EXPLORING THE EFFECTS OF STUDENT CHOICE OF TOPIC ON READING FLUENCY

INTERVENTIONS

by

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Abstract

Intrinsic motivation to read and reading difficulties reciprocally interact—students who have difficulties in reading are often less motivated to read, resulting in reading disengagement and even greater reading difficulties. However, by increasing a student's reading motivation, deep practice in reading also increases, resulting in improved reading outcomes. A way to improve student motivation is by incorporating student autonomy (through choice) in an intervention. The purpose of the study was to examine the effectiveness of a reading fluency intervention that incorporates student choice of topic through a multiple baseline across students design. Results indicated improvements in student reading fluency, both with the instructional passages and the generalization passages. Results from this study provide support for reading interventions that include choice of topic, even though students may choose passages or topics that are above their current reading levels.

Preface

The present study was conducted by Michèle P Cheng (primary research graduate) under the supervision of her supervisor, Dr. Sterett Mercer. The primary research graduate collected, and analyzed the data. A secondary research graduate conducted inter-observer agreement. The research conducted was approved by the University of British Columbia Behavioral Research Ethics Board (BREB) under certificate H15-03050.

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Chapter 1: Introduction

Students who struggle with reading in elementary school will often enter high school with reading skills one to two grades lower than that of their peers (Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008). In addition to poor school achievement, individuals with reading difficulties often have lower self-esteem, higher anxiety and depression, more social problems, and more aggression and delinquent behaviour (Eissa, 2010). The number of struggling readers is increasing. According to the United States (U.S.) National Assessment of Educational Progress (NAEP), there has been a decline since 1992 in the number of high school seniors who are at or above the "Proficient" level in reading (NCES, 2009). In fact, a third of Grade 4 public school students and a quarter of Grade 8 public school students performed at or below the "Basic" level on their reading tests (NCES, 2009).

A potential explanation for this decrease in reading literacy is the interaction of student lack of motivation and reading difficulties. Indeed, Stanovich (1986) hypothesized that early and persistent reading failure can initiate a downward spiral of increasingly negative repercussions. For instance, decreased motivation can lead students to avoid reading practice, which in turn results in increased reading difficulties, and thus a cascade of "poor-get-poorer" effects arises (Morgan et al., 2008). Studies have shown that students with reading difficulties are often less motivated to read (Donahue, Daane, & Yin, 2005). Furthermore, students who are less motivated to read will read less often than their peers (Wigfield & Guthrie, 1997). Reading less, in turn, contributes to the students' reading difficulties (Morgan et al., 2008) and increasingly generalized difficulties in cognitive processing, motivation, and behaviour (Scarborough & Parker, 2003; Stanovich, 1986).

More than half of the Grade 4 students assessed in a 2002 U.S. national survey stated that reading was not often performed for enjoyment (Donahue, Daane. & Yin, 2005). Furthermore, according to the 2006 Progress in International Reading Literacy Study, in which students from 40 different countries were assessed in reading, 37% of Grade 4 students stated that they only read once or twice a month, or even less outside of school (Mullis, Martin, Kennedy, & Foy, 2007). Evidently, reading is not an engaging task for some students.

Studies have also shown that highly motivated students read two-thirds more outside of school than their less motivated peers (Wigfield & Guthrie, 1997). In fact, the International Reading Association (2000) listed the onset and continuity of a student's motivation to read as one of the key requirements for reading comprehension. Additionally, studies have shown that, although teaching certain cognitive strategies, such as how to activate prior knowledge and strategic text processing, have been empirically found to improve student reading skills, motivation to read could override the contributions of these important constructs (Anmarkrud & Braten, 2009).

Although motivation is hypothesized to be an important factor in developing proper reading skills, its benefits in improving student skills have not yet been fully explored. Specifically, some methods to increase motivation, such as how to provide student choice, have not been adequately studied and are not being included as part of empirically-supported reading interventions, despite their potentially substantial benefits. The current study evaluated the effect of providing choice, a motivating factor, on the effectiveness of reading interventions. Specifically, this study focuses on the effectiveness of a reading fluency intervention that incorporates student choice of topic in a multiple baseline across students design.

Chapter 2: Literature Review

Motivation and Practice in Reading Achievement

Motivation is a theoretical construct used to explain why individuals repeatedly engage in a particular task. Guthrie and Wigfield (2000) defined motivation to read as an individual's personal ambitions, values, and attitudes related to reading topics, practices, and results. Studies have found that both an individual's cognitive skills, such as background knowledge and cognitive strategy use, and their level of motivation account for substantial differences in reading performance (Logan, Medford, & Hughes, 2011; Toboada et al., 2009). In fact, motivation appears to provide a stimulating and revitalizing role for cognitive processes, which in turn can impact achievement at a particular task (Pintrich, 2003; Toboada et al., 2009; Wigfield, Eccles, Schiefele, Roeser & Davis-Kean, 2006).

Multiple theoretical models underline the benefits of incorporating motivational factors in reading instruction (Becker, McElvany & Kortenbruck, 2010). For instance, the good-information-processing model integrates motivation within a set of key components of reading, such as cognitive capacity, general strategies, metacognition, and previous knowledge (Pressley, Brokowski & Schneider, 1989). Achievement motivation (motivation for specific goals, such as reading) has specifically been understood as a multidimensional construct (Eccles & Wigfield, 2002; Schiefele, 1999; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). According to a factor analysis, at least nine components can be differentiated within reading motivation (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997), including interest, preference for challenge, involvement, self-efficacy, competition, recognition, grades, social interaction, and work avoidance (Toboada et al., 2009). These components can be classified into two categories of motivation: internal and external motivations, the former of which has been shown to stimulate

greater persistence and sustained effort in activities (Ryan & Deci, 2000). Many of the internal motivation constructs can be encompassed in what is called "intrinsic motivation", which is a primordial concept in achievement motivation. In fact, a number of studies have emerged to advocate for the importance of intrinsic motivation on goal achievement and activity performance (Baker & Wigfield, 1999; Becker et al., 2010; Deci & Ryan, 1985; Guthrie et al., 2004; Guthrie et al., 1999; McElvany et al., 2008; Schaffner & Schiefele, 2007; Schlackman & Unrau, 2006; Wang & Guthrie, 2004; Toboada et al., 2009;).

Intrinsic motivation and reading achievement. Intrinsic motivation, which is voluntary engagement in an activity based on personal interest in the activity itself (Wang & Guthrie, 2004), plays an important role in goal achievement. In this case, intrinsic motivation for reading involves wanting to read based on interest in reading itself, being engaged in the act of reading, or reading for enjoyment (Guthrie, McRae & Klauda, 2007). Sources of intrinsic reading motivation can include experiencing positive emotions when reading, considering reading books as a source of enjoyment, evaluating reading as important, and having a genuine interest in the topic covered by the reading material (Becker et al., 2010). In other words, intrinsic motivation is an important construct linked to reading progress, and it is heavily involved in improving reading skills.

Accomplishing challenging reading tasks often produces within the individual a feeling of pleasure, as well as an improvement in reading skills (Csikszentmihalyi, 1990). This concept is known as "flow" (Csikszentmihalyi, 1975). Flow, which is the cognitive and emotional satisfaction felt by performing a specific activity of leisure, leads students to invest a greater amount of time in the task at hand (in this case, reading). Through flow, students are considered intrinsically motivated and become self-determined in reading tasks (Wang & Guthrie, 2004).

Flow can lead individuals to being proactive and engaged, or alternatively, the lack thereof can lead individuals to be passive and alienated. It is largely a function of the social conditions in which individuals develop and function, and the presence of flow is what sparks individuals in being self-motivated (or intrinsically motivated).

The expectancy-value framework (Wigfield & Eccles, 2000) describes another pathway in which intrinsic motivation leads to goal achievement. Within this framework, the student's self-efficacy to accomplish a task, as well as the value the student places on performing it, influences the amount of effort, the persistence, and the choices the student makes to pursue a goal (Anmarkrud & Braten, 2009). The perception of the importance of the task, its necessity pertaining to current and future goals, and the individual's genuine interest in performing the task are key factors encompassed within this framework (Wigfield & Eccles, 2000). Task valuation extends beyond simple pleasure in performing the task. Individuals also put forth effort if the task has a practical purpose, a concept known as utility value, and attainment value, which is how important conquering the task is to goal achievement. Deciding that performing a task is useful for a specific goal increases an individual's intrinsic motivation to perform the task at hand.

Ultimately, intrinsic reading motivation implies a student is interested in reading, which is a student's personal investment in the activity (Alexander & Murphy, 1998). Interest in reading increases the frequency of reading (Morgan et al., 2008) and a deeper understanding of what is read (Schiefele, 1996; Schiefele & Krapp, 1996).

Deep practice and reading achievement. The more reading is practiced, the better the reader becomes. Daniel Coyle published a book (2009), in which he concisely explains Hebb's law as it applies to practice. Every time we practice a specific task, the neurons in our brain fire

an action potential, and it strengthens the protective myelin sheath around it, allowing for a facilitated task performance the following attempt. Since neurons that fire through a circuit frequently become stronger, faster and more fluent (Coyle, 2009), the more an individual practices a particular task, the easier it is for them to perform it at a later time, and the more they improve at the task. That is why frequent reading enhances reading efficiency: the reading process becomes better automatized. For instance, decoding and strategy use in reading become second nature, which can free up more cognitive resources for higher-order information processing, such as reading fluency and reading comprehension (Laberge & Samuels, 1974). In fact, studies have shown that intensive reading interventions (i.e., reading practice) lead to changes in spatiotemporal profiles of regional brain activity and improvements in reading (Simos, Fletcher, Sarkari, Billingsley, Rebecca, Denton, & Papanicolaou, 2007). In other words, the more a reader practices, the better the reader becomes.

Reading motivation and deep practice. Motivation to read increases the amount of time spent practicing reading, which in turn facilitates reading literacy (Becker et al., 2010). Reciprocally, improved reading literacy increases reading motivation and, subsequently, reading engagement.

Research suggests that intrinsic motivation to read is associated with higher levels of reading attainment (Wang & Guthrie, 2004), and is positively correlated with student academic performance (Lepper, Henderlong Corpus & Iyengar, 2005). A study showed that intrinsic motivation to read had a strong correlational relationship with reading achievement for fourth- and fifth-grade students, even when background variables, such as socioeconomic status and gender were controlled (Baker & Wigfield, 1999). In addition, students who were intrinsically motivated to read often persisted when faced with difficult tasks (Deci, 1992), and they

voluntarily put more effort into reading than their less motivated peers (Logan, Medford &
Hughes, 2011). Intrinsic reading motivation has been associated with the ability to perform
higher order literacy tasks (Turner, 1995), and has had a positive correlation with the amount of
time spent reading, and reading comprehension (Gottfried, 1990; Guthrie et al., 1999). In fact,
studies have shown that students who were assessed as having very high academic intrinsic
motivation performed better than their peers on reading measures throughout elementary and
high school (Gottfried, Cook, Gottfried & Morris, 2005).

Conversely, students with reading difficulties might have a reduced motivation to read,
resulting in an avoidance of reading, and subsequently increased reading difficulties. A study
was conducted to determine whether early reading failure decreases children's motivation to
practice reading (Morgan et al., 2008). Results indicated a relationship between early reading
failure, poor motivation, and avoidance of reading. Furthermore, a second study showed that,
when faced with assessments at the same difficulty level as their peers, students who had greater
reading difficulties also had a more challenging task ahead of them and needed greater reading
motivation to persist at the task and perform well (Logan et al., 2011). In other words, children's
motivation to read is influenced by the difficulty level of their reading materials (Medford &
McGeown, 2012).

To conclude, intrinsic motivation and deep practice are two factors that contribute to
greater improvements in reading. Motivation to read increases student practice in reading
(through reading amount), which consequently affects achievement in reading. Conversely,
practicing how to read facilitates the task, thereby increasing student motivation to read in the
future. Both intrinsic motivation and deep practice have a reciprocal interaction affecting reading
achievement.

Choice and Intrinsic Motivation

According to self-determination theory, autonomy is one of the three fundamental needs that underlie people's intrinsic motivation (Deci, 1971). Indeed, motivation to read is increased when a student's environment allows them to freely perform certain actions, or to have the ability to choose certain elements in a task (Patall, Sylvester & Han, 2014). When students are autonomously motivated, their choice in task performance is driven by intrinsic motivation. In other words, they perform certain activities because they are pleasant, interesting, meaningful or important to them (Wijnia, Loyens, Derous & Schmidt, 2015). Consequently, autonomous motivation has been shown to result in increased academic outcomes (Wijnia et al., 2015). Conversely, when a student's environment is perceived as controlling, or having no option for student choice, intrinsic motivation is diminished (Patall, Sylvester & Han, 2014). Choice is therefore an important factor in intrinsic motivation.

Research has shown that choice can lead to many positive outcomes, such as an increase in interest, pleasure derived from the activity, and perseverance on a task (Cordova & Lepper, 1996; Iyengar & Lepper, 1999; Swann & Pittman, 1977; Zuckerman et al., 1978), as well as an increase in effort, deep-learning, and performance on a task (Amabile, 1979, 1983; Amabile, Hennessey & Grossman, 1986; Cordova & Lepper, 1996; Iyengar & Lepper, 1999; Patall et al., 2008, 2010). In fact, a meta-analysis on the effects of choice was conducted and demonstrated that choice enhanced intrinsic motivation, effort, task performance, and perceived outlook on outcome (Pattall et al., 2008). Furthermore, all types of choices increased intrinsic motivation, indicating that offering individuals choices provides them with perceived autonomy and competence, which enhances intrinsic motivation (Wijnia et al., 2015). Therefore, students may

need to feel autonomous and competent for motivation to result (Deci, 1980; Deci & Ryan, 1985; Deci & Ryan, 1987, Ryan & Deci, 2000).

Choice and Reading Fluency. The National Reading Panel (2000) identified reading fluency, which is the speed, accuracy, and expression of reading, as one of the five major instructional targets for reading. It is a critical skill to acquire, as it facilitates higher-order reading skills, such as reading comprehension, and deriving meaning from text (LaBerge & Samuels, 1974). Multiple reading fluency interventions have been evaluated and found to support a student's improvement in reading, specifically in reading speed, accuracy, and comprehension (Therrien, 2004). However, few have incorporated student choice of topic, which is why the present study will examine the effects of student choice of topic on the effectiveness of reading fluency interventions.

As mentioned, previous studies have shown that choice can have a powerful motivating effect on reading outcomes. One particular study examined the effects of student choice of whether and how to be instructed on academic performance (Daly, Garbacz, Olson, Persampieri & Ni, 2006). A multiple-probe design was used to measure the effects of academic performance during a reading fluency intervention with two middle school students. Students could select whether to be instructed in reading. Results showed that both students consistently chose to be instructed and stable increases in oral reading fluency were obtained. A second study examined whether improvements in oral reading fluency could be produced through student-selected parent-delivered reading interventions (Daly & Kupzyk, 2012). In an alternating treatments design, three students were given the opportunity to choose which intervention strategies they wanted their parents to use. Once again, generalized improvements in oral reading fluency were found for all participants. A final study evaluated the benefits of student choice through an

experiment, in which the benefits of instructor-selected literature resources were compared to the benefits of student-selected literature resources on several learning outcome variables (Wijnia et al., 2015). Sixty undergraduate students participated in the study, and results showed that students in the student-selected literature condition had higher scores on autonomous motivation and perceived competence, and lower scores on perceptions of mental effort during studying. While the students in the instructor-selected condition performed better on tests of factual knowledge, no difference was found between groups for conceptual questions. Overall, the results indicated that the students who selected their own literature benefited in terms of autonomous motivation, perceived competence, and perceptions of mental effort invested during learning.

These studies show that choice plays a prominent role in reading performance. Individuals are more likely to engage in an activity if they believe they have chosen it (Lewin, 1952). However, reading interventions have not yet fully utilized choice to improve student reading outcomes. Studies have been conducted that demonstrated how providing student choice in reading interventions, such as student choice of reading intervention strategy, as well as "whether" and "how" to be instructed, has led to stable increases in reading fluency (Daly, Garbacz, Olson & Persampieri, 2006; Daly & Kupzyk, 2012). However, while studies have found an effect of student choice of strategy and instruction on reading fluency, very few studies have explored the benefits of other venues for student choice in reading interventions. Specifically, to my knowledge, no study has yet explored the effects of student choice of reading topic in reading fluency interventions.

Allowing students to choose which passage topic to read increases the difficulty in providing students with passages that are matched to their reading level; however, other factors

may need to be considered when determining the appropriateness of a reading passage for a student, such as whether the student is motivated to read that passage. In a study that examined the effects of instructional match on a student's ability to generalize and retain information from passage reading instruction (Daly, Martens, Kilmer & Massie, 1996), students were instructed to read passages that were either instructionally matched to their reading levels, or instructionally mismatched. Results showed that there were more generalized gains in students' oral reading accuracy and fluency when the passages utilized were at the student's reading ability level. The prevailing argument has since been that the use of passages that incorporate student choice may be too difficult, and therefore not as effective in interventions as those that are purposefully chosen to be at a student's instructional reading level (Daly, Martens, Kilmer & Massie, 1996). The intervention passages provided for students within the previous study were highly controlled for difficulty. Arguably, it can be logical to assume that students would perform better on researcher-selected passages that are at their instructional reading level, in comparison to standard passages that are too difficult. However, within the argument, motivation is never taken into account.

Though a passage may be matched to a student's reading level, other factors may nevertheless play a role in student reading performance on that passage. For instance, student motivation plays an important role in reading performance, and studies show that a student's motivation to read a specific passage is unrelated to that passage's difficulty (Fulmer & Tulis, 2013). In fact, when selecting a book for independent reading, students will often choose books that are more difficult, rather than instructionally-levelled (Donovan, Smolkin, & Lomax, 2000). Burns and colleagues (2015) also conducted a study examining informal reading inventories (IRIs) used to identify students' instructional level by assessing the highest reading level at

which students can decode and comprehend a passage. Researchers examined the validity of IRIs by examining the percentage of words read correctly for 64 Grade 2 and Grade 3 students. Results showed that students' reading accuracy was inconsistent across books that were considered to be at the same level of difficulty and within the student's instructional reading level (Burns et al., 2015). The researchers suggested that the inconsistent reading performance on texts of similar levels of difficulty could have been caused by additional factors, such as text structure, prior knowledge, the nature of the reading task, or how the definition of the reading level was defined (Burns et al., 2015). In any case, the accuracy with which students are assigned to an instructional reading level comes into question, and it becomes necessary to caution against relying uniquely on assessment data to define a student's instructional reading level, as other factors, such as motivation, may come into play when assessing student reading performance.

Finally, what of passages that students themselves choose to read, and for which they are self-motivated to read? A recent study examined whether the books preferred by children were harder than books that were chosen for children by teachers, parents, and librarians (Topping, 2015). Results not only indicated that these books were significantly more difficult, they also showed that when students were free to choose which book to read, they were able to maintain a high rate of success in reading comprehension despite the fact that they chose books that were well above their current reading level (Topping, 2015). This article suggests that although reading accuracy may be lower, if students are interested in the reading topic, they may nevertheless be able to maintain a high degree of text comprehension. Though matching passage difficulty to reading level is important, letting students choose which books to read can lead to a better match for other considerations, such as motivation. For instance, when provided with choice, students may select books on familiar topics, thus facilitating text comprehension. Books

chosen may also be of greater interest to them because of genre (i.e., fiction vs. non-fiction), or even gender of the protagonist (Topping, 2015).

While student instructional reading level was found to be an important indicator of student reading performance (Daly et al., 1996), studies have shown that student performance was still found to be inconsistent among different passages of similar reading levels (Burns et al., 2015), thus suggesting that other factors also may impact student reading performance. Further studies indicated that student choice of reading material is often of a higher difficulty level than their instructional level, however students are nevertheless able to maintain a high degree of reading comprehension (Topping, 2015). Furthermore, as indicated in previous research, student motivation impacts reading performance, which might lead to performing better or worse on certain passages. If a passage is of higher interest, the student may read more of it than if it were a less stimulating passage. Allowing a student the choice of which passage to read may result in more stable reading patterns because it incorporates the student's reading interest when determining their instructional materials. In fact, providing choice may increase a student's access their own natural reinforcement for reading (intrinsic motivation), as they would enjoy the reading materials presented. As such, reading enjoyment is used to promote reading engagement and offers a different motivational channel at a student's disposal, compared to extrinsic and performance-based reinforcement.

A student's motivation to read a particular passage through the provision of choice should be included when evaluating whether the passage is of appropriate difficulty. After all, student choice of reading topic has a strong motivating component, and can result in higher reading outcomes, despite increased text difficulty.

The Present Study

As there have been few studies exploring the effects of student choice in reading fluency interventions, the present study is an attempt to expand the literature and gain valuable insight regarding the effects of a student's choice of topic on their intrinsic reading motivation and reading improvement. In addition to assessing the effectiveness of a reading intervention that incorporates student-selected passages, this study examines the effect of choice of reading topic on student engagement in reading, as well as amount of reading performed outside of the intervention.

To examine the effectiveness of a reading intervention that incorporates student choice of topic, the current study used a delayed multiple baseline design across four participants. Following a baseline phase, students participated in eight weeks of an oral reading fluency intervention. The following three research questions were addressed:

1. Can a reading fluency intervention be effective in improving student reading skills if it incorporates a student's choice of reading topic?

2. What are the effects of a reading intervention that incorporates student choice of topic on student motivation and engagement during the reading intervention?

3. What are the effects of a reading intervention that incorporates student choice of topic on reading initiative outside of the reading intervention?

Chapter 3: Method

Participants

Four students in Grade 4 who were identified by their teachers as experiencing reading difficulties participated in this study. They attended an Anglophone school in the Catholic Independent Schools Vancouver Archdiocese (CISVA). While they participated in other clubs and interventions programs (such as track & field, choir, and spelling interventions), these did not include reading intervention services. Their demographics and reading behaviours are in Tables 1, as described by their parents and 2, as described by the participants.

Table 1

Parent-Reported Student Demographics

Student Pseudonym	Age	Languages Spoken at Home	Parental Education	Time Spent Reading at Home	KBIT IQ Composite
Ron	9:3	English (98%) Tagalog (2%)	High School and Bachelor Degrees	3.5hrs/wk	96
Harry	9:6	English (85%) Ilocano (10%) Tagalog (5%)	Bachelor Degrees	3hrs/wk	90
Hermione	9:9	English (99%) Tagalog (1%)	Bachelor Degrees	12hrs/wk	105
Ginny	9:3	Spanish (100%)	Bachelor and Master Degrees	2hrs/wk	104

Table 2

Student-Reported Reading Behaviours

Student Pseudonym	Number of Books at Home	Library Visits	Reading at Home	Reading at School
Ron	10-20	1/month	Every day	2-3/week
Harry	20-30	1/week	Every day	Almost never

Student Pseudonym	Number of Books at Home	Library Visits	Reading at Home	Reading at School
Hermione	10-20	2-3/week	Many times/day	Every day
Ginny	20-30	1/week	2-3/week	Every day

Measures

    Cognitive functioning. The Kaufman Brief Intelligence Test, Second Edition (KBIT-2) is a brief norm-referenced measure designed to screen individuals aged 4.0 to 90.11 for cognitive functioning (Kaufman & Kaufman, 2004). The KBIT-2 is a commonly used screener for cognitive functioning that requires approximately 15 minutes to administer and involves three subtests (Verbal Knowledge, Riddles and Matrices) that measure the two closest broad abilities to general intelligence. The KBIT-2 was reported as having strong levels of reliability (0.89 to 0.96). Furthermore, validity evidence shows that the KBIT-2 has strong correlations with other intelligence and achievement tests (Kaufman & Kaufman, 2004).

    Broad reading. A computerized adaptive test (CAT) of broad reading skills, aReading (Christ et al., 2014) was administered as a measure of comprehension and related areas of reading. It uses a multiple-choice item format and establishes a student's broad reading skills by assessing a range of reading domains, including concepts of print, phonological awareness, phonics, vocabulary, and comprehension (Christ et al., 2014). The FastBridge aReading is administered and scored with browser-based software, and benchmark standards are available for each grade level. Because this measure is computerized, it is relatively easy to administer and highly efficient, as there is an item-response theory (IRT)-based selection, leading to optimal items to administer. FastBridge aReading administrations each contain 30 items and require approximately 10 to 15 minutes. A composite scale score is obtained ranging from 350 to 650. It has a high degree of reliability, as evidenced by having most coefficients of reliability above

0.80, and even having a coefficient of reliability of 0.95 for alternate forms reliability (Christ et al., 2014). It also has a high degree of construct and predictive validity, and a strong positive correlation between composite scores from other reading measures, such as the Gates-MacGinitie Reading Tests, 4th, edition (GMRT-4), a test of student vocabulary and reading comprehension skills (Christ et al., 2014).

      Reading fluency. During the intervention, the primary dependent variable, student reading fluency, was measured by obtaining the number of correct words read per minute (WCPM) on instructional (passages the students chose to read within intervention) and standardized (generalization) passages, FastBridge CBMReading. In CBMReading students are asked to read a narrative passage of roughly 230 - 300 words aloud for one minute, while the instructor follows along on a computer or tablet. There are three passage levels for CBMReading, with multiple grades represented within the same level. Student performance in reading is measured by the number of words correctly read per minute (WCPM). The student's WCPM scores can be horizontally and vertically equated to yield a comparable metric across levels. CBMReading has a moderate to high degree of validity, with most coefficients of reliability being above 0.80 (Christ et al., 2014). It also has a strong degree of concurrent and predictive validity in relation to similar assessments tools, such as the Test of Silent Reading Efficiency and Comprehension (TOSREC; Johnson, Pool, & Carter, 2011), an assessment of silent reading of connected text for comprehension; the Group Reading Assessment and Diagnostic Evaluation (GRADE; Bents, 2007), an assessment of pre-literacy skills, emerging reading skills, and core reading skills; the Measures of Academic Progress (MAP), a universal reading screener and assessment of student growth; the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Next, an assessment of early literacy skills and oral reading fluency;

and AIMSweb, a reading screener, progress monitoring tool and manager of data for student oral reading fluency performance (Christ et al., 2014). Most coefficients were above 0.90 (Christ et al., 2014).

Reading interest and accessibility to books. Short questionnaires on student reading interest (Appendix A) and reading habit (Appendix B) were administered to students prior to beginning the intervention. These questionnaires were developed by the researcher and identified the students' reading topic interests, frequency of reading, and accessibility to books. They required a total of 5 minutes to administer.

Motivation and Engagement Measures. The Motivation to Read Profile (MRP) is a measure of student motivation and engagement in reading (Gambrell et al., 1996). Students were asked to complete the MRP Survey, which contains 20 multiple-choice items. A composite score is used to determine a student's overall motivation for reading, and it was used in this study. The MRP requires approximately 20 minutes to administer and it was reported as having generally high levels of reliability, with an inter-rater reliability coefficient of 0.87. A test of validity was also conducted and statistically significant correlations between student motivation and reading achievement (Gambrell et al., 1996).

In addition to the MRP, students were asked to rate their motivation to read and their engagement in reading prior to beginning every session. They did so by evaluating the statements "I look forward to reading today" and "I enjoy reading" on a scale ranging from 1 (not at all) to 5 (very much so) at the beginning of every session. This required about 1 minute to administer.

Amount of reading measure. During the week, students were also asked to keep a log of the amount of time spent reading. Whenever they read (independently or with a parent, guardian,

friend, or sibling) for a period of 15 minutes of longer, they were asked to log their reading time in a booklet.

Procedure

Recruitment. Four students in grades 3-4 were selected as participants for the present study. Signed informed parental or guardian consent (Appendix C) was obtained prior to beginning the study. Signed student assent (Appendix D) was also obtained on the first meeting with the student. The assent form was read to the student and they were explained the process of the study. At these grade levels, students typically can read connected text with accuracy. However, they may have difficulties reading grade-level text with enough fluency to derive meaning from the passage. Eligible students were identified by their teachers as reading one to three grades below their expected instructional level. They were also required to have a score within two standard deviations from the mean on the Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman & Kaufman, 2004). Students with scores more than two standard deviations below the mean may have required a more intensive reading intervention than the one provided in the present study. Finally, students were required to be at least instructional on grade 1 reading materials based on performance on a computerized adaptive test (aReading) measuring basic reading skills. These requirements ensured that the students selected would benefit from a reading fluency intervention. Prior to baseline, parents were also asked to fill out a demographics questionnaire, yielding the data reported in Table 1.

Selection of instructional materials. Following eligibility identification, students were asked to complete a short questionnaire about their favourite books and reading topics to determine an appropriate selection of reading material. They were also administered a reading questionnaire to determine the amount of reading and accessibility of books outside of the

intervention. Based on student response on the interest questionnaire, as well as their performance on the initial FastBridge aReading, a set of books was acquired in the instructional range for each student. The difficulty of the books was obtained through the Lexile Analyzer (2015), which is a software program that measures the complexity of text by scoring and comparing each text based on characteristics, such as sentence length, word frequency, semantic complexity and referential cohesion. Passages with a Lexile score between 420-820 (at or slightly above a Grade 4 student's instructional reading level) were chosen. This was determined by linking the student's grade level to a range of Lexile values. These books were divided into passages of 250-300 words each. One passage was chosen per intervention session, but participants also had the opportunity to select a consecutive passage in a following intervention session.

        Experimental design. The students participated in a reading fluency intervention that integrated several evidence-based fluency-building strategies in a delayed multiple baseline across students design, in which the initiation of baseline measurement was delayed across students, but student participation and data collection was otherwise conducted concurrently. The study used a delayed design due to a limited number of reading passages, and to allow the ability to begin collecting baseline data with some students while still obtaining consent for others. In this study, all participants were identified prior to beginning baseline data collection; however, obtainment of consent was delayed for one student due to student illness resulting in temporary absence from school. The independent variable in this study was participation in a reading fluency intervention that included student choice of reading topic and selection of specific instructional materials. The primary dependent variable was student reading fluency, and secondary dependent variables were student reading motivation and student reading amount. In

this single-subject design, students acted as their own comparison and began the intervention at different time periods to control for threats to internal validity, such as historical events, participant maturation, testing conditions, instrumentation, attrition, statistical regression (or regression toward the mean) and participant selection, which may arise when there is no additional comparison group in the study (Kratochwill et al., 2010). The present study had two conditions: a baseline condition and an intervention condition. Initiation of the intervention condition was staggered and students began the intervention at sessions 6.0, 8.0, 10.0 and 12.0, respectively. These start points were selected to allow for six baseline data points to be gathered for each student, and for there to be enough overlap between participant baseline data to discount the aforementioned threats to internal validity. A priori phase changes were selected over response-guided changes to begin intervention as quickly as possible and optimize the students' time to improve in reading fluency. A student's academic performance is often highly variable (Kratochwill, Levin, Horner, & Swoboda, 2014) and response-guided changes would likely have resulted in prolonged baseline conditions, thus delaying the students' interventions.

Progress monitoring. Reading fluency probes from instructional and standardized passages (one of each per session) were administered and the number of words read correctly per minute (WCPM) was calculated as the primary dependent variable. Progress monitoring was collected three times a week in baseline and intervention, wherein students completed the reading fluency probes from FastBridge CBMReading. During the intervention, the instructor also recorded WCPM on instructional passages based on the first and final reading of each passage. Students also completed the reading motivation and engagement scales as measures of secondary dependent variables. Finally, prior to baseline, prior to beginning the intervention, and at the end of the intervention phase, the students were asked to complete the FastBridge

aReading as a measure of broad reading skills and the Motivation for Reading Profile, to measure student motivation and engagement in reading.

Baseline. During baseline, students participated in regular classroom instruction and progress monitoring.

Reading fluency intervention. The intervention sessions occurred three times a week, individually, and in a quiet area. Each student participated in the intervention session for a period of 8 weeks. Students received a reading fluency intervention modelled after the procedure developed in the Helping Early Literacy with Practice Strategies (HELPS) program (Begeny, 2009), with certain exceptions, namely the selection of passages for the intervention, the level of difficulty of these passages, and the criteria necessary to move from one passage to the next. Students were asked to choose a reading topic from a selection of three to five presented. They then read the passage aloud three times, each for a duration of one minute. In between readings, the instructor implemented evidence-based strategies that are designed to improve student reading fluency. These strategies are repeated reading, modeling, error-correction, verbal cuing for students to read with fluency, goal setting, performance feedback, and using systematic praise and a structured reward system for student reading behaviors and accomplishments.

Repeated reading. Repeated reading involves reading the same passage several times. In the present study, students were asked to read the same passage three times. It has been shown to increase a student's oral reading fluency and, as a result, reading comprehension (Therrien, 2004).

Modeling. Modeling is when a secondary individual reads aloud to the student, with the objective to show the student proper reading fluency and expression. In the present study, after the first reading, the instructor read the same passage aloud to the student. The instructor paused

after roughly seven words and the student filled in the missing word (Begeny, 2009). This ensured that the student was following along as the instructor read aloud. Modeling has been found to increase the accuracy and fluency of reading and is an effective tool for student improvement in reading fluency, even more than repeated readings alone (Chard, Vaughn, & Tyler, 2002; Therrien, 2004).

Phrase-drill error corrections. In the current study, after the second reading, the instructor selected two to four words from the passage that the student had read incorrectly, or had had difficulty reading fluently. The instructor first modelled how to correctly say the word, and then asked the student to read a segment of the passage that included the word three times. Phrase-drill error corrections can be an important part of repeated reading interventions (Therrien, 2004). Indeed, they facilitate learning how to read difficult words.

Verbal cueing. In the present study, the instructor began every intervention session with an introductory statement, reminding the student to give their best reading, which involved reading as quickly as they could without making mistakes. Prior to every reading, the instructor once again reminded the student to give the instructor their best reading. Verbal cueing a student to focus on giving their best reading improves the student's performance in oral reading fluency (Therrien, 2004). It is therefore an important component of repeated reading interventions.

Goal setting. The present study incorporated goal setting into the reading fluency intervention by asking the student to attempt to read more words than in their first reading. The use of goal setting interventions leads to significant growth over time (Morgan & Sideridis, 2006). In fact, a meta-analysis showed that goal setting interventions yielded substantially greater treatment effects compared to a modeling and repeated reading intervention alone (Morgan & Sideridis, 2006).

Performance feedback. Performance feedback involves providing information to the students regarding their reading performance for a particular passage. In the present study, the instructor provided feedback to the students on their performance. The students could see their performance graphed on their progress chart. The addition of performance feedback to goal setting interventions leads to more effective interventions and greater improvements in reading fluency (Morgan & Sideridis, 2006).

Reinforcement. In the present study, the instructor provided specific, genuine, effort-based praise to the students, such as "I can tell that you are working very hard today, and you are putting forth good effort to reach your goal!" At the end of every intervention session, students were awarded two stickers to put on their performance charts: one for putting forth good effort during the intervention, and another for reaching the daily reading goal.

Intervention implementation. The instructor pulled the student out of the regular classroom and to the reading intervention location. At the beginning of the session, the student was asked to choose a book passage from the selection of three to five books presented. The instructor then read the introductory statement to the students and asked the student to put forth their best effort. The student then read the passage aloud for one minute. Meanwhile, the instructor followed along and took note of the words that the student read incorrectly, or with which the student had difficulties reading. At the end of the first reading, the student had a general goal to read more words correctly than on their initial reading of the passage. The instructor next modeled the passage aloud for the student, and the student followed along and read omitted words. The student then read the passage a second time for one minute. After the second reading, the instructor provided phrase-drill error correction for the student. The instructor cued the student to give their best reading, and the student read the passage a final time

for one minute. The instructor praised the students, based on reading fluidity, accuracy, expression, and/or effort. At the end of the final reading, the students' performance was graphed based on their performance on the first and third readings of the passage. The students were also given stars based on their effort and goal achievement.

      Implementation integrity and inter-scorer agreement. A graduate student in school psychology implemented the intervention. The implementation flow chart is illustrated in Figure 1. They worked with all the students during the baseline and intervention phases. During the intervention, they followed a guide to implementation. Finally, all sessions were recorded and reviewed independently by a graduate student in school psychology to ensure fidelity of implementation. The independent evaluator reviewed one-third of the recorded sessions (i.e., 8 of 24 sessions per participant) and rescored the CBMReading progress monitoring. It was completed independently and without knowing the first instructor's scoring. All sessions were conducted with 100% integrity. Percentage agreement between the instructor and independent evaluators was calculated to account for inter-rater reliability. Percentage agreement was calculated by dividing the raters' lower WCPM obtained by the higher WCPM and multiplying the quotient by 100. Percentage agreement was between 89% and 100% for generalization passages, and between 83% and 100% for instructional passages (with 95% of reviewed sessions exceeding 90% percentage agreement). The results meet or exceed the minimal threshold of 0.80-0.90 that is required to meet evidence standards (Kratochwill et al., 2013).
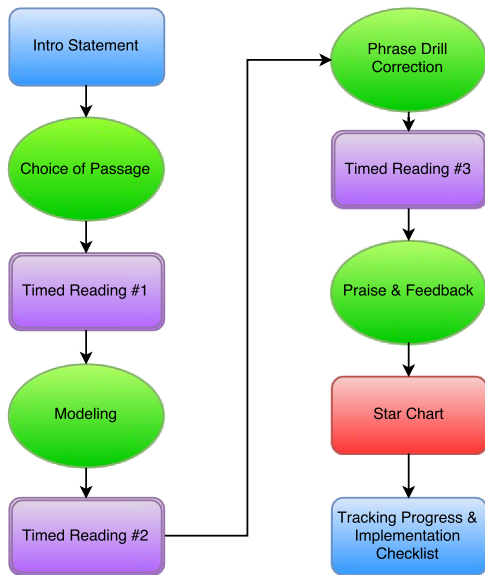
Figure 1. Implementation Flow Chart

Data Analysis

The dependent variables (i.e., WCPM on the instructional passages and the standardized FastBridge CBM Reading passages, student motivation scale and student reading amount scale) were graphed and visually analyzed, to detect changes in level, trend and variability from baseline to intervention phases. Changes between baseline and intervention (with first and third readings) were analyzed and compared. Specifically, the within-phase level, trend and variability of data points were calculated to characterize the overall gains in reading during the intervention. First and third readings in intervention were also compared to the baseline. Additionally, reading fluency in baseline and intervention phases were analyzed for generalization passages, and student motivation was assessed with the student motivation scales. Finally, student performance in FastBridge aReading and Motivation to Read Profile prior to the baseline, prior to the intervention and at the end of the intervention were also compared between baseline and pre-intervention, and pre-intervention to post-intervention, to determine whether student gains in overall broad reading skills and motivation to read were found.

Additionally, Kendall's Tau correlation, which can be used as a statistical test and effect size measure of non-overlapping data between two phases, was used to quantify improvements in reading resulting from the intervention (Tincani & De Mers, 2016). Of the possible variants of Tau, this study considered improvement to be non-overlapping data between baseline and intervention phases plus improving trend in intervention, with correction for improving trend during baseline (when such baseline improvement occurred); this measure is referred to as Tau_{A} $_{vs. B + Trend(B) – Trend(A)}$ when baseline trend correction is performed or $Tau_{A vs. B + Trend(B)}$ when there is no baseline trend correction in Parker et al. (2011). If Kendall's Tau for baseline data was statistically significant and trend was in the direction of improvement, then baseline trend was removed from the entire data series using the Theil–Sen estimator (see details in Tarlow, in press). Tau scores range from -1.0 to 1.0 with |0.00 – 0.65| suggesting a weak or small effect, |0.66 – 0.92| suggesting a medium to high effect; and |0.93 – 1.00| suggesting a large or strong effect (Parker & Vannest, 2009; Rakap, 2015; Rispoli et al., 2013;).

Chapter 4: Results

Fluency on Instructional Passages

After completing the intervention sessions with the participants, the data accumulated on the instructional passages were analyzed in two ways: direct gains of the intervention and generalized improvement on instructional passages. The following Figure 2 demonstrates student differences between the 1st and 3rd readings of the same instructional passages during intervention sessions. All participants improved in 100% of the sessions, except for one session for Ron. The mean differences between the first and third readings are outlined in Table 3.
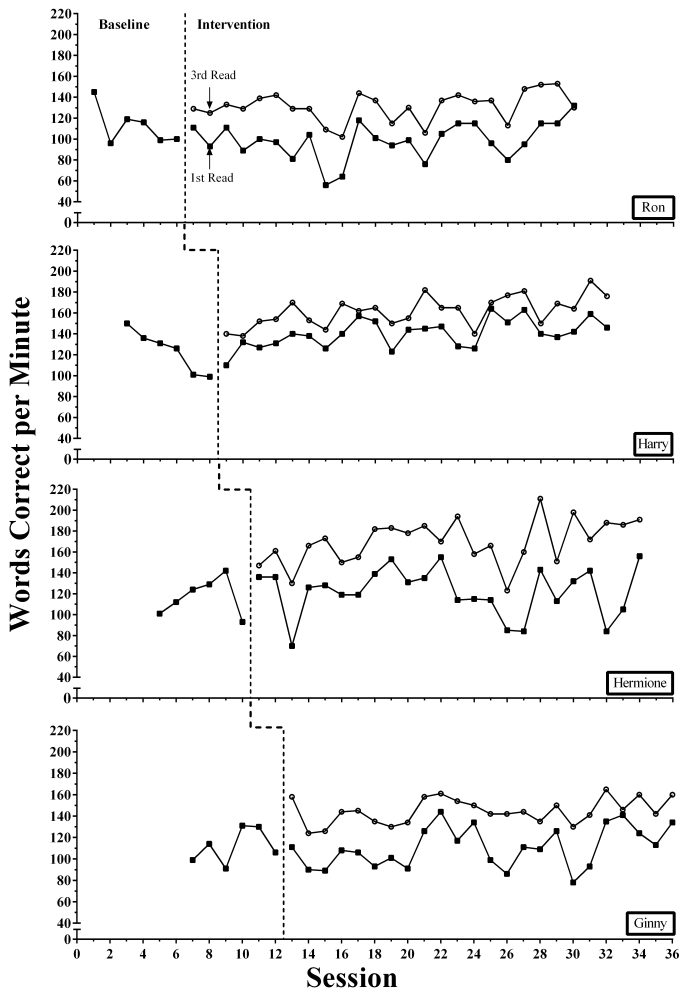
Figure 2. Participant reading gains on first and third instructional passage readings

Table 3

Means and mean differences between first and third readings

Participants	1st Reading	3rd Reading	Mean Differences
Ron	98.42	131.25	32.83
Harry	140.33	161.75	21.42
Hermione	122.25	169.92	47.67
Ginny	110.79	144.83	34.04

Direct gains of intervention. Direct gains of the intervention were analyzed by comparing participants' baseline data to their performance on the third readings during the intervention phase. Table 4 shows descriptive statistics for all participants on baseline and third readings of instructional passages. Table 5 shows participant Tau values and statistical significance.

Table 4

Descriptive statistics for participants' reading fluency on third reading of instructional passages

Phase	Mean	Standard Deviation	Slope
Ron			
Baseline	112.50	18.55	-18.77
Third Read	131.25	35.86	1.67
Harry			
Baseline	123.83	20.13	-31.29
Third Read	161.75	14.34	3.63
Hermione			
Baseline	116.83	18.30	4.71
Third Read	169.92	21.22	3.93
Ginny			
Baseline	111.83	16.34	10.53
Third Read	144.83	11.78	1.74

Table 5

Tau values measuring differences in reading from baseline to third reading in intervention

Participant	Tau Value	*p*
Ron	0.365	0.01

29

Participant	Tau Value	p
Harry	0.403	0.00
Hermione	0.546	0.00
Ginny	0.448	0.00

Tau$_{A \text{ vs. } B + \text{Trend(B)}}$

Ron. Ron's performance on the baseline passages initially demonstrated a descending trend (slope = -18.77 WCPM per week). Following the intervention implementation, Ron appeared to increase in the number of words read correctly per minute (slope = 1.67 WCPM per week). He demonstrated a positive change in trend, and an increased level ($M_{baseline}$ = 112.5; $SD_{baseline}$ = 18.55; $M_{3rd \, read}$ = 131.25, $SD_{3rd \, read}$ = 35.86). Ron's Tau value (Tau = 0.365; p = 0.01) was statistically significant, but of small magnitude. Based on magnitude and statistical significance of Tau, the change in trend, and improvement in level on average, there is a demonstrated effect of reading improvement because of the intervention administered.

Harry. Harry's performance on the baseline passages initially demonstrated a descending trend in baseline (slope = -31.29 WCPM per week). Following the implementation of the intervention, there was a change in trend on the third readings (slope = 3.63 WCPM per week). There was also a change in level ($M_{baseline}$ = 123.83; $SD_{baseline}$ = 20.13; $M_{3rd \, read}$ = 161.75, $SD_{3rd \, read}$ = 14.34). These observations are consistent with the effect size measures. Tau was of small magnitude and statistically significant (0.403, p = 0.00). Based on the magnitude and statistical significance of Tau, the change in trend, and the change in level, there is a demonstrated effect on reading for Harry from baseline to final reading on instructional passages.

Hermione. Hermione's baseline performance demonstrated an improving baseline trend (slope = 4.71). When comparing baseline to intervention, there appeared to be a change in trend (slope = 3.93), as well as a change in level ($M_{baseline}$ = 116.83; $SD_{baseline}$ = 18.30; $M_{3rd \, read}$ = 169.92, $SD_{3rd \, read}$ = 21.22). However, it is difficult to detect an effect because of the

improvements in baseline trend. Tau values indicate a statistically significant, small improvement over time (Tau = 0.546, p = 0.00). Based on the magnitude and statistical significance of Tau, and the change in level, there appears to be a demonstrated effect on reading for Hermione from baseline to third reading on instructional passages, limited however by her improving trend in baseline.

Ginny. Ginny's performance on the baseline passages demonstrated an initial improving trend (slope = 10.53 WCPM per week). Following the implementation of the intervention, there was a change in trend on the third readings (slope = 1.74 WCPM per week). During the intervention, she demonstrated an increased level ($M_{baseline}$ = 111.83; $SD_{baseline}$ = 16.34; $M_{3rd\ read}$ = 144.83, $SD_{3rd\ read}$ = 11.78); however, it is difficult to detect an effect because of the improvements in baseline trend. Tau values indicate a small, statistically significant improvement over time (Tau = 0.448, p = 0.00). Thus, based on the magnitude and statistical significance of Tau, as well as a change in level, there is some evidence of a demonstrated effect, with limitations noted due to improving baseline trend.

Summary. Overall, the data show a clear demonstration of effect for two out of four participants (Ron and Harry), with the third and fourth participants (Hermione and Ginny) showing demonstrated effects, but with limitations.

Generalized improvement on instructional passages. Generalized improvements related to the intervention on instructional passages were analyzed by comparing the participants' baseline data to their performance on the first readings during intervention sessions. Figure 2 illustrates participant reading gains from baseline to first and third intervention readings. Table 6 shows descriptive statistics for all participants on baseline and first readings of instructional passages. Table 7 shows participant Tau values and statistical significance.

Table 6

Descriptive statistics for participants' reading fluency on first reading of instructional passages

Phase	Mean	Standard Deviation	Slope
Ron			
Baseline	112.50	18.55	-18.77
Intervention (1st Reading)	98.42	17.81	2.13
Harry			
Baseline	123.83	20.13	-31.29
Intervention (1st Reading)	140.33	13.51	3.06
Hermione			
Baseline	116.83	18.30	4.71
Intervention (1st Reading)	122.25	23.46	-0.75
Ginny			
Baseline	111.83	16.34	10.53
Intervention (1st Reading)	110.79	18.94	3.03

Table 7

Tau values measuring differences in reading from baseline to first reading

Participant	Tau	*p*
Ron	-0.019	0.900
Harry	0.584	0.00
Hermione	0.01	0.943
Ginny	0.15	0.251

$Tau_{A \text{ vs. } B + Trend(B)}$

Ron. As mentioned above, Ron's baseline performances demonstrated a decreasing trend (slope = -18.77 WCPM per week). During the intervention, there was a change in trend (slope = 2.13 WCPM per week), but a decrease in level ($M_{baseline}$ = 112.50; $SD_{baseline}$ = 18.55; $M_{1st\ read}$ = 98.42, $SD_{1st\ read}$ = 17.81). Additionally, Tau was near zero and not statistically significant, thus there is not enough evidence to suggest a demonstrated effect from baseline to first intervention readings.

Harry. Harry's baseline performance demonstrated an initial decreasing trend (slope = -31.29 WCPM per week). There was a change in trend in intervention (slope = 3.06 WCPM per week). Additionally, there was a change in level ($M_{baseline}$ = 123.83; $SD_{baseline}$ = 20.13; $M_{1st\ read}$ = 140.33, $SD_{1st\ read}$ = 13.51) and a small, statistically significant Tau value (Tau = 0.584, p = 0.00). Based on the magnitude and statistical significance of Tau, as well as the change in level and trend, the data suggest a demonstrated effect from baseline to first intervention readings, limited by much overlap between baseline and intervention performances.

Hermione. Hermione's baseline performance demonstrated an initial improving trend (slope = 4.71 WCPM per week). During the intervention, there was a negative change in trend (slope = -0.75), but a slightly improving level ($M_{baseline}$ = 116.83; $SD_{baseline}$ = 18.30; $M_{1st\ read}$ = 122.25, $SD_{1st\ read}$ = 23.46). Additionally, Tau was near zero and not statistically significant, thus suggesting no demonstrated effect from baseline to first intervention readings.

Ginny. Ginny's baseline performance demonstrated an initial improving trend (slope = 10.53 WCPM per week). During the intervention, there was a negative change in trend (slope = 3.03 WCPM per week) and no change in level ($M_{baseline}$ = 111.83; $SD_{baseline}$ = 16.34; $M_{1st\ read}$ = 110.79, $SD_{1st\ read}$ = 18.94). Additionally, Tau was negligible and not statistically significant, thus suggesting no demonstrated effect from baseline to first intervention readings.

Summary. Overall, the data suggest only one demonstrated effect (Harry) from baseline to first intervention readings. Therefore, there do not appear to be generalized improvements on instructional passages.

Fluency on Standardized Passages

Participants' fluency on standardized passages was also analyzed to determine whether generalized gains occurred. The following Figure 3 illustrates WCPM in baseline and

intervention on the standardized passages. Table 8 shows descriptive statistics for all participants during baseline and intervention on standardized passages. Table 9 shows participant Tau values and statistical significance.
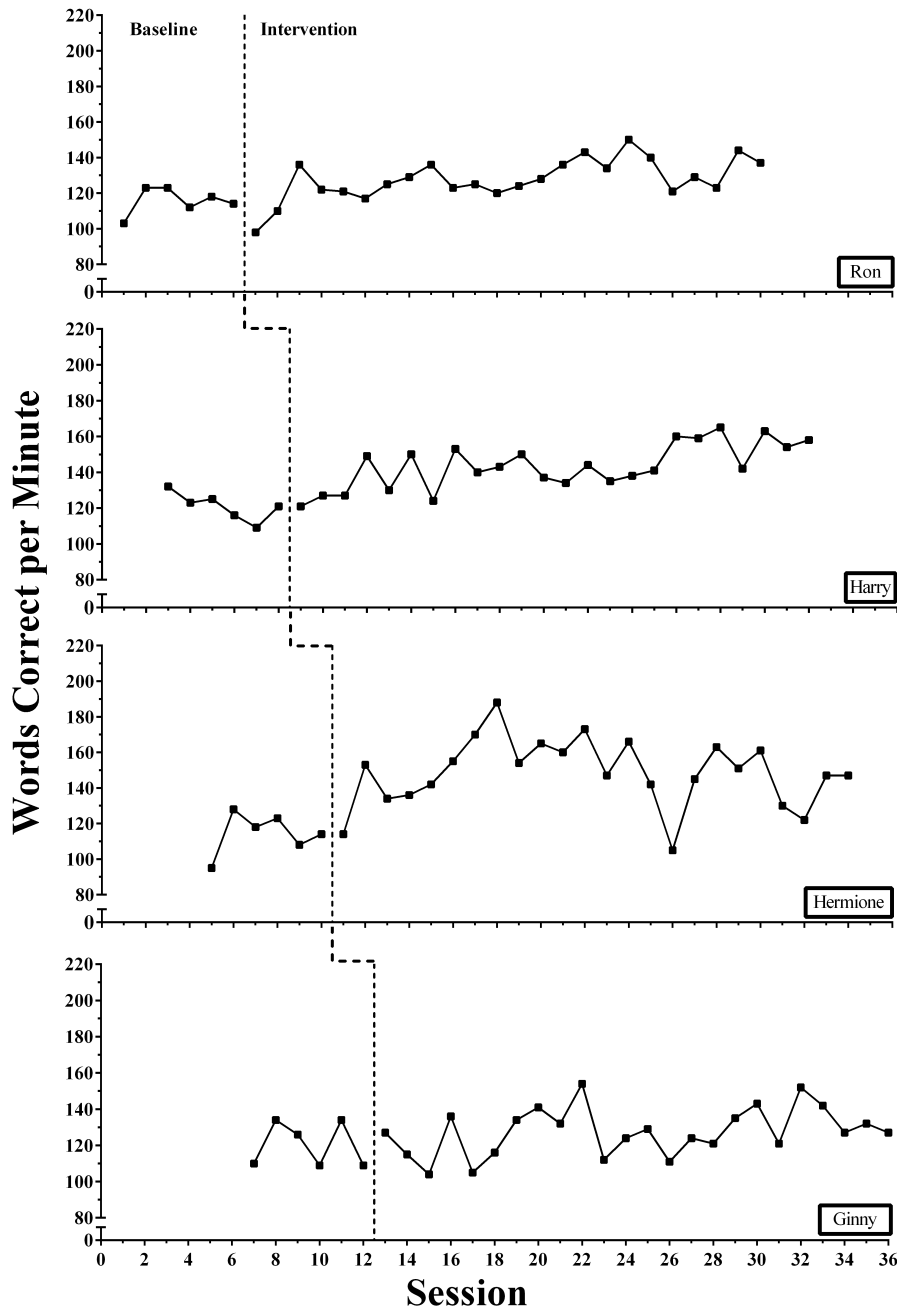

Figure 3. Number of words read correctly per minute on standardized passages

Table 8

Descriptive statistics for standardized passages

Phase	Mean	Standard Deviation	Slope
Ron			
Baseline	115.50	7.61	2.49
Intervention	127.96	11.51	2.91
Harry			
Baseline	121.00	7.87	-9.09
Intervention	143.50	12.77	3.69
Hermione			
Baseline	114.33	11.74	3.42
Intervention	148.75	19.10	-0.51
Ginny			
Baseline	120.33	12.40	-1.11
Intervention	127.67	13.38	1.95

Table 9

Differences in reading from baseline to standardized intervention passages

Participant	Tau	p-value
Ron	0.505	0.00
Harry	0.613	0.00
Hermione	0.271	0.04
Ginny	0.246	0.06

Note. $Tau_{A \text{ vs. } B + Trend(B)}$ was calculated for all students.

Ron. Ron's baseline passages demonstrated an improving trend (slope = 2.49 WCPM per week). Following the intervention implementation, his performance on the standardized passages increased with a slight change in trend (slope = 2.91 WCPM per week) and larger change in level ($M_{baseline}$ = 115.50; $SD_{baseline}$ = 7.61; $M_{Intervention}$ = 127.96, $SD_{Intervention}$ = 11.51). Additionally, Tau was small and statistically significant (0.505, p = 0.00). Based on the magnitude and statistical significance of Tau, as well as the change in level and trend (albeit small change in trend), the data suggest a demonstrated effect on reading.

Harry. Harry's baseline performance demonstrated a decreasing trend (slope = -9.09 WCPM per week). Following intervention implementation, his performance on standardized passages increased with a positive change in trend (slope = 3.69 WCPM per week) and level ($M_{baseline}$ = 121.00; $SD_{baseline}$ = 7.87; $M_{Intervention}$ = 143.50, $SD_{Intervention}$ = 12.77). Additionally, Tau results were small to moderate and statistically significant (Tau = 0.613, p = 0.00). Based on the change in level and trend, as well as the magnitude and statistical significance of Tau, there is a demonstrated effect on reading.

Hermione. Hermione's baseline performance demonstrated an improving trend (slope = 3.42 WCPM per week). Following intervention implementation, her performance on standardized passages increased with a positive change in level ($M_{baseline}$ = 114.33; $SD_{baseline}$ = 11.74; $M_{Intervention}$ = 148.75, $SD_{Intervention}$ = 19.10). Despite a decreasing trend in intervention (slope = -0.51 WCPM per week), Tau was small but statistically significant (Tau = 0.271, p = 0.04). Therefore, based on the magnitude and statistical significance of Tau, as well as the change in level, there is a demonstrated effect on reading, limited by the decrease in trend.

Ginny. Ginny's baseline performance demonstrated a decreasing trend (slope = -1.11 WCPM per week). Following intervention implementation, her performance on standardized passages increased with a positive change in trend (slope = 1.95 WCPM per week) and level ($M_{baseline}$ = 120.33; $SD_{baseline}$ = 12.40; $M_{Intervention}$ = 127.67, $SD_{Intervention}$ = 13.38). However, Tau was small and not statistically significant (Tau = 0.246, p = 0.06), and therefore there is no demonstrated effect.

Summary. Overall, three of the four participants (Ron, Harry, and Hermione) showed a demonstrated effect on standardized reading passages. This suggests that the reading intervention led to generalized improvements in the participants' reading fluency.

Broad Reading Skills

For Ron, Harry and Hermione, there was a decrease in broad reading skills from pre-baseline and pre-intervention, to post-intervention (Figure 4). Ginny's scores appeared to increase slightly. Based on these results, it does not appear that the intervention improved the participants' broad reading skills, contrary to the previously discussed results.
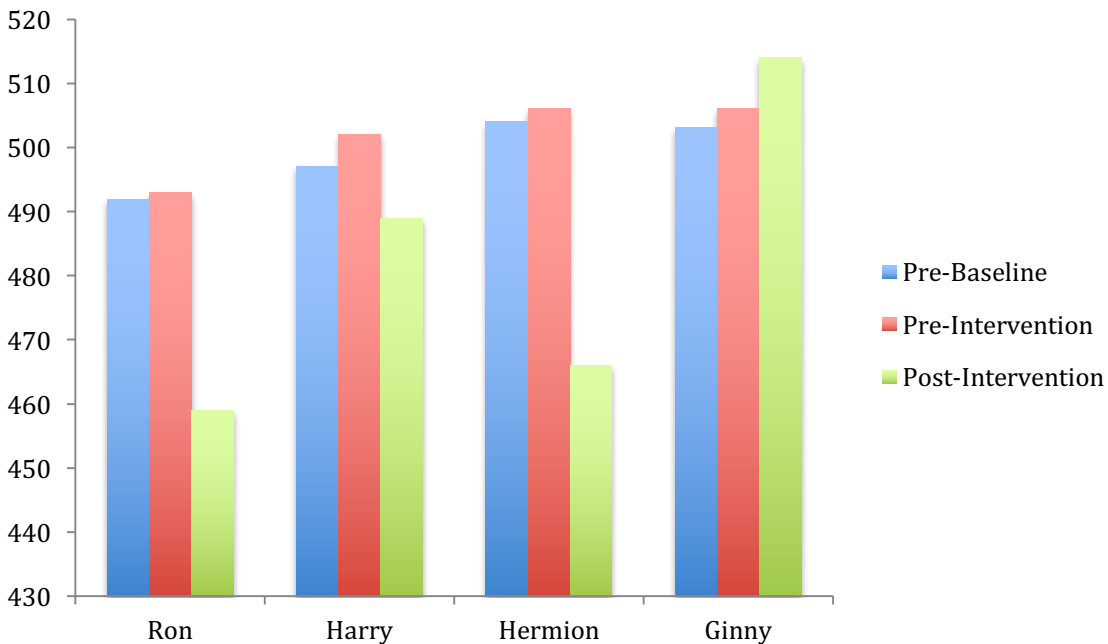
Figure 4. Participants' aReading performances

Motivation to Read

The participants' motivation to read was assessed daily with the motivation to read rating scale, and with the Motivation to Read Profile prior to baseline, prior to the intervention phase and at the end of the intervention phase.

Motivation and engagement rating scale. To demonstrate the effect of the intervention on participants' motivation to read, standardized mean differences (Table 10) and Tau values (Table 11) were calculated using the numerical values obtained from the motivation and engagement rating scales. All students showed a slight improvement based on standardized mean

differences between phases that was constrained by ceiling effects (Table 10; Figure 5). All

participant standardized mean differences were positive. However, the participants' Tau values

suggest that only two participant demonstrations of improvements in reading motivation and

engagement (Harry and Ginny) were obtained. Harry and Ginny's Tau values were statistically

significant and of small to moderate magnitude. Therefore, based on the participants'

standardized mean differences and magnitude and significance of Tau, the data suggest that all

students improved in reading motivation, but only two participants improved to the point of

showing a demonstrated effect.

Table 10

Participant means for motivation and engagement scales

Phase	Ron	Harry	Hermione	Ginny
Baseline	8.33	8.50	9.00	7.00
Intervention	9.08	9.20	9.41	8.04
Standardized Mean Difference	1.88	1.46	0.49	0.96

Table 11

Differences in motivation and engagement from baseline to intervention

Participant	Tau	p-value
Ron	0.158	0.30
Harry	0.423	0.01
Hermione	0.173	0.25
Ginny	0.648	0.00

All students used use $Tau_{A \, vs. \, B \, + \, Trend(B)}$

Motivation to Read Profile. The student's ratings of their motivation to read did not

differ substantially prior to baseline, prior to intervention and at the end of the intervention phase
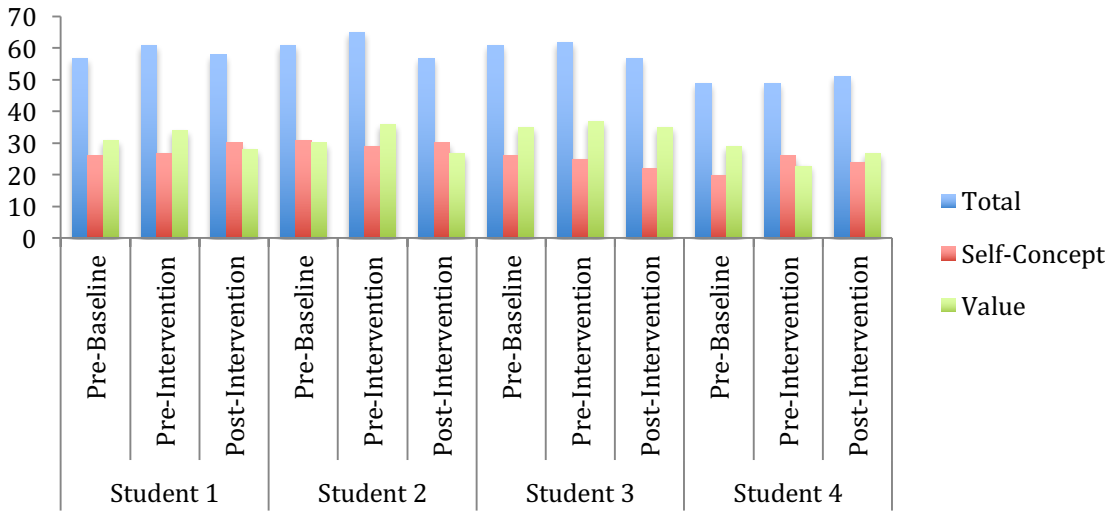
(Figure 10).

Figure 5. Student Motivation to Read Profile

Amount of Reading

Due to a large amount of missing data (55% missing data), no conclusions can be made as to the change in amount of reading prior to and post-intervention.

Chapter 5: Discussion

The purpose of this study was to examine the effectiveness of a reading intervention that included student choice of topic. To accomplish this goal, a reading fluency intervention was administered to four participants in Grade 4. The reading intervention included several evidence-based strategies, such as repeated reading, verbal cueing, modeling, phrase drill error correction, praise and feedback. Uniquely, this intervention also included a selection of passages from which students could choose. The effectiveness of such an intervention was assessed in a delayed multiple baseline across participants design. Each baseline phase lasted 6 sessions, and each intervention phase lasted 24 sessions. The effectiveness of the intervention was measured by student progress in words read correctly per minute, both on chosen instructional passages, and on untaught, standardized passages.

Three research questions were addressed:

1. Can a reading fluency intervention be effective in improving student reading skills if it incorporates a student's choice of reading topic?

2. What are the effects of a reading intervention that incorporates student choice of topic on student motivation and engagement during the reading intervention?

3. What are the effects of a reading intervention that incorporates student choice of topic on reading initiative outside of the reading intervention?

The main hypothesis of the study was that the intervention would help to improve participants' reading fluency skills, as well as their motivation to read and the amount of reading performed outside of the intervention.

Findings and Implications

Visual and statistical analysis demonstrate direct improvements in reading fluency for all participants from baseline to the third reading of the instructional passages during intervention. There were also significant improvements in reading fluency between the first and third reading of instructional passages during the intervention phase. These direct gains in reading fluency were seen across all four participants. While only one demonstration (no functional relation) was found for generalized fluency improvement based on baseline and first readings of instructional passages during intervention, three of the four participants demonstrated generalized improvements in reading fluency between baseline and intervention on the standardized passages, thus demonstrating a functional relation for generalized reading fluency improvements.

The data suggest that a reading fluency intervention that incorporates evidence-based strategies, as well as student choice of reading topic, is effective in improving reading fluency. Generalized reading improvements were found on the untaught, standardized passages for three of the four students despite the fact that the intervention included an option for students to choose passages that were potentially above their instructional reading levels.

No significant change was found in the participants' broad reading skills. This may be attributed to the participants' fatigue towards the end of the semester, or even due to the assessment's inability to discern progress after only 8 weeks of intervention.

All participants showed improved means and positive standardized mean differences on the motivation and engagement reading scales, despite ceiling effects obtained from the measurement used. Additionally, two participants showed small to moderate and statistically significant Tau values on the participants' motivation to read, suggesting motivation improvements as a result of the intervention. However, the two other participants did not show

an effect. One hypothesis for this lack of effect may be attributed to the scale's ceiling effects. The lack of change may also be caused by the participants' initial high levels of motivation at the beginning of the intervention. The lack of significant change may have thus resulted from ceiling effects with the measures used. Anecdotally, although the participants' ratings did not appear to show improvements in motivation, the participants verbally demonstrated to the instructor increased interest and motivation to read. Additionally, as all four participants maintained high levels of motivation, social validity may be demonstrated, as all participants were ready to engage in each session.

Finally, no conclusions could be made regarding the participants' amount of reading outside of the intervention, due to a large amount of missing data. The method used to collect data (i.e. ask the participants to fill out a weekly reading log) may not have been ideal, as participants often lost or forgot to return the logs at the end of the week.

Limitations

The results of this study should be interpreted while considering the following limitations. First, the low number of participants limits the generalizability of the results. The four participants selected attended the same elementary school, and had similar backgrounds. Most students spoke Tagalog at home, and had parents with high educational attainment. Additionally, all parents reported reading to their child at least three times a week, and all participants reported having access to books at school and at home. While this demographic similarity is ideal for a multiple baseline design, so as to reduce threats to internal validity, it does limit the potential of generalization to a larger population. However, this limitation is typical for single-case subject design studies, and generalizability is typically established through direct and systematic replications in future studies to establish the boundaries of effects. In fact,

researchers using single case designs often recommend a 5-3-20 (five single case studies examining the intervention, three research teams of different researchers, and a minimum of 20 combined participants) threshold to consider a particular intervention an evidence-based practice (Kratochwill et al., 2013). It is therefore highly recommended that replication of the study be conducted to determine the extent to which results generalize across participants in different settings.

Secondly, intervention onset was fixed a priori and all participants transitioned from baseline to intervention after six baseline data points were gathered, regardless of data variability during the baseline phase. This transition was conducted due to limited resources and as an attempt to begin intervention faster for participants who are struggling in reading. However, baseline data were not stable and improving prior to intervention onset in some cases, which complicated visual analysis. Specifically, there were improving baseline trends for two students on the generalized passages and for two students on the instructional passages.

Third, all data were gathered by the same instructor, which while reducing inter-instructor discrepancies, may have induced bias. The instructor was aware of the study's objectives and therefore bias may have incurred. While bias effects were partially mitigated by establishing inter-observer agreement with a third party who was unaware of the study's initial results, it is nevertheless a limit to the study at hand.

Finally, the participants' reading fluency data were highly variable, and this variability may have rendered effects more difficult to detect. Replication of the study, with added components such as averaging multiple progress monitoring probes per occasion, and increasing the duration of baseline is therefore recommended.

Implications for Practice and Research

Results from this study provide additional support for reading fluency interventions that include student choice. Specifically, the results provide support for reading interventions in which students can choose the passage they read, despite the fact that students may choose passages or topics that are above their current reading levels. Roughly twenty-one percent (20.65%) of the passages that students chose within the study were above the student's recommended reading levels as determined by matching the student's performance in reading with recommended Lexile bands from the Lexile Analyzer (2015). Many of these passages were chosen as part of a continuation of a book in which the participants were interested. Participants continued to read difficult passages from the same book, despite the increased difficulty in certain passages because their interest in the topic was a stronger factor than the difficulty of the passage. Up until this point, studies have found that student choice, such as choosing whether and how to be instructed (Daly et al., 2006), and which intervention to implement (Daly & Kupzyk, 2012), may play an important role in improvements in reading. Additionally, studies have shown that student-selected passages may result in increased autonomous motivation, perceived competence, and perceptions of mental effort (Wijnia et al., 2015). Specifically, student choice of reading topic resulted in improved reading comprehension (Topping, 2015). However, to my knowledge no study had yet evaluated the effectiveness of a reading fluency intervention that included student choice of passage topic. The current study expands the literature in this area, and provides support for such an intervention.

The current study supports the impact of choice as a motivating component, and its importance in academic settings, including interventions. Students with reading difficulties are less motivated to read compared to their peers (Donahue, Daane & Yin, 2005). This lower

motivation to read has been hypothesized to result in a decrease in amount of reading, and an increase in reading difficulties. Motivation is therefore thought to be an important component of academic achievement (Morgan et al., 2008). In fact, motivation has long been hypothesized to be an important component of goal achievement in academic settings. The current study supports the notion that providing choice and instruction on selected materials may enable students to access their own natural reinforcement for reading (intrinsic motivation) by supporting the reading of enjoyable materials. As such, internal reinforcement, through reading enjoyment, is used to promote reading engagement and offers a different motivational channel at the instructor's disposal, compared to extrinsic and performance-based reinforcement.

At this time, teachers have access to evidence-based interventions that are effective with students with reading difficulties. However, student participation in these interventions may be lower due to limited motivation to partake in these interventions. For instance, studies have shown that within academic settings, students may choose to either perform the activities presented, or engage in disruptive behaviours (Skinner, Wallace, & Nieddenriep, 2002). Educators may reduce the frequency of disruptive behaviours and increase student academic behaviour by including choice within the classroom, such as allowing students to choose assignments and altering assignments to make them more acceptable to students (Skinner, Wallace, & Nieddenriep, 2002). The present study provides evidence that not only supports choice as a motivating factor for general task completion, but as an appropriate component to promote task engagement (in this study, within reading interventions). Without choice, students are less engaged in reading; however choice increases enjoyment of the task and prolongs a student's desire to engage in the task (provide reference). The current study showed change in student motivation between baseline and intervention phases using the motivation and

engagement rating scales, suggesting that this intervention is an effective reading intervention that may motivate students to read. All participants had improved means on the motivation and engagement rating scales, with three obtaining means that were greater than 1SD. Additionally, two participants showed statistically significant small to moderate Tau values. An area of future research would be to conduct a similar study with less motivated students so that ceiling effects are less of an issue.

Recommendations for Future Research

Future studies should examine the benefits of reading interventions that include choice on student reading comprehension, motivation to read, and amount of reading to obtain replicability of results. First, studies have shown that reading fluency skills may be predictive of higher-order reading skills, such as reading comprehension (Riedel & Samuels, 2007). Therefore, this reading fluency intervention may have had an impact on students' comprehension of the passages read, as well as general improvements in reading comprehension. As comprehension was not measured on instructional or standardized passages, it is recommended that further studies include a comprehension component within the intervention. Secondly, studies have shown that students are becoming less motivated to read (Mullis et al., 2007). Including choice may result in improved autonomous motivation in this area. This study attempted to determine if motivation increased as a result of choice. However, the measures used may not have been conducive in detecting changes in motivation, due to ceiling effects, as well as research biases such as response bias (i.e., students ranking motivation high to appear "good" in the eyes of the instructor), and confounding variables (i.e., students mistaking general happiness or excitement as being motivated to read). Therefore, it is recommended that further research be conducted on the effects of this reading fluency intervention on a student's motivation. Finally, due to large

amounts of missing data, the amount of reading outside of the intervention could not be analyzed in this study. However, theoretically it may be reasonable to suspect that improving a student's enjoyment of reading (through the selection of passage topics that are of their interest), the student's motivation to read outside of intervention may increase as well. Future studies are therefore recommended to assess the impact on reading enjoyment and reading amount.

Additional studies examining the effectiveness of a reading fluency intervention that includes student choice of topic should be performed to expand results to larger populations of students. More specifically, a between-subjects design may be performed with more participants to evaluate the generalizability of this study. A larger-scale study would improve the ability to detect differences in motivation, amount of reading, broad reading skills and reading comprehension, particularly through contrasting interventions with and without choice, and also allow for the evaluation of long-term effects of the intervention post-intervention.

Conclusion

To conclude, results from this study indicate that the intervention appeared to have an improving effect on students' reading fluency skills. Additionally, results suggest that most participants could generalize their reading gains to other passages outside of the instructional passages. Despite its limitations, the present study provides preliminary evidence of the importance of student choice of topic in reading fluency interventions.

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Appendices

Appendix A

NAME: _____

Reading Topics Questionnaire

1. My favourite thing to think about is _____.

2. I love to play _____.

3. I would love to learn more about _____.

4. My three favourite topics to read about are _____.

5. I enjoy books that are

   a. About real-life characters

   b. About make-believe stories

   c. Both real-life and make-believe

6. My favourite book is _____.

7. I enjoy books that

   a. Have many pictures and little writing

   b. Have a lot of writing and fewer pictures

   c. Both have many pictures and lots of writing

8. I like books that

   a. Are about action and adventures

   b. Are about things I can learn

   c. Are funny

   d. Are about mystery

1. I enjoy reading

1	2	3	4	5
Not at all	Not a lot	Neutral	A little	A Lot

2. How many books do you have at home?
   a) 1-10
   b) 10-20
   c) 20-30
   d) 30+

3. How often do you visit the library?
   a) Never
   b) Once a year
   c) Once a month
   d) Once a week
   e) 2-3 times a week
   f) Every day

4. How often do you read at home?
   a) Almost never
   b) Once a week
   c) 2-3 times a week
   d) Every day
   e) Many times a day

5. How often do you read at school?
   a) Almost never
   b) Once a week
   c) 2-3 times a week
   d) Every day
   e) Many times a day

Appendix C
Parent Consent Form

Reading Fluency Intervention with Student Choice of Topic Study

Principal Investigator	**Student Investigator**
Principal Investigator, Ph.D., R.Psych.	Student Investigator, B.Sc.
Associate Professor	M.A. Student
Department XYZ	Department XYZ
University XYZ	University XYZ
Phone: (XXX) XXX-XXXX	Phone: (XXX) XXX-XXXX
Email: abcdefghijklmnop@xyz.com	Email: abcdefghijklmnop@xyz.com
	Co-Investigator
	Co-Investigator, B. Ed.
	M.A. Student
	Department XYZ
	University XYZ

Dear Parent/Guardian(s),

This is a request for permission for your child to participate in a one-on-one reading fluency intervention at their school as part of a research study. Reading is an important skill that can be difficult to master for all children. Reading fluency interventions have been developed in an attempt to help improve student-reading skills. Your child has been nominated by their classroom teacher as a candidate for the study. This research is being conducted to fulfill the requirements of the Student Investigator's thesis for a Master's of Arts degree. Please read the following form carefully.

Purpose:
The purpose of this study is to examine the benefits of a reading fluency intervention that incorporates student choice of topic on reading skills for students in Grades 3 or 4.

Research Study Participation:
Taking part in this study means that:
1. You allow your child to receive 8 weeks of a one-on-one reading intervention, delivered three times a week, for a total of 24 intervention sessions. Each session will last approximately 15 minutes, and will involve activities aimed at improving reading fluency skills. The sessions will be delivered during school hours by a UBC graduate research assistant.
2. You allow your child to participate in 30 assessment sessions over 13 weeks where a UBC graduate research assistant will assess your child's reading fluency progress. Each session will last approximately 15 minutes, and will involve reading short passages while being timed.
3. You allow your child to be audio recorded during the assessment and reading intervention sessions. The recordings are for research purposes only, and will not be shared with your child's teacher, school administration, or school district. Only the study investigators will have access to the audio recordings. The recordings will be reviewed by the study's investigators to verify that intervention sessions are being conducted

correctly, and the recordings will be destroyed after they are reviewed by the research team.

Potential Risks:
Your child will be taken out of the classroom three times a week for approximately 15 minutes to participate in the reading intervention sessions and assessment sessions. Therefore, time out of the classroom may be a concern. However, to remedy this risk, times for intervention sessions will be selected in collaboration with classroom teachers to minimize the impact of lost instructional time.

Potential Benefits:
By participating in the study, your child will receive one-on-one reading instruction with a graduate research assistant. As a result, it is expected that your child will experience gains in reading fluency skills leading to improved reading comprehension. In addition, by allowing your child to participate in this study, you will help improve our understanding of the effect of a reading fluency intervention that incorporates student choice of topic on reading motivation and reading improvements.

Compensation:
Your child may receive small gifts such as stickers or colourful pencils at the end of the intervention as a thank you for their participation.

Confidentiality:
Because your child's classroom teacher has nominated them for this study, and it is necessary to establish times that your child will receive the reading intervention, your child's classroom teacher will know that they are participating in the study. However, outcomes of the reading fluency intervention will not be shared with your child's teacher, school administration, or the school district without your permission. Only the study investigators and graduate research assistants will have access to information gathered about your child in the study, including audio recordings. Audio recordings of the sessions, as well as all information collected, will be securely stored in a locked lab office at the University of British Columbia. All electronic information will be kept on encrypted computers. No individual student, teacher, or school will be identified by name in any reports of the study.

Contact for concerns about the rights of research subjects:
If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at XXX-XXX-XXXX or if long distance e-mail RSIL@ors.ubc.ca or call toll free X-XXX-XXX-XXXX.

Consent:
Your consent for your child to participate in this study is entirely **voluntary** and you may refuse to participate or withdraw from the study at any time without harming your child's standing within the school. Agreeing or not agreeing to participate in the study will not have an impact on the student's classroom evaluation.

If you have any questions or concerns, please contact the Student Investigator, (Student Investigator), at (XXX) XXX-XXXX, or the Principal Investigator, (Principal Investigator, at (XXX) XXX-XXXX

Whether or not you allow your child to participate, please **sign this form** and **return it to your child's classroom teacher, sealed in the envelope provided.** Please return the form within the next seven days so that we know you received the form and have been informed about the study. Please keep the first two pages of this consent form for your records.

I, _____ have read and understand the information about the project,

"Reading Fluency Intervention with Student Choice of Topic Study" I understand that my child,

_____'s participation in the project is voluntary. He/she may stop at any

time.

Please check one of the following options:

_____   **Yes**, I agree that my child may take part in this project.

_____   **No**, I do not wish my child to take part in this project.

If you answered **yes,** please answer the following questions:

I would like to receive a summary of my child's intervention results:

Yes _____   No _____

I give permission for my child's classroom teacher to receive a summary of my child's intervention results:

Yes _____   No _____

Your signature: _____

Date: _____

Thank you for your help!

Reading Fluency Intervention with Student Choice of Topic Study
Student Assent Form

Hi, my name is [student investigator] and I'm a student from the University of British Columbia. I am working on a project that involves reading with students at your school, and your teacher thought that you would be a good student to help me with the project. Your parent also knows about the project, and said it would be okay for you to take part. If you agree participate, we will do some different activities to help you with your reading. I will meet with you three times a week for about 6 minutes for about two weeks and three more times a week for 20 minutes for about 2 months to work on reading. We'll go somewhere in the school outside of your classroom to read, like the library or an empty classroom. If you agree now but don't want to take part in project later, you can stop at any time during the time we work together. Is this okay with you? **[wait for response]**

Do you have any questions?

Do you want to participate in the project: _____**YES**   _____**NO**

Student Name:_____

Student Signature:_____   Date:_____

Investigator name:_____

Investigator signature:_____   Date:_____