PHONOLOGICAL AWARENESS TRAINING FOR STRUGGLING READERS IN GRADE 1 FRENCH IMMERSION

by

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This intervention study with cohorts analysed the effectiveness of phonological awareness (PA) instruction on the reading development of struggling Grade 1 readers enrolled in an early French immersion (FI) program in Southern Ontario. To date, there have been no published studies of PA interventions for FI students who are considered to be at risk for later reading problems. The findings indicate that a phonologically-based intervention can effectively address PA deficits and facilitate reading acquisition for FI students from diverse linguistic backgrounds who are struggling to learn to read in French.

Approximately 100 children with varied language backgrounds participated in the study during each school year. A new cohort was added each year for a period of three consecutive years. At-risk readers from each of the three cohorts were identified on the basis of their performance on English word reading and/or English PA measures that were administered. Pre-test measures were administered in November, and immediate post-test measures were administered in April. Delayed post-testing was conducted in February of the following two school years to assess the durability of treatment effects.

Small groups of 3-4 struggling readers from intact classes were randomly assigned to experimental and control conditions in each of the three consecutive years.
For 18 weeks, the treatment group was provided with English PA training in combination with letter-sound correspondence instruction, and the control group received English instruction designed to increase vocabulary development. At the conclusion of the intervention phase of the study, immediate post-testing indicated that the treatment group was closing the achievement gap in comparison to the typically developing readers on both English and French measures of PA and measures of French word reading. At this time point, there was still a significant difference between the control group’s performance on these same measures and that of the typically developing readers. Delayed post-testing results indicated that the treatment group significantly outperformed the control group on French measures of elision, word reading, and word reading fluency.
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### Table of Contents

Abstract .............................................................................................................. ii
Acknowledgements ........................................................................................ iv
List of Tables ..................................................................................................... vii
List of Figures ................................................................................................... viii
List of Appendices ........................................................................................... ix
Dedication .......................................................................................................... x

Chapter One: Rationale and Overview of Dissertation Research .................. 1
  1.1 Introduction ................................................................................................. 2
  1.2 Rationale for the Study ............................................................................... 4
  1.3 The French Immersion Context .................................................................. 6

Chapter Two: Literature Review and Hypotheses ......................................... 9
  2.1 The Need for Early Identification and Early Intervention ....................... 10
  2.2 Methodology of the Review ...................................................................... 11
  2.3 Empirical Studies and Related Theory ...................................................... 12
    2.3.1 Monolingual and bilingual children: The role of PA in reading acquisition ... 12
    2.3.2 The role of PA in the early identification of at-risk readers in FI .......... 16
    2.3.3 The effectiveness of PA instruction ...................................................... 22
  2.4 Research Questions and Hypotheses of the Current Study .................... 25

Chapter Three: Methodology ......................................................................... 28
  3.1 Participants ................................................................................................ 29
  3.2 Intervention ................................................................................................. 34
  3.3 Measures .................................................................................................... 37
    3.3.1 Family literacy practices questionnaire.............................................. 40
    3.3.2 Nonverbal cognitive ability ................................................................. 40
    3.3.3 English phonological awareness ......................................................... 40
    3.3.4 French phonological awareness .......................................................... 41
    3.3.5 English word reading .................................................................. 42
    3.3.6 French word reading .................................................................. 42
    3.3.7 English word reading fluency ............................................................ 43
    3.3.8 French word reading fluency .............................................................. 43
  3.4 Procedure .................................................................................................... 44

Chapter Four: Results .................................................................................... 45
  4.1 Descriptives ................................................................................................. 46
  4.2 Inter-correlations ........................................................................................ 51
  4.3 Statistical Analyses .................................................................................... 53
  4.4 Immediate Effects ....................................................................................... 53
    4.4.1 Closing the gap between typically developing and struggling readers .... 53
  4.5 Delayed Effects ........................................................................................... 55
    4.5.1 Treatment effects on the English tasks .............................................. 56
    4.5.2 Treatment effects on the French tasks ............................................... 58

Chapter Five: General Discussion .................................................................. 62
  5.1 Summary of Findings ................................................................................ 63
  5.2 Study Limitations ....................................................................................... 72
  5.3 Challenges of School-Based Research .................................................... 76
  5.4 Study Replication in the Natural School Setting ....................................... 78
5.5 A Promising Future for Struggling Readers in Bilingual Education Programs...... 81
5.6 Implications for Future Research................................................................. 83
5.7 Conclusion ...................................................................................................... 83
References ........................................................................................................... 85
List of Tables

Table 1: Grade 3 contextual information for school and school board 2008-2013........29
Table 2: Time line of the intervention study.........................................................31
Table 3: Effects of attrition rate for struggling readers selected \(n=16\) and not
selected for analyses \(n=28\)........................................................................33
Table 4: Distribution of students across groups by cohort, gender, language and age...34
Table 5: Organization of individually administered measures by cohort.................38
Table 6: Summary of pre- and post-test measures administered.............................39
Table 7: Descriptive statistics for typically developing \(n=208\), treatment \(n=5\),
and control \(n=7\) groups at Time 1 and Time 2..............................................47
Table 8: Descriptive statistics for typically developing \(n=208\), treatment \(n=5\)
and control \(n=7\) groups at Time 3 and Time 4.............................................48
Table 9: Inter-correlations between T1, T2, T3 and T4 outcomes for the treatment
group \(n=5\) in upper diagonal and control group \(n=7\) in lower diagonal......52
List of Figures

Figure 1: Growth patterns for the treatment and control groups on English and French elision .................................................................49

Figure 2: Growth patterns for the treatment and control groups on English and French word reading .........................................................50

Figure 3: Estimated mean scores for the treatment and control groups on T1, T2, and T4 English blending .........................................................57

Figure 4: Estimated mean scores for the treatment and control groups on T1, T2, T3, and T4 English word reading ........................................58

Figure 5: Estimated mean scores for the treatment and control groups on T2, T3, and T4 French elision ............................................................59

Figure 6: Estimated mean scores for the treatment and control groups on T2, T3, and T4 French word reading ..............................................60
List of Appendices

Appendix A: Family Literacy Practice Questionnaire………………………………..93

Appendix B: Measures…………………………………………………………...……96
   B-1   French Word Identification……………………………………………97
   B-2   French Elision……………………………………………………………100
   B-3   French Blending Words…………………………………………………103
   B-4   French Word Reading Fluency……………………………………….…105

Appendix C: Scope and Sequence of PA Training……………………………………107

Appendix D: Fidelity Checklists…………………………………………………………109
This dissertation is dedicated to all of the children who were withdrawn from early total French immersion programs in order to access supplemental reading interventions in the English-language elementary school program.
Chapter One: Rationale and Overview of Dissertation Research
1.1 Introduction

Phonological awareness (PA) refers to the insight that words used in speech consist of syllables, onsets and rimes, and phonemes. It is a construct that has been studied extensively for more than 20 years, largely due to its strong association with early reading achievement (Adams, 1990; Wagner et al., 1997). Students who lack sensitivity to the smaller sound components within spoken language are likely to experience difficulty with the acquisition of decoding skills which are so necessary for proficient reading. Fortunately, research has established that PA can be successfully taught to young children who are struggling to learn to read. There has been an abundance of research examining the effects of PA training on the reading development of children who may be at risk for later reading difficulties (National Reading Panel, 2000). To my knowledge, however, there have been few published Canadian studies investigating those effects in the French immersion (FI) context. This is not surprising, given the paucity of research examining FI students’ acquisition of early reading skills.

There is one unpublished study, recently conducted in the FI setting, which served as an inspiration for the current investigation. For her Master’s thesis, MacCoubrey (2003) provided English-speaking Senior Kindergarten (SK) immersion students with a 12-week French PA intervention, in combination with letter-sound correspondence instruction. The intervention was initiated prior to the introduction of formal literacy instruction in the classroom. This researcher found significant gains in PA, but no effect was observed in French word reading. In her discussion of the study’s limitations, she suggested that slightly older FI students would be ideal subjects for a future investigation, as formal reading instruction is provided on a regular basis during Grade 1 in accordance
with curriculum expectations (Ontario Ministry of Education, 2001). In her view, targeting Grade 1 students might increase the positive effects of PA training on reading development, due to the fact that it would be supported by daily classroom practice (Snow, Burns, & Griffin, 1998). It was this idea which prompted the current study.

There have been many studies indicating that PA is a robust predictor of later reading success (Adams, 1990; Nicholson, 1997; Snow et al., 1998); however, no studies have looked at whether the positive effects of a PA intervention would be sustained over time in the FI context in Canada. How would a phonologically-based intervention impact the PA skills of Grade 1 FI students who are having difficulty acquiring early reading skills? As we have seen, MacCoubrey (2003) found significant gains in the PA of native-English speakers who were struggling to learn to read in French. Given recent demographic changes in Canada (Swain & Lapkin, 2005), would PA training be as effective for FI students from diverse linguistic backgrounds who are experiencing problems with reading acquisition? Is it possible that PA training in combination with letter-sound correspondence instruction would also result in improvements in reading development for Grade 1 children who are exhibiting early signs of difficulty learning to read in the FI program? These are the fundamental questions that this intervention study sought to answer.

The remainder of this first chapter will include a discussion of the rationale for the study and provide an overview of the FI context. The second chapter will include an extensive literature review, a presentation of the specific research questions this dissertation seeks to address, as well as the hypotheses of the current study. The third chapter will describe the methodology, and the results will be presented in the fourth
chapter. The fifth and final chapter will summarize the findings of this intervention study with cohorts, provide suggestions for replication in the early FI setting, and discuss implications for future research.

1.2 Rationale for the Study

In Ontario, early FI programs usually begin in either SK or Grade 1 (Halsall, 1998). In most English-language district school boards, parents have the option to enrol their children in either the FI or regular English program when the children are ready to begin their educational careers. In both of these programs, a small percentage of children struggle to learn to read; however, appropriate reading support is rarely provided for struggling readers in the FI setting (Genesee, 2007; Genesee & Jared, 2008; Mady & Arnett, 2009). Instead, parents are often advised by school board personnel to switch their children to the English stream where they can access a wider array of support services (Cummins, 1984; Stern, 1991). This recommendation is largely based on the fact that early reading intervention opportunities have traditionally been available exclusively in the English program (MacCoubrey, Wade-Woolley, Klinger, & Kirby, 2004). If parents disregard this advice and opt to keep their children in FI despite their difficulties with reading acquisition, the achievement gap typically continues to widen. Eventually, some struggling readers are withdrawn from FI and enrolled in English-language elementary school programs (Hart, Lapkin, & Swain, 1989; Mannavarayan, 2001).

Clearly, this is not equitable practice. Both regular English and FI programs are publicly funded in this province. Those children in SK or Grade 1 who are having problems acquiring early reading skills should have access to supplementary reading interventions so that they can become fluent, proficient readers in later years, regardless
of the program in which they are enrolled. It should not be necessary for them to switch programs or schools in order to access much needed support (Parkin, Morrison, & Watkin, 1987). Students who miss out on early intervention opportunities are likely to experience reading difficulties throughout their lives (Juel, 1988; Stanovich, 1986), so it is the responsibility of Ontario district school boards to ensure that every effort is made to facilitate the development of young children’s early reading skills in both FI and regular English programs.

In my capacity as special education teacher in the early FI context, I have been increasingly frustrated by the number of struggling readers who have transferred to the regular English program. More often than not, this is a result of inadequate early identification procedures and inequitable access to supplementary instructional interventions (Wise, 2011) that would specifically address their reading difficulties. In my role, I have observed that it is usually the same students who are flagged as weak readers year after year by their classroom teachers. Although certain gains are made in reading, the achievement gap typically persists over time and begins to negatively impact achievement levels in core subject areas. In other words, children who exhibit signs of early reading problems tend to experience difficulty acquiring concepts that are introduced in social studies, mathematics, and science. This is partially due to the fact that they are required to gather information from print (e.g., textbooks, online resources). It has been my professional experience that without appropriate reading interventions, the cycle of failure commonly referred to in the reading literature (Juel, 1988; Stanovich, 1986) cannot be easily broken.
Therefore, before I settle into retirement from teaching, I would like to make a contribution to second language (L2) reading research by investigating the effectiveness of supplementary PA training for Grade 1 FI students who are struggling to acquire early reading skills. I firmly believe that students enrolled in publicly funded alternative education programs such as FI have as much right to evidence-based literacy instruction as students enrolled in English-language elementary school programs. Ontario’s English-language district school boards need to embrace a more preventative approach to the reading difficulties of early immersion students. Hopefully, my research will awaken school board officials to the issue at hand and persuade them to invest in the futures of all struggling readers in this province by providing them with equitable access to supplementary reading interventions.

1.3 The French Immersion Context

Early immersion programs in Canada, which are designed specifically for children whose first language is not French, begin in SK or Grade 1 (Halsall, 1998). Distinctions between total and partial immersion are often made, with total immersion characterized by 100% French language instruction during the primary grades, as opposed to 50% French and 50% English instruction in partial immersion programs (Genesee & Jared, 2008). In early total FI, the setting in which this study took place, primary classroom teachers who are fluent in the target language communicate with the students solely in French, which is the language of instruction for all core subjects. English is introduced in Grade 3 or 4, starting with one period per day and increasing gradually over time. By Grade 7 or 8, students receive approximately 50% of their instruction in French and the remaining 50% in English (Mannavarayan, 2001). Interestingly, children enrolled in these
programs acquire French literacy skills before learning to read and write in English, the majority language, or their own first language.

This French as a second language program option was initially developed more than 40 years ago in response to parental demands for educational programs which would encourage French-English bilingualism among their children (Lambert & Tucker, 1972). The model was based upon additive bilingualism; that is, “adding the second language without detriment to the development of the first” (Swain & Lapkin, 2005, p. 169). Since the inception of the FI program in Quebec in 1965 (Burns & Olson, 1981; Hart & Lapkin, 1998), enrolment has expanded beyond Quebec’s borders into every province and territory. According to Canadian Parents for French (2008), 6.7% of the student population in English-language school boards in Ontario was enrolled in FI programs during 2007-2008.

For many years, FI students came predominantly from English-speaking families (Genesee, 1987). It was generally accepted that immigrants to Canada should be discouraged from enrolling their children in FI programs because “learning English as a second language presents enough of a challenge” (Canadian Council on Learning, 2007, p. 9), although the available research evidence involving English language learners clearly challenges this assumption (Dagenais & Berron, 2001; Mady, 2007; Swain, Lapkin, Rowen, & Hart, 1990). Taylor (1992) explains that this assumption “was largely based on ‘common sense’ rather than empirical findings” (p. 753). In the last decade, changes in Canadian demographics, particularly in large urban centres, have given rise to linguistically diverse student populations (Swain & Lapkin, 2005). Consequently, student enrolment in early FI has changed dramatically since the start of the program, and for
many of the children who are currently registered, French “is a third or fourth language” (Swain & Lapkin, 2005, p. 171).

Notwithstanding the abundant evidence suggesting that FI schooling is an effective way to promote academic achievement and bilingualism in Canada (e.g., Cummins & Swain, 1986; Genesee, 1987; Turnbull, Lapkin, & Hart, 2001), not all students experience success in immersion programs, and not every child who is enrolled remains in the program (Stern, 1991). In some cases, transfer to the regular English program is the only viable alternative to meet their educational needs. Reading difficulties are one of the most important factors influencing parents to transfer their children (Hart et al., 1989; Mannavarayan, 2001), and parental decisions to withdraw their children are typically made prior to the end of Grade 3 (Halsall, 1998).

This relationship between early reading problems and attrition from FI should concern immersion educators. Clearly, this delay in the identification of at-risk readers in the FI context is a significant issue which needs to be addressed. Identifying children who may be at-risk for future reading difficulties before the cycle of reading failure is initiated is one of the challenges facing SK and Grade 1 FI teachers. What steps can early FI educators take in order to identify at-risk readers at an earlier stage in their literacy development so as to prevent persistent reading problems? Additionally, what can be done to facilitate reading acquisition for early FI students who are not responding as expected to literacy instruction in the large group classroom setting? These questions will create the focus for the literature review.
Chapter Two: Literature Review and Hypotheses
2.1 The Need for Early Identification and Early Intervention

Like children in other public education programs, children who enrol in FI programs typically present with varying reading abilities. Immersion educators continually strive to improve instruction in order to accommodate as many children as possible, so that they will be afforded the advantages of bilingualism in Canada’s two official languages, French and English. Nevertheless, the system often fails to meet the needs of a small percentage of students who have difficulty learning to read. What is alarming is that research has suggested that children who struggle to acquire reading skills almost invariably remain poor readers in later years (Juel, 1988; Stanovich, 1986). A vicious cycle ensues, in that the more frustration these low-achieving readers experience, the more uninterested they become in the reading process. Despite the shared optimism among teachers that students who struggle to acquire reading skills will eventually catch up to their peers in reading, only isolated examples support this belief (Clay, 1979).

There is abundant evidence linking early identification of reading problems followed by appropriate intervention to the achievement of later reading success (National Reading Panel, 2000). Despite the importance of early identification, FI students in SK or Grade 1 in Ontario elementary schools are generally not assessed for potential reading problems until Grades 2 or 3 (Keep, 1993). This is largely due to the fact that most children who enter the FI setting have little background in the French language, and there is a widespread belief that they must first acquire listening and speaking skills before formal reading instruction can be introduced and before reading problems can be identified (MacCoubrey et al., 2004; Geva & Herbert, 2012). As a result
of this delay in the identification process, early FI students who may be at risk for future reading difficulties typically do not receive timely instructional interventions (Parkin et al., 1987). The consequences of late identification can be far-reaching for many of these children.

What can be done to address this lag in the identification of and intervention for at-risk readers in early FI programs? This literature review will address this question and, hopefully, offer some insight for educators who are attempting to narrow “the steadily widening gulf between the good and poor readers” (Juel, 1988, p. 445). Few studies have examined the reading growth of young children enrolled in FI programs in Canada, and even less is known about reading development and interventions for immersion students who are at risk for later reading difficulties. For the purposes of this review, the term ‘at-risk’ will refer specifically to those students who are struggling to acquire pre-reading skills (e.g., PA). Such students are typically identified on the basis of risk assessments administered by their classroom teachers either during the latter half of SK or at the beginning of Grade 1, prior to the introduction of formal literacy instruction (Endler, 2008).

2.2 Methodology of the Review

A number of steps were involved in gathering the information contained in this review of the literature. First, an electronic search was done to locate relevant articles using search engines such as Google Scholar and ERIC. Keywords included: FI, early immersion, at-risk readers, at-risk students, early identification, and early intervention. Moreover, in response to my request for assistance, a number of references were sent to me electronically from the data base of Canadian Parents for French. Key Canadian
investigators who had conducted research related to students at risk in early FI programs were contacted via e-mail and asked for additional references related to the topic. Following this extensive search, relevant articles and studies were selected for analysis, and all references were examined so as to locate additional research which may have been previously overlooked.

The next section of this literature review includes: (a) a brief overview of the role of PA in reading acquisition for children from both monolingual and bilingual backgrounds, (b) an examination of the research evidence concerning the role of PA in the early identification of struggling readers in the FI context, and (c) a summary of empirical studies investigating the effectiveness of PA instruction for students who are at risk for later reading difficulties. In the final section, the hypotheses of the current investigation are stated.

2.3 Empirical Studies and Related Theory

2.3.1 Monolingual and bilingual children: The role of PA in reading acquisition

As we have seen, PA and reading achievement are closely linked. PA refers to the insight that spoken words consist of smaller units of sound. It involves an understanding that the pronunciations of words can be separated from the meanings attached to them. For example, a child who has PA is alert to the fact that “dog” is a word that is made up of three different sounds, /d/, /o/, /g/, as opposed to a furry animal that people commonly have as pets. Students who lack such awareness tend to have difficulty learning to decode, which is a prerequisite for proficient reading (National Reading Panel, 2000). Recent studies involving young children from monolingual English-speaking backgrounds have shown that tests of PA can be used effectively to predict later reading
ability (Adams, 1990; Ehri et al., 2001; Nicholson, 1997; Snow et al., 1998; Stanovich, 2000). This body of monolingual reading research concerning early literacy development provides investigators with a valuable window into the processes which may be involved in learning to read in an L2.

Investigations involving students with diverse linguistic backgrounds have demonstrated that PA in one’s L1 is highly predictive of reading achievement in an L2 (Cisero & Royer, 1995; Comeau, Cormier, Grandmaison, & Lacroix, 1999; Durgunoğlu, Nagy, & Hancit-Bhatt, 1993; Jared, Cormier, Levy, & Wade-Woolley, 2011). These studies have provided compelling evidence that PA is a general, rather than a language-specific, cognitive mechanism which, once established, can generalize to an L2. Based on systematic review of the L2 learning literature, Genesee and Geva (2006) concluded that reading acquisition in a first and second language involves similar cognitive processes.

In one of the first investigations into cross-linguistic effects involving alphabetic languages, Durgunoğlu et al. (1993) found that the phonological sensitivity of 27 Spanish-speaking Grade 1 children predicted their PA and reading skills in English, their L2. More specifically, the students who performed well on measures of both PA and word identification in their L1 were more likely to recognize English words and pseudowords than those students with weak PA and reading test results in Spanish. Furthermore, PA predicted word reading performance both within and across languages. The researchers highlighted the pedagogical significance of their findings, suggesting that educators provide PA training in children’s L1 in order to strengthen their reading ability in L2. They concluded that in this particular examination of the effects of cross-linguistic
transfer on L2 reading involving two alphabetic languages, PA did not appear to be language-specific.

Further evidence of transfer was suggested by Cisero and Royer (1995), who discovered that increases in the L1 task performance of kindergarten and first grade Spanish-speaking students on an initial phoneme detection task resulted in similar increases in English task performance. Based upon the children’s results, the investigators concluded that L1 task performance was a robust predictor of L2 task performance from Time 1 to Time 2. Their recommendations address the use of diagnostic assessment by educators to identify children with poor PA skills in their L1 who may be at risk for later L2 reading difficulties. They propose the implementation of instructional strategies early on to “reduce the likelihood of the child’s becoming a poor reader” (Cisero & Royer, p. 301).

One possible explanation that has been posited for the findings of these studies is that “there appear to be some similarities in phonologic awareness development in English and Spanish” (Cisero & Royer, 1995, p.279), which resulted in greater transfer. Previously, Durgunoğlu et al. (1993) alluded to “similar types of processing [which] underlie both Spanish and English word recognition” (p. 462). These interpretations certainly seem plausible. It is interesting to note that the children involved in these studies had little to no English language background at the outset of the investigations. Nevertheless, the results suggest that the participants were able to apply the phonological structure of their native language to a second alphabetic language and that this ability facilitated the L2 learning process.
In one of the first examinations of the longitudinal link between PA and reading in the FI context, Comeau et al. (1999) provided additional evidence that PA in one alphabetic language is strongly associated with PA and reading achievement in another alphabetic language. This study involved student populations residing in French-English bilingual communities. These researchers extended the findings of Durgunoğlu et al. (1993) and Cisero and Royer (1995), in that they were able to demonstrate a relationship between PA and decoding skills for native-English speakers learning to read in French. Specifically, for FI students in Grades 1, 3, and 5, there was a strong relationship between their English PA and reading achievement in both English and French a year later. This investigation corroborated the findings of previous studies by demonstrating that PA is a consistent and reliable predictor of word-level reading and provided compelling evidence of transfer of phonological processes across alphabetic languages. Given the fact that these L2 learners were exposed to the target language outside of the school environment, some caution must be exercised in interpreting the results.

Does variation in the complexity of grapheme-phoneme relationships in alphabetic languages such as English and French also influence students’ reliance on PA during reading acquisition? Without a doubt, the two languages differ in their phonological structures, but one specific question that must be addressed is the extent to which those differences increase the challenges inherent in learning to read. Both languages are recognized as having deep orthographies; that is, sets of rules governing their writing systems. Specifically, this refers to the manner in which letters represent sounds in languages and form words according to accepted usage. English is largely unpredictable in terms of the manner in which graphemes map onto phonemes, whereas
French has a more consistent pattern of grapheme-to-phoneme mapping. As Endler (2008) explained, “French is considered to have a more shallow orthography than English” (p. 33). Therefore, the degree of cross-language transfer may be affected by the fact that French and English orthographies are more similar than English and Spanish orthographies. This could be a topic of interest for future studies.

2.3.2 The role of PA in the early identification of at-risk readers in FI

Early success in reading is critically important. Stanovich (1986) coined the term ‘Matthew effect’ to illustrate the rich-get-richer phenomenon, suggesting a cumulative advantage for strong readers. He explained that proficient readers make substantial gains in vocabulary development and general proficiency as a result of reading extensively. In contrast, poor readers lack the motivation or desire to read, which results in weak vocabulary development and a general lack of interest in the mounting struggle that reading presents. Further discouragement with the course of their literacy development results in a cycle of reading failure.

Research has suggested that children who have difficulty acquiring reading skills in SK and Grade 1 seldom catch up (Clay, 1979; Juel, 1988; Stanovich, 1986). This contributes to the ever-widening achievement gap between the lowest-achieving pupils and their peers in reading. Clay (1979) alluded to the cycle of failure in her investigation of 100 New Zealand children who were beginning reading instruction at the age of five. She reported that where a low-achieving child “stood in relation to his age-mates at the end of his first year of school was roughly where you would expect to find him at 7:0 or 8:0” (p. 3). In a later study conducted in the United States that focused on the literacy development of 54 Texan children in Grades 1 through 4, Juel (1988) found that the
The probability that a poor reader in Grade 1 would remain a poor reader at the end of Grade 4 was 0.88.

The findings of these investigators continue to exert considerable influence on current research efforts and form the basis of present day thinking regarding the importance of early identification of and early intervention for at-risk readers. Once potential reading risk has been identified, early intervention programs can be designed and implemented to narrow the gap between the lowest-achieving children and their peers in reading before it becomes too wide to bridge. It follows that if early FI educators intervene while the achievement gap between strong and weak readers is still relatively small, the incidence of reading failure could be reduced and a greater number of children would have the opportunity to become proficient readers in both French and English. Therefore, one of the challenges facing SK and Grade 1 immersion teachers is to identify children who may be at risk for future reading difficulties before the cycle of reading failure is initiated.

In order to accomplish this, early FI educators would need to find a way to assess students’ reading risk immediately upon entry into the FI setting. Given the abundance of research evidence demonstrating that PA is predictive of reading achievement and that this underlying cognitive ability can transfer from L1 to L2, it may be possible to individually administer tests of PA in L1 in order to identify both English-speaking and non-English-speaking students who may be at risk for later reading difficulties. If PA is as reliable a predictor of reading achievement as researchers have suggested, then perhaps it is unnecessary to wait until after children in early immersion have acquired oral
language proficiency in French to flag those who might benefit from additional reading interventions.

In light of the linguistic diversity represented in today’s FI schools, one major obstacle which immersion educators will likely face in situations where children are struggling with French literacy skill acquisition is that it may not be possible to obtain valid and reliable measures of PA in L1. At present, students who enrol in these publicly funded alternative education programs have varied linguistic backgrounds, and for this reason, appropriate L1 risk assessment instruments and personnel who are adequately trained to individually administer those instruments may be difficult to locate. Additionally, setting up supplementary reading interventions to enhance PA skills in a multitude of L1s would likely be unmanageable for FI schools.

An empirical study that was recently conducted in the early FI context provides a rather stunning example of the logistical problems inherent in assessing children’s PA in their L1 (Wise & Chen, 2009). The investigators examined the effectiveness of small group PA training on the French reading development of 5- and 6-year-olds who had just enrolled in a Grade 1 single-track FI school in Ontario. Single-track schools typically offer only FI programs, and should not be confused with dual-track schools which offer both FI and English language programs. The 29 students who received the 20-week intervention came from diverse linguistic backgrounds and had had little to no exposure to the French language. Due to the fact that PA assessment tools were unavailable in the various languages represented in the sample, both pre- and post-tests of the children’s PA skills were administered in English, the majority language and an L2 for many of the participants in the study. The PA instruction was first delivered in English and then
switched to French once the students had acquired a degree of French language proficiency. Following the PA training, the researchers found that the French reading achievement levels of the treatment group were significantly higher than those of the previous school year’s at-risk readers who had not been provided with PA training.

In this particular investigation, cross-linguistic transfer was used as a diagnostic tool by the researchers, as suggested by Durgunoğlu (2002). In other words, for students whose L1 was not English, it was assumed that their PA skills would transfer across languages and that they would be able to reliably demonstrate their varying phonological processing skills on an English measure of PA. This was a reasonable assumption on the part of the researchers, in light of the evidence that PA is not a language-specific, cognitive mechanism (Cisero & Royer, 1995; Comeau et al., 1999; Durgunoğlu et al., 1993; Geva & Wang, 2001).

Wise and Chen (2009) included students in their sample who “were identified as being at risk for reading difficulties” (p. 2). All of the students who were selected for the early intervention program had failed to meet the reading expectations during their kindergarten year and had obtained scores at or below the 40th percentile on a standardized test of PA that was administered in English at the beginning of first grade. One specific question that arises is whether or not these children whose L1 was not English would have developed PA skills in English over time as their English language proficiencies developed. Was performance on the PA measure in their L2 a true reflection of their L1 PA abilities? Due to the practical limitations in using transfer as a diagnostic tool, the investigators had no way of knowing definitively if the students’ PA skills in their L1s were well-developed or not. Based upon previous empirical findings in similar
studies, they concluded that the English PA measures would provide a window into the children’s PA skills in their L1s. Clearly, tests of PA in individual students’ L1s would have provided more precise diagnostic information regarding the development of these underlying cognitive abilities. Without a doubt, there would have been less room for speculation and a more solid foundation upon which to draw conclusions.

Three recent FI studies examined predictors of early reading development in young English-speaking children whose exposure to French has been limited to the classroom. MacCoubrey et al. (2004) found that English phonological measures taken in the fall of Grade 1 accurately predicted reading achievement levels of native-English speakers at the beginning of Grade 2 in both French and English. This thorough investigation examined a number of predictor variables, including two measures of PA (sound isolation and phoneme blending), a rapid automatized naming (RAN) task, and a phonological working memory task. Two additional measures were taken to rule out differences in maturation and general cognitive ability. Outcome measures included both French and English word identification tests, which were administered to the students at the end of Grade 1 and again in the fall of Grade 2. Findings indicated that students who performed poorly on PA tasks achieved the lowest reading results in both French and English. These researchers extended the findings of previous studies by identifying English PA measures that can be used in reading risk-assessment procedures involving native-English-speaking children in early FI programs.

In another FI study, Endler (2008) observed that English PA tasks that were administered during SK were robust predictors of French and English word reading ability in Grade 1. This longitudinal investigation examined the pre-reading skills of
students from English-speaking backgrounds in order to determine the most consistent and reliable predictors of French word reading a full year later. Endler’s study was unique in that predictors of early reading were examined several months prior to the onset of formal literacy instruction in the classroom. Her examination included measures of oral language and PA (i.e., elision, an auditory deletion task), tests of phonological memory, and a rapid automatized naming (RAN) task. Outcome measures included French and English tests assessing students’ ability to read lists of real words and pseudowords in isolation. This study found that those SK children who performed poorly on the English elision task were more likely to perform poorly on the Grade 1 French reading outcome measures.

More recently, Haigh, Savage, Erdos, and Genesee (2011) conducted a study of the relationship between PA and reading achievement in the early FI context. These investigators were interested in finding evidence of a causal link between phonemic awareness (i.e., the ability to identify and manipulate individual sounds in spoken language) and later reading success. Baseline measures were administered in English with monolingual English-speaking children during SK, followed by an assessment of L1 and L2 reading skills during the spring of Grade 2. Results indicated that English phoneme blending was a reliable predictor of French reading outcomes, adding further empirical support to the notions that PA transfers across alphabetic languages and plays a causal role in the acquisition of early reading skills.

MacCoubrey et al. (2004), Endler (2008), and Haigh et al. (2011) demonstrated that children’s individual differences in PA, measured in English at an early stage in their literacy development, could accurately predict their success or lack thereof with French
reading acquisition. The results of these investigations have important implications for primary classroom teachers. These findings indicate that it is not necessary to delay assessment of reading risk in SK or Grade 1 French immersion, as previously thought. Rather than waiting until oral proficiency in the French language is acquired, student performance on English tests of PA can be examined at the beginning of the school year to identify students who may be at risk for later reading difficulties. Following early identification, instructional interventions can be initiated to narrow the ever-widening achievement gap between strong and weak readers (Geva & Herbert, 2012).

2.3.3 The effectiveness of PA instruction

Early identification and appropriate, timely intervention ensure that the small percentage of children whose needs have not been met by reading instruction in the large group classroom setting will be provided with explicit and systematic training in small groups. This “response-to-intervention” approach has received a great deal of attention in the reading literature in recent years, and has made an enormous impact on the teaching of reading in elementary schools because it sets children up to succeed rather than waiting for them to fail (Horowitz, 2005; Vellutino, Scanlon, Zhang, & Schatschneider, 2008; Simmons et al., 2008). The key to its success lies in the commitment of teachers to preventing persistent reading problems by flagging at-risk students without delay and providing them with supplementary reading interventions early on.

The vital role of PA in facilitating early reading has been well-documented (Expert Panel on Literacy & Numeracy Instruction, 2005). Since research has consistently shown that students who find it difficult to identify and manipulate individual phonemes within words are likely to struggle with acquisition of decoding
skills, the ultimate goal of PA instruction is improving phonemic awareness (Robertson & Salter, 2007). A meta-analysis of 52 studies by the National Reading Panel (2000) showed that phonemic awareness training effectively enhances reading achievement in beginning readers. It is therefore highly likely that interventions focusing on phonemic awareness would improve reading skills of at-risk readers enrolled in early FI programs.

MacCoubrey (2003) conducted one of the very few studies to have investigated early intervention for small groups of at-risk readers in the FI context. The at-risk readers in this study were native-English speakers enrolled in SK classes. They were able to read fewer than 2 words and scored at or below the 40th percentile on measures of PA. The treatment group \((n = 26)\) was provided with 12 weeks of phonemic awareness training in French, while the control group \((n = 23)\) was engaged in French vocabulary-building activities for that same period. The intervention significantly improved at-risk readers’ PA skills in both French and English. No effect, however, was observed in word reading ability. According to MacCoubrey, one possible explanation for this finding was that the children had not yet been introduced to formal literacy instruction in the classroom setting; that is, the connection between spoken and written language had not been reinforced during regular classroom activities. It was suggested that Grade 1 students would be ideal participants for future investigations, as they receive daily reinforcement of letter-sound correspondences during reading instruction, in accordance with Ontario curriculum expectations.

Although MacCoubrey (2003) made an important contribution to our understanding of the reading development of children in the early FI context, this study has several limitations. First, the participants were predominantly native-English
speakers, and this no longer reflects the changing demographics in FI schools (Swain & Lapkin, 2005). Second, the early intervention was effective for at-risk readers enrolled in SK FI programs, but it is unclear as to whether similar interventions would have been effective with a slightly older Grade 1 student population. This would be essential to investigate, given the number of public school boards in Ontario which, according to the Ontario branch of Canadian Parents for French, offer FI programs that commence in Grade 1. Finally, MacCoubrey used French as the sole language of instruction for her phonemic awareness intervention. It is not always feasible to provide supplementary instruction in French when children are only just beginning to acquire the language. Further investigations would have to address these issues.

A recent investigation conducted by Wise and Chen (2010) corroborated MacCoubrey’s (2003) findings and extended them to an older student population from varied language backgrounds. These researchers examined the impact of PA instruction on the reading achievement of at-risk Grade 1 readers enrolled in an early FI program. Twenty-nine children from diverse linguistic backgrounds participated in the study. At-risk readers were identified on the basis of their text reading performance and PA test scores, and received 20 weeks of PA training in small groups. In an effort to satisfy demands of school administration to use French for as large a part of the intervention as possible, instruction was initiated in English and then switched to French once the students had acquired a foundation in the French language. Because of this language combination, the intervention could be initiated immediately upon entry into the immersion context with struggling readers who were just developing French oral proficiency.
Significant gains were found in the PA skills of the treatment group \((n = 15)\). Results also indicated that the end-of-year French reading achievement levels of the treatment group were superior to those of the comparison group \((n = 14)\). These findings suggested that a phonologically-based intervention can effectively address PA deficits and facilitate French reading acquisition for early immersion students from varied language backgrounds who are considered to be at risk for later reading difficulties. It is noteworthy that this study was the first to establish a link between PA instruction and French reading achievement among early immersion children.

The investigation conducted by Wise and Chen (2010) had several limitations. First, the number of at-risk readers who participated in the study was small, which limited the generalizability of the results. Second, there was no control group against which to evaluate gains in PA, so it is difficult to determine whether or not improvements were attributable to the effectiveness of the PA training. Finally, the at-risk readers in the treatment group and the comparison group were enrolled in different school years, so the possibility cannot be ruled out that at least some between-group differences observed on outcome measures resulted from cohort differences. Due to these limitations, this study would need to be replicated by future studies with more rigorous designs.

2.4 Research Questions and Hypotheses of the Current Study

This study examined the effectiveness of PA training for Grade 1 FI students from diverse linguistic backgrounds who were identified as being at risk for later reading difficulties. It investigated two major research questions, the first of which explored whether or not English PA training would result in improved English and French PA of the struggling readers in the treatment group, as compared with those in the control
group. In addition, this study investigated whether or not there were immediate effects of English PA training on English and French PA for the struggling readers in the treatment group, as compared to typically developing readers. The National Reading Panel’s meta-analysis of 52 investigations (2000) demonstrated that PA can be successfully taught to young children who are struggling to acquire early reading skills. Furthermore, numerous investigations involving L2 learning have shown that prerequisite skills (e.g., PA) in a child’s first language will facilitate successful acquisition of those skills in another language (Genesee & Geva, 2006). Although the majority of the children who were identified as struggling readers in the present study were from non-English-speaking homes, those who were assigned to the treatment group received PA training in English. As previously discussed, strong evidence of cross-linguistic transfer of PA has been found among L2 learners from varied language backgrounds. Based upon the abundant evidence that PA is a non-language-specific cognitive mechanism which, once established, can generalize to an L2 (Cisero & Royer, 1995; Comeau, et al., 1999; Durgunoğlu, et al., 1993), it was hypothesized that the students in the treatment group would do significantly better than those in the control group on English and French measures of PA following 18 weeks of explicit and systematic PA instruction in English. It was further hypothesized that the treatment group would begin to close the achievement gap in comparison to the typically developing readers on English and French PA measures immediately following the intervention phase of the study.

The second research question explored whether or not struggling readers in the treatment group who were provided with English PA training would outperform those in the control group on French reading measures taken at the end of Grade 1, as well as in
Grades 2 and 3. In addition, this study investigated whether or not there were immediate effects of English PA training on French reading for the struggling readers in the treatment group, as compared to typically developing readers. This study focused on the strong relationship between PA and early reading skills (National Reading Panel, 2000). There is abundant research evidence suggesting that PA in one language will facilitate reading development in another language (Geva & Genesee, 2006). This study’s design and implementation were based upon empirical evidence from investigations involving children with monolingual backgrounds (Adams, 1990; Ehri et al., 2001; Nicholson, 1997; Snow et al., 1998; Stanovich, 2000) and diverse linguistic backgrounds (Cisero & Royer, 1995; Comeau et al., 1999; Durgunoğlu et al., 1993) indicating that PA is a robust predictor of later reading ability. Based upon the overwhelming evidence in support of early identification and intervention for students who are at risk for later reading difficulties (e.g., National Reading Panel, 2000; Vaughn et al., 2006), it was hypothesized that struggling readers in the treatment group who received PA training in English would significantly outperform those in the control group on French reading measures administered at the end of Grade 1, as well as in Grades 2 and 3. It was further hypothesized that the treatment group would begin to close the achievement gap in comparison to the typically developing readers on French reading measures immediately following the intervention phase of the study.
Chapter Three: Methodology
3.1 Participants

The children who participated in this study had just enrolled in a public, single-track FI elementary school in a middle- to upper-middle-class neighbourhood in Southern Ontario. In total over the three-year period, English pre-test measures were administered to 252 Grade 1 students from diverse linguistic backgrounds (mean age 5 years, 9 months, 51% males) to identify those students who were struggling to acquire early reading skills in the fall immediately upon entry into the FI program. Notably, although most of the children in the sample had been born in Canada, only 34.5% came from homes in which English was the primary language spoken and 65.5% came from homes in which a language other than English was spoken.1 The demographics for the total sample of 252 students are comparable to the contextual information reported for Grade 3 students at this particular school, as well as in this school board over a 5-year time period (Education Quality and Accountability Office, 2014; see Table 1).

Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>School</th>
<th>Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2009</td>
<td>27</td>
<td>39</td>
</tr>
<tr>
<td>2009-2010</td>
<td>43</td>
<td>40</td>
</tr>
<tr>
<td>2010-2011</td>
<td>48</td>
<td>41</td>
</tr>
<tr>
<td>2011-2012</td>
<td>47</td>
<td>42</td>
</tr>
<tr>
<td>2012-2013</td>
<td>49</td>
<td>46</td>
</tr>
</tbody>
</table>

1 In order to be classified as English L1 speakers, parents had to indicate that English was spoken in the home environment 50% of the time or more.
Grade 1 students were identified as at risk for later reading difficulties on the basis of their pre-test performance (T1) on English measures of PA and/or word reading. Specifically, children scoring at or below the 50th percentile on the English measure of elision (CTOPP, Wagner, Torgesen, & Rashotte, 1999) and/or the English letter-word identification test (WJIII, Woodcock, McGrew, & Mather, 2001) were eligible for the intervention. In total, 44 struggling readers (17.46% of the Grade 1 children who were tested) were selected to receive the intervention, from the three consecutive cohorts over the three-year period. Those children who scored above the 50th percentile on the elision test and/or the word reading test were considered to be typically developing readers. A decision was reached to overidentify children at the beginning of each school year (i.e., by using the 50th percentile as a cutoff) so as to include both readers who were having difficulty with acquisition of English reading skills and those truly at risk for future reading problems in the study. A letter of information was sent home to parents, and a return rate of 100% in each of the three years clearly indicated that parents were interested in having their children take part in the intervention.

The 44 children who met the selection criteria were provided with an 18-week intervention; those in the treatment group focused on English PA, and those in the control group focused on English vocabulary building. All instruction was given by the author of this dissertation, who was a special education teacher at the school. Immediate post-testing commenced at the end of April (T2), at the conclusion of the early intervention program. The children received a battery of language and literacy measures in both English and French immediately following the intervention. They received delayed post-tests in the two languages roughly a year later (T3), during the winter term of Grade 2 and again two years later (T4), during the winter term of Grade 3. Table 2 displays a
detailed timeline of the study. Classroom teachers, who worked collaboratively as a grade team, based their French language instruction on the same Ontario curriculum expectations and delivered similar balanced literacy programs in all three years of the study (Ontario Ministry of Education, 2001).

Table 2

Timeline of the Intervention Study

<table>
<thead>
<tr>
<th>Cohort</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>2013-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-test (Nov.)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention (Dec.-Apr.)</td>
<td>Immediate post-test (Apr.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pre-test (Nov.)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention (Dec.-Apr.)</td>
<td>Immediate post-test (Apr.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Pre-test (Nov.)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Delayed post-test (Feb.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention (Dec.-Apr.)</td>
<td>Immediate post-test (Apr.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the purposes of data analysis, a decision was reached to focus on a group of struggling readers who had scored at or below the 30<sup>th</sup> percentile on both English elision (CTOPP, Wagner et al., 1999) and English word reading (WJIII, Woodcock et al., 2001). Although there is considerable debate in the literature as to how reading achievement should be defined, the 30<sup>th</sup> percentile has been a suggested criterion when determining
students’ successful performance on achievement measures (Torgesen, 2000). This criterion level has been used as an indication of risk status in recent reading investigations (e.g., Simmons et al., 2008; Vellutino et al., 2008). This more stringent classification of ‘at-risk’ was used in order to be consistent with selection criteria used in previous reading intervention studies (e.g., O’Connor, Jenkins, & Slocum, 1995).

Although 16 students scored at or below the 30th percentile on both elision and word reading measures administered in English at T1, the final sample was composed of five students in the treatment group and seven in the control group. Their distribution across groups by cohort, gender, age, and language is presented in Table 4. Due to attrition, only 12 of the 16 intervention students were available for delayed post-testing at T4. One of the students who had been assigned to the treatment group and three of the students who had been assigned to the control group had withdrawn from the FI program and transferred to regular English-language programs at other schools at this time point (see Table 3).
Table 3

*Effects of Attrition Rate for Struggling Readers Selected (n = 16) and Not Selected (n = 28) for Analyses*

<table>
<thead>
<tr>
<th></th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Cohort 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not selected for analyses (n = 9)</td>
<td>Selected sample (n = 10)</td>
<td>Not selected for analyses (n = 11)</td>
</tr>
<tr>
<td>Pre-test (T1)</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Immediate Post-test (T2)</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Delayed Post-test (T3)</td>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Delayed Post-test (T4)</td>
<td>7</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

At pre-test (T1), the mean age of the 12 children in this group was 5 years 9 months. Of these 12 students who met the selection criteria for inclusion in this group and were available for testing at all four time points, 25% were male and 16.7% were English L1 speakers. The remaining students (n = 10) were non-English-speaking and the languages represented in this group included: Cantonese (10%), Turkish (10%), Hebrew (10%), Serbian (10%) and Russian (60%).
### Table 4

**Distribution of Students across Groups by Cohort, Gender, Language, and Age**

<table>
<thead>
<tr>
<th></th>
<th>Treatment Group (n = 5)</th>
<th>Control Group (n =7)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cohort 1</strong></td>
<td>3 (60.0%)</td>
<td>5 (71.4%)</td>
</tr>
<tr>
<td><strong>Cohort 2</strong></td>
<td>2 (40.0%)</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td><strong>Cohort 3</strong></td>
<td>-</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>2 (40.0%)</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>3 (60.0%)</td>
<td>6 (85.7%)</td>
</tr>
<tr>
<td><strong>Age (SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>5.89 (0.38)</td>
<td>5.93 (0.29)</td>
</tr>
<tr>
<td>T2</td>
<td>6.29 (0.51)</td>
<td>6.24 (0.39)</td>
</tr>
<tr>
<td>T3</td>
<td>7.24 (0.39)</td>
<td>7.16 (0.31)</td>
</tr>
<tr>
<td>T4</td>
<td>8.09 (0.02)</td>
<td>8.05 (0.03)</td>
</tr>
<tr>
<td><strong>English L1</strong></td>
<td>1 (20.0%)</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td><strong>Non-English-speaking</strong></td>
<td>4 (80.0%)</td>
<td>6 (85.7%)</td>
</tr>
<tr>
<td>Russian</td>
<td>3 (60.0%)</td>
<td>3 (42.8%)</td>
</tr>
<tr>
<td>Hebrew</td>
<td>-</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td>Cantonese</td>
<td>-</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td>Turkish</td>
<td>1 (20.0%)</td>
<td>-</td>
</tr>
<tr>
<td>Serbian</td>
<td>-</td>
<td>1 (14.2%)</td>
</tr>
</tbody>
</table>

#### 3.2 Intervention

In each of the three consecutive Grade 1 cohorts, the struggling readers who had been identified were provided with small group instruction for 18 consecutive weeks, beginning in early December. In a natural school setting such as this, it was not feasible to use random selection of individual participants to conditions. Consequently, groups of students from intact classes were randomly assigned to experimental and control conditions “to bolster claims of causality” (Troia, 1999, p. 50). Each group consisted of three or four children, an effective group size for students requiring supplemental reading interventions (National Reading Panel, 2000). In collaboration with classroom teachers, certain periods of the school day were designated for withdrawal support. Each small group of students was withdrawn to a small room in close proximity to their classrooms.
Twice per week, reading instruction was delivered in this quiet setting by the author of this dissertation, who was the special education teacher at the school. Each instructional session lasted approximately 25 minutes. Every effort was made to ensure that instructional time was balanced across conditions. The 44 struggling readers in both the treatment and control conditions received instruction solely in English.

The treatment group was provided with PA training in combination with letter-sound correspondence instruction. In light of the educational research indicating that PA skills typically develop in a particular sequence (Hodson, 2002), the students received instruction designed to increase their PA skills in a systematic manner. Over the course of the treatment, they became cognizant of the fact that sentences are made up of words, words are made up of syllables, and syllables are made up of individual sounds or phonemes. This progression increased the children’s awareness of increasingly smaller units of speech, and over time, they learned to produce and manipulate them.

Despite the commercial availability of instructional materials that teach PA skills in isolation, this particular PA training was deliberately linked to children’s literature in order to create “contextualized literacy experiences” (McGee & Richgels, 2000, p. 212). Readily available materials that teach PA skills in isolation are frequently criticized for failing to provide sufficient motivation for young learners. In contrast, utilizing a variety of popular children’s stories allowed learning to take place in a more meaningful and authentic manner. Over the course of the 18 weeks, instructional activities at the word, syllable, and phoneme level involved vocabulary found in these texts. Each week, the instructor read aloud a new story to the children in their groups. In total, the students in the treatment group received 15 hours of explicit PA instruction, a period of time considered to be effective for facilitating reading achievement (National Reading Panel,
Phonemic awareness was the ultimate goal of the PA training; consequently, 10 of the 18 weeks of the intervention focused on phonemic awareness instruction. The scope and sequence for the PA intervention program are presented in Appendix C.

In order to control for the Hawthorne effect (Troia, 1999), the struggling readers in the control group were provided with an alternate intervention which focused on vocabulary instruction, and they were taught in small groups by the same instructor. The children in this condition received the same amount of instructional time as those in the treatment group. The same texts were utilized for instructional purposes, and they were read aloud in the same order to ensure that the treatment effects were solely attributable to the PA training, rather than to the novelty of the experimental intervention.

The vocabulary instruction that the students in the control condition received was similarly contextualized in rich children’s literature; that is, the participants took part in vocabulary-building activities involving words that were taken directly from the stories that the instructor read orally. Prior to reading each story aloud, all new vocabulary was introduced and word meanings were shared. During oral reading, the instructor paused deliberately when new words were read aloud so as to draw the students’ attention to the new vocabulary in context and clarify meaning. In order to enhance the children’s understanding of the new vocabulary, text illustrations were highlighted as the stories were read aloud. Additionally, conversations that took place following the readings were specifically intended to deepen the students’ knowledge of word meanings. To help the children in the control group make sense of the new vocabulary that was being introduced in this literary context, the instructor encouraged them to draw upon their prior knowledge and experience during these discussions.
Fidelity checks were completed at regular intervals by research assistants and school personnel to avoid instructional drift and ensure that experimental and control conditions were being faithfully implemented (Troia, 1999). During all three years of the investigation, checklists were completed while the instructor was delivering instruction to the students in both conditions. These are presented in Appendix D. According to Troia (1999) this procedure makes it possible to report percent accurate implementation, an index of treatment fidelity, at the conclusion of the study. Results of the 62 fidelity checklists completed over the course of the three-year investigation indicated 94 percent accurate implementation of experimental and control conditions. This shows that the instructor adhered closely to the instructional objectives for each group.

3.3 Measures

Due to the fact that children did not speak or read French when they entered Grade 1, only English pre-test measures were administered at T1 to all of the participants. English and French outcome measures were administered to both groups in all three years of the study at immediate post-test during the spring term of Grade 1 (T2), as well as to both groups in Cohort 1 at delayed post-test during the winter terms of Grade 2 (T3) and Grade 3 (T4). English and French outcome measures were only administered to the intervention students in Cohorts 2 and 3 at delayed post-test during the winter terms of Grade 2 (T3) and Grade 3 (T4). The organization of individually administered measures by cohort is presented in Table 5, and a summary of measures administered is presented in Table 6.
Table 5

*Organization of Individually Administered Measures by Cohort*

<table>
<thead>
<tr>
<th>Cohort 1</th>
<th>Gr. 1 Pre-test (T1)</th>
<th>Gr. 1 Immediate Post-test (T2)</th>
<th>Gr. 2 Delayed Post-Test (T3)</th>
<th>Gr. 3 Delayed Post-Test (T4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English measures all participants</td>
<td>English and French measures all participants</td>
<td>English and French measures all participants</td>
<td>English and French measures all participants</td>
</tr>
<tr>
<td></td>
<td>Cohort 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>English measures all participants</td>
<td>English and French measures all participants</td>
<td>English and French measures intervention students only</td>
<td>English and French measures intervention students only</td>
</tr>
<tr>
<td></td>
<td>Cohort 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>English measures all participants</td>
<td>English and French measures all participants</td>
<td>English and French measures intervention students only</td>
<td>English and French measures intervention students only</td>
</tr>
</tbody>
</table>
### Table 6

**Summary of Pre- and Post-test Measures Administered**

<table>
<thead>
<tr>
<th>Testing Schedule</th>
<th>Treatment Group (At-Risk Readers)</th>
<th>Control Group (At-Risk Readers)</th>
<th>Non-selected Group (Typically Developing Readers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>administered in</td>
<td>nonverbal cognitive ability (MAT)</td>
<td>nonverbal cognitive ability (MAT)</td>
<td>nonverbal cognitive ability (MAT)</td>
</tr>
<tr>
<td>English in the fall of Grade 1 (T1)</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-reading ability (WJ III) – letter-word identification</td>
<td>-reading ability (WJ III) – letter-word identification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Cohort 3 only: word reading fluency test (TOWRE)]</td>
<td>[Cohort 3 only: word reading fluency test (TOWRE)]</td>
<td></td>
</tr>
<tr>
<td>Immediate post-tests</td>
<td>phonological awareness (CTOPP) – both elision &amp; blending, as well as a French experimental test of elision &amp; blending</td>
<td>phonological awareness (CTOPP) – both elision &amp; blending, as well as a French experimental test of elision &amp; blending</td>
<td></td>
</tr>
<tr>
<td>administered in</td>
<td>-reading ability - English letter-word identification (WJ III), and an experimental French word identification test [Cohorts 2 &amp; 3 only: a word reading fluency test in both English &amp; French (TOWRE)]</td>
<td>-reading ability - English letter-word identification (WJ III), and an experimental French word identification test [Cohorts 2 &amp; 3 only: a word reading fluency test in both English &amp; French (TOWRE)]</td>
<td></td>
</tr>
<tr>
<td>English and French in the spring of Grade 1 (T2)</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td></td>
</tr>
<tr>
<td>Delayed post-tests</td>
<td>phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
<td>phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
<td></td>
</tr>
<tr>
<td>administered in</td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td></td>
</tr>
<tr>
<td>English and French in the winter of Grades 2 (T3) and 3 (T4)</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
<td>-phonological awareness (CTOPP) – both elision &amp; blending (blending at T4 only), as well as a French experimental test of elision &amp; blending (blending at T4 only)</td>
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<tr>
<td></td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td>-reading ability - English letter-word identification (WJ III), an experimental French word identification test, &amp; a word reading fluency test in English &amp; French (TOWRE)</td>
<td></td>
</tr>
</tbody>
</table>
3.3.1 Family literacy practices questionnaire

Parents who had provided written consent for their children’s participation were asked to provide information related to demographics and home literacy practices (Appendix A). They were also asked whether or not they and their Grade 1 children spoke English or a different language at home. This information was used in the present study to classify English L1 and multilingual children.

3.3.2 Nonverbal cognitive ability

Nonverbal cognitive ability was assessed at pre-test (T1) using the Matrix Analogies Test (expanded form; Naglieri, 1985). Each student was asked to view a visual pattern with a missing portion in order to determine which of six possible pieces would best fit the pattern. Test administration involved the presentation of 64 such patterns, which were organized into four subtests containing 16 test items each. For each subtest, testing was discontinued after the student made four consecutive errors. This test was only administered at T1.

3.3.3 English phonological awareness

To measure PA, two subtests of the Comprehensive Test of Phonological Processing (CTOPP, Wagner et al., 1999) were administered. On both the elision and blending words subtests, there were six practice items and 20 test items, and testing was discontinued as soon as three consecutive errors were made on the test items. On the elision subtest, students were encouraged to listen to individual English words read aloud by the examiner. Next, they were asked to delete a word part or sound in each word that had been presented (e.g., “say sunshine without saying sun” or “say blend without saying /l/”). The English elision measure was given to the typically developing readers and
intervention students in Cohort 1 at all four time points, but these two groups in Cohorts 2 and 3 were only given this measure at T1 and T2. Due to time constraints, it was only given to the intervention students in Cohorts 2 and 3 at T3 and T4. During the administration of the blending words subtest, students were asked to listen to parts of words or individual sounds in words and put the word parts or sounds together to form whole words (e.g., “cup + cake” or “/b/ /ã/ /d/”). Due to time constraints, the English blending measure was only given to the intervention students, and it was only administered at T1, T2 and T4.

3.3.4 French phonological awareness

Two French experimental measures of PA that had been previously constructed and used by MacCoubrey (2003) were modified for the present investigation. These tasks were similar in design to the two English phonological processing subtests described above. Individual test items were selected in collaboration with the Grade 1 classroom teachers to ensure that the children would be familiar with the words presented. Both the elision and blending words tests contained six practice items and 20 test items. During test administration, the tasks were discontinued when individual students made three consecutive errors on the test items. The French elision measure (see Appendix B-2) was given to the typically developing readers and the intervention students in Cohort 1 at T2, T3, and T4, but these two groups in Cohorts 2 and 3 were only given this measure at T2. Due to time constraints, it was only given to the intervention students in Cohorts 2 and 3 at T3 and T4. The French blending measure (see Appendix B-3) was only given to the intervention students at T2 and T4.
3.3.5 English word reading

English word reading was measured by the Letter-Word Identification subtest of the Woodcock-Johnson III battery (WJIII, Woodcock et al., 2001). There was a total of 76 test items on this standardized measure, and they were organized into sets of increasing difficulty consisting of one to eight words per set. The beginning 16 test items required students to either identify letter names or point to letters presented orally by the examiner. On the remaining 60 test items, students were asked to read aloud sets of English words that became gradually more challenging as the task progressed. Testing was discontinued when the student made six consecutive errors in a complete set. This measure was given to the typically developing readers and intervention students in Cohort 1 at all four time points, but these two groups in Cohorts 2 and 3 were only given this measure at T1 and T2. Due to time constraints, it was only given to the intervention students in Cohorts 2 and 3 at T3 and T4 (see Table 3).

3.3.6 French word reading

A French experimental word reading measure (see Appendix B-1) that had been previously developed and administered by MacCoubrey (2003) was modified for the present investigation. The test was comparable to the English word reading test described above; however, it did not include test items requiring students to name letters or point to letters following an oral prompt. In consultation with the Grades 1 to 3 teachers, individual test items were selected and grouped into sets of eight words per set. The sets increased in the level of difficulty as the task progressed. Test items consisted of words that had been taught by Grade 1 classroom teachers during instructional time, as well as those that were taught in Grades 2 and 3. There was a total of 120 test items. Each student
was presented with sets of French words to read orally, and testing was discontinued when a student obtained a score of less than five out of eight words read accurately in a set. This measure was given to the typically developing readers and intervention students in Cohort 1 at T2, T3, and T4, but these two groups in Cohorts 2 and 3 were only given this measure at T2. Due to time constraints, it was only given to the intervention students in Cohorts 2 and 3 at T3 and T4.

3.3.7 English word reading fluency

English word reading fluency was measured by the Sight Word Efficiency subtest of the Test of Word Reading Efficiency (TOWRE, Torgesen, Wagner, & Rashotte, 1999). This individually administered test measured students’ ability to recognize familiar sight words presented by the examiner in a printed vertical list. Students had 45 seconds to accurately identify as many real words as possible from the list, and their raw score was based upon the total number of single words read accurately in that period of time. This measure was only given to the typically developing readers and intervention students in Cohort 3 at T1. It was only given to these two groups in Cohorts 2 and 3 at T2. Due to time constraints, it was only administered to intervention students at T3 and T4.

3.3.8 French word reading fluency

A French adaptation of the Sight Word Efficiency subtest of the Test of Word Reading Efficiency (TOWRE, Torgesen et al., 1999) that had been used in a previous investigation by Jared et al. (2011) was used to measure word reading fluency in this investigation (see Appendix B-4). Individual students were provided with 45 seconds to accurately identify as many real French words as they could from a vertical list. A raw score was obtained by calculating the number of words that had been read correctly in
that time period. This measure was only given to the typically developing readers and intervention students in Cohorts 2 and 3 at T2, and it was only administered to intervention students at T3 and T4.

3.4 Procedure

All of the pre- and post-test measures were individually administered in a quiet setting by trained undergraduate and graduate students who were blind to conditions. Those responsible for the administration of French measures were bilingual in French and English. In order to prevent student fatigue, an effort was made to administer English test batteries on different days than French test batteries, and both English and French test batteries were administered in random order. Approximately half of the students began with English measures and the other half started with French measures on a random basis. Pre-test sessions lasted approximately 30 minutes, and post-test and delayed post-test sessions required an additional 30 minutes, due to the fact that both English and French measures were administered. English instructions were provided for all English measures. To ensure understanding, both French and English instructions were given prior to all French measures.
Chapter Four: Results
4.1 Descriptives

To account for attrition bias, independent samples \( t \)-test comparisons were made between the students who left the study \((n = 4)\) and the students who participated in the entire study \((n = 12)\). There were no statistically significant differences between the missing students and the final sample at initial Grade 1 English testing. Mean raw scores, standard scores, and standard deviations for the typically developing, treatment, and control groups at each time point are presented in Tables 7 and 8. Internal reliabilities for all English and French measures at each time point are also reported in Tables 7 and 8. The growth patterns for the two groups on English and French elision across the different time points are displayed in Figure 1. The growth patterns on English and French word reading are displayed in Figure 2. Scores on English tasks at initial Grade 1 testing were similar for the treatment and control groups (see Tables 7 and 8).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Typically Developing</th>
<th>Treatment</th>
<th>Control</th>
<th>Typically Developing</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\alpha$</td>
<td>$M \ (SD)$</td>
<td>$M \ (SD)$</td>
<td>$M \ (SD)$</td>
<td>$\alpha$</td>
<td>$M \ (SD)$</td>
</tr>
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<td>Nonverbal Reasoning</td>
<td>0.89</td>
<td>22.88 (11.66)</td>
<td>12.33 (7.71)</td>
<td>11.40 (7.53)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Standard Score</td>
<td></td>
<td>118.51 (15.14)</td>
<td>104.33 (10.13)</td>
<td>105.00 (12.10)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>English Elision</td>
<td>0.85</td>
<td>11.01 (4.81)</td>
<td>2.17 (1.17)</td>
<td>2.30 (0.68)</td>
<td>0.91</td>
<td>12.87 (4.94)</td>
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<td>Standard Score</td>
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<td>13.41 (2.96)</td>
<td>9.20 (0.75)</td>
<td>8.79 (1.14)</td>
<td>13.19 (3.25)</td>
<td>11.50 (2.35)</td>
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<tr>
<td>English Blending</td>
<td>0.58</td>
<td>12.28 (3.38)</td>
<td>13.21 (6.83)</td>
<td>6.90 (1.91)</td>
<td>0.84</td>
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<tr>
<td>Standard Score</td>
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<td>13.21 (2.42)</td>
<td>10.80 (1.10)</td>
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<td>12.75 (1.87)</td>
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<tr>
<td>English Word Reading</td>
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<td>36.69 (9.95)</td>
<td>18.50 (9.27)</td>
<td>16.00 (6.31)</td>
<td>0.95</td>
<td>40.07 (9.77)</td>
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<td>Standard Score</td>
<td></td>
<td>127.11 (14.70)</td>
<td>100.45 (14.46)</td>
<td>98.91 (12.77)</td>
<td>119.14 (12.87)</td>
<td>96.33 (15.42)</td>
</tr>
<tr>
<td>French Elision</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.94</td>
<td>13.32 (5.83)</td>
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<tr>
<td>French Blending</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.76</td>
<td>--</td>
</tr>
<tr>
<td>French Word Reading</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.98</td>
<td>47.36 (17.77)</td>
</tr>
</tbody>
</table>
### Table 8

Descriptive Statistics for Typically Developing ($n = 208$), Treatment ($n = 5$), and Control ($n = 7$) Groups at Time 3 and Time 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time 3</th>
<th></th>
<th></th>
<th>Time 4</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Typically Developing</td>
<td>Treatment</td>
<td>Control</td>
<td>Typically Developing</td>
<td>Treatment</td>
<td>Control</td>
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<tr>
<td></td>
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<td>$M (SD)$</td>
<td>$M (SD)$</td>
<td>$\alpha$</td>
<td>$M (SD)$</td>
</tr>
<tr>
<td>English Elision</td>
<td>0.66</td>
<td>14.61 (4.56)</td>
<td>12.00 (4.34)</td>
<td>8.50 (3.46)</td>
<td>0.92</td>
<td>16.76 (3.80)</td>
</tr>
<tr>
<td>Standard Score</td>
<td>12.89 (2.98)</td>
<td>12.40 (2.14)</td>
<td>9.75 (2.05)</td>
<td>12.71 (3.99)</td>
<td>11.60 (4.28)</td>
<td>8.29 (1.60)</td>
</tr>
<tr>
<td>English Blending</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.67</td>
<td>--</td>
</tr>
<tr>
<td>Standard Score</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>9.60 (1.52)</td>
<td>8.71 (1.11)</td>
</tr>
<tr>
<td>English Word Reading</td>
<td>0.93</td>
<td>47.88 (7.72)</td>
<td>36.50 (11.47)</td>
<td>28.13 (5.22)</td>
<td>0.83</td>
<td>54.84 (7.21)</td>
</tr>
<tr>
<td>Standard Score</td>
<td>120.23 (10.50)</td>
<td>105.30 (14.29)</td>
<td>95.83 (9.38)</td>
<td>114.53 (11.76)</td>
<td>105.80 (10.26)</td>
<td>92.86 (11.17)</td>
</tr>
<tr>
<td>English Word Fluency</td>
<td>0.98</td>
<td>62.74 (13.98)</td>
<td>41.33 (24.07)</td>
<td>25.13 (11.27)</td>
<td>0.98</td>
<td>--</td>
</tr>
<tr>
<td>Standard Score</td>
<td>118.55 (12.76)</td>
<td>99.63 (21.30)</td>
<td>92.33 (11.12)</td>
<td>--</td>
<td>109.40 (22.35)</td>
<td>89.00 (13.74)</td>
</tr>
<tr>
<td>French Elision</td>
<td>0.92</td>
<td>14.76 (5.01)</td>
<td>12.83 (5.19)</td>
<td>7.88 (4.88)</td>
<td>0.93</td>
<td>19.47 (6.20)</td>
</tr>
<tr>
<td>French Blending</td>
<td>0.96</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.96</td>
<td>--</td>
</tr>
<tr>
<td>French Word Reading</td>
<td>0.98</td>
<td>67.24 (20.85)</td>
<td>78.33 (27.62)</td>
<td>34.13 (14.77)</td>
<td>0.99</td>
<td>86.05 (20.34)</td>
</tr>
<tr>
<td>French Word Fluency</td>
<td>0.97</td>
<td>55.26 (11.63)</td>
<td>47.83 (16.02)</td>
<td>25.13 (8.49)</td>
<td>0.99</td>
<td>64.60 (9.32)</td>
</tr>
</tbody>
</table>
Figure 1. Growth patterns for the treatment and control groups on English and French elision.
Figure 2. Growth patterns for the treatment and control groups on English and French word reading.
4.2 Inter-correlations

Inter-correlations were examined between the treatment and control groups in order to explore the relationships between measures, across time points, and across languages (i.e., English and French). Generally speaking for both groups, significant correlations were found within and across English and French measures and across time points, with strong test-retest reliability for all measures (see Table 9). Specifically for the treatment group, English PA (elision) had significant strong correlations with both English word reading and English word reading fluency ($r = 0.80$ to $0.95$), as well as with French word reading and French word reading fluency ($r = 0.80$ to $0.95$). For the control group, English PA (both elision and blending) had strong negative correlations with English word reading and English word reading fluency ($r = -0.84$ to $-0.93$), as well as with French word reading fluency ($r = -0.84$ to $-0.93$). Interestingly, although English PA (elision) was negatively correlated with English and French word reading fluency, French PA (elision) had strong positive correlations with English and French word reading fluency ($r = 0.80$ to $0.84$).
Table 9
Inter-correlations Between T1, T2, T3 and T4 Outcomes for the Treatment Group (n = 5) in Upper Diagonal and Control Group (n = 7) in Lower Diagonal

|       | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| T1 EPA-E |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T1 EPA-B | .11  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T1 EWR  | -.34 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T2 EPA-E | .30  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T2 EPA-B | -.32 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T2 EWR  | -.14 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T3 EPA-E | -.28 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T3 EPA-B |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T3 EWR  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T4 EPA-E |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T4 EPA-B |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| T4 EWR  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

Note: *p < .05; **p < .01; EPA-E = English elision; EPA-B = English blending; EWR = English word reading; EWRF = English word reading fluency; FPA-E = French elision; FPA-B = French blending; FWR = French word reading; FWRF = French word reading fluency
4.3 Statistical Analyses

A repeated measures analysis of variance (ANOVA) was used to examine the changes in both English and French PA and word reading across the treatment and control groups from Grades 1 to 3. A significant Condition x Time interaction would indicate that there was a difference between the two groups over time. Post hoc tests with a Bonferroni correction were conducted for significant interactions at $p < .05$. Dunnett’s C post hoc test was used to evaluate comparisons where the assumption of homogeneity of variance was not met. Effect sizes were reported for non-significant findings when medium to large effect sizes were achieved. A medium to large effect size suggests that differences would have reached statistical significance if the sample size had been larger.

4.4 Immediate Effects

For the purposes of data analysis, it was important to examine the immediate effects of the intervention. One-way ANOVAs were conducted to explore whether the mean scores of the treatment group differed significantly from those of the typically developing readers in comparison to the control group on both French and English measures of PA and word reading at T2. The purpose of these analyses was to determine whether or not the treatment group was beginning to close the achievement gap on these measures immediately following the intervention phase of the study.

4.4.1 Closing the gap between typically developing and struggling readers

Data analyses were completed in order to determine whether or not the students in either the treatment or control groups had closed the achievement gap with the typically
developing readers. Mean scores on English elision, French elision, English word reading, and French word reading were examined at T2 for all 252 Grade 1 students (e.g., for typically developing readers, as well as for the students in the treatment and control groups). Scores at T2 were used for this particular analysis because all three cohorts participated in data collection at this time point. Due to time restraints, data were not collected from typically developing readers at either T3 or T4 (see Table 5).

A one-way ANOVA was conducted to evaluate whether the average English elision, French elision, English word reading, and French word reading scores at T2 in the treatment and control groups approached the average scores for the typically developing readers. First, the assumption of homogeneity of variances was checked. This assumption was violated for English elision and French elision. Therefore, the ANOVA table could not be interpreted and the Welch test was used instead. The results for English elision, Welch (2, 10) = 55.66, \( p < .001 \), and French elision, Welch (2, 12) = 61.40, \( p < .001 \), were significant, indicating that some of the population means were significantly different from each other. Follow-up tests were conducted to evaluate pairwise differences among the means for each measure. As the variances among the three groups were different, Dunnett’s C test was used. There was a significant difference between the control group and typically developing readers, as well as between the control group and the treatment group on the English and French measures of elision at T2; however, there was no difference between the treatment group and the typically developing readers on these measures. Therefore, it can be concluded that the treatment group’s performance approached that of the typically developing readers on English and French elision at T2.

Next, the assumption of homogeneity of variances was checked for English word reading and French word reading. This assumption was met for both measures. The
results for English word reading were significant, $F (2, 219) = 31.42, p < .001$, indicating that some of the population means were different. Follow-up tests were conducted to evaluate pairwise differences among the means. As the variances among the three groups were not different, the Bonferroni test was used. There was a significant difference in the mean English word reading scores between the typically developing group and both the treatment and control groups. However, the means of the treatment and control groups were not significantly different from each other. Therefore, it can be concluded that neither the experimental nor the control group performed as well as the typically developing readers on English word reading at T2.

The ANOVA results for French word reading were also significant, $F (2, 219) = 19.60, p < .001$. Follow-up tests were conducted to evaluate pairwise differences among the means. As the variances among the three groups were different, Dunnett’s C test was used. There was a significant difference between the control group and typically developing readers, as well as between the control group and the treatment group on the French measure of word reading at T2; however, there was no difference between the treatment group and the typically developing readers on this measure. Therefore, it can be concluded that the treatment group’s performance approached that of the typically developing readers on French word reading at T2.

4.5 Delayed Effects

For the purposes of data analysis, it was also important to examine the delayed effects of the intervention. First, one-way ANOVAs were conducted to explore whether or not the mean scores of the treatment group differed significantly from those of the control group on both French and English measures of PA and word reading at T4. The
purpose of these analyses was to determine whether or not there was a difference in task performance between the groups concurrently. Second, repeated measures ANOVAs, using a mixed design approach, were conducted to explore gains made by the treatment group in comparison to the control group on measures of PA and word reading in both English and French from T1 to T4 (English measures only) and T2 to T4 (French measures only). There was considerable interest in examining the gains made by the treatment group in comparison to the control group at the end of Grade 1 (immediately following the intervention phase of the study), as well as in Grades 2 and 3 in order to determine whether or not gains were sustainable.

4.5.1 Treatment effects on the English tasks

To investigate gains over time on English elision scores from T1 to T4 for the treatment and control groups, a 2 (condition: treatment vs. control) x 4 (time: T1 vs. T2 vs. T3 vs. T4) mixed ANOVA was calculated. There was a significant main effect of time, $F(3, 30) = 22.21, p < .001$, but not for condition, $F(1, 10) = 4.60, p > .05$. There was no interaction effect, $F(3, 30) = 1.89, p > .05$. Students who received the PA intervention made significantly higher gains than the control group on English elision scores from T1 to T2, $t(14) = 2.73, p < .05, d = 1.51$. However, the difference between the two groups was reduced and no longer significant at T4, $t(10) = 1.49, p > .05, d = .73$, despite a moderate effect size.

A 2 (condition: treatment vs. control) x 3 (time: T1 vs. T2 vs. T4) mixed ANOVA was used to evaluate English blending scores for the treatment and control groups from T1 to T4. There was a significant main effect for time, $F(2, 20) = 21.76, p < .001$, but

\footnote{Conventions for Cohen’s $d$ effect sizes are as follows: $0.20 =$ small effect, $0.50 =$ medium effect and $0.80 =$ large effect.}
not for condition, $F(1, 10) = 4.30, p > .05$. There was a significant interaction effect for Condition x Time, $F(2, 20) = 4.47, p < .05$ (Figure 3). Post hoc tests with a Bonferroni correction revealed statistical differences from T1 to T2, $p < .05$, and T1 to T4, $p < .001$, but not from T2 to T4.

Figure 3. Estimated mean scores for the treatment and control groups on T1, T2, and T4 English blending.

A 2 (condition: treatment vs. control) x 4 (time: T1 vs. T2 vs. T3 vs. T4) mixed ANOVA was performed to evaluate developmental gains in English word reading from T1 to T4 for the treatment and control groups. There was a significant main effect for time, $F(3, 30) = 93.65, p < .001$, suggesting improvement in English word reading from T1 to T4 for both groups. There was no significant main effect for condition. Developmental gains from T1 to T4 were qualified by a significant interaction effect for Condition x Time, $F(3, 30) = 3.35, p < .05$. A Bonferroni post hoc test revealed significant improvements over time: T1 to T2, $p < .01$, T2 to T3, $p = .001$, and T3 to T4, $p = .001$ (see Figure 4).
Figure 4. Estimated mean scores for the treatment and control groups on T1, T2, T3, and T4 English word reading.

A 2 (condition: treatment vs. control) x 2 (time: T3 vs. T4) mixed ANOVA was used to evaluate English word reading fluency for the treatment and control groups from T3 to T4. There was a significant main effect for time, $F(1, 10) = 17.88, p < .01$, but not for condition, $F(1, 10) = 3.75, p > .05$. There was no significant interaction effect, $F(1, 10) = 0.20, p > .05$.

4.5.2 Treatment effects on the French tasks

A 2 (condition: treatment vs. control) x 3 (time: T2 vs. T3 vs. T4) mixed ANOVA was conducted to assess gains made by the treatment and control groups in French elision from T2 to T4. There was a significant main effect for time, $F(2, 20) = 3.41, p < .05$. Furthermore, there was a significant main effect for condition, $F(1, 10) = 14.70, p < .01$, and a significant interaction effect for Condition x Time, $F(2, 20) = 4.23,$
Follow-up Bonferroni comparisons were significant for T2 to T4, \( p < .05 \), but not for T2 to T3, or T3 to T4. Group comparisons demonstrated that the treatment group significantly outperformed the control group, \( p < .01 \). Students in the treatment group made significantly higher gains than the control group in French elision at T4, \( t(10) = 4.48, p = .001, d = 0.77 \) (see Figure 5).

![Figure 5. Estimated mean scores for the treatment and control groups on T2, T3, and T4 French elision.](image)

A 2 (condition: treatment vs. control) x 2 (time: T2 vs. T4) mixed ANOVA was used to evaluate French blending scores for the treatment and control groups from T2 to T4. There was a significant main effect for time, \( F(1, 10) = 43.65, p < .001 \), but no main effect for condition, \( F(1, 10) = 3.31, p > .05 \) nor a significant interaction, \( F(1, 10) = 4.17, p > .05 \).

A 2 (condition: treatment vs. control) x 3 (time: T2 vs. T3 vs. T4) mixed ANOVA was also performed on French word reading for the treatment and control groups to examine gains made from T2 to T4. There was a significant main effect for time, \( F(2, 22) = 47.24, p < .001 \), with growth from T2 to T4 for both groups. There was also a
significant main effect for condition, \( F(1, 11) = 21.72, p < .001 \). Importantly, there was a significant interaction effect for Condition \( \times \) Time, which suggests that the treatment group made greater gains on French word reading from T2 to T4 than the control group, \( F(2, 22) = 4.05, p < .05 \). Bonferroni comparisons indicated significant differences between T2 and T3, \( p < .001 \) and T2 and T4, \( p < .001 \), but not between T3 and T4. In addition, follow-up pairwise comparisons confirmed a significant difference between the two groups, \( p = .001 \). The treatment group scored significantly higher than the control group at T2, \( t(14) = 2.83, p < .05, d = 1.56 \), T3, \( t(12) = 3.88, p < .01, d = 2.02 \), and T4, \( t(11) = 5.71, p < .001, d = 0.84 \) (see Figure 7). Therefore, students in the treatment group not only outperformed the control group immediately following the intervention, but they also made more gains from T2 to T4.

![Figure 6](image)

*Figure 6.* Estimated mean scores for the treatment and control groups on T2, T3, and T4 French word reading.

A 2 (condition: treatment vs. control) \( \times \) 2 (time: T3 vs. T4) mixed ANOVA was used to evaluate French word reading fluency for the treatment and control groups from
T3 to T4. There was a significant main effect for time, $F (1, 10) = 14.07, p < .01$, and a significant main effect for condition, $F (1, 10) = 8.68, p < .05$. There was a significant difference between the two groups at T4, with the treatment group outperforming the control group on French word fluency, $t (10) = 2.24, p < .05, d = 1.32$; however, there was no significant interaction, $F (1, 10) = 1.12, p > .05$. 
Chapter Five: General Discussion
5.1 Summary of Findings

The primary goal of this educational research was to design and implement an early intervention study with a rigorous methodology in order to support Grade 1 students who were struggling with reading acquisition in the early total FI context. This intervention study with cohorts aimed to explore the effectiveness of supplemental PA training for children at risk for persistent reading difficulties. For three consecutive years, English measures of PA and word reading were administered to Grade 1 children in order to identify those students who were having problems acquiring early reading skills. In small groups for 18 weeks, students in the experimental condition were provided with English PA training in combination with letter-sound correspondence instruction. Those in the control condition were involved in English vocabulary-building activities for that same period of time. Post-testing was completed during Grade 1 immediately following the intervention phase of the study, as well as during Grades 2 and 3. Two major research questions were addressed: (1) Would English PA training result in improved English and French PA of the struggling readers in the treatment group, as compared with those in the control group? (2) Would struggling readers in the treatment group who were provided with PA training in English outperform those in the control group on French reading measures taken at the end of Grade 1, as well as in Grades 2 and 3?

In response to the first question, data analyses indicated that students in the treatment group who were provided with English PA training in combination with letter-sound correspondence instruction demonstrated significantly higher gains than those in the control group on English PA measures (both elision and blending) from T1 to T2. These findings are consistent with the results of previous investigations involving training
programs that combine PA and letter-sound correspondence instruction and offer strong evidence that supplemental PA training in English can improve English PA skills for Grade 1 FI students who are identified early on as struggling to learn to read. For example, Schneider, Roth, and Ennemoser (2000) found that when struggling kindergarten readers were provided with such training, the effects were substantial. Similar results were reported following the National Reading Panel’s (2000) meta-analyses of training studies; that is, effect sizes were large immediately following training. In addition, data analyses revealed that at T2, there was no significant difference between treatment group’s mean elision scores in English and those of the typically developing readers; however, the control group’s mean elision scores in English were significantly different. In other words, the students in the treatment group had begun to close the achievement gap immediately following the intervention phase of the study, which is consistent with the stated hypothesis.

Results of delayed post-testing, however, indicated that the treatment group’s PA gains in English (both elision and blending) were reduced and were no longer significant at T4, although the effect size remained large. Perhaps this can be partially explained by the fact that the students were no longer receiving supplemental PA instruction in small groups at that time point (i.e., in the winter of Grade 3), and twenty-two months had elapsed since the conclusion of the early intervention program. Moreover, four students had dropped out of the study at T4, reducing the sample size considerably. Due to the fact that the students in the treatment group had descriptively higher mean scores than those in the control group at T4, it is certainly conceivable that the results at this time point would have been significant with a larger sample. Notwithstanding the lack of significant difference at T4, gains in the students’ PA skills from T1 to T2 lead to significant growth
in their French reading skills at immediate and delayed post-testing. This will be discussed in detail in the forthcoming paragraphs.

Data analyses were also conducted to examine the differences in performance between students in the two conditions on French measures of PA (both elision and blending). Although the students in the treatment group had descriptively higher mean scores than those in the control group and the effect sizes were substantial at T2, the differences between the two groups did not reach statistical significance at this time point. Two possible reasons may account for the lack of significant results. First, the PA training was provided in English at a time when the children were only beginning to acquire French language abilities. As such, they did not have opportunities to practise their PA skills in French during the intervention phase of the study. Second, the sample size was quite small, so it is conceivable that the differences would have reached statistical significance if the sample size had been larger. Notably, moderate correlations were found in the treatment group between English and French elision at T2 and T3. These findings are consistent with previous research evidence on cross-linguistic transfer of PA (Comeau et al., 1999; Durgunoğlu et al., 1993) and suggest that the English PA intervention may have had some positive effects on French PA. Despite the lack of significant French PA results in this investigation at T2, further data analyses at this time point revealed that there was no significant difference between the treatment group’s mean elision scores in French and those of the typically developing readers; however, the control group’s mean elision scores in French were significantly different. Consistent with the stated hypothesis, this indicates that students who were provided with supplemental PA training had begun to close the achievement gap immediately following treatment.
Although no significant differences in performance were found on French PA measures between two groups immediately following the intervention at T2, the treatment group significantly outperformed the control group on the French elision measure at T4. This is an important finding in light of the fact that the sample size was considerably reduced at this time point. These results suggest that once PA was established in English, the students in the treatment group were able to transfer the PA skills they had acquired to French, the language of instruction in the classroom. Perhaps this can be partially explained by the fact that at T2, the students were just beginning to develop French language skills; however, at T4, these skills were becoming well-established, allowing for the transfer of newly acquired PA skills from English to French. Once again, these findings are consistent with previous research evidence on cross language transfer of PA (Comeau et al., 1999; Durgunoğlu et al., 1993) and seem to indicate that the English PA training had some positive effects on French PA. Additionally, when gains were closely examined from T2 to T4, the treatment group had made significantly higher gains in comparison to the control group. These French elision results are consistent with the stated hypothesis.

In answer to the second research question, the students in the treatment group significantly outperformed those in the control group on measures of French word reading immediately following the intervention at T2, and demonstrated substantial reading growth in French from T2 to T4 in comparison to the control group. These findings speak to the lasting training effects of explicit and systematic PA instruction and are consistent with the stated hypothesis. Additionally, data analyses revealed that at T2, there was no significant difference between treatment group’s mean word reading scores in French and those of the typically developing readers; however, the control group’s
mean scores in French word reading were significantly different. Similar to results of analyses involving English and French elision at T2, the students in the treatment group had begun to close the achievement gap in French word reading immediately following the intervention phase of the study. Once again, this is consistent with the stated hypothesis. This early intervention study is the first to demonstrate that English PA training in combination with letter-sound correspondence instruction can effectively facilitate French reading acquisition for early immersion students who are struggling to learn to read. Improvements in the treatment group’s reading performance attest to the cross-linguistic transfer from English PA to French word reading (Comeau et al., 1999; Durgunoğlu et al., 1993).

Although a previous investigation involving SK students enrolled in a FI program (MacCoubrey, 2003) attempted to establish a link between a phonologically-based reading intervention and reading development, no such link was successfully established. Perhaps this disparity can be explained by the fact that the provision of daily reading instruction is not a curriculum expectation for SK students, but must be provided in Grade 1 in accordance with the Ontario curriculum guidelines. In other words, the supplemental PA training that was given in the present study supported the daily classroom instructional practices of the Grade 1 teachers; for this reason, the positive training effects were more likely to be sustained over time (Snow et al., 1998).

Not only did delayed post-testing show that English PA training resulted in substantial improvements in French word reading skills at T4 for the treatment group as compared to the control group, the PA intervention was also effective in accelerating French word reading fluency of the students in the treatment group. The students who were provided with supplemental PA instruction in combination with letter-sound
correspondence instruction scored significantly higher than those in the control group on French word reading fluency at T4, a finding which is consistent with the stated hypothesis.

Research has shown that students who are at risk for reading failure often experience difficulties with both accuracy and fluency in word reading (Hudson, Lane, & Pullen, 2005). Wise, Ring and Olson (2000) found that Grade 2 students who had received English PA training in small groups, in addition to individualized computer instruction which focused on both PA and story reading, improved only on English measures of word reading without time constraints. No such gains were demonstrated with regard to automaticity. In contrast, the present results indicate that students in the treatment group significantly outperformed those in the control group on both untimed and timed measures of French word reading at T4. In order to explain their students’ slow but accurate decoding, Wise et al. (2000) stated that computers provided speech support by supplying words with which the struggling readers were having difficulty while reading words in exercises and stories independently. As a result, there were few opportunities during the training phase of their investigation for the students to apply their improved phonological decoding skills to independent reading.

The students in the present study, however, had ample opportunity to transfer the PA skills they were taught in small groups and develop fluent French reading in context in the large group classroom setting. In accordance with Grade 1 curriculum expectations, students are expected to read French words in a variety of contexts at a sufficient rate by the end of the school year (Ontario Ministry of Education, 2006). It is standard practice for primary FI teachers to incorporate automaticity into their balanced literacy programs.
by encouraging repeated reading of texts so that their students’ oral reading begins to sound like natural speech (Ontario Ministry of Education, 2006, p. 41).

The students in the treatment group did not significantly outperform those in the control group on measures of English word reading immediately following the intervention at T2, although the students in the treatment group had descriptively higher mean scores than those in the control group at this time point. Once again, it is possible that the differences would have reached statistical significance if the sample size had been larger. Perhaps these findings can be partially explained by the fact that Grade 1 students who are enrolled in Ontario’s FI programs typically receive no English reading instruction until Grade 3 or 4 (Halsall, 1998), so they had no opportunity to develop reading skills in English during classroom instructional time. Outside of instructional time, some of the children may have had the opportunity to develop English reading skills; however, the vast majority of the intervention students came from non-English-speaking homes, so it is not unreasonable to suggest that such opportunities may have been limited. Although the results of the present investigation indicate that the mean scores of the treatment and control groups were not significantly different in English word reading at either T2 or T4, the effect size of the intervention was moderate.

This school-based intervention research has several strengths. First, efforts were made to identify students struggling with reading acquisition early in their educational careers, something that is typically not attempted in elementary FI schools until Grades 2 or 3 (Keep, 1993; MacCoubrey et al., 2004). The percentage of FI students who were identified as struggling readers (i.e., approximately 6 %) was certainly in line with what one might expect in the general population. Early classification of students as at-risk addressed the delay in the identification process that often results from prioritizing oral
language proficiency in early immersion classrooms. Because the FI program insists that students acquire listening and speaking skills in the French language before they receive reading instruction, weak readers often fail to get the timely support they need in early immersion classrooms and remain behind in later years (Parkin et al., 1987). By undertaking assessment of reading risk using English measures, it was possible to identify struggling readers at the beginning of the school year and provide them with effective supplemental reading interventions.

Second, although random assignment of individual children to treatment and control groups was not feasible in the elementary school context, students from intact classrooms were randomly assigned to conditions to bolster claims of causality. Third, the study’s design included four time points, so it was possible to measure the sustainability of the treatment effects. Fourth, a rigorous methodology was employed in this investigation, which included an index of treatment fidelity that was utilized to ensure that the two conditions were faithfully implemented. Although using a sole instructor who was not blind to the conditions may have limited generalizability of the results, it could be argued that 94 percent accurate implementation in both conditions indicates that efforts to minimize instructional drift were highly successful.

Finally, the PA intervention was given in a natural school setting and could therefore be easily replicated in any FI elementary school. Using English measures of PA and word reading, it would be possible for SK or Grade 1 teachers to identify students who are showing early signs of difficulty with reading acquisition immediately upon entry into immersion. They could then offer PA training before the achievement gap becomes too wide to bridge. In most Grade 1 FI classrooms in Ontario, PA is an integral part of a balanced literacy program. In this natural setting, students receive direct PA
instruction in French, in addition to direct instruction in the use of other reading cues, to help them identify familiar words and decode unfamiliar words (Ontario Ministry of Education, 2006). For struggling readers, classroom-based PA instruction in the large group setting is insufficient to meet their learning challenges and needs to be reinforced with systematic and explicit PA training provided in combination with letter-sound correspondence instruction on a withdrawal basis (National Reading Panel, 2000). Intensive, small group instruction would support the daily classroom practices of teachers so that the positive effects of PA training would be sustained over time.

The findings of the present investigation contribute new evidence to the literature regarding reading development in the early total FI context. They suggest that identifying Grade 1 students who are exhibiting early signs of difficulty with reading acquisition immediately upon entry into the FI program and providing them with reading interventions that focus on English PA training in combination with letter-sound correspondence instruction can have a positive impact on the growth of French reading skills. As we have seen, early intervention opportunities have only been available to struggling readers in English-language elementary schools in recent years (MacCoubrey et al., 2004). In order to access necessary instructional interventions, FI students experiencing reading difficulties frequently had to withdraw from immersion and transfer to the regular English stream (Genesee & Jared, 2008; Mady & Arnett, 2009; Parkin et al., 1987). More often than not, struggling readers were vigorously counselled out of FI and encouraged to switch to the regular English program in order to get the support they needed. It is interesting to note that three of the four students who dropped out of the study and transferred to the English stream were assigned to the control group, and only one of the students in the treatment group left the investigation. This study’s promising
results demonstrate that withdrawing from FI may no longer be necessary. By remaining in FI and having access to appropriate support, these children could continue to enjoy the many advantages associated with the immersion program (Genesee, 2006; Mannavarayan, 2002; Turnbull et al., 2001) and have the opportunity to become functionally bilingual in French and English.

5.2 Study Limitations

Without a doubt, the investigations by MacCoubrey et al. (2004), Endler (2008), and Haigh et al. (2011) have contributed new and vital evidence to the current knowledge regarding the reading growth of English-speaking children who are learning French as an L2 in the early immersion setting. However, these studies failed to recognize the shifting demographics in FI schools in Canada within the last decade (Swain & Lapkin, 2005). In their examinations of predictors of French reading ability, these investigators deliberately chose not to examine the performance of students with diverse linguistic backgrounds on English measures of PA. This raises the question as to whether or not similar assessment procedures would have misidentified typically developing readers (i.e., those whose first language was not English) as at-risk. It is certainly unreasonable to expect that Canadian schools have access to measures of PA in a variety of languages to permit accurate assessment of pre-reading skills in each student’s L1. Nevertheless, the lack of generalizability of these researchers’ results should prompt educators to explore consistent and reliable ways to identify at-risk readers from varied language backgrounds early in their educational careers, so that they can be provided with timely reading interventions to prevent reading failure. Given recent increases in the number of students with diverse linguistic backgrounds who register for publicly funded elementary school
programs, extending this research would be beneficial to primary teachers in both the FI context and the regular English stream.

The research evidence pertaining to cross-linguistic transfer of PA presented thus far has shown the challenges inherent in using cross-language transfer as a diagnostic tool (Durgunoğlu, 2002) to identify students who are struggling to acquire early reading skills in a second or foreign language. As discussed, educators must determine each child’s PA abilities on the basis of available PA measures in the majority language, a process which may be less than reliable.

What is the worst case scenario? It seems to me that if PA weaknesses are identified in this manner, and the diagnosis is in fact a true reflection of the child’s L1 abilities, then the provision of supplemental PA training in the L2 would likely be beneficial. If, however, a child is inaccurately identified as having weak PA skills on the basis of performance on L2 measures of PA and is then included in an intervention designed to remediate this ‘weakness,’ would any serious harm be done? It could be argued both ways. On the one hand, issues related to the development of self-confidence could result from a child’s own perceptions that his/her skills are not as well-developed as those of his/her peers. Children could begin to view themselves as less capable academically in relation to others, and this perception might be reinforced by classmates, either intentionally or unintentionally. Lack of self-confidence could potentially have a profoundly negative effect on the child’s attitudes toward learning in future years. Moreover, teachers’ misperceptions of the child’s true abilities might influence instructional decisions in the classroom setting that limit his/her potential to become a fluent, proficient reader.
On the other hand, it is conceivable that a child who is misidentified on L2 measures as having weak PA abilities when those skills were actually well-developed in L1 would be unscathed by attempts to remediate those ‘weaknesses.’ It is entirely possible that during and following supplemental PA training, his/her proficiencies in the majority language would continue to develop and later performance on measures of PA would indicate substantial improvement. In this case, the child would, in all likelihood, become a competent reader in both the L1 and the second or foreign language. No further remediation would be necessary. No harm would likely have been done.

Without question, there is a tremendous need to find answers to these and many other practical issues. As educators, we are continually faced with a small percentage of children who struggle to learn to read in their L2. A close examination of the linguistic diversity represented in today’s elementary school student populations creates a sense of urgency to locate solutions to L2 reading acquisition difficulties in a timely manner. It makes good sense to build upon children’s existing phonological knowledge in order to ease their transition into reading in another language. Given what is known about cross-language transfer of PA, there is good reason to believe that effective instructional interventions can be established for students who are having problems with reading acquisition in their L2. Teachers may be well-advised to consider the implementation of supplementary PA training programs to enhance their students’ reading achievement levels when they are not responding to classroom literacy instruction as expected.

The present investigation had several limitations. First, risk assessment undertaken in English at the beginning of Grade 1 resulted in the identification of a very small number of students who performed at or below the 30th percentile on measures of both PA and word reading. This adversely affected the generalizability of the results. At
the same time, the fact that 16 struggling readers were identified in a sample of 252
students from diverse linguistic backgrounds (i.e., approximately 6%) suggests that over-
identification was not a concern, as numerous investigations have reported similar
percentages of at-risk readers. The administration of English measures for risk
assessment purposes could have resulted in the overidentification of students from
diverse linguistic backgrounds as struggling readers; however, by employing a stringent
identification criterion with the group of struggling readers that was created, this
possibility was considerably reduced. Only two of the 16 students who met the selection
criteria for inclusion in the intervention study came from English-speaking backgrounds.
This made it difficult to examine the differences in performance between students from
English-language backgrounds and those from varied language backgrounds.

A second limitation is that the children who participated in this study were
enrolled in an FI school in a middle- to upper-middle-class neighbourhood, which
suggests that they may not have been representative of the FI student population at large;
that is, their high socioeconomic status may have resulted in a lack of generalizability of
the results. Third, generalizability of the results may have also been limited by having a
single instructor for both the experimental and control conditions in all three years of the
study; however, instructor-by-condition confounds were aptly addressed in this manner.
Fourth, the lack of availability of standardized French measures of PA and word reading
resulted in a substantial reliance upon experimental French outcome measures in the
research that was conducted. Finally, the vocabulary instruction that the control group
received may have contributed to the development of phonemic awareness skills, thereby
reducing the training effects of the PA intervention. It is important to acknowledge the
“strong relation between early vocabulary development and the emergence of
phonological awareness ability” (Metsala & Walley, 1998, p. 111). Due to these limitations, this study needs to be replicated by future investigations with more rigorous methodologies.

5.3 Challenges of School-Based Research

Navigating the complexities of conducting educational research in a FI elementary school is certainly challenging, particularly when it involves the provision of supplemental reading instruction on a withdrawal basis. By participating in this investigation, students who were identified as being at risk for later reading difficulties were withdrawn from their classrooms for approximately 50 minutes per week for 18 consecutive weeks. On several occasions, their teachers expressed concern about the hours of essential classroom instruction their students were prevented from receiving as a result of their participation in the study. An issue that Grade 1 teachers believed to be especially problematic was that the children were receiving English instruction while enrolled in a FI program. In the early total FI context, there is a clear expectation on the part of school administrators and staff that as much instruction as possible be given in French. Although the study had received approval from both the school board and the FI school principal, there was noticeable lack of interest in the research effort on the part of the teachers over the course of the investigation. This adversely affected school climate and contributed to the development of tensions between me and my Grade 1 colleagues.

A second major challenge faced by the research team was attrition. As we have seen, students who are struggling with reading acquisition in FI elementary schools are often encouraged to switch to the English-language program. More often than not, their parents are informed that support services are more readily available in the regular English stream (Cummins, 1984; Stern, 1991) and they are encouraged to transfer their
children to the English program. The regularity with which this happens had a direct and profound effect on this research project. Specifically, 2 of the 16 struggling readers who had been randomly assigned to either the treatment or control group from intact class groups withdrew from the FI program and were unavailable for delayed post-testing at T3, and 2 more were unavailable for delayed post-testing at T4. Although our research team attempted to balance the number of students in the two instructional conditions, the rate of attrition made this virtually impossible. The impact of attrition on our intervention group was considerably less severe at T3, as only two of the 2 students in the control group had switched out of the immersion program and the treatment group was unaffected. The impact was considerable at T4 in that one of the six students in the treatment group and one additional student in the control group had switched out of the immersion program at that time point.

A third issue that regularly presented a challenge in this elementary school setting was the ability to deliver small group instruction to struggling readers on a consistent basis. The Grade 1 teachers had been involved in making the early intervention program schedule and knew well in advance when their students would be withdrawn from the classroom. However, a number of factors contributed to irregularity in scheduling instructional time. To name a few, school-wide events (e.g., assemblies, presentations, fundraising activities, classroom photos), interruptions (e.g., fire drills, lock downs, evacuation procedures, office announcements), unanticipated events (e.g. late arrivals, parent pick-ups for medical/dental appointments, recess accidents, field trips), and individual health issues (e.g., general absenteeism due to illness, cases of lice, sudden onset of stomach flu or nose bleeds) adversely affected the regularity with which supplemental reading instruction could be delivered. Although it was a daily challenge to
balance instructional time for the experimental and control groups, we managed to do so successfully. This was due, in part, to the fact that I was a teacher at the school and therefore able to exert some influence on last minute scheduling changes.

5.4 Study Replication in the Natural School Setting

This is the first reading intervention study to establish a link between English PA training and French reading development for Grade 1 FI students who are exhibiting early signs of difficulty acquiring reading skills. These results should be of great interest to FI educators because they demonstrate that English can be used successfully for both early identification and intervention purposes to facilitate French reading acquisition in the early FI setting. They are consistent with the findings of previous investigations which have examined the transfer of English PA to French reading skills (Comeau et al., 1999; Durgunoğlu et al., 1993). In order to identify FI students who may be at risk for later reading difficulties and provide them with systematic and explicit PA instruction early on, it is recommended that the following steps be followed by FI educators:

1. As a grade team, select an English test of PA and an English test of word reading, both of which are sensitive to individual differences and would be appropriate for the students in your class. Read the test manuals carefully to ensure that the tests you have chosen are reliable measures (e.g., above 0.85) that are predictive of reading development. It would be particularly valuable to choose tests that have been through formal standardization procedures, allowing you to compare the performance of your individual students to that of a normative sample. This will help you decide which SK or Grade 1 students will benefit most from the provision of PA training (e.g., those scoring at or below the 30th percentile when compared to other students at their grade level).
2. Once reading risk assessment has been undertaken and struggling readers have been identified, divide the students into small groups of 3-4. In consultation with your special education teacher, decide who will be responsible for the delivery of PA training 2-3 times per week, as well as when and where this instruction will take place.

3. Using the suggested scope and sequence in Appendix C, begin English instruction at the word level with learning activities taken from popular children’s literature that you have selected to read aloud to your students. Next, progress to more challenging tasks at the syllable level and conclude with instructional activities at the phoneme level. Try to remember that activities which focus on segmenting and blending have been found to have the most positive influence on the development of early reading skills (National Reading Panel, 2000).

4. Be sure to base small group instruction on stories that are age-appropriate so that the children will be engaged in the instructional process. Make these selections in collaboration with literacy teachers, librarians, and your grade team partners.

5. In order to increase children’s awareness that sentences are made up of individual words, copy sentences from the story you have already read orally onto chart paper. Point to each word in the sentence as you read it aloud. Be sure to draw their attention to the fact that words in sentences are separated by spaces. Then, ask each student in turn to tap each word in the sentence as you read it orally. You can also ask the other group members to clap one time for each word in the sentence as each student takes his/her turn tapping. Another idea to raise awareness that sentences are composed of words is to omit meaningful words in the story as you read aloud to see if they can catch the omission. For this activity, be sure to include some storybooks incorporating rhyme,
and encourage the children to provide the rhyming word you omitted. This will improve their sensitivity to different sound components within spoken language.

6. To increase your student’s awareness that individual words consist of syllables, begin instruction with compounds words (e.g., sunshine). As you read a story aloud which contains a number of compound words, encourage the students to clap one time for each syllable or word part. Ask them to segment the word into syllables (e.g., “What is the first part of the word?” [The correct answer is sun]. “What is the last part of the word?” [The correct answer is shine].) Once they have demonstrated that they can segment 2-syllable compound words successfully, progress to words found in the text which contain 2, 3, or more syllables. These segmenting activities can also be combined with blending activities. After you produce each syllable in a compound word orally, ask the students to guess the word (e.g., “Guess my word: base [SHORT PAUSE] ball.” [The correct response is baseball].) Once the students understand the task and experience some success, progress to blending activities involving 2, 3, or more syllables.

7. Keep in mind that phonemic awareness is the goal of PA training, so allocate considerable time to increase awareness of individual sounds in spoken words. In order to heighten awareness that words can be broken down even further into phonemes, encourage the children to identify each sound they hear in words taken directly from the story you have read aloud to them. Use plastic cubes to symbolize phonemes, a different colour for each one. As you say each word aloud slowly, place the cubes in Elkonin boxes (Elkonin, 1973), one for each phoneme. The purpose of this activity is to provide the children with a visual representation of phonemes in words. Begin instruction with 2-phoneme words (e.g., go = /g/ + /o/), placing a coloured cube in one box to represent the /g/ sound and a different coloured cube in an adjacent box to represent the /o/ sound.
Once the students demonstrate mastery of words containing 2 phonemes, progress to 3-phoneme or more words. These segmenting activities can be combined with blending activities, requiring the students to guess a word from the text after hearing you produce each phoneme orally (e.g., “Guess my word: /m/ [SHORT PAUSE] /a/ [SHORT PAUSE] /t/.” [The correct response is *mat*].)

It would be worthwhile to consider the following points:

- What are some of the challenges your grade team and support staff would face by undertaking reading risk assessment at the beginning of the school year with your current SK or Grade 1 FI students?
- In order to meet the needs of as many struggling readers as possible, what is the most efficient way for your grade team and support staff to organize the provision of supplemental PA instruction?
- How can you best utilize the expertise of school board consultants (e.g., literacy coaches, speech and language pathologists, psychologists) to assist your grade team and support staff in selecting: a) English measures that would be appropriate for risk assessment and post-testing, and b) popular children’s literature that would be suitable for the provision of English PA training?
- What is the most effective way to communicate with parents of the struggling readers to ensure that they are aware of the risk assessment results, the early intervention program that will be initiated, and the results of post-testing?

### 5.5 A Promising Future for Struggling Readers in Bilingual Education Programs

To the best of my knowledge, this intervention study with cohorts is the first of its kind to show the effectiveness of supplemental PA training on the reading achievement of struggling readers from varied language backgrounds in the FI context. This research is
successful in demonstrating that despite the limited resources available, the provision of small group PA instruction at an early stage in students’ reading development is possible within the natural school setting. The Grade 1 students who were identified as exhibiting early signs of difficulty with reading acquisition and then received timely phonologically-based instruction in English made significant gains in both English and French PA, as well as in French reading skills. The results of this investigation indicate that struggling readers in FI programs can be identified early on and an evidence-based intervention can be initiated before the children have developed oral proficiency in the French language. It is conceivable that these students will have the opportunity to become functionally bilingual, and become fluent, proficient readers in both French and English.

This study may also have implications for Spanish-speaking children enrolled in English immersion or Spanish-English bilingual programs in the United States who are experiencing difficulty learning to read. As previously discussed, the National Literacy Panel (August & Shanahan, 2006) concluded that literacy in a first language facilitates reading acquisition in a second language. In other words, young learners from predominantly Spanish-speaking backgrounds who are struggling to acquire English reading skills could benefit from explicit and systematic instruction in Spanish PA (Leafstedt & Gerber, 2005). Research involving cross-linguistic transfer across such languages has shown that it is the attainment of PA that influences later reading achievement, and that the language of instruction does not make a significant difference. Therefore, the provision of Spanish PA training for students identified early on as exhibiting signs of difficulty with reading acquisition could have beneficial effects on both Spanish and English literacy development (Gorman & Gillam, 2003). Regardless of the language in which students are being immersed, the key to reducing the number of
children in immersion programs with persistent reading problems is timely assessment of reading risk and the provision of evidence-based reading interventions at an earlier stage in their educational careers.

5.6 Implications for Future Research

Future investigations examining early identification of and intervention for struggling readers enrolled in early FI programs clearly need to be undertaken, given the scarcity of research addressing the reading development of young children in this context. Further studies should look more closely at early identification procedures that can be used effectively in the natural school environment with early immersion students from varied language backgrounds. Additionally, the most effective manner of implementing PA interventions for SK and Grade 1 students who are experiencing difficulty with acquisition of reading skills needs to be explored. Moreover, research should carefully examine whether French or English, or a combination of the two, is the most effective language of instruction for reading interventions targeting at-risk readers in the FI setting. Finally, the extent to which intensive PA instruction reduces the incidence of reading failure among at-risk readers in early immersion programs needs to be investigated.

5.7 Conclusion

Research efforts to date demonstrate that explicit and systematic instruction in PA for early FI students who may be at risk for later reading difficulties, provided early in their educational careers in small group settings for maximum effectiveness, may be the key to breaking the cycle of failure. As we have seen, retention of struggling readers in FI is a serious issue, and unfortunately, not every child who is enrolled in early immersion remains in the program. Genesee (2007) has suggested that withdrawal of at-risk readers
from FI programs (i.e., attrition) should not be an issue if evidence-based instructional interventions are provided early on. Interestingly, Kruk and Reynolds (2012) have shown that at-risk readers’ exposure to an additional language may result in increased reading achievement in the FI context, compared to the English-language context. Risk assessment needs to be undertaken by FI educators without delay, and the results of this study offer strong evidence that English can be used for both assessment and training purposes in this bilingual education context. It is entirely possible that with appropriate support, these students will become fluent, proficient readers in both of Canada’s official languages, French and English. Phonologically-based intervention studies (MacCoubrey, 2003; Wise & Chen, 2010; Wise, Chen, & D’Angelo, 2014) represent an initial step towards the realization of that goal. All that is necessary is a serious commitment on the part of the Ontario government, English-language district school boards, and early FI educators to the prevention of reading failure.
References


Appendix A: Family Literacy Practice Questionnaire
FAMILY LITERACY PRACTICES QUESTIONNAIRE

Please take a few moments to complete this questionnaire. Your effort will help us better understand the factors that influence a child’s ability to learn to read in French. Please return the questionnaire to your Grade 1 child’s classroom teacher at your earliest convenience.

1. My Grade 1 child’s name is __________________________________, born on __________________________. First name Last name

2. Indicate his/her gender. Please check one. Male ______ Female ______

3. What language did he/she first learn to speak at home during childhood? Language: ___________________________ Age of first words: __________

4. At what age did he/she first speak English? ___________ French? _____________

5. Please list the languages spoken at home in order from most often to least often.

<table>
<thead>
<tr>
<th>Language Spoken</th>
<th>Mother</th>
<th>Father</th>
<th>Grade 1 Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most often</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasionally</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Least often</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Please indicate the percentage of time your Gr. 1 child speaks each language at home.

<table>
<thead>
<tr>
<th>Language</th>
<th>Always (75-100%)</th>
<th>Frequently (50-74%)</th>
<th>Sometimes (25-49%)</th>
<th>Rarely (0-24%)</th>
<th>Never (0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Please indicate place of birth.

<table>
<thead>
<tr>
<th>Place of Birth</th>
<th>Mother</th>
<th>Father</th>
<th>Grade 1 Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Born in Canada</td>
<td>YES NO</td>
<td>YES NO</td>
<td>YES NO</td>
</tr>
<tr>
<td>Born outside of Canada</td>
<td>Specify country:</td>
<td>Specify country:</td>
<td>Specify country:</td>
</tr>
<tr>
<td></td>
<td>Age of arrival in Canada</td>
<td>Age of arrival in Canada</td>
<td>Age of arrival in Canada</td>
</tr>
</tbody>
</table>

8. Please indicate your Grade 1 child’s ethnic or cultural background________________
9. Please check the highest level of education attained for each parent – indicate which degree where indicated *, if appropriate.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed high school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college/university</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed college/university *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional degree/certificate *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-graduate degree (Masters, Doctorate, Law) *</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. What is your occupation? **Mother** ________________ **Father** ________________

11. If you are a new Canadian and were employed before immigrating to Canada, please indicate your occupation(s) in your former country:

**Mother** ________________ **Father** ________________

12. At what age did you start reading with your Grade 1 child? ____________________

13. How would you describe your Grade 1 child’s enjoyment of reading? Please check one.

**Very much** ____  **A little** ____  **Not at all** ____

14. Approximately how many children’s books do you have around the house (including library books)? Please check one.

**More than 100** ____  **50-100** ____  **25-50** ____  **10-25** ____  **Fewer than 10** ____

15. How often does your Grade 1 child engage in the following activities?

<table>
<thead>
<tr>
<th>Home Literacy Activities</th>
<th>Every Day</th>
<th>Once or twice per week</th>
<th>Once or twice per month</th>
<th>Once or twice per year</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading with family member(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading with friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer reading activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational TV, videos, or DVDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Measures
# French Word Identification Test

<table>
<thead>
<tr>
<th>ami</th>
<th>bonjour</th>
<th>avec</th>
<th>maison</th>
</tr>
</thead>
<tbody>
<tr>
<td>école</td>
<td>fête</td>
<td>lundi</td>
<td>maman</td>
</tr>
<tr>
<td>dans</td>
<td>famille</td>
<td>il</td>
<td>livre</td>
</tr>
<tr>
<td>petit</td>
<td>une</td>
<td>tête</td>
<td>arbre</td>
</tr>
<tr>
<td>fille</td>
<td>garçon</td>
<td>bon</td>
<td>beau</td>
</tr>
<tr>
<td>travail</td>
<td>comme</td>
<td>matin</td>
<td>chanson</td>
</tr>
<tr>
<td>elle</td>
<td>devoir</td>
<td>journée</td>
<td>faute</td>
</tr>
<tr>
<td>lecture</td>
<td>moi</td>
<td>élève</td>
<td>porte</td>
</tr>
<tr>
<td>qui</td>
<td>sur</td>
<td>assez</td>
<td>demander</td>
</tr>
<tr>
<td>écouter</td>
<td>fin</td>
<td>nous</td>
<td>pas</td>
</tr>
<tr>
<td>devenir</td>
<td>facteur</td>
<td>inviter</td>
<td>lumière</td>
</tr>
<tr>
<td>patate</td>
<td>relever</td>
<td>venir</td>
<td>tourner</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>équipe</td>
<td>mener</td>
<td>ouvrage</td>
<td>preuve</td>
</tr>
<tr>
<td>retrouver</td>
<td>véritable</td>
<td>réaliser</td>
<td>usage</td>
</tr>
<tr>
<td>s’habiller</td>
<td>cuillère</td>
<td>espadrilles</td>
<td>tourbillon</td>
</tr>
<tr>
<td>permettent</td>
<td>écaille</td>
<td>éventail</td>
<td>bâiller</td>
</tr>
<tr>
<td>vieille</td>
<td>réveil</td>
<td>l’oreille</td>
<td>appareil</td>
</tr>
<tr>
<td>bouillon</td>
<td>feuillage</td>
<td>l’écureuil</td>
<td>rouille</td>
</tr>
<tr>
<td>vadrouille</td>
<td>chevreuil</td>
<td>bouilloire</td>
<td>l’araignée</td>
</tr>
<tr>
<td>baleine</td>
<td>l’espion</td>
<td>panthère</td>
<td>phoque</td>
</tr>
<tr>
<td>drap</td>
<td>mucus</td>
<td>dard</td>
<td>appât</td>
</tr>
<tr>
<td>abat</td>
<td>entrepris</td>
<td>inouïe</td>
<td>scierie</td>
</tr>
<tr>
<td>surélevé</td>
<td>absorber</td>
<td>jacinthe</td>
<td>excrément</td>
</tr>
<tr>
<td>controversé</td>
<td>litière</td>
<td>humidité</td>
<td>crampon</td>
</tr>
<tr>
<td>asphyxié</td>
<td>quincaillerie</td>
<td>menuiserie</td>
<td>hygiénique</td>
</tr>
<tr>
<td>infiltre</td>
<td>interdependent</td>
<td>indigène</td>
<td>psychologue</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>déployrèrent</td>
<td>éclatèrent</td>
<td>moquèrent</td>
<td>développerent</td>
</tr>
<tr>
<td>écrasèrent</td>
<td>équilibrent</td>
<td>adaptent</td>
<td>deviennent</td>
</tr>
<tr>
<td>préviennent</td>
<td>transmettent</td>
<td>emprisonnent</td>
<td>exerçaient</td>
</tr>
<tr>
<td>deviendraient</td>
<td>parcouraient</td>
<td>élargissent</td>
<td>térébenthine</td>
</tr>
</tbody>
</table>
Appendix B-2: French Elision

French Elision Test

MATERIALS: None
CEILING: Stop after the examinee misses 3 test items in a row.
FEEDBACK: Give feedback on all practice items and test items 1-5 only.
SCORING: Record correct answers as 1 and incorrect answers as 0. The total score is the total number of correct test items up to the ceiling.

PRACTICE ITEMS

DIRECTIONS: Say: “Nous allons faire un jeu de mots.”
   If correct say, “C'est ça, ton. Nous allons essayer le suivant.
   If incorrect say, “Ce n'est pas tout à fait ça. Chaton sans dire chat fait ton. Nous allons essayer le suivant.

   Say, “Let's play a word game.
   a. Say chaton. Now, say chaton without saying chat.”
   If correct say, “That's right, ton. Let's try the next one.”
   If incorrect say, “That's not quite right. Chaton without saying chat is ton.
   Let's try the next one.” Continue to give feedback as before.

   b. “Dis parterre. Maintenant, dis parterre sans dire terre.” (par)
   b. “Say parterre. Now say parterre without saying terre.” (par)

   c. “Say souris. Now say souris without saying sou.” (ris)

TEST ITEMS

Continue to give feedback.
1. “Say surtout. Now, say surtout without saying tout.” (sur)
2. “Say toucher. Now, say toucher without saying tou.” (chez)
3. “Say poisson. Now, say poisson without saying son.” (pois)

PRACTICE ITEMS

Say, “Okay, now let’s try some where we take away smaller parts of words.”
“Bon, maintenant nous allons essayer d’enlever une plus petite partie des mots.
Continue to give feedback. Use the phoneme, not the letter name (e.g., /k/ is the sound of k).

d. “Say cou. Now say cou without saying /kl/.”
d. “Dis cou. Maintenant, dis cou sans dire /kl/.” (ou)

If correct say, “That’s right, ou. Let’s try the next one.”
“C’est ça, ou. Nous allons essayer le suivant.

If incorrect say, “That’s not quite right. Cou without saying /k/ is ou.”
“Ce n’est pas tout à fait ça. Cou sans dire /k/ fait ou.
e. “Say pouce. Now say pouce without saying /sl/.” (pou)
e. “Dis pouce. Maintenant, dis pouce sans dire /sl/.” (pou)
f. “Say lune. Now say lune without saying /ll/.” (une)
f. “Dis lune. Maintenant, dis lune sans dire /ll/.” (une)

TEST ITEMS

4. “Say boeuf. Now say boeuf without saying /bl/.” oeuf
4. “Dis boeuf. Maintenant, dis boeuf sans dire /dl/.” (oeuf)

5. “Say mille. Now say mille without saying /ml/.” il
5. “Dis mille. Maintenant, dis mille sans dire /ml/.” (il)

REMAINING TEST ITEMS

Provide no feedback on the remaining items.

6. “Say met. Now say met without saying /ml/.” et
7. “Say route. Now say route without saying /tl/.” roue
8. “Say mouche. Now say mouche without saying /ch/.” mou
9. “Say piquer. Now say piquer without saying /kl/.” pied
10. “Say marché. Now say marché without saying /ch/.” marée
11. “Say mardi. Now say mardi without saying /ld/.” mari
12. “Say place. Now say place without saying /ll/.” passe
13. “Say constant. Now say constant without saying /sl/.” content
14. “Say flamme. Now say flamme without saying /ll/.” femme
15. “Say plisser. Now say plisser without saying /sl/.” plier
16. “Say mètre. Now say mètre without saying /tl/.” mère
17. “Say fleur. Now say fleur without saying /fl/.”

18. “Say sport. Now say sport without saying /p/.”

19. “Say plaindre. Now say plaindre without saying /l/.”

20. “Say texte. Now say texte without saying /kl/.”


22. “Say cable. Now say cable without the /bl/.”

23. “Say muguet. Now say muguet with the /gl/.”

24. “Say parle. Now say parle without the /rl/.”

25. “Say gruau. Now say gruau without the /u/.”
French Blending Words Test

**MATERIALS:** None

**CEILING:** Stop after examinee misses 3 test items in a row.

**NOTE:** If the examinee asks you to repeat the sounds, you may repeat the sounds one more time.

**PROMPT:** If the examinee says the sounds separately (e.g., s-i, rather than si), prompt by saying, “**Try to say the sounds all together as a real word.**” This prompt can be used as often as needed on practice words only.

**FEEDBACK:** Give feedback on all practice items and the **first 3 test items only**.

**SCORING:** Record correct answers as 1 and incorrect answers as 0. The total score for this subtest is the total number of correct test items up to the ceiling.

---

**DIRECTIONS:** Say, “Listen. You will hear some words in small parts, one part at a time. I want you to listen carefully and then put these parts together to make a whole word. Ready? Let’s try one.”

Say, “What word do these sounds make? Par-ti.” Pause to allow the child to answer.

If correct say, “That’s right. Parti. Let’s try the next one.”

If incorrect say, “That’s not quite right. When you put par-ti together, it makes parti. You try it. Par-ti makes ________? (Pause.) Let’s try the next one.”

Continue with the items listed below, pausing after each item, and give corrective feedback as above.

<table>
<thead>
<tr>
<th>What word do these sounds make?</th>
<th>tô - bé</th>
<th>tomber</th>
</tr>
</thead>
<tbody>
<tr>
<td>What word do these sounds make?</td>
<td>s - èn</td>
<td>scène</td>
</tr>
<tr>
<td>What word do these sounds make?</td>
<td>t - òp</td>
<td>taupe</td>
</tr>
<tr>
<td>What word do these sounds make?</td>
<td>n - ô</td>
<td>non</td>
</tr>
<tr>
<td>What word do these sounds make?</td>
<td>m - a - t</td>
<td>math</td>
</tr>
</tbody>
</table>

**TEST ITEMS:** Say, “Let’s try some more words. Each time you will hear the word one part at a time. Listen carefully and put the parts together to make a whole word.”

Continue with the items below, pausing after each item. Items may be repeated once. Feedback can be given on **items 1-3 only**.
If correct say, "That's right."
If incorrect say, "When you put bal-kô together, it makes balcony."

<table>
<thead>
<tr>
<th>Correct Response</th>
<th>Score (1/0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. bal - kô</td>
<td>balcony</td>
</tr>
<tr>
<td>2. koʃ - maR</td>
<td>cauchemar</td>
</tr>
<tr>
<td>3. ob - jè</td>
<td>objet</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4. y – n</td>
<td>une</td>
</tr>
<tr>
<td>5. n – uï</td>
<td>nouille</td>
</tr>
<tr>
<td>6. s – O</td>
<td>seau</td>
</tr>
<tr>
<td>7. ŋ – a</td>
<td>chat</td>
</tr>
<tr>
<td>8. n – ap</td>
<td>nappe</td>
</tr>
<tr>
<td>9. m – è – s</td>
<td>messe</td>
</tr>
<tr>
<td>10. j – O – n</td>
<td>jaune</td>
</tr>
<tr>
<td>11. I – y – n</td>
<td>lune</td>
</tr>
<tr>
<td>12. t – R – i – s – t</td>
<td>triste</td>
</tr>
<tr>
<td>13. d – i – s – k</td>
<td>disque</td>
</tr>
<tr>
<td>14. p – i – s – t – a – ŋ</td>
<td>pistache</td>
</tr>
<tr>
<td>15. s – ĕ – t – y – R</td>
<td>ceinture</td>
</tr>
<tr>
<td>16. a – R – t – i – s – t</td>
<td>artiste</td>
</tr>
<tr>
<td>17. s – p – è – k – t – a – k – l</td>
<td>spectacle</td>
</tr>
</tbody>
</table>
Appendix B-4: French Word Reading Fluency (TOWRE)
Instructions to children:

PRACTICE: Say, "Je veux que tu lises des listes de mots le plus rapidement possible. On va commencer par lire une liste pour s'entraîner. Tu liras la liste de haut en bas, le plus rapidement possible. Si tu tombes sur un mot que tu ne sais pas lire, passe-le et avance au mot suivant. Si tu veux, pour ne pas perdre ta place, tu peux poser ton doigt sous le mot que tu lis."

PRACTICE WORDS: sur, mon, jour, gros, froid, auto, mais, écrire

TEST: Say, "Maintenant tu vas lire des listes de mots qui sont plus longues. Au départ, les mots sont assez faciles, mais ils vont devenir de plus en plus difficiles. Lis autant de mots que tu peux le plus rapidement possible, jusqu'à ce que je te dise d'arrêter. Commence ici (point to the upper left corner of Form B) and lis jusqu'en bas de la liste. Ensuite, continue à lire à partir du haut de la liste suivante (point to top of second column). Lis les mots dans l'ordre, mais si tu tombes sur un mot que tu ne sais pas lire, passe-le et avance au mot suivant. Tu peux poser ton doigt sous le mot que tu lisant si tu veux. Si tu sautes un mot, pose ton doigt sous le mot suivant. Est-ce que tu comprends? Bon, tu commenceras quand je retournerai la carte."

| 1. est | 27. travail | 53. foule | 79. uniforme |
| 2. sur | 28. sauter | 54. mieux | 80. nécessaire |
| 3. chat | 29. partie | 55. dedans | 81. problèmes |
| 4. rouge | 30. rapide | 56. avion | 82. absent |
| 5. moi | 31. fin | 57. joli | 83. annoncer |
| 6. à | 32. lait | 58. fameux | 84. plaisant |
| 7. non | 33. dos | 59. enfants | 85. propriété |
| 8. nous | 34. perdu | 60. sans | 86. détrésse |
| 9. il | 35. trouver | 61. finalement | 87. information |
| 10. le | 36. papier | 62. étrange | 88. récession |
| 11. et | 37. ouvert | 63. budget | 89. comprendre |
| 12. oui | 38. gentil | 64. refouler | 90. accentuer |
| 13. dé | 39. capable | 65. enfermer | 91. confiant |
| 14. lui | 40. souliers | 66. justice | 92. intuition |
| 15. comme | 41. argent | 67. matin | 93. bruyant |
| 16. livre | 42. grand | 68. rôgouder | 94. courageux |
| 17. parti | 43. père | 69. décrire | 95. aliéner |
| 18. aide | 44. riviére | 70. vêtement | 97. étendre |
| 19. alors | 45. espace | 71. affaires | 98. prairie |
| 20. temps | 46. petit | 72. qualifier | 99. limousine |
| 21. bois | 47. gauche | 73. puissant | 100. valentin |
| 22. rire | 48. gens | 74. s'effondrer | 101. détective |
| 23. homme | 49. presque | 75. éléments | 102. récemment |
| 24. bébé | 50. vagues | 76. pionnier | 103. consigne |
| 25. nouveau | 51. enfant | 77. souvenir | 104. transitoire |
| 26. arrêt | 52. fort | 78. dangereux | |
## Appendix C: Scope and Sequence of PA Training

**PHONOLOGICAL AWARENESS SCOPE & SEQUENCE**

<table>
<thead>
<tr>
<th>Week</th>
<th>Focus (Text Used)</th>
<th>Phonological Awareness Goals</th>
<th>Sample Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Words in sentences (Zimmermann, 1989)</td>
<td>The student will recognize rhyming words when presented with rhyming and non-rhyming pairs.</td>
<td>“Do these words rhyme: _____ / _____?”</td>
</tr>
<tr>
<td>2</td>
<td>Words in sentences (Galdone, 2001)</td>
<td>The student will orally produce rhyming words when given a stimulus word.</td>
<td>“Tell me a word that rhymes with _____.”</td>
</tr>
<tr>
<td>3</td>
<td>Words in sentences (Cutbill, 2008)</td>
<td>The student will orally segment sentences into words.</td>
<td>“Point to/Clap one time for each word in this sentence.”</td>
</tr>
<tr>
<td>4</td>
<td>Words in sentences (Viorst, 1972)</td>
<td>The student will orally segment compound words into their root words, blend root words to form compound words, isolate first or last root words in compound words and orally delete root words from compound words.</td>
<td>“Clap one time for each root word in the word _______. “ “Guess my word, _______ [PAUSE] _______.” “What is the first/last root word in the word _______?” “Say ______. Now, say it again without saying ______.”</td>
</tr>
<tr>
<td>5</td>
<td>Syllables in words (Keats, 1998)</td>
<td>The student will orally segment words into syllables and identify the number of syllables in words.</td>
<td>“Clap one time for each syllable in the word _______. Now, count the number of syllables in the word.”</td>
</tr>
<tr>
<td>6</td>
<td>Syllables in words (Kimmel, 1993)</td>
<td>The student will orally blend syllables to form words.</td>
<td>“Guess my word, ______ [PAUSE] ______ [PAUSE] ______.”</td>
</tr>
<tr>
<td>7</td>
<td>Syllables in words (DePaola, 1975)</td>
<td>The student will isolate first initial, then final, and lastly medial syllables in words.</td>
<td>“What is the first/last/middle syllable in the word _______?”</td>
</tr>
</tbody>
</table>
| 8 | Syllables in words  
(Carle, 1996) | The student will delete  
first initial, then final,  
and lastly medial  
syllables in words.  

“Say _______.  
Now, say it again,  
without saying  
_______.” |
|---|---|---|
| 9-18 | Phonemes in  
words  
(McCloskey, 1976; Paul &  
Thomas, 1989;  
Slobodkina, 1968;  
Munsch, 1996;  
Sendak, 1963;  
Henkes, 1991;  
Bailey, 2003;  
Knowles, 1998;  
Tucker, 2003;  
Waber, 2000) | The student will orally  
segment words into  
phonemes & blend  
phonemes to form  
words. Isolate first  
initial, then final, and  
lastly medial  
phonemes in words.  
Delete first initial, then  
final, and lastly medial  
phonemes in words.  

“Listen as I say this  
word: _____. Now,  
listen as I say the  
word again slowly,  
one sound at a time:  
/\ /\ /\ /. What  
sounds do you hear  
when I stretch the  
word ______? What  
letters make those  
sounds? Let’s write  
the word.”  

“Listen as I say the  
sounds in this word:  
/\ /\ /\ /. Now,  
listen as I say the  
sounds in the word  
again slowly and try  
to guess my word:  
/\ [PAUSE] /\  
[PAUSE] /\ /. What  
letters make those  
sounds? Let’s read  
the word.”  

“What is the  
first/last/middle  
sound you hear in  
the word ______?”  

“Say _______.  
Now, say it again,  
without saying /\/.” |
Appendix D: Fidelity Checklists

Fidelity of Treatment: Observation Checklist #1

**Purpose:** Weekly manipulation checks need to be conducted to ensure that treatment conditions are implemented faithfully by all instructors.

Date of Observation: ___________  Name of Observer: ______________________

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Indices of Treatment Fidelity</th>
<th>Response (check one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Were instructional goals for the session explicitly stated (e.g., “Today we are learning to…”)</td>
<td>Yes  No</td>
</tr>
<tr>
<td>2.</td>
<td>Did the instructor use auditory and/or visual cues for modeling purposes to ensure understanding?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>3.</td>
<td>Was instruction contextualized in popular children’s literature?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>4.</td>
<td>Did the instructor use vocabulary taken directly from the text to practise the PA skill being taught?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>5.</td>
<td>Did the students receive PA instruction in combination with letter-sound training?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>6.</td>
<td>Were the students provided with an opportunity for guided practice?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>7.</td>
<td>Were students provided with an opportunity to demonstrate their ability to apply learned concepts independently?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>8.</td>
<td>Was positive feedback and encouragement provided by the instructor?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>9.</td>
<td>Did the students appear to be engaged in the learning process?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>10.</td>
<td>Did the students appear to be enjoying the PA training activities?</td>
<td>Yes  No</td>
</tr>
</tbody>
</table>
**Fidelity of Treatment: Observation Checklist #2**

**Purpose:** Weekly manipulation checks need to be conducted to ensure that treatment conditions are implemented faithfully by all instructors.

**Date of Observation:** ______________ **Name of Observer:** ____________________

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Indices of Treatment Fidelity</th>
<th>Response (check one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Was vocabulary instruction contextualized in popular children’s literature?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>2.</td>
<td>Was new vocabulary introduced prior to oral reading?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>3.</td>
<td>Was a verbal introduction to the text provided?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>4.</td>
<td>Did the instructor pause during oral reading to explain unfamiliar words?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>5.</td>
<td>Did the instructor use visual cues (e.g., illustrations) during oral reading to enhance understanding?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>6.</td>
<td>Following oral reading, did conversations about the text deepen students’ knowledge of word meanings?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>7.</td>
<td>Were students encouraged to draw upon their prior knowledge and experience?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>8.</td>
<td>Was positive feedback and encouragement provided by the instructor?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>9.</td>
<td>Did the students appear to be engaged in the learning process?</td>
<td>Yes  No</td>
</tr>
<tr>
<td>10.</td>
<td>Did the students appear to be enjoying the vocabulary-building activities?</td>
<td>Yes  No</td>
</tr>
</tbody>
</table>