**Literature Review of Reading Interventions**

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**Introduction**

 Reading intervention research often determines the direction of which programs are utilized in schools. Various approaches to reading intervention are the focus of research, mostly looking for answers to a similar question: what are the effects of a particular intervention? As most school communities vary in both size and composition, it is important that research in the area of reading interventions be inclusive, rigorous, and utilize quality research measures. Overwhelmingly, the research conducted in the area of reading intervention overlaps in many areas such as methods, measurement, and variables. A number of similar limitations in this research is also present such as sample size, composition, access, and administration influence. Overarching themes in the literature include assessment measures, intervention types, and how personal experience and context influences an intervention program’s success. These themes emerge in the research because some of these themes align with what is perceived to be best practice, and other themes are apparent due to the type of research.

**Assessment Measures**

 In respect to sampling, some researchers chose to use teacher or administration based selection (Beach et al., 2018; Glover, 2017; McCray et al., 2018; Young et al., 2018). The method of sampling was not based on scores, biased, and not reliable. However, in one study (McCray et al., 2018), the sampling was already problematic as the students were institutionalized. It is important to note that four studies (Glover, 2017; Leko et al., 2015; McCray et al., 2018; Young et al., 2018) were considered qualitative research, whereas the remaining eleven studies were considered quantitative research (Beach et al., 2018; Clarke et al., 2017; Coyne et al., 2018; Kim et al., 2016; Müller et al., 2017; Oostdam et al., 2015; Partanen et al., 2019; Schneider et al., 2016; Troyer, 2017; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019). Three of the four qualitative research studies had sampling limitations due to teacher or administration involvement (Glover, 2017; McCray et al., 2018; Young et al., 2018), and two quantitative research studies had sampling limitations due to teacher or administration involvement (Beach et al., 2018; Vernon-Feagans et al., 2018). Other studies sampling limitations were based upon their sample size (Müller et al., 2017; Oostdam et al., 2015; Partanen et al., 2019; Troyer, 2017; Williams & Vaughn, 2019).

Data was collected through interviews (Leko et al., 2015; McCray et al., 2018), observations (Clarke et al., 2017; Leko et al., 2015; Schneider et al., 2016; Troyer, 2017; Young et al., 2018), and assessments (Beach et al., 2018; Clarke et al., 2017; Coyne et al., 2018; Glover, 2017; Kim et al., 2016; Leko et al., 2015; McCray et al., 2018; Müller et al., 2017; Oostdam et al., 2015; Partanen et al., 2019; Schneider et al., 2016; Troyer, 2017; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019; Young et al., 2018). Studies which used interviews and observations had more researcher interpretation, whereas studies relying solely on assessment data assumed and theorized the factors influencing the outcomes. Regarding baseline assessments, preliminary testing was completed to determine suitability for participation in the study (Clarke et al., 2017; Coyne et al., 2018; Kim et al., 2016; Leko et al., 2015; Müller et al., 2017; Oostdam et al., 2015; Partanen et al., 2019; Schneider et al., 2016; Troyer, 2017; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019). Preliminary testing was completed with norm-referenced assessments commonly used in diagnostic testing for learning disabilities such as the Test of Word Reading Efficiency 2 (TOWRE-2, Wagner, Torgesen & Rashotte, 2011), which relies on measurement of sight word efficiency as well as phonemic decoding efficiency (Beach et al., 2018; Clarke et al., 2017; Williams & Vaughn, 2019). Another preliminary test used in the studies was the Dynamic Indicators of Basic Early Literacy Skills–Next (DIBELS Next; Good et al., 2011) which measures phonemic awareness, alphabetic principle, accuracy and fluency (Beach et al., 2018; Coyne et al., 2018). A common test conducted in the studies was the Woodcock-Johnson Diagnostic Reading Battery, III (WJDRB, III; Woodcock, Mather, & Schank, 2004) which measures phonemic awareness, phonics, fluency, vocabulary, and reading comprehension (Partanen et al., 2019; Schneider et al., 2016; Vernon-Feagans et al., 2018). Finally, one study used the Kaufman Test of Educational Achievement, Second Edition (KTEA‐II; Kaufman & Kaufman, 2004) which measures letter and word recognition and reading comprehension in the reading composite, as well as phonological awareness, nonsense word decoding, word recognition fluency, decoding fluency, associational fluency, and naming facility in the reading-related subtests (Partanen et al., 2019). One study chose to use the Iowa Test of Basic Skills, Reading Comprehension (ITBS) and the North Carolina End-of-Grade (EOG) reading comprehension (Kim et al., 2016), both state-specific norm referenced assessments. While norm referenced assessments are increasingly more common, the universally known and used assessments such as the TWORE-2, DIBELS, WJDRB, and KTEA-II have larger sample sizes and are considered to be more reliable.

Analysis of data was conducted by researchers through a variety of means, such as (M)ANCOVA models (Beach et al., 2018; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019), coding (Beach et al., 2018; Leko et al., 2015; McCray et al., 2018; Müller et al., 2017; Troyer, 2017; Williams & Vaughn, 2019), intra-class correlations (Müller et al., 2017; Williams & Vaughn, 2019), comparison groups (Beach et al., 2018; Partanen et al., 2019; Schneider et al., 2016; Williams & Vaughn, 2019), and chi-square tests (Beach et al., 2018; Clarke et al., 2017). The analysis similarities between studies demonstrates the utility of tools used in analysis of data. In the context of reading intervention, data is varied which is why more than one type of analysis is used. In using more than one tool, the reliability of the findings is increased.

**Interventions**

 In the literature reviewed, there was variety of reading intervention programs being used to support students. Two of these reading interventions included *READ 180* and *System 44*. While *READ 180* is a standalone program for grades four through twelve, *System 44* can be embedded within the *READ 180* program for small group directed intervention. Studies using the *READ 180* or *System 44* programs found little statistical significance, but did find some overall progress (Leko et al., 2015; McCray et al., 2018). Another study chose to use teacher coaching as a way to enhance a reading intervention program by making an explicit aim to have a child-focused solution to an intervention (Glover, 2017). While coaching was valuable to increasing teacher competence, data was not collected on how well the students progressed in their reading after the intervention took place, so the effectiveness of the intervention on students is unknown. Another study using a coaching model used the *Strategic Adolescent Reading Intervention (STARI)* to gather data and report on how teacher capacity was built around the area of reading interventions. This particular study was also limited because it relied on the amount of work completed and self-reports (Troyer, 2017). Without the use of a specific reading intervention program, one study chose to design reading intervention materials in cooperation with a learning therapist. The words were based on syllables in texts typically read by nine to twelve-year-old children (Müller et al., 2017). The result of the study was that there was a strong effect in word recognition and no effect in text-based reading comprehension. The study is limited because it is inspired by research but the intervention is made up and never been used outside of this study.

*Read Two Impress (R2I)* was implemented for reading intervention for students in grades two and three with a focus on studying their independent reading levels (Young et al., 2018). Overall, the researchers found that after six weeks of targeted intervention, *R2I* had a moderate effect on students’ independent reading levels (Young et al., 2018). *Reading Enhances Achievement During Summer (READS)* was used as a reading intervention program for one of the studies, aimed to determine if the interventions taking place during the school year can be supported over the summer (Kim et al., 2016). Overall, the data collected demonstrated that the intervention paired with the summer reading program was statistically significant for second graders as it had a delayed effect. The researchers believed that this delayed effect may have been due to the second graders fluency development increasing with age and exposure. For third graders, the intervention paired with the summer reading program were nonsignificant (Kim et al., 2016). *Sound Partners* (Vadasy, Wayne, O’Connor, Jenkins, & Pool, 1996) was implemented for one study, with the aim of supporting struggling readers and lower the rate at which students are identified as having a disability in reading. Results between pre and post testing were nonsignificant (Beach et al., 2018).

 The *Reading Intervention for Adolescents (RIA)* intervention focused on academic language through explicit vocabulary instruction and practice with oral and written skills. Assessment was completed in word reading, vocabulary, and comprehension. While the researchers expected a difference which would be statistically different, their findings post intervention were nonsignificant in each of the areas assessed (Williams & Vaughn, 2019). The *Continuous Reading (CR)* and *Repeated Reading (RR)* program results implemented in grades two through four were found to be outliers based on other research results using the same programs. The *CR* and *RR* programs with the intent of examining reading fluency were the shortest intervention conducted in respect to the other literature examined (Oostdam et al., 2015). Other programs, such as *Proactive Early Interventions in Reading (P-EIR)* claims to focus on all areas of reading. After implementation in four schools in four districts, the researchers found that with younger students the results were more significant (Coyne et al., 2018). This finding may be due in part to the development of students in grades one and two compared to older students. Overall, the results were positive and it was found that P-EIR supplementation was statistically significant in a multitiered system of support framework (Coyne et al., 2018).

 In a rural setting, researchers used a *Targeted Reading Intervention (TRI)* as a holistic approach to reading comprehension, focusing on word identification, fluency, vocabulary, and comprehension. The program targets one student at a time within a classroom, serving approximately five students in a school year. The results of the study indicated that in respect to word identification, there was a small effect size. In the area of fluency, there was no significant difference. In vocabulary, the effect size was small. Finally, in comprehension, there was a medium effect size (Vernon-Feagans et al., 2018). In a smaller study, researchers trained educational assistants in the Orton-Gillingham approach to work one-on-one or with small groups of students for forty minutes each day. In addition, students in need of intensive intervention were receiving one-on-one support with a Learning Assistance teacher. Out of all of the studies reviewed, this study had the highest reported time where students may have been engaged in intervention. Word recognition, reading comprehension, word recognition fluency, and decoding fluency all were statistically significant for students who received intensive intervention in the Orton-Gillingham approach (Partanen et al., 2019). Language comprehension and decoding were targets of a reading intervention program called *Reading Intervention and Comprehension (RI + C)* (Clarke et al., 2010). This intervention was shown to have a small but statistically significant improvement in reading comprehension and vocabulary compared to the control group (Clarke et al, 2017).

Information and communication technologies (ICT) was used in one study which implemented the *MindPlay Virtual Reading Coach (MVRC)* online reading intervention (MindPlay Educational Software for Reading, 2015). Using this intervention, the focus was on phonemic awareness and phonics. Overall, the researchers found that the effects of the intervention were large in reading fluency and non-word spelling specifically, followed by real world spelling which was found to be in the moderate range (Schneider et al., 2016).

 Of all of the interventions used in the studies the intervention has a focus on or the intervention is assessed on phonological growth (Beach et al., 2018; Coyne et al., 2018; Leko et al., 2015; Müller et al., 2017; Partanen et al., 2019; Schneider et al., 2016; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019), fluency (Beach et al., 2018; Coyne et al., 2018; Müller et al., 2017; Oostdam et al., 2015; Schneider et al., 2016; Vernon-Feagans et al., 2018; Young et al., 2018), or comprehension (Beach et al., 2018; Clarke et al., 2017; Kim et al., 2016; Müller et al., 2017; Oostdam et al., 2015; Troyer, 2017; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019). Studies focusing on teacher capacity and coaching did not assess students’ growth (Glover, 2017; Leko et al., 2015; McCray et al., 2018) therefore limiting the understanding of the effectiveness of the intervention used.

**Personal Experience and Context Influences an Intervention Program’s Success**

 In the literature reviewed, all studies identified the participants by age, gender, and ethnicity. In studies focusing on teacher capacity, teacher contexts were explained and personal experience with reading intervention programs and reading training were specified (Glover, 2017; Leko et al., 2015; Troyer, 2017; Vernon-Feagans et al., 2018). Teachers who had positive experiences in reading training and implementing reading intervention programs had successful outcomes (Glover, 2017; Leko et al., 2015). It is important to mention that different teachers have different teaching styles, so one type of intervention will be different in each classroom if teachers are given autonomy over their class (Kim et al., 2016; Leko et al., 2015).

Most studies focused on students of low socioeconomic status, minority groups, and students with behavioural concerns (Beach et al., 2018; Clarke et al., 2017; Coyne et al., 2018; Kim et al., 2016; Leko et al., 2015; McCray et al., 2018; Müller et al., 2017; Oostdam et al., 2015; Partanen et al., 2019; Schneider et al., 2016; Vernon-Feagans et al., 2018; Williams & Vaughn, 2019). Studies did not specify if students were offered anything in return for their participation through the classroom teacher or research team. Teachers were given release time to work with coaches and opportunities to debrief with coaches or administration (Coyne et al., 2018; Leko et al., 2015; Schneider et al., 2016).

There were a number of concerns in the implementation of the studies which affected the climate in which the intervention was taking place. In the technology based study, some students were unable to log in effectively at the beginning of classes, affecting their progress and contact time with the intervention (Schneider et al., 2016). It was clear in studies with students who had behaviour concerns that their priority needs being met was more important than the reading intervention study being conducted (McCray et al., 2018). Timing of the intervention was also important, as in one study spring break occurred after the intervention took place, followed by high-stakes testing. The researchers determined that there was an element of teaching to the test where the intervention was not continued after they left, affecting what they thought might have been more significant data (Young et al., 2018).

In some studies, the successful outcome of the studies could be contributed to the intervention type, the interventionist, or the context. In a teacher coaching model, students were not the focus of the study, but benefited because their teachers were given training to understand child-focused solutions to reading delays (Glover, 2017). Another successful approach was when the intervention took place either one-on-one or in small groups (Clarke et al., 2017; Oostdam et al., 2015; Partanen et al., 2019). By decreasing the student to instructor ratio, more specialized intervention is able to take place.

**Conclusion**

 Based on the research, it is evident that more studies regarding specific reading interventions must occur to widen the scope of understanding the effectiveness of specific reading interventions. The focus of reading intervention research has a specific demographic to study, while not problematic in developing samples, the lack of research conducted in Canada demonstrates that studying reading interventions through a Canadian lens is not a priority. It should be noted that reading intervention research conducted in the United States does not necessarily transfer to Canada due to the variation in curriculum, lack of high stakes testing, and teacher preparedness programs. However, the demographics of Canadians and Americans are similar enough that the results are viewed as transferable. Similar assessment measures used in reading intervention research indicates a consistency in conducting data analysis. While there are reasons to be skeptical of analysis in research, using common assessment measures is promising. Teacher and student participation in reading intervention studies is paramount in ensuring the success of a program. While the final results may be statistically nonsignificant, the intervention itself equips students and teachers with reading strategies they may find useful in following years. It would be of more benefit to students and teachers for reading intervention studies to be conducted over a longer period of time, however, the reality is that researchers and school districts have to move onto other projects.

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