reading, (e) Data Mountain, and (f) Mind Play Virtual Reading Coach.

Discussion of Components' Effectiveness

Of the studies included in this review, fluency, phonemic awareness, and phonics were the most common intervention components (see Figure 2). This is no surprise, given that students must be able to understand the relationship between sounds and letters before they can become fluent readers. Repeated reading was the most common component along with various forms of assisted reading (e.g., partner, echo, dyad). These were also the fluency components that resulted in largest effect sizes. Interestingly, one study found that students' attitudes about reading declined for those that were in dyad reading (Downs et al., 2020). Other studies found mixed results in oral reading fluency or significant results in other areas of reading, such as passage comprehension (see Hammerschmidt-Snidarich et al., 2019). Extant research has supported the link between fluency and comprehension (Hudson et al., 2020). Instructional techniques that resulted in the large effect size was by far explicit instruction.

Subgroup Analysis: Conclusions Regarding Effective Interventions for Specific Learners

Roberts et al. (2022) found a limited number of studies on the effects of high-quality commercial reading interventions for English learners suggesting that more research using high quality procedures is needed. The review completed by Roberts et al. highlighted several curricula that resulted in large effect sizes for reading fluency of English learners (i.e., Sound Partners, Pro-Active Reading). The present review included two studies that focused explicitly on English Language Learners, Barber et al. (2018) and Vanderwood et al. (2014). However, neither used these curricula. Barber et al. (2018) found that technology assisted repeated readings of culturally relevant materials (RACES) resulted in significant fluency and comprehension gains. Vanderwood et al. (2014) found increases in phoneme segmentation and growth in nonsense word fluency at a higher rate using PAVII than the control group, but not enough to close the achievement gap. Two studies in this review used Sound Partners and reported small to moderate effects (see Beach et al., 2018) and large effects (see Beach & Traga Philippakos, 2021) for oral reading fluency in third graders, however, outcomes were not disaggregated. Common fluency strategies for this population included repeated reading, reading decodable texts, and word list training paired with explicit instruction and family involvement.

This review found seven studies that reported at least one student with a disability in their participants. However, none of the studies focused explicitly on students with disabilities or differentiated the results. Five of these interventions included explicit instruction, which is not surprising given the rich support for this strategy with students who have disabilities (Archer & Hughes, 2011). As special educators know, higher opportunities to respond-that are highly structured-lead to increases oral reading fluency (Fien et al., 2015). Other common instructional techniques used were error correction/feedback, technology-assisted instruction, goal setting, and the use of decodable texts. The interventions included goal setting (see Didion et al., 2020) and well-known interventions (Sound Partners, see Beach & Traga Philippakos, 2021).

At-risk students seemed to make larger gains when they were in smaller groups (Tiers 2 and 3) and were given explicit instruction. The fluency components that were the most effective were repeated reading, partner reading, and shared reading. For general education students who were not struggling readers, Jefferson et al. (2016) did not find statistically significant differences in oral reading fluency post Tier 1 differentiated intervention that used SRA Corrective Reading and Decoding Strategies. However, they did conclude that based on other outcomes (e.g., prosody, intonation), there was a positive impact.

Implications for Practice and Future Research

The purpose of this systematic review was to identify peer-reviewed research published from 2014 to 2025 on interventions or practices designed to help children in kindergarten through third grade learn to develop foundational reading skills related to fluency. This review found that positive outcomes were evidenced across all groupings: whole (Tier 1), small (Tier 2), and individual (Tier 3), which aligns with

Strong and Anderson (2024) who stated that there is little difference in outcomes when students are provided intervention in small groups versus one-on-one.

There is indication from previous research that rigorous single case methodology leads to more significant outcomes than group designs (see Maki & Hammerschmidt-Snidarich, 2022). Future research should evaluate rigor of the studies and look for correlation between study design and learner outcome. Additionally, while there are several systematic reviews (see Hudson et al., 2020) and meta-analyses (see Maki & Hammerschmidt-Snidarich, 2022; Zimmerman et al., 2021) on reading-related topics, none focus specifically on the K-3 grade levels related to reading fluency. Future research should extend this work to a meta-analysis.

Limitations

Several limitations are evident with this systematic review. First, 21.4% ($n = 6$) of the studies that met the criteria for inclusion were conducted during summer reading programs. It is possible that the Boolean phrasing limited the results to these studies. Second, in several of the studies, it was difficult to locate the information needed regarding the participants, intervention components or implementation. The population parameters of this systematic review limited results to kindergarten through grade three. When demographics were reported as percentages, it was impossible to ascertain the number of students who were English learners, received special education services, etc. Further, most (78.5%, $n = 22$) authors did not report some of the demographic variables of interest (e.g., special education, multilingual). Relatedly, there was variation in the amount of detail included in the studies about the intervention components, dosage, and the intervention tier. To discuss the characteristics of interventions and the impact of intervention components on student learning outcomes, more specificity is needed. Lastly, the studies did not report dosage and effect sizes in a consistent manner. Some studies did not include the number of weeks an intervention was implemented. Effect sizes were reported in numerous ways and there were X single case studies that did not include effects but showed positive impacts on oral reading fluency. Maki and Hammerschmidt-Snidarich (2022) indicated that single case research can result in more significant outcomes than group designs. However, when reporting on effect sizes, those impacts are lost.

Conclusion

Given the findings of this synthesis and previous research, it is apparent that fluency interventions can be successful, but do not always lead to the magnitude of improvement anticipated for the identified outcome. Reading is an interconnected and complex skill. It is no surprise that interventions designed to impact one aspect of reading (e.g., fluency) will often influence another aspect (e.g., comprehension). Perhaps the largest take-away is that researchers and practitioners need to diagnose specific skills for remediation and select targeted interventions for those skills but expect non-linear results.

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