A READING FLUENCY INTERVENTION FOR SECOND-LANGUAGE READERS IN FRENCH IMMERSION PROGRAMS: STUDY OF CROSS-LINGUISTIC EFFECTS

by

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Abstract

Evidence from studies of the development of reading skills in bilingual populations suggests that reading instruction in one language could have beneficial effects on the development of reading skills in another language. To examine the effects of French reading instruction on French and English oral reading fluency, a reading fluency intervention was delivered to three Grade 3 students enrolled in a French immersion program and experiencing reading difficulties following a concurrent multiple baseline across participants design. It was hypothesized that the intervention would have beneficial effects on reading fluency skills in both languages. The intervention led to improvements in French reading fluency on instructional passages during the intervention for all participants. Improvements did not generalize to the probes used for French progress monitoring, as students demonstrated similar progress before and after the intervention was put in place. Students also demonstrated gains in reading comprehension during both phases. All three students however showed an increase in English reading fluency during the intervention phase, suggesting the intervention had a beneficial effect on English oral reading fluency. The lack of generalization of effect to the French progress monitoring probes could be due to the students’ progress in French prior to the intervention and to their more limited vocabulary in French. Results from this study provide support for the transferability of reading skills across languages and suggest that the procedures used are a promising intervention for improving reading fluency in French immersion students. It was recommended that future research further investigate the effectiveness of the intervention using a larger sample.
Preface

Data collection for this project was approved by the University of British Columbia’s Research Ethics Board (certificate no. H14-03085) and was supported by the Social Sciences and Humanities Research Council of Canada, and the National Association of School Psychologists Graduate Student Research Grant. The lead author and Dr. Sterett Mercer collaboratively developed the study design with input from Dr. Serge Lacroix. The instructional procedures were adapted from the Helping Early Literacy with Practice Strategies (HELPS; Begeny, 2010) by the lead author, with input from Dr. Mercer. All written content of this thesis represents original, unpublished work.
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Introduction

Around the world, a growing number of children speak a language at home that is different from the one they learn to read and write in school (UNICEF, 2009). As Canada has two official languages and around 15% of Canadians reporting speaking a language other than English or French most often at home, Canadian children are no exception (Statistics Canada, 2012). In addition, the establishment of French immersion programs (programs where Anglophone children acquire high levels of competence in French by being delivered academic content instruction in French) have allowed more Canadian children to have the opportunity to receive a bilingual education (Cummins, 1998; Genesee, 2007).

Since the inception of French immersion in an English-speaking community in Québec more than fifty years ago, the education outcomes of students attending this type of program have been the subject of much research. For instance, studies comparing the development of literacy and language skills of French immersion students and students attending regular English programs have found that although immersion students tend to show initial delays in English skills, the delays eventually disappear (Genesee, 2004; Turnbull, Hart, & Lapkin, 2003). Therefore, after a few years in the program, students generally attain levels of achievement that are comparable to the ones attained by students attending regular English programs (Geva & Clifton, 1994; Rubin, Turner, & Kantor, 1991). Additionally, research has shown that the level of proficiency in French attained by immersion students is significantly superior to the one attained by students receiving traditional French instruction for short periods of time throughout the week (Barik & Swain, 1975; Genesee, 1978). While recent reviews of
research on the educational attainment of French immersion students are available (Genesee, 2004; 2007; Genesee & Jared, 2008), most of studies assessing educational outcomes of immersion for were carried out several decades ago. The rise in popularity of immersion programs and changes in Canadian demographics that have occurred in the past decades have however led to an increase in the diversity of the immersion student population, calling into question the generalizability of the results of earlier studies to the current population (Swain & Lapkin, 2005).

In spite of the fact that immersion students in general achieve as well as students attending regular programs, just like in regular programs, a portion of immersion students do face academic difficulties (Genesee, 2007). At the moment, educators still have difficulty understanding why some immersion students struggle, in particular when they experience difficulties learning how to read. These students are often challenging for teachers and school psychologists, since it can be difficult to decipher if the source of their difficulties is their low proficiency in the language of instruction or impairment in the basic abilities needed to learn how to read (Geva, 2000; Lundberg, 2002).

Academic struggles such as reading difficulties have been identified as an important factor contributing to the high rate of attrition from immersion programs (Obadia & Thériault, 1997). However, removing children from immersion programs might not be the best way to remediate the difficulties experienced by students, because research indicates that students who experience difficulty learning to read in immersion are also likely to experience difficulties in a non-immersion program (Erdos, Genesee, Savage, & Haigh, 2011; Genesee & Jared, 2008). In addition, a study comparing students with below average academic abilities and language impairments
enrolled in French Immersion programs to counterparts in regular English programs found that the students in immersion programs did not show more severe impairments on measures of academic development than the students in regular program (Geva, 1994). On the other hand, results from the same study showed that the students in French Immersion did have the benefit of showing superior performance than their counterparts on French Language tests (Geva, 1994).

It has also been suggested that bilingualism is associated with cognitive benefits such as enhanced metalinguistic skills and executive control (Bialystok, Craik, & Luk, 2012). Results from studies conducted with immersion students are suggesting that bilingualism acquired through second-language immersion could have similar benefits (Bialystok, Peets, & Moreno, 2014; Nicolay & Poncelet, 2013). While the effects of bilingualism in children and younger adults has recently been questioned due to a lack of replication in studies with larger samples, there is still strong support for link between bilingualism and executive functioning in older adults (Valian, 2015).

Given these benefits, many have argued that more effort should be put into the inclusion of at-risk students in immersion programs (Genesee, 2007). The development of interventions to improve reading skills in both English and French is therefore critical in order to adequately support Immersion students experiencing reading difficulties and allow them to benefit from advantages of receiving a bilingual education. Although we now have developed effective interventions to improve reading skills in monolingual English students, the development of reading in a second language and its impact on reading skills in the first language are not as well understood.
An issue being raised in the field is whether the skills involved in learning to read in a first and a second language are the same. Despite the lack of research on the transferability of the skills acquired through direct intervention, evidence from studies with immersion students does suggest that literacy skills transfer from one language to the other (Comeau, Cormier, Grandmaison, & Lacroix, 1999; Deacon, Wade-Woolley, & Kirby 2007; Jared, Cormier, Levy, & Wade-Woolley, 2011). In line with this evidence and given the very limited number of studies directly assessing the transfer of reading skills across languages through interventions, the present investigation is an attempt to gain further insights regarding the effects of reading instruction in one language on reading skills in another. To do so, this study will examine the effects of delivering an oral reading fluency intervention to immersion students in French on the development of their oral reading fluency in both English and French.

**Linguistic Interdependence Principle**

Although the development of reading in bilingual students is still not fully understood, a growing amount of evidence suggests that reading skills develop interdependently across languages. The Linguistic Interdependence Principle proposed by Cummins (1979, 2000) states that cognitive academic language proficiency (CALP) is transferable from one language to another. According to this principle, reading instruction in one language leads to a deeper CALP, which is strongly related to literacy in the second language. This hypothesis is based on the assumption that there is an underlying cognitive proficiency common across languages which allows the transfer of academic and literacy-related skills. This theory also holds that many of the skills involved in reading are highly transferable. This principle would explain results from
research on immersion programs showing that students instructed for all or part of the day through a minority language experience no long-term academic delays in the majority language (Cummins, 2000; Genesee, 2004; Rubin, Turner, & Kantor, 1991; Turnbull, Hart, & Lapkin, 2003).

According to the principle, the lack of relationship between academic achievement in the majority language (English in the case of French immersion) and instruction time received in that language in immersion programs would be evidence that academic skills in first and second languages are interdependent (Cummins, 2000). As will be discussed below, support for this theory is provided by studies of bilingual populations showing that there is a strong association between reading skills in a student’s first and second language (Abu-Rabia, 2001; Geva & Clifton, 1994; Geva, Wade-Wolley, & Shany, 1997; Melby-Lervag & Lervag, 2011; Verhoeven, 1994), by studies showing that early literacy indicators can predict reading skills across languages (Comeau, Cormier, Grandmaison, & Lacroix, 1999; Deacon, Wade-Woolley, & Kirby, 2007; Jared et al., 2011; MacCoubrey, Wade-Woolley, Klinger, & Kirby, 2004), and by a study showing that oral reading fluency in one language is predictive of oral reading fluency in another (Ramirez & Shapiro, 2007).

**Relation between reading skills across languages.** In line with Cummins’ theory, research with Immersion and other bilingual students has shown repeatedly that there is a strong association between reading skills in students’ first and second language. For instance, Geva and Clifton (1994) examined the reading accuracy, speed and comprehension of good and poor readers in Grade 2 immersion programs and
found positive and significant correlations between the students’ scores on English and French measures of each skill.

Similar results were found in immersion programs in other languages (Verhoeven, 1994; Geva, Wade-Wolley, & Shany, 1997). Verhoeven (1994) studied the transfer of literacy skills in Turkish students placed in Dutch immersion in the Netherlands. The students included in the study were either part of an immersion program where they received only three hours of instruction in their first language (Turkish) per week or in a transition program in which literacy was first taught in the students’ first language before they were introduced to Dutch as a second language. After administering different measures of language and literacy to the two groups at the beginning and end of Grade 1 and at the end of Grade 2, it was found that word reading efficiency and reading comprehension transferred from either language to the other. Specifically, results showed that in the immersion group, early measures of literacy skills in Dutch were significantly predictive of later literacy skills in Turkish, and that in the transition group, early measures of literacy skills in Turkish were predictive of later literacy skills in Dutch. Additionally, Geva and colleagues (1997) examined the cross-language relation between the reading speed and accuracy in students learning how to read in English and in Hebrew simultaneously and found that corresponding accuracy and speed across the two languages were highly correlated.

Support for the interdependence principle can also be found in studies conducted with older students learning a new language. For example, the relation between English and Russian reading skills in bilingual university students was assessed by Abu-Rabia
(2001) who found significant positive correlations across languages in skills such as spelling, oral cloze, word attack, and word identification.

Finally, strong support for linguistic interdependence can be found in a recent meta-analysis of research on cross-linguistic transfer of literacy skills (Melby-Lervag & Lervag, 2011). Based on evidence from 47 correlation studies, results from the meta-analysis indicated that moderate to large correlations exist between decoding skills and phonological processing in bilingual readers’ first and second languages.

**Invariance of prediction of early literacy indicators.** In addition to the evidence that the development of reading skills is related across languages in bilingual students, a number of studies looking at the development of reading in immersion students have found that many of the early indicators that have been shown to predict reading ability in English also predict reading across languages. For instance, phonological processing and Rapid Autotomized Naming (RAN) are two of the cognitive abilities that have been the most strongly associated to the development of reading in monolingual English students (Blachman, 1984; Denckla & Cutting, 1998; Scarborough, 1998; Share, Maclean, & Matthews, 1984; Wagner & Torgeson, 1987; Vanderveld, & Siegel, 1995). While the link between these abilities and literacy has been shown to exist in several languages (Elbro, Borstrom & Petersen, 1998; Georgiou, Parilla, & Papadopoulos, 2008; Liao, Georgiou, & Parilla, 2008; Oney & Durgunoglu, 1997; Pan, McBride-Chang, Shu, Liu, Zhang, & Li, 2011), the relationship between measures of these early literacy indicators in one language and reading in another had not been completely established. Researchers in the field have therefore attempted to determine
which indicators of reading were commonly predictive across the two languages spoken by students in French immersion programs.

One of the first studies to have looked at such predictors was conducted by Comeau, Cormier, Grandmaitre, and Lacroix (1999), who administered word decoding and phonological processing measures in both French and English to Grade 1, 3, and 5 immersion students. In addition, participants were also administered English different tests of cognitive ability. After measuring word recognition skills a year later, results showed that phonological processing measured in French and English were both equally related to later reading achievement in both languages, even after controlling for speeded naming and pseudoword repetition. It was also found that the combined results from the phonological processing tasks in both languages were particularly predictive of future decoding skills in French. Additionally, this longitudinal study showed that speeded naming also predicted later reading skills in both languages. These results therefore provided strong support for the invariance in prediction of early abilities such as Rapid Automatized Naming (RAN) and phonological processing across alphabetic languages.

Similar results were reported by MacCoubrey, Wade-Woolley, Klinger, and Kirby (2004), who used performance on tasks measuring phonological processing in English at the end of Grade 1 to identify who would be a poor or a typical reader at the beginning of Grade 2. Predictive discriminant analysis revealed that performance on sound isolation and phoneme blending tasks correctly identified later reading skills in both French and English. They also found that adding RAN performance as a predictor increased the diagnostic accuracy for French reading skills. These results provide
further evidence of the importance of early phonological processing in English in the development of French reading skills.

A study by Deacon, Wade-Woolley, and Kirby (2007) looked at the relation between reading and morphological awareness across languages. Morphological awareness is one’s understanding of the smallest meaningful units of a language such as affixes, root words, and grammatical inflections. Understanding of these units is assessed by measuring one’s ability to reflect on and manipulate them. While this ability is known to be linked to the development of reading skills in monolingual children, it had until then received less attention in second-language research. Deacon and colleagues therefore longitudinally assessed French immersion students’ morphological awareness in Grade 1, 2, and 3 using a past tense analogy task where they were asked to complete an analogy by producing the correct past tense form of a verb. They then examined the relationship between performance on this task and measures of French and English reading from the three grades, controlling for several variables such as English vocabulary and phonological processing. Their results showed that while early measures of English morphological awareness were significantly related to both English and French reading, early measures of French morphological awareness were only significantly related to French reading. However, when morphological awareness in French was measured in the later grades, it was significantly related to both English and French reading. In line with results from the previously mentioned studies, Deacon and colleagues’ results also found that early performance on an English phonological processing task was predictive of later French word identification. Results from this study confirm the findings from previous studies showing that phonological processing
can predict reading across languages, in addition to presenting new evidence about the invariance of prediction of morphological awareness.

A recently published study by Jared and colleagues (2011) also reported results that indicate that early literacy skills measured in English were associated with the development of reading in French. In this four year longitudinal study, 140 French immersion students were followed to determine which English cognitive and linguistic skills in Kindergarten would predict reading achievement in French in Grades 1, 2, and 3. Using hierarchical linear modeling, it was found that even when assessed in English, phonological processing, letter-sounds knowledge, RAN, and grammatical knowledge were all predictive of reading ability in French. Results from this study therefore provide strong evidence that skills already been identified as predictors of reading achievement in monolingual students are also predictive of reading ability across languages. Studies have also shown that such early literacy indicators measured in English were not only predictive of decoding skills, but that they were also related to later reading comprehension skills, and that they were predictive of reading achievement across languages even when the instruction of French was delayed for several years (Bourgoin, 2014; Erdos, Genesee, Savage, & Haigh, 2011).

However, not all research evidence supports the theory that most early skills are predictive of reading achievement across languages. While the previously described studies provide valuable insight into the relation between phonological processing and reading across languages, they only used broad measures of phonological processing. Theories of phonological processing propose that it can be separated into different levels of awareness. Specifically, the broader ability of phonological processing can in
fact be divided into three levels: syllable awareness, onset and rime awareness, and phoneme awareness (Bruck & Genesee, 1995). It has been proposed that while overall phonological processing predicts reading across languages, these levels would contribute differently to the development of reading depending on the degree of transparency of a language’s alphabet. In transparent languages, such as French and Greek, a given letter is always pronounced the same way. However, in opaque languages such as English, the same letter often has more than one pronunciation.

A seminal study conducted by Bruck and colleagues (1997) found that while phonological processing was related to the development of early reading skills for both French and English monolingual students, the specific ability that best predicted successful reading was different for the two languages. Their research showed that successful reading in English was best predicted by phonemic awareness, but that syllable awareness was the best predictor of reading in French. It was proposed that the difference in the prosodic nature of each language was a possible explanation for these variations (Bruck & Genesee, 1995).

Tingley and colleagues (2004) followed this work by assessing how each level of phonological processing was differentially associated with French immersion students’ French and English word reading ability. Results from their work showed that in Kindergarten and Grade 1 students, onset-rime and phoneme awareness scores were significantly correlated with word reading ability in both French and English, but that syllable awareness was significantly correlated only with French pseudoword reading. To explain the difference between their results and Bruck et al. findings, Tingley and
colleagues proposed that familiarity with the phonological structure of French may influence the relation between syllable awareness and French reading ability.

**Transferability of oral reading fluency.** Further evidence for the transferability of reading skills across languages has also been provided in the work of Ramirez and Shapiro (2007). The innovative study examined the relationship between oral reading fluency across languages. Specifically, they tried to determine whether students’ oral reading fluency in Spanish, their native language, was predictive of their oral reading fluency in English several months later. Using Curriculum-Based Measurement (CBM) to assess 68 bilingual education students in Grades 1 through 5, it was found that Spanish oral reading fluency measured in the fall significantly predicted English oral reading fluency in the spring of the same school year. Results showed that Spanish reading fluency probes administered at the beginning of the year accounted for 68.6% of the variation in the English reading fluency probes administered at the end of the year. This strong relation between English and Spanish oral reading fluency suggests that the skill is transferable across languages, providing further support for the linguistic interdependence of reading skills.

**Reading Interventions with Bilingual Students**

Despite the growing evidence showing that reading skills in bilingual children are strongly related across languages, it is still unclear whether reading instruction in one language can have an impact on reading skills in another. While the results from the previously presented studies strongly suggests that reading skills are related across languages, the correlational and longitudinal evidence these studies provide is not sufficient to conclude that the reading instruction in one language can have effects on
reading skills in another. Direct investigation of the effects of reading interventions across languages is still lacking. Little research in general has been conducted to assess the effectiveness of interventions for immersion students experiencing reading difficulties. Nonetheless, the findings from reading intervention studies conducted with bilingual students such as English Language Learners (ELLs) and students enrolled in immersion programs, in conjunction with the implications of the previously described studies, can provide valuable insight on the possible influence of reading instruction across languages.

**Early literacy skills.** Research studies with Kindergarten and Grade 1 students attending French immersion programs provide evidence that providing systematic and explicit phonological awareness and letter-sound correspondence instruction to be effective with immersion students who are considered at-risk for later reading difficulties (Wise, 2014; Wise & Chen, 2010). A study by Wise and Chen (2010), assessed the effects of a 20-week-long phonological awareness small group intervention on the development of phonological awareness and word reading skills of Kindergarten students enrolled in French immersion. The intervention was first delivered in English and then delivered in French as students became more proficient in the language. Results indicated that students receiving the intervention attained significantly higher French reading achievement levels in comparison to the previous school year’s at-risk readers who had not been provided with PA training, suggesting that a phonologically based intervention can have beneficial effects on French reading acquisition for young French immersion students.
An unpublished intervention study conducted by Wise (2014) assessed the effects of phonological awareness (PA) instruction on the reading development of struggling Grade 1 French immersion students. The intervention, delivered in English, consisted of a combination of phonological awareness training and letter-sound correspondence instruction. As would be expected, results indicated that immediately after the end of the intervention, students who had received the intervention outperformed a control group on English measures of phonological awareness. In addition, although they did not show significantly superior performance in French measures of phonological awareness immediately after the end of the intervention, the students in the intervention group performed significantly better than the control group at a delayed post-test, about two years later. The students who had received the intervention also showed superior French word reading skills than the students in the control group both immediately after the end of the intervention and two years later.

**Second language reading interventions.** With the growing cultural diversity in Canadian and American schools, increased efforts have been put into evaluating whether interventions that have been shown to improve reading abilities in monolingual students are also effective with students who are learning English as a second language. For example, Saenz, Fuchs, and Fuchs (2005) looked at the effects of implementing classwide Peer-Assisted Learning Strategies (PALS) on the reading performance of ELLs with a learning disability. After conducting PALS session three times a week for 15 weeks in different Grade 3 to 6 classrooms, reading outcomes were compared to a control group who did not receive the intervention. It was found that while the intervention group did not show significantly greater improvements in reading
fluency compared to the control group, they did show greater gains in reading comprehension. These results are consistent with studies conducted on the use of PALS with monolingual students with learning disabilities, which show greater effect sizes for gains in reading comprehension than in reading fluency (Fuchs, Fuchs, Mathes, & Simmons, 1997; Simmons, Fuchs, Fuchs, Mathes, & Hodge, 1995).

The effects of the Helping Early Literacy with Practice Strategies (HELPS) Program, a program previously shown to improve oral reading fluency in monolingual students, on the reading skills of ELL students, were examined Begeny, Ross, Greene, Mitchell, and Whitehouse (2012). In this study, the performance on a standardized test of English oral reading fluency of ELL students that had received the intervention in English for five to seven months was compared to the performance of ELL students who did not receive intervention. Results showed that while the two groups showed equal oral reading fluency skills prior to the intervention, the ELL students in the intervention group scored significantly higher than the control group on measures of oral reading fluency after five to seven months of intervention.

Results from two studies of the effects of reading interventions for Grade 1 ELL students at risk for reading problems conducted by Vaughn et al. (2006) also provide valuable insight into the development of reading skills in bilingual students. The two studies, using two different samples of ELL students, examined the effects of an intervention delivered either in English or in Spanish, based on the language of instruction for core reading. Thus, the first study examined the effects of a comprehensive intervention delivered in Spanish to struggling Spanish ELL students receiving core reading instruction also in Spanish, while the second study examined the
effects of the same intervention, but delivered in English to struggling Spanish ELL students receiving core reading instruction in English.

For both studies, an adapted version of Proactive Reading (Mathes, Torgesen, Wahl, Menchetti, & Grek, 1999) was used as the intervention. This integrated intervention included phonemic awareness, phonics, word reading, and text reading instruction, in addition to language support activities designed to address the needs of ELL students. After receiving this intervention in approximately 115 sessions of supplemental reading instruction, the performance on different literacy measures of the students who received the intervention was compared to the performance of a group of controls who attended the same school but did not receive the intervention.

For the Spanish study, significant effects of the intervention were found on Spanish measures of phonological processing, letter-sound and letter-word identification, verbal analogies, word reading fluency, and spelling. For the English study, significant effects of the intervention were found on English measures of phonological processing, isolated word reading, and spelling.

In addition to examining the effects of the intervention on measures of literacy skills in the language in which the intervention was delivered, the authors also assessed its influence on skills in the other language spoken by the student (English in the case of the Spanish study and Spanish in the case of the English study). Findings showed that, in addition to showing superior performance on a number of Spanish measures, the students who received the intervention in Spanish also outperformed the control group on English measures of phonological processing, letter-sound and letter-word identification. However, in the English study, no significant difference was found
between the intervention group and their comparison group on Spanish literacy measures. Although this study provides some support for the transfer of the effects of reading instruction across languages, its findings suggest that this transfer may be more likely to happen when instruction is provided in a student’s first language.

**Immersion programs reading interventions.** While research on the development of reading skills in ELL students provides valuable information on the skills involved in learning how to read in a second language, an issue with this population is that it often differs from students who speak the majority language as their first language on other important variables such as culture and socioeconomic status. Immersion programs have several characteristics that set them apart from the education ELL students are exposed to. To start, in immersion programs all students usually enter with similar (and limited) levels of proficiency in the language of instruction (Swain & Johnson, 1997). In addition the classroom culture mirrors the majority culture, which means that for most students, the culture at school is the same as the culture at home (Swain & Johnson, 1997). Finally, although some ELL students still learn how to read and write in their first language outside of school, French immersion students are all expected to eventually master English in addition to French (Swain & Johnson, 1997). This population therefore provides us with valuable information about the way reading develops in bilingual children, and whether the same skills can predict reading across languages. However, until now, most intervention studies conducted in immersion programs appear to have focused on assessing teacher, parent, or student satisfaction with different intervention programs (Arnett, 2010; Bournot-Trites, 2004; Rousseau, 1999).
The Current Study

Given the limited number of studies examining the effects of reading interventions across languages, the present study was an attempt to gain further insights regarding the cross-linguistic transfer between reading in French and English among students attending French Immersion programs. In addition to assessing the effectiveness of a reading fluency intervention delivered in French on French reading skills, this study examined whether the intervention also had effects on reading skills in the student's native language (English).

A well-researched area in the field of reading, oral reading fluency, or the oral translation of text with speed, accuracy, and expression has received recognition as a critical component of skilled reading and an important instructional target (National Reading Panel, 2000). Given the strong dependence of the ability to obtain meaning from print on the development of fluent and accurate word recognition, it has been proposed that oral reading fluency is an essential aspect of successful reading development (Fuchs, Fuchs, Hosp, & Jenkins, 2001; LaBerge & Samuels, 1974; Snow, Burns, & Griffin, 1998).

The need for effective fluency instruction methods is further emphasized by the fact that students with reading or learning disabilities are most at risk for presenting difficulties in fluency (Archer, Gleason, & Vachon, 2003; Torgesen, & Hudson, 2006). Support for the importance of reading fluency as an instructional target has also been provided by research showing that measures of oral reading fluency are highly predictive of results from standardized tests of reading achievement (Reschly, Busch, Betts, Deno, & Long, 2009). A large body of research now supports different
interventions that have been proven to improve oral reading fluency in monolingual students (Chard, Vaughn, & Tyler, 2002; Morgan & Sideridis, 2006; Therrien, 2004). For the purpose of this study, oral reading fluency also presents the advantage of being easily measurable in two languages with very similar assessment procedures.

To examine the effects of French reading instruction on French and English oral reading fluency, the current study used a randomized concurrent multiple baseline design across three participants. After baseline phases of varying lengths, three French immersion students received an oral reading fluency intervention in French for 5 to 10 weeks. Measures of oral reading fluency in French and English were taken weekly throughout the baseline and intervention phases. Two research questions were addressed:

1. Do oral reading fluency instruction methods proven to improve reading in monolingual English students also improve French oral reading skills in immersion students? It was hypothesized that the methods would improve French oral reading fluency and reading comprehension in immersion students.

2. Does oral reading fluency instruction delivered in French also improve English oral reading Fluency? It was hypothesized that oral reading fluency instruction in French would also improve English oral reading Fluency.
Method

Participants

Three Grade 3 students, two boys and one girl, were recruited for the present study. The Grade 3 students did not receive any formal instruction in English in class, as in this school, students only start English instruction is introduced in Grade 4. All students were from the same class in an independent, Catholic, French Immersion school in Vancouver, British Columbia. The students had been identified by their teacher as experiencing reading difficulties in French, and were all demonstrating performance in French oral reading fluency below the 25th percentile for Grade 3 based on beginning of the year IDAPEL Benchmark assessment local norms (see Table 1). Prior to the beginning of the study, students’ parents were asked about the language(s) spoken at home, exposure to other languages, parental education, and length of time spent reading in French, English and/or other languages in the home, and this information is also presented in Table 1. It was required that students included in the study come from households where English is the primary language spoken to ensure that the students have had some exposure to the language outside of school.

Pseudonyms are used in place of participants’ real names.

<table>
<thead>
<tr>
<th>Student Pseudonym</th>
<th>Age</th>
<th>Languages Spoken at Home</th>
<th>Time Spent Reading in English/Week</th>
<th>Time Spent Reading in French/Week</th>
<th>Parental Education</th>
<th>KBIT IQ Composite</th>
<th>French Reading Fluency Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suzie</td>
<td>8.6</td>
<td>English (80%) French (20%)</td>
<td>2 hours</td>
<td>2 hours</td>
<td>Bachelor's Degree</td>
<td>124</td>
<td>15th</td>
</tr>
<tr>
<td>Dylan</td>
<td>8.0</td>
<td>English</td>
<td>1.5 hours</td>
<td>1.5 hours</td>
<td>Masters of Arts</td>
<td>90</td>
<td>9th</td>
</tr>
<tr>
<td>Billy</td>
<td>8.6</td>
<td>English</td>
<td>1 hour</td>
<td>1.5 hours</td>
<td>Bachelor's Degree</td>
<td>99</td>
<td>6th</td>
</tr>
</tbody>
</table>
Materials

A set of 20 French passages of approximately 200 words was selected for the intervention from L’heure de la lecture (Dorais, 2014), an existing French reading series. All the passages were selected from the Grade 2 level of the series. To ensure appropriate readability, the selected passages were first controlled for number of multiple syllable words, and sentence length using the Lix readability formula (Bjornsson, 1968). Passages were then modified by substituting longer words for shorter ones and shortening sentences to ensure that all of them had Lix scores between 29 and 31. Finally, the passages were piloted by recording and comparing the number of words read correctly in one minute by a research assistant speaking French as a second language. Passages on which performance differed significantly from the others were not used for the intervention.

Measures

Cognitive functioning. The Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman & Kaufman, 2004)) was used to get an estimate of the students’ cognitive functioning. The KBIT-2 is a brief, standardized, individually administered test of verbal and nonverbal abilities that can be used with individuals between 4 and 90 years old. The KBIT-2 provides an IQ Composite score as an estimate of overall cognitive abilities, which includes the scores obtained on two verbal and one nonverbal tasks.

Reading fluency. Three different measures were used to assess the students’ reading fluency throughout the study. French reading fluency was assessed by measuring Words Correct per Minute (WCPM) on French instructional and
generalization (IDAPEL) passages. English reading fluency was assessed by measuring WCPM on English generalization passages (DIBELS Next). The three measures are described in more details below.

**French instructional passages.** The number of words correct per minute (WCPM) read by the students during the first and last read of the intervention passages (described above) was used as a measure of within-session improvement. WCPM were calculated by subtracting the number of words read incorrectly from the total number of words read by the student within exactly one minute. Words read incorrectly included mispronounced, substituted, and omitted words, words read in the incorrect order, as well as hesitations that lasted more than three seconds. Self-corrections that occurred within three seconds were scored as words read correctly.

**French generalization passages.** The *Indicateurs dynamiques d’habiletés précoces en lecture* (IDAPEL) are a battery of French language experimental curriculum-based measures modeled after the DIBELS. Like the English measures, the IDAPEL were designed to monitor progress in different literacy skills. With probes of equal difficulty, they can be administered frequently to assess growth in skills and to evaluate the effects of intervention. For the present study, the IDAPEL Facilité en Lecture Orale (FLO) passages were used to assess progress in French reading fluency. The IDAPEL FLO is a curriculum-based fluency measure where students read passages aloud for one minute while the number of correct words per minute is recorded. The passages used are a mixture of narrative, expository and/or informative genres all written by a native French speaker. Their development adhered to rigorous oral reading fluency passage design specifications and careful calibration was used.
before classifying the passages into different grade-levels (Dufour-Martel & Desrochers, 2011).

Results from a study investigating the use of IDAPEL FLO with French immersion students have shown that it is a reliable measure useful in predicting French reading outcomes of second-grade French immersion students (Dufour-Martel & Good, 2009). A study was also conducted to assess the psychometric properties of IDAPEL FLO using participants attending French school districts in a Canadian province where English is majority language and French a minority language. Results show that the measure has adequate alternate form reliability, ranging from .94 to .98, and that scores obtained on the IDAPEL FLO are significantly correlated with other existing reading-related measures designed for the diagnostic assessment of reading difficulties (Dufour-Martel & Desrochers, 2011).

**English generalization passages.** The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) are curriculum-based English literacy measures. For the present study, DIBELS Oral Reading Fluency (DORF) probes were used weekly to assess progress in English reading fluency. The DORF is a curriculum-based fluency measure where students read passages aloud for one minute while the number of correct words per minute is recorded (Good & Kaminski, 2011). Since DORF passages of the same level are of equal difficulty, different probes can be administered frequently to assess growth in skills and to evaluate the effects of intervention. Oral reading fluency has been found to be one of the most valid measures to monitor reading competence (Reschly et al., 2009). The alternate-form reliability of different DIBELS-Next ORF reading passages drawn from the same level is adequate, ranging from .73
to .97 (Powell-Smith, Good, & Atkins, 2010). In addition, predictive validity correlations ranging from .64 to .77 were found between DORF Words Correct and measures of later reading achievement (Dewey, Powell-Smith, Good, & Kaminski, 2014). DIBELS-Next ORF are therefore reliable and valid measures of oral reading fluency.

**Reading comprehension.** The students’ French reading comprehension skills were assessed using the *Compréhension en lecture* (Reading Comprehension) subtest from the Échelle francophone d’appréciation du rendement (EFAR; Lacroix, 2012). The EFAR is a standardized French academic achievement test that was developed using curriculum in effect in many Canadian provinces. Its standardization sample was composed of Canadian students attending school in French in a linguistic minority setting, a number of which were bilingual with English as their dominant language (Lacroix, 2015). The subtest comprises 57 items of increasing difficulty, which require students to associate words to images, identify a word that does not belong amongst a list of five words, or to complete a passage by identifying with the missing word.

**Procedure**

**Recruitment and baseline screening.** Data collection for this project was approved by the University of British Columbia’s Research Ethics Board prior to recruitment. Students were nominated by their classroom and Learning Assistance teachers based on their learning history and performance on the previous year’s school-wide reading fluency benchmark assessments. Consent was obtained from parents through a signed form, and student assent was obtained from the participants after the study was explained verbally to them.
Prior to the beginning of the study, a baseline screening was conducted with each student to ensure they met inclusion criteria. Specifically, a benchmark assessment of reading fluency in French and English was completed using IDAPEL and DIBELS- Next Grade 3 level passages to confirm that the students were demonstrating reading difficulties. The KBIT-2 was used during the screening to obtain an estimate of the students’ cognitive functioning.

During screening, a survey-level assessment was also conducted using IDAPEL and DIBELS-Next to determine the instructional level at which each student’s progress would be monitored throughout the study. For DIBELs next passages, instructional level was defined as passages where students could read a number of words falling between the 25th for fall and the 75th percentile for spring performance that Grade based on AIMSweb reading fluency norms (AIMSweb, 2012) as well as between the DIBELS-Next Fall and Spring Benchmark Goals (Good & Kaminski 2011). The assessment was conducted by asking students to read 2 passages at their grade level (Grade 3) for 1 minute each. If the number of words read correctly indicated that the passages were within the student’s instructional level, Grade 3 level probes were selected to monitor progress. If the Grade 3 levels probes were beyond the student’s instructional level, students were asked to read passages from levels of decreasing difficulty until passages met the criteria described above. Based on the survey-level assessment, DIBELS-Next Level 2 passages were used with Suzie, Level 3 passages were used with Dylan, and Level 1 passages were used with Billy.

For IDAPEL passages, instructional level was defined as passages where students showed performance between the 25th and 75th percentile based on the local
percentiles provided by the IDAPEL scoring system. Based on the results, it was determined that all three student's instructional level was at the Grade 2 level, and that Grade 3 passages were slightly above their instructional level. Because of the limited number of IDAPEL passages available (only 9 benchmark probes were available per grade level), progress monitoring was performed using passages from two different levels on each assessment session. The decision of combining passages from two different levels on each progress monitoring session was made because monitoring with more than one probe per occasion has been suggested to reduce the standard error of measurement and to increase the reliability of slope estimation (Jenkins, Graff, & Miglioretti, 2009). Following the survey-level assessment, it was determined that progress monitoring for all three students would be conducted using one Grade 2 level FLO and one Grade 3 level FLO passage on each occasion.

**Research design.** The selected students participated in a reading fluency intervention integrating several evidence-based fluency-building strategies delivered in a randomized concurrent multiple baseline across participants design. This single-case design was selected to assess the effects of the intervention because the staggered introduction of the intervention across participants allows for each participant to act as their own control while also controlling for threats to internal validity such as historical events, participant maturation, and exposure to the clinical or experimental protocol and environment (Kazdin, 1982). The current design consisted of two conditions: (a) a baseline condition and (b) an intervention condition.

During baseline, students participated in regular classroom instruction, and data on the dependent measures was collected regularly. The length of baseline phases
(three, five, and seven weeks) was fixed a priori, based on the number of IDAPEL passages available. Following the baseline phases, the intervention was introduced in a staggered fashion across the three students who received 9, 7, and 5 weeks of instruction, respectively. Students were randomly assigned to the order of introduction. The two primary dependent variables for collecting progress monitoring data in baseline and intervention condition were (a) French Oral Reading Fluency and (b) English Oral Reading Fluency. As required with single case experiments, the dependent variables were repeatedly measured at baseline and throughout the intervention. Assessment sessions occurred once a week during both the baseline and the intervention phases. Intervention sessions occurred twice a week during the intervention phase. Assessment and intervention sessions were implemented in a one on one context in a quiet room.

**Assessment sessions.** English reading fluency was assessed during weekly assessment sessions. Due to the limited amount of French passages available, French reading fluency was assessed weekly in the three weeks preceding and following a phase change, and bi-weekly during the rest of the baseline and intervention phases. During assessment sessions, reading fluency was assessed by asking students to read two unfamiliar DORF passages and two unfamiliar IDAPEL FLO passages aloud for one minute. The score for English reading fluency was the mean number of words read correctly and the mean number of errors across the two DORF passages. The score for French reading fluency will be the mean number of words read correctly and the mean number of errors across the two IPAPEL FLO passages. The EFAR’s *Compréhension en lecture* subtest was used on the first and last assessment sessions of the baseline
phase, as well as on the last assessment session of the intervention phase to collect data on changes in the students’ reading comprehension.

**Intervention sessions.** Twice a week, students were pulled out of their classroom individually to receive a reading intervention adapted from the procedure developed in the Helping Early Literacy with Practice Strategies (HELPS) program (Begeny, 2009). Intervention sessions lasted approximately 20 minutes per student. The intervention procedure included seven evidence based strategies shown in previous research to improve students' reading. The strategies included goal-setting, verbal cueing procedures for students to read with fluency and for comprehension, repeated reading, modeling, phrase-drill error correction, performance feedback, and a motivational system. Data about the students’ performance during intervention sessions was collected by recording the number of words read correctly per minute (WCPM) during the first and third reading of the passage used in the intervention.

**Verbal cueing.** Research suggests that providing students with a cue about fluency or comprehension has positive effects on oral reading fluency (Therrien, 2004). Therefore, at the beginning of each session, the examiner read an introductory statement to the student, prompting the student to read with speed, accuracy, and good expression. The students were told to try to understand and remember the story.

**Repeated reading.** Reading the same passage several times has been shown to significantly increase oral reading fluency and reading comprehension (Chard, Vaughn, & Tyler, 2002; National Reading Panel, 2000; Therrien, 2004). Consequently, each student had to read a new passage aloud three times during each session.
**Modeling.** Evidence also suggests that providing students with a model of accurate and fluent reading prior to repeated readings of a passage is more effective than repeated readings alone (Chard et al., 2002). Thus, the examiner provided modeling for the passage by reading it fluently while the student followed along. To verify that the student was following along, the interventionist stopped five to seven times to ask the student to read the next word.

**Phrase-drill error correction.** Receiving corrective feedback from an adult has been found to be an essential component of repeated readings interventions (Therrien 2004). Specifically, phrase-drill error correction has been identified as an effective way to help students learn how to read words they had difficulty decoding and to improve oral reading fluency (Begeny, Daly, & Valleley, 2006). For this reason, the interventionist selected up to five words that were read incorrectly or less fluently by the student after each reading. After modeling the correct way to read the word, the interventionist asked the student to read the phrase containing the difficult word three times.

**Goal-setting and performance feedback.** The use of goal setting and performance feedback are effective in improving oral reading fluency (Morgan & Sideridis, 2006). Therefore, each student was provided feedback on his performance through graphing of their performance. After the first reading of a session, the interventionist graphed the student’s performance on their personal progress chart. They then established a goal of increasing performance of 20 words correct per minute (WCPM) and presented it to the student by drawing a coloured line representing the goal on the student’s progress chart. For each reading, the student’s performance
(WCPM and WIPM) was graphed in front of them, therefore providing them with a visual representation of their performance. With the help of the graph, the interventionist explicitly discussed and showed the student the extent his improvement after multiple readings of the same passage.

**Motivational system.** Evidence suggests that using contingent reinforcement in addition to strategies such as repeated readings is beneficial for students experiencing difficulties with oral reading (Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; Eckert, Ardoin, Daly, & Martens, 2002). As reinforcement, each student was given a motivational reward chart that consisted of a grid where they could put stickers. Each row of the grid had several white squares and a few shaded squares. During each session, the students received stickers to put on the grid to reward them for improving their reading through practice. For instance, students received one sticker for improving their WCPM from the first read of a passage to the third one. They could receive a supplemental sticker for meeting the goal established after the first reading. Each sticker was placed in a square of the grid. Every time the student reached a shaded square, he was allowed to choose a small prize. As they gave the students stickers to put on the chart and throughout the session, the interventionist delivered specific and genuine praise to the students. They used statements such as “I can tell you are really working to meet your goal!”, and “Look at how much you have improved!”

**Implementation.** At the beginning of each session, the examiner read the introductory statement to the student. The student then read a first instructional passage aloud while the examiner scored the number of words read incorrectly per minute and the number of words read correctly per minute. The student was then asked to say what
he remembered about the story during a brief retell task. A goal for the session was then established based on the performance of the first reading. Next, the interventionist provided modeling for the passage. The student was then asked to read the passage out loud a second time for one minute. This second reading was followed by a phrase-drill error correction for words read incorrectly. The student then read the passage for one minute a third and final time. The examiner graphed the student’s performance on the first and third readings of the passage. The student was given a star to put on his motivational chart to reward effort for doing better on the third reading than on the first. If the student attained the improvement goal for the session, they received an additional sticker. The student also received praise immediately after each reading for improving reading rate, accuracy, or expression.

**Fidelity of implementation.** Three graduate students in school psychology who were fluent in French served as interventionists for this study. Interventionists received a training session to learn how to administer the intervention. To ensure the interventionists followed intervention procedures, scripted directions and a step-by-step implementation protocol were provided to them to use during the sessions. Interventionists were also provided a form where they were asked to record any intervention components that were forgotten during the session. According to this form, all components were implemented on each session. As a supplemental measure of integrity, all sessions were recorded and a third of them were reviewed later to be assessed for fidelity. The review of the session confirmed that 100% of the intervention components were performed during each session.
**Inter-rater reliability.** All assessment sessions were also recorded and a third of them (i.e. 4 out of 12 sessions for each participant) were reviewed so that the number of words read correctly could be independently scored to determine inter-scorer agreement. Percentage agreement between raters was calculated for each reading of the reviewed session by dividing the lower WCPM value reported by the higher WCPM and multiplying the results by 100. Agreements between 90% and 100% were found, meeting the minimal threshold of 0.80-0.90 required to meet evidence standards (Katochwill et al., 2010).

**Data analysis**

Systematic visual comparison of responding was used to analyse results from this study. Each student’s reading fluency data on instructional passages were graphed to compare change in level from the first and last read of the passage used during a session as well as to determine if the trend of the students’ performance throughout the intervention phase increased. Ordinary Least Squares (OLS) slope estimates were used as a supplement to visual analysis to investigate change on first readings of instructional passages in the intervention phase. Generalization data were graphed and analyzed across students to determine if experimental control was demonstrated by replicating effects across the three different students (Horner et al., 2005). WCPM for French and English oral reading fluency were graphed together to facilitate cross-language comparisons. Visual analysis of the graphed data was performed by three different raters, inspecting for changes in level, trend, and/or variability between the baseline and intervention phases. OLS slope estimates were calculated as a supplement to visual analysis to calculate within-phase slopes for each student.
Results

Reading Fluency on Instructional Passages

During intervention sessions, interventionists recorded the number of words correct per minute (WCPM) on the first and third read of intervention passages. Students’ French oral reading fluency scores during sessions, measured by WCPM, are displayed in Figure 1. Data for within-session gains (first to third read) and trend in initial reads over time are presented separately.

Within-session gains. See Table 2 for mean scores on the first and last read, the standard deviation of performances during the first and last read, as well as the mean differences between the first and last read for each student. Within-session gains ranged from a minimum improvement of 3 WCPM to a maximum improvement of 45 WCPM. Visual analysis and mean WCPM differences both indicate that all students showed increased level in the third read of sessions in comparison to the first read.

Between-session gains. Visual analysis of the data presented in Figure 1 suggests that two of the three students (Suzie and Dylan) demonstrated a clear increasing trend in the number of WCPM in the 1st read of intervention passages throughout the weeks. Dylan demonstrated the steepest growth, with an OLS slope estimate of 0.44 WCPM per day. Suzie also demonstrated an increase in performance throughout the weeks, with a slope estimate of 0.36. The third student, Billy, demonstrated the slowest growth rate in intervention passages, with a variable but slightly increasing trend (slope = 0.12).
Figure 1. Students' French WCPM on 1st and 3rd read across intervention sessions.
### Table 2
**Means of Reading Fluency Measures during Intervention Sessions**

<table>
<thead>
<tr>
<th>Student</th>
<th>Mean WCPM 1st Read</th>
<th>Standard Deviation 1st Read</th>
<th>Mean WCPM 3rd Read</th>
<th>Standard Deviation 3rd Read</th>
<th>Mean Difference Between 1st and 3rd Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suzie</td>
<td>71.4</td>
<td>9.3</td>
<td>97.5</td>
<td>13.6</td>
<td>26.1</td>
</tr>
<tr>
<td>Dylan</td>
<td>73.8</td>
<td>11.2</td>
<td>92.9</td>
<td>12.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Billy</td>
<td>51.5</td>
<td>6.8</td>
<td>72.3</td>
<td>9.5</td>
<td>20.8</td>
</tr>
</tbody>
</table>

### Reading Fluency on Generalization Passages

Students’ French and English oral reading fluency, measured by words correct per minute (WCPM), across both phases are displayed in Figure 2. Mean WCPM, standard deviation, and OLS slope estimates representing change in WCPM per day for each student across phases are presented in Table 3. Results are presented by dependent variable, analyzing results for each student, beginning with French reading fluency and followed by English reading Fluency.

### Table 3
**Means, Standard Deviations, and OLS Slope Estimates of French and English Reading Fluency Measures across Phases**

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline OLS Slope Estimate</th>
<th>Mean WCPM Baseline</th>
<th>Standard Deviation Baseline</th>
<th>Intervention OLS Slope Estimate</th>
<th>Mean WCPM Intervention</th>
<th>Standard Deviation Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>French</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suzie</td>
<td>0.86</td>
<td>61.8</td>
<td>7.1</td>
<td>0.36</td>
<td>73.2</td>
<td>9.7</td>
</tr>
<tr>
<td>Dylan</td>
<td>0.38</td>
<td>66.5</td>
<td>4.8</td>
<td>0.18</td>
<td>72.9</td>
<td>7.4</td>
</tr>
<tr>
<td>Billy</td>
<td>0.03</td>
<td>47.2</td>
<td>4.6</td>
<td>0.01</td>
<td>54.5</td>
<td>3.9</td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suzie</td>
<td>-0.97</td>
<td>52.3</td>
<td>9.1</td>
<td>0.49</td>
<td>80.4</td>
<td>11.71</td>
</tr>
<tr>
<td>Dylan</td>
<td>0.01</td>
<td>79.1</td>
<td>2.6</td>
<td>0.33</td>
<td>82.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Billy</td>
<td>-0.18</td>
<td>24.6</td>
<td>3.7</td>
<td>0.17</td>
<td>34.3</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Figure 2. Students’ French and English WCPM across phases.
**French reading fluency.** The overall pattern across students for French reading fluency revealed no clear differences between phases as there were no consistent changes in level, trend, or variability across students. For all three students, the level and trend during the intervention phase appeared to be a continuation of the positive trend demonstrated during the baseline phase.

**Suzie.** During the baseline phase, Suzie demonstrated improvements in French reading fluency, as represented by the increasing trend in her WCPM during the three first assessment sessions (OLS slope estimate = 0.86). The sustained increasing trend (slope estimate = 0.36) indicates she continued to show improvements in French reading fluency during the intervention phase. Therefore, visual analyses suggest that the intervention had no significant effect on Suzie’s French reading fluency, and that the trend during the intervention phase was a continuation of baseline trend.

**Dylan.** During the baseline phase, Dylan also demonstrated slight improvements in French reading fluency, as represented by the small increasing trend in his WCPM in the five first assessment sessions (slope estimate = 0.38). Although he demonstrated a decrease in level on the first assessment session following the introduction of the intervention, he generally continued to show a slight increasing trend (slope estimate = 0.18). Visual analyses suggest that the trends during the baseline and intervention phases were similar, and that the intervention had no significant effect on Dylan’s French reading fluency on IDAPEL passages.

**Billy.** During the baseline phase, Billy showed a variable but flat trend of WCPM (slope estimate = 0.03), suggesting no improvements in French reading fluency performance. His performance was similar during the intervention phase, where he
continued to show a variable flat trend (slope estimate = 0.01). Therefore, visual analyses suggest that the intervention had no significant effect on Billy’s French reading fluency, as the trends during the baseline and intervention phases were similar.

**English reading fluency.** Visual analysis of the overall pattern across participants shows an increase in trend and/or level following the introduction of the intervention. Although the pattern of response (i.e., change in trend, level, or both) varied for each participant, all three showed a difference between phases.

**Suzie.** During the baseline phase, Suzie’s English reading fluency performance followed a decreasing trend (slope estimate = -0.97). During the intervention phase, however, Suzie showed an immediate change to an increasing trend in her WCPM throughout the weeks (0.49). Therefore, visual analyses suggest that the intervention has a positive effect on Suzie’s English reading fluency, as there was a significant increase in trend during the intervention phase in comparison to the baseline phase.

**Dylan.** During the baseline phase, Dylan demonstrated no significant growth or decrease English reading fluency performance, as represented by the stable flat trend of the first five data points (slope estimate = 0.01). Although he demonstrated an immediate decrease in level following the implementation of the intervention, visual inspection of the data reveals a delayed increase in trend during the intervention phase (slope estimate = 0.33). Visual analyses suggest that the trend during the intervention phase was superior to the one during baseline, and that the intervention also had a positive effect on Dylan’s English reading fluency.

**Billy.** Billy demonstrated a decreasing trend in English reading fluency during the baseline phase (slope estimate = -0.18). Following the implementation of the
intervention, Billy demonstrated an immediate increase in level. Following this immediate improvement in performance, his performance followed a variable but flat trend throughout the phase and he maintained a higher level of WCPM compared to the baseline phase (slope = 0.17). Specifically, his mean level of performance went from 24.6 WCPM during the baseline phase to 34.3 WCPM during the intervention phase. Visual analyses suggest that the intervention had an immediate positive effect on Billy’s English reading fluency, as it led to an immediate increase in level.

**Reading Comprehension**

The standard scores obtained by each student on the EFAR *Compréhension en lecture* subtest at the beginning of the baseline phase (Time 1), before the introduction of the intervention (Time 2), and at the end of the intervention (Time 3) are presented in Table 4. It is important to note that the number of weeks between Time 1, 2, and 3 was different for each student. Results indicate that all students showed improvements from Time 1 to 2, and from Time 2 to 3. Table 4 presents growth rates during the baseline and the intervention phase as calculated by raw score points per week.

**Table 4**

*French Reading Comprehension Scores at Time 1, Time 2, and Time 3*

<table>
<thead>
<tr>
<th>Student</th>
<th>Standard Score at T1</th>
<th>Standard Score at T2</th>
<th>Standard Score at T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suzie</td>
<td>65</td>
<td>73</td>
<td>97</td>
</tr>
<tr>
<td>Dylan</td>
<td>53</td>
<td>69</td>
<td>77</td>
</tr>
<tr>
<td>Billy</td>
<td>61</td>
<td>73</td>
<td>77</td>
</tr>
</tbody>
</table>

**Table 5**

*French Reading Comprehension Raw Score Growth Rate*

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline Phase</th>
<th>Intervention Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suzie</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Dylan</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>Billy</td>
<td>.5</td>
<td>.2</td>
</tr>
</tbody>
</table>
Discussion

This purpose of this study was to examine the effects of a French reading intervention on both the French and English oral reading fluency skills of French immersion students. To do so, a French reading intervention including procedures such as repeated readings, goal-setting, modeling, phrase-drill error correction, and a motivational system was delivered to three Grade 3 students demonstrating reading fluency difficulties. The effects of the reading fluency intervention were assessed using a concurrent multiple baseline across participants design with baseline phases lasting between 3 to 7 weeks and intervention phases lasting between 5 to 9 weeks. The effects of the intervention were measured by recording words read correctly per minute on passages in each language.

Two research questions were addressed: (1) Do oral reading fluency instruction methods proven to improve reading in monolingual English students also improve French reading skills in immersion students? (2) Does oral reading fluency instruction delivered in French also improve English oral reading Fluency? It was hypothesized that the intervention would improve oral reading fluency in both languages. The study’s major findings, limitations, and implications will be discussed in this section, as well as recommendations for future research.

Major Findings

Results from this study indicate that the intervention led to improvements in French reading fluency on instructional passages during intervention sessions. The improvement observed during intervention sessions did not generalize to the probes used for French progress monitoring, as there was no significant difference in the
growth of French reading fluency skills when assessed with IDAPEL passages between the baseline and intervention phases. However, the intervention appeared to lead to significant improvements in English reading fluency skills when compared to regular classroom instruction. All students showed gains in reading comprehension throughout both the baseline and the intervention phases.

**French reading skills.** Visual analyses of the graphed intervention data suggests that the intervention led to within-session improvements in reading fluency. All three students read significantly more words correct per minute (WCPM) on the third read of intervention passages than on the first one, with mean differences between the first and third read ranging from 19.1 WCPM to 26.1 WCPM. Students also generally showed progress in reading fluency on the first read of the passages used during the intervention throughout the intervention phase, as evidenced by positive trends demonstrating improvements ranging between approximately 1 to 3 WCPM per week. It is however not possible to determine whether this improvement was due to the intervention, as no baseline data was collected using the intervention passages.

The results of this study did not indicate generalization of the improvement observed during intervention sessions to the IDAPEL passages. For all three students, the trend observed during the intervention phase appeared to be a continuation of the trend they demonstrated during the baseline phase. Suzie and Dylan were both showing some growth in WCPM throughout the baseline phase, and maintained similar growth after the introduction of the intervention. Dylan demonstrated mostly flat trends during the baseline and intervention phases, showing negligible growth in WCPM during both phases. Consistent with these results, the data collected on the students’ reading
comprehension skills also indicate that they showed growth during both the baseline and the intervention phases.

**Cross linguistic transfer.** While the intervention did not lead to a significant change in generalized reading fluency on the French progress monitoring passages, positive changes in trend or level following the implementation of the intervention were found for English reading fluency. Suzie and Dylan both demonstrated changes in trend, going from showing flat or decreasing slopes during the baseline phase to increasing performances throughout the intervention phase. While Billy demonstrated mostly flat trends during both phases, he showed an immediate change in level following the introduction of the intervention. His performance increased significantly and remained superior to the one during the baseline phase, suggesting the intervention had an immediate positive effect on his English reading fluency. The fact that the start of the intervention was staggered across three different points in time, and that its effect on English reading fluency was replicated across the three students, strongly suggest that the improvements can be attributed to the intervention.

A number of factors could explain the presence of effects on English reading fluency skills despite the lack of generalization to the French reading fluency. To start, while they were not showing any growth in English reading fluency, students were already showing an improvement in French oral reading fluency during the baseline phase. This is likely due to the fact that students were receiving instruction in French reading as part of regular classroom instruction. The presence of growth during the baseline phase could have made it more difficult to detect the supplemental effects of the intervention. In addition, while English progress monitoring was conducted at each
student’s instructional level, French progress monitoring was done at the same level for all students due to the limited number of passages available, which could have decreased the sensitivity to change of the measures (Hintze, Daly, & Shapiro, 1998; Shapiro, 2008).

Another factor that could have contributed to the lack of significant effect of the intervention on French reading fluency is the students’ more limited language proficiency in the language. Theories of reading development suggest that word meaning or vocabulary knowledge contribute significantly to the development of word and text reading efficiency (Torgesen & Hudson, 2006). Studies conducted with monolingual students (Ouellette, 2006; Nation & Snowling, 2004) and ELL students (Geva & Zadeh, 2006; Gottardo, 2002) have found vocabulary to be predictive of word recognition skills. The students’ performances on the Verbal Knowledge subtest of the KBIT-2 suggest that all students demonstrated typical English vocabulary for their age. While the students’ French vocabulary knowledge was not assessed, research, in addition to the interventionists’ experience with the three students, suggest that the students showed more limited oral language proficiency in French than in English (Genesee, 1978).

Limitations

The results of this study should be interpreted in light of a number of limitations. One of the most important limitations of this study was the limited number of IDAPEL monitoring passages available. First, the small number of IDAPEL passages available limited the number of data points collected for French reading fluency, which had to be assessed every two weeks for part of the study (instead of every week). The length of
the phases were also limited as a consequence, and the baseline phase for Suzie only consisted of three data points, instead of the recommended minimum of five (Kratochwill et al., 2013). In addition, in order to reduce measurement error, and because only nine passages per grade level were available, passages from two different grade levels were used during each assessment session. The students’ reading fluency on the highest level used (Grade 3 passages) at the start of the study was below the 25th percentile, suggesting the passages were above their instructional level, which has been suggested to diminish the sensitivity of curriculum-based reading measures (Hintze, Daly, & Shapiro, 1998; Shapiro, 2008; Shapiro, 2011).

Another limitation of this study was that no data were collected on the students’ French reading fluency during the baseline phase using passages adapted from the same series as to the ones used for the intervention. Collecting data using these passages would have provided information about the students’ French reading fluency progress to supplement the data collected using IDAPEL passages. The lack of baseline data makes it impossible to determine whether the growth in WCPM read on the first read of instructional passages observed throughout the intervention phase on these passages can be attributed to the intervention.

An additional limitation of this study is the repeated use of the same form of the reading comprehension subtest throughout the study. As only one version of the subtest was available, the students were repeatedly exposed to the same questions, which could have led to a practice effect and inflated the scores obtained at time 2 and 3. Finally, the low number of participants in the study limits the generalizability of results. All three students attended a small Catholic Independent School, and had parents with
high educational attainment who spent time reading with them at home. As with most studies involving single case-designs, replications of this study will be necessary to determine the extent to which the findings will generalize across participants exhibiting different characteristics and across different settings.

**Implications for Practice and Research**

Results from this study provide further support for the Linguistic Interdependence Principle proposed by Cummins (1979, 2000). Until now, most of the evidence supporting the cross-language transferability of reading skills had been provided by correlational studies (e.g., MacCoubrey, Wade-Woolley, Klinger, & Kirby, 2004; Melby-Lervag & Lervag, 2011; Ramirez & Shapiro, 2007). Consistent with findings showing that fluency skills are strongly related across languages (Ramirez & Shapiro, 2007), the results of the current study indicated that a French fluency intervention could have effects on English reading fluency skills. The fact that students showed greater improvements in English reading fluency following the introduction of a French reading intervention is a strong indication that fluency skills are transferable across languages.

One other study, conducted with English Language Learners, had directly assessed the impact of an intervention on reading skills across languages (Vaughn et al., 2006). Results from the present study differ from the results presented by Vaughn and colleagues, which found that in Spanish-speaking English Language Learners in Texas, reading instruction only had effects across languages if instruction was delivered in the students’ first language (Spanish). The difference in results could be due to the amount of exposure to print in their first language students had outside of school. In the current study, the students’ first language, English, was also the majority language of
the province. In addition to being exposed to print in English in their community, the students were reported to spend time reading in English at home, and were expected to master reading skills in their first language within a few years. The same may not be true for ELL students whose first language is not the majority language. The difference in results suggests that there might be differences in the development of reading skills of these two types of bilingual learners.

The effectiveness of any type of reading intervention in the context of French immersion has been the subject of very little research. At this time, immersion teachers have access to few evidence-based interventions that have been shown to be effective with the population they are working with. Although this study did not show significant generalized French reading fluency and reading comprehension gains, the progress made during intervention sessions as well as the effects of the intervention on English reading fluency suggests that the procedures used are a promising intervention for improving reading fluency in French immersion students. In addition, findings suggest that the intervention procedures can be used to address reading difficulties across languages. Developing interventions that are effective across languages has important implications for immersion education, as immersion students demonstrating difficulties with French reading are also likely to struggle in English (Erdos, Genesee, Savage, & Haigh, 2011; Geva & Clifton, 1994). Therefore, although no significant effects on French reading fluency were identified, the procedures can be valuable in preparing students for the transition to English reading instruction.
Recommendations for Future Research

Future investigations examining the effectiveness of reading interventions with struggling French immersion students still need to be undertaken, given the growing popularity of these programs and the distinct needs of these students (Canadian Parents for French, 2013; Halifax Regional School Board, 2011; Ottawa-Carleton District School Board, 2007). To start, it would be recommended that the effects of this intervention would be further investigated by conducting a study using a larger sample. Using a between-group design would eliminate the need for repeated progress monitoring, allowing for a more prolonged intervention duration and for the use of more comprehensive reading assessment measures. A larger scale study could also examine the long-term effects of the intervention several months after the completion of the intervention.

Further studies should also look more closely at the impact of interventions such as this one on reading comprehension skills across languages. Results reported by Wise (2014), who found that an English phonological awareness training led to immediate and delayed improvements in word reading, suggest that the cross-linguistic effects of interventions can impact a number of skills. As fluency skills have been found to be predictive of reading comprehension (Riedel & Samuels, 2007; Yovanoff, Duesbery, Alonzo, & Tindal, 2005), and research suggests that fluency interventions similar to this one can also lead to gains in reading comprehension in monolingual students (Therrien, 2004), it is possible that the intervention developed for this study could have immediate and or delayed beneficial effects on reading comprehension across languages. While the reading comprehension measures and design and this
study could not indicate any significant impact of the intervention on comprehension skills, a between-group design could allow for more meaningful results.

Additionally, future studies could examine the influence of different variables, such as changing the language the intervention is delivered in or adding vocabulary instruction to determine the most effective manner of implementing reading fluency interventions with students in immersion. Finally, longitudinal studies should be conducted to examine the long-term effects of the French intervention on the development of reading skills before and after students start receiving formal English reading instruction.

Conclusion

Retention of struggling readers in French immersion is an important issue, and the development of evidenced-based interventions to address reading difficulties is necessary to address the needs of diverse learners in French immersion. Results from the study indicate that the intervention had no significant effect on students’ French reading fluency on generalization passages when compared to classroom instruction. However, the intervention’s effects on French reading fluency during intervention sessions and its effects on English reading fluency suggest the procedures employed are promising for addressing reading difficulties with French immersion students.

Consistent with the body of research supporting the Linguistic Interdependence Principle, the improvements in English reading fluency skills following the implementation of the French reading intervention suggest that reading skill instruction can have effects across languages. This finding has important implications, as
immersion students that are experiencing difficulties in French literacy are also likely to experience difficulties in English. Despite its limitations, the present study represents an initial step in the development of reading interventions for French immersion students, and suggests that the procedures used should be the subject of further research to assess their effectiveness using a larger sample.
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