Relationships between Adolescents' Oral Language Skills, Metacognitive Knowledge and Strategies, and Reading Comprehension in English and French

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Abstract

This thesis examined bilingual reading comprehension within the parameters of two theories of second language (L2) reading comprehension performance: the Linguistic Interdependence Hypothesis (LIH) and the Linguistic Threshold Hypothesis (LTH). The oral language skills and metacognitive knowledge and reading strategies that relate to L2 reading comprehension are first described. The shortcomings of previous research in L2 reading comprehension are then discussed. The following four research questions are then posed: (1) What oral language skills contribute to reading comprehension in English (L1) and French (L2)?; (2) How does metacognitive knowledge and strategies for reading comprehension compare and contrast in English and French?; (3) What type of metacogitive knowledge and skills contribute to reading comprehension in English and French?; and (4) What is the relative influence of oral language and metacognitive knowledge and strategies on reading comprehension in English and French? Based on the research results, a fifth question was addressed in the Discussion: Which theoretical framework (LIH; LTH) provides a better explanation for the results of this study?

Participants were 48 bilingual adolescents who spoke English (L1) and French (L2), enrolled in grade 10, and attended mainstream anglophone high schools in Quebec. They completed oral language and reading comprehension tasks in English and French, and questionnaires about their strategies for reading comprehension in both languages. Multiple linear regression analyses revealed that vocabulary skills contributed to reading comprehension in both English and French. Furthermore, word-reading difficulty was a metacognitive factor that related to reading in English and French. Perceived difficulty of word reading in English significantly related to English reading comprehension. Although participants' repertoire of French metacognitive components was more strategic

and reader-directed compared to the English strategies, none of the French strategies significantly related to French or English reading comprehension. When only the significant oral language and metacognitive factors were entered into one analysis, French vocabulary predicted English and French reading comprehension. More support was found for the LIH in light of L2 vocabulary predicting both L1 and L2 reading. Differences between the curricula for L1 and L2 language learning were discussed and set the parameters for an explanation of the absence of cross-language transfer of metacognitive reading strategies.

Résumé

Cette recherche avait pour but l'évaluation de la compréhension en lecture en langue seconde (L2) selon deux théories: le Linguistic Interdependence Hypothesis (LIH) et le Linguistic Threshold Hypothesis (LTH).

Les habiletés en langue orale et les stratégies métacognitives en lecture en L2 ont été décrites. Ceci a été suivi par une discussion des principaux désavantages des études antérieures. Quatre questions ont été posées dans cette recherche: (a) Quelles habiletés en langue orale contribuent à la compréhension en lecture en anglais (L1) et en français?; (b) Comment se comparent les stratégies métacognitives pour la compréhension en lecture en anglais et en français?; (c) Quels types de stratégies métacognitives contribuent à la compréhension en lecture en anglais et en français?; (d) Quelle est l'influence relative des habiletés orales et les stratégies métacognitives sur la compréhension en lecture en anglais et en français? Une cinquième question a été posée au cours de la Discussion car elle est basée sur les résultats des quatre premières questions: Quelle théorie est mieux appuyée selon les résultats de cette recherche?

Les participants(es) furent un groupe de 48 adolescents(es) fréquentant l'école anglaise régulière au Québec. Tous ont accompli un ensemble de tâches en langage oral et en compréhension en lecture. Ils ont répondu à des questionnaires portant sur leurs stratégies métacognitives en lecture en anglais et en français. Leur fonctionnement intellectuel non-verbal et leur habileté à lire des listes de mots ont aussi été évalués.

Les connaissances en vocabulaire en L1 et en L2 ont contribué à la compréhension en lecture dans les deux langues. Des aspects touchant la difficulté en lecture de mots étaitent un facteur commun en L1 et en L2. Ce facteur a contribué à la compréhension en lecture en anglais. Bien que le répertoire de stratégies métacognitives

en français semblait plus centré vers le lecteur comparé aux stratégies en anglais, aucune des stratégies en français n'a contribué à la performance en lecture en français ou en anglais. Une analyse comparant seulement les habiletés orales et les stratégies métacognitives significatives a révélé que le vocabulaire en français pouvait prédire les performances en lecture en anglais et en français.

Le LIH offre une meilleure explication des résultats obtenus dans cette étude car cette théorie permet à la recherche de constater l'habileté du transfert non seulement de L1 à L2, mais aussi d'un plan inversé–de L2 à L1.

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Giovanni and Emmitt, I hope my journey serves as an example for you to follow in your own lives. Believe in yourselves, and never set limits on what you set out to accomplish.

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CHAPTER 1

Introduction

In 2004, the Canadian government's Official Languages Support Program Branch (OLSPB) of the Department of Canadian Heritage released a comprehensive publication entitled *The Next Act: New Momentum for Canada's Linguistic Duality. The Action Plan for Official Languages in Canada*. This document outlined a set of priorities for various aspects of official languages in the community, education, and public service. The OLSPB's challenge to education and school policy was to find new ways to bring more students to a level of functional bilingualism, with the development of solid literacy skills topping their priority list. The goal of doubling the number of bilingual high school graduates who can successfully comprehend written text in their L2, by 2013, presented an interesting opportunity to language researchers and educators. On a national scale they were given the possibility of studying the characteristics of the L2 learner. Important factors to assess included current reading levels in L2, measurement of the progress required to attain competence, and factors likely to facilitate or impede this attainment. In this way second language researchers should be in a position to support this L2 learning effort and help bring students to the level of L2 literacy they need to attain.

Canada's goal represents just one of several international initiatives aimed at improving literacy skills among school-age populations (Malloy & Botzakis, 2006). For individuals of any language background, reading is a basic life skill (Durgunoglu, 1997). Social, financial, and demographic processes now transcend national boundaries, and have resulted in an intensification of world-wide social relations (Kearney, 1995). Globalization has contributed to an imperative need for individuals to become proficient in both oral and written forms of a second language. Proficiency in a second language

can improve overall quality of life; it is one key to higher education, it can become a vehicle for social mobility, and is an asset in the workforce. Yet, no cognitive process occurs in a vacuum (Rogoff, 1991). Bilingual cognition, especially literacy development, is affected by the social and cultural influences surrounding its development (Yang, 2010). The diversity in L2 learning contexts has resulted in an impressive range of research endeavors related to the acquisition of L2 reading skills. For example, the focus of Canadian studies, where learning an L2 is very prestigious, has been on how processes that support literacy development in L1 favour L2 reading. A very different scenario is reflected in literature from the United States, in which a major focus is on how best to incorporate immigrant and minority language students into the general education L1 curriculum, and how to decide in what language literacy instruction should begin to ensure the best possible success level for these students (Durgunoglu, 1997).

A large proportion of research with individuals reading in L2 stems from a theoretical pursuit aimed at understanding the basic nature of L2 reading. Models and theories of the L2 reading process have been developed that incorporate basic word reading, language skills, and higher-level text comprehension. Any attempt to explain how a text is understood in L2 entails explaining how distinct processes relate to and interact during a particular reading event. Several different ways of modeling the reading process have been proposed, with differences in the emphasis attributed to specific skill components, such as word decoding, vocabulary, and grammar knowledge, or strategic reading skills in L1 and L2 (e.g., Alderson, 1984; Bernhardt, 1991, 2000; Clarke, 1980; Cummins, 1980; Gough & Tunmer, 1986).

A further driving force behind L2 reading studies (and perhaps, in part, a consequence of developments in L2 reading models) is a practical one: a desire expressed

by the educational community to improve methods of teaching L2 reading, with the ultimate goal of improving L2 education and literacy (Lightbown, 2000; Littlewood, 2004). The reading goals set by the OLSPB (2004) for Canadian high school students learning English or French as their L2 may be classified in this category of L2 publications. Recent statistical data have provided support for efforts to improve literacy among Canadian youth. For example, young Canadians who have high levels of proficiency in reading at age 15 are more likely to graduate from high school and to have plans to pursue post-secondary education (Statistics Canada, 2006). However, recent indicators have also shown that 48% of the population aged 16 or older score at or below a Level 3 on a measure of prose literacy, in which Level 3 is considered the minimum level of performance required to complete average reading tasks in a knowledge-based society (Statistics Canada, 2006). Students in the lowest two levels of reading literacy were more likely to drop out of high school. In Quebec, there has been an increase in the high school drop out rate, rising from 26% to 29% between 2000 and 2007 (Chung, 2009). These are examples of student performance rates to show that, for many students, attaining competent reading even in their mother tongue is a struggle. Nevertheless, this reality coexists with school programs across the nation encouraging L2 development, especially literacy skills in L2. This sets high expectations for student achievement. At the same time, it foreshadows the collective effort needed on behalf of second-language educators, school administrators, and researchers alike to take a closer look at what can be done to work toward achieving this end.

This research project stems from a widely-supported proposition in the L2 reading literature that both an understanding of the processes that underlie reading comprehension ability among bilinguals, and the best way to achieve effective reading instruction for

bilingual students is best understood within the bilingual learning context in which these skills are acquired (Koda, 2005; Kucer, 2009). Given that there is such a wide range of variability in the educational programs that have been developed to provide instruction in different languages, the term "bilingual learning context" can take on very different meanings. Generally speaking, bilingual education consists of combining language and academic instruction, with the integration of these two components falling along a continuum from language-driven to content-driven (Genesee, 2001). A primary issue of concern for those involved in pedagogy for bilingual education remains the same: How best to promote and develop reading skills in students' two languages?

The general purpose of this research was to examine the reading-related skills among a sample of students from a bilingual population who attended mainstream English schools in the province of Quebec. Two well-known theoretical frameworks that have guided a significant amount of second language reading research into the role played by readers' oral language and metacognitive skills in reading comprehension set the parameters of this study: The Linguistic Interdependence Hypothesis (LIH; Cummins, 1979; 1981) and the Linguistic Threshold Hypothesis (LTH; Cummins & Swain, 1986). Both theories will be described in detail in a later section of this thesis (see pages 12 and 19). More specifically, this research set out to examine the oral language and metacognitive skills involved in reading among a sample of English-speaking (L1) high school students learning French (L2) as their second language. One goal was to assess the relation between oral language skills and reading comprehension ability in students' L1 and L2. A second goal was to assess the nature of students' metacognitive knowledge and reading strategies in L1 and L2. A third goal was to explore relationships between students' metacognitive knowledge and strategies for reading, and reading comprehension

in L1 and L2. A fourth goal was to compare the relative influence of oral language skills and metacognitive knowledge and reading strategies in reading comprehension performance in L1 and L2. A fifth goal was to compare the two theoretical frameworks that guided this research (i.e., LIH and LTH) in light of the results obtained from this study.

The implications of this study will be of practical value to educators and other professionals involved in bilingual education in Quebec. From a pedagogical perspective, this research may help teachers adapt their reading instruction in a way that it targets the development of the language and metacognitive processes implicated in reading comprehension for the bilingual population represented in this study. An awareness of the processes that are important for reading comprehension may help pinpoint areas of potential weakness in the respective languages, and help make appropriate recommendations for remediation.

CHAPTER 2

Literature Review

Defining Bilingualism

Bilingualism is widespread around the world. Many individuals are exposed to more than one language on a regular basis, and have some ability in a language other than their mother tongue (Duncan, 1989; Grosjean, 1982). Bilingual people outnumber monolinguals, and it can be expected that this development will continue (DeGroot & Kroll, 1997). For example, Crystal (2003) estimated that two-thirds of the world's children are raised in bilingual environments. These children grow up in communities where they are exposed to one language at home, another when they attend primary or secondary school, and a third (or fourth) if they move to a different city or province for higher education or employment (Doughty & Long, 2003). Such experiences can only increase the scope of bilingualism, as a result of people making life choices that entail adding a language to their verbal repertoires (Bhatia & Ritchie, 2004).

A perusal of the literature on L2 learning revealed a long history of debates surrounding how bilingualism should be defined (Genesee, 1987), which in turn has shaped research into language learning and the issues that have drawn attention in this growing field of inquiry (Pica, 2005). For example, some early work on bilingualism selected children on the basis of their immigrant status, such as having a foreign last name (Hakuta & Garcia, 1989). Other writers viewed bilingualism along a single dimension: the level of oral fluency participants had in two languages. For some researchers, then, being bilingual meant that one belonged to a specific category of individuals who spoke two languages perfectly (Brisk, 2006). Such views of bilingualism were proposed by early theorists such as Bloomfield (1935), who maintained that bilingualism consisted of

"the native-like control of two languages" (p. 56). Individuals with different levels of oral ability in L2 were disregarded (DeGroot & Christoffels, 2006; Thiery, 1978). A further tenet of this early view of bilingualism was that the two languages were separate and autonomous systems. The borrowings and switches observed between languages were regarded as evidence of interference or careless language use (Grosjean, 1982). In line with the early conceptualization of bilingualism as a balance between two languages, investigations were concerned with searching for "true" bilinguals using language tests and psycholinguistic measures, with "ideal" bilinguals performing equally well in L1 and L2 (Alderson, 1984; Grosjean, 1982).

The notion of bilingualism has been reconceptualised in the L2 literature as a concept that encompasses language skills other than traditional oral fluency. There is now a general agreement that bilingualism no longer deals uniquely with the degree of oral competence one has, but rather, concerns individuals who use different types of language skills across two (or more) languages (Hakuta, 1986), and who use these languages for different purposes (Koda, 2005). For example, Grosjean (1989) defined "bilingual" as a person with abilities in two or more languages "to the extent required by his or her needs and those of the environment" (p. 6). This view replaced the traditional emphasis on oral skills, and broadened the notion to include individuals with varying levels of abilities across language domains (i.e., listening, speaking, reading, and writing). That is, while some may speak a language, they may not read or write in that language. Others may listen and understand a language but not speak or write it (Baker, 2001). Furthermore, within each language, the level of development of each skill domain can vary. For example, one might be a proficient reader in one's L1, yet have only basic reading skills in an L2. Several possibilities exist with regard to the extent to which one's

skills in L2 are developed, as well as the context and with whom a language is used, implying that bilinguals present unique linguistic configurations across settings (Koda, 2005).

A further tenet of this more inclusive view was that the bilingual's L1 and L2 are complementary structures that reside within one general language system, and interact regularly (Cook, 1992; De Groot & Kroll, 1997; Grosjean, 1982; Guiora, 2005). Grosjean (1982) drew upon the analogy of a track-and-field athlete to further clarify this point:

> The high hurdler blends two types of competencies, that of high jumping and that of sprinting. When compared individually with the sprinter or the high jumper, the hurdler meets neither level of competence, and yet when taken as a whole the hurdler is an athlete in his or her own right. No expert in track and field would ever compare a high hurdler to a sprinter or to a high jumper, even though the former blends certain characteristics of the latter two. A high hurdler is an integrated whole, a unique and specific athlete, who can attain the highest levels of world competition in the same way that the sprinter and the high jumper can. In many ways, the bilingual is like the high hurdler: an integrated whole, a unique and specific speaker-hearer, and not the sum of two complete or incomplete monolinguals. (p. 55)

The notion that the bilingual language system consists of interactions between L1 and L2 competencies that are, in most cases, highly variable from one individual to the next, is an appealing concept for cognitive psychologists and linguists interested in bilingual development. Several investigations have explored linguistic and cognitive mechanisms involved in language faculties across different bilingual populations (e.g.,

Chamot & Kupper, 1989; Grosjean, 1982, 1989; Koda, 1994; Smythe & Everatt, 2000). The common message that resonates from several recent reports is that there is a need to further explore models unique to bilingual language processing. Furthermore, others identified a need to delineate the conditions under which L1 or L2 variables contribute to L2 performance and achievement (Bernhardt, 2003, 2005; Koda, 2005; Yamashita, 2002). It has been noted that consideration of L1 and L2 faculties together is basic to studying and understanding L2 learning (Koda, 1994), and also stands to make profound contributions to knowledge about the nature of cross-linguistic processing (Bialystok, 2002; Schachter, 1998).

Reading Comprehension

Of the four language skills, reading, both in L1 and L2, holds a prominent position in the interests of researchers and educators (e.g., Cromley & Azevedo, 2007; Proctor, Carlo, August, & Snow, 2005; Snow, Burns, & Griffin, 1998; Wray, 2001). For many students learning an L2, reading is arguably the most important of the four skills to be acquired, particularly in English as a second or foreign language (Dworin, 2003; Slavin & Cheung, 2005; Wiley, 2005). At advanced levels of L2 proficiency, the ability to read at a reasonable rate and comprehend what is read has been acknowledged to be just as important as oral skills (Eskey, 1970). In L2 settings, such as in institutions of higher education where English is the language of instruction or where academic materials are to a large degree written in English, reading skills are critical. Without solid reading skills, L2 learners cannot perform at the levels required to be successful and competent in environments where their L2 is the majority language (Wiley, 2005).

Numerous variables are involved in the acquisition of proficient reading and reading comprehension is generally acknowledged to be an active process in which

readers repeatedly engage in a variety of processes (Adams, 1998; Koda, 2005). Therefore, reading comprehension is not a single, unitary skill (Adams, 1998). A broad research effort has uncovered several of the component operations involved in successful reading comprehension, such as decoding skills (reading words accurately and fluently, accessing lexical representations; e.g., Adams, 1990; Brady & Shankweiler, 1991; Gough & Tunmer, 1986; Hulme & Snowling, 1992; Stanovich, 1985), involvement of knowledge from different domains (vocabulary, linguistic structure, and discourse; e.g., Nation & Snowling, 1998; Pearson, Hiebert, & Kamil, 2007; Stuart, Stainthorp, & Snowling, 2008; Wixson, 1986), and a variety of processing capacities (mental representations for text, comprehension strategies; e.g., Bernhardt, 1991; Carr & Thompson, 1996; Miyake & Shah, 1999).

There have been several attempts at constructing explicit models of the range of processes involved in reading comprehension. Although there is no one accepted framework to account for the host of processes involved in reading, interactive models have become popular, with the term "interactive" serving to emphasize that different processes are responsible for providing different types of data for understanding written text. Within an interactive point of view, these data serve to update information sources, and are shared with other processes (Perfetti & Roth, 1981). Furthermore, the interactive standpoint maintained that bottom-up and top-down processes may be synthesized based on information provided simultaneously from several knowledge sources (Stanovich, 2000). Because successful comprehension requires input from several skill domains and knowledge sources, it can be disrupted by a lack of any of these elements, even if the reader is competent in the other ones. Therefore, comprehension can fail as a result of

effortful word decoding, unfamiliar vocabulary, poor background knowledge, or failing to use effective strategies for reading the text.

Reading Comprehension in L2

The groundwork for a large proportion of the L2 reading studies has been based on research trends in L1 reading (Koda, 1994; Weber, 1991). However, several researchers have expressed that L2 reading should be studied from its own well-defined paradigms in order to clarify unique aspects of L2 processes, to understand why L2 reading achievement differs amongst L2 learners, and to determine the dimensions along which L1 and L2 reading constructs differ (Berhnardt & Kamil, 1995).

The term L2 learner covers a broad span, and it is used very generally. In particular, the term obscures important differentiating variables, which have strong impacts on how learning to read (and, consequently, reading instruction) proceeds in an L2. There are several distinct L2 reader populations, including preschool children without prior literacy experience and school-aged children with differing L1 literacy experiences, as well as adult learners who are highly literate in their L1. Although L2 knowledge is a common variable in each group, the developmental profiles differ according to personal experiences with regard to where, how, and why L2 literacy is acquired. For example, the focus of reading instruction of six-year-old native Spanish-speaking children, acquiring reading skills in English as their L2 in an American public school, is likely quite different compared to native English-speaking Canadian high school students who have acquired some French (L2) at home, and have regular exposure to oral input in French within their community. While a challenging aspect of conducting L2 reading research is establishing a well-defined target group for investigation, it can

help in terms of leading to recommendations that are effective and relevant (Dworin, 2003).

In light of the findings from L1 reading research that reading ability is dependent on mastery of code-related oral language and comprehension skills, which all relate to reading in unique ways (e.g., Gough, Hoover, & Petersen, 1996; Oakhill, Cain, & Bryant, 2003; Storch & Whitehurst, 2002), several have noted the pressing need to pursue examinations of similar skills among different types of L2 reader groups in order to contribute to the development of comprehensive models of L2 reading that account for L1 and L2 sources of achievement (e.g., Bernhardt, 2003; Bernhardt & Kamil, 1995; Brisbois, 1995; Taillefer, 1996). A comprehensive reading framework can serve as a blueprint within which to evaluate reading-related skills acquired in both L1 and L2, thus allowing for an examination of possible interactions, influences on L2 reading achievement, and ultimately, the generation of subsequent practical recommendations to improve reading comprehension.

Theoretical Frameworks for Reading Comprehension in L2

Linguistic interdependence hypothesis. Many studies of processes underlying L2 reading ability have centered on how reading-related skills that develop in L1 carry over, or transfer, to affect L2 reading achievement (Durgunoglu, Nagy, & Hancin-Bhatt, 1993; Taillefer, 1996). Such efforts sprang from evidence from studies, conducted in a wide range of language environments, with L2 learners from different backgrounds, that revealed moderate (e.g., Verhoeven, 1994) to strong (e.g., Comeau, Cormier, Grandmaison, & Lacroix, 1999) correlations between bilingual students' L1 and L2 reading scores in situations in which they had an opportunity to develop literacy in both languages. This stream of research is consistent with the Linguistic Interdependence

Hypothesis (LIH; Cummins, 1979; 1981), a model of L2 reading achievement that sparked interest among early L2 publications. The LIH posited that, in alphabetic scripts, there are common underlying processes involved in reading across languages, thus allowing skills to transfer from one language to another. Transfer research has been guided by the tenet that the representation of two languages in a bilingual mind includes a common set of representations that is the register for general linguistic knowledge, separate from representations for language-specific information (Bialystok & Hakuta, 1994; Durgunoglu, 2002). Transfer of reading skills occurs between cognitive processes that are shared by L1 and L2. A further tenet of the interdependence theory is that once readers acquire skills in L1, they merely need to apply (transfer) them to similar tasks in L2. The implication for bilingual reading is that if a student has acquired a given skill in his or her L1, the expectation is that this same skill will also emerge during L2 reading (Bernhardt, 2003; Schoonen, Hulstijn, & Bossers, 1998).

Word reading. Word reading ability plays a necessary and central role in reading (Gough et al., 1996), and has been recognized as "the foundational process of reading" (Archer, Gleason, & Vachon, 2003, p. 89). Becoming skilled at reading an alphabetic script ultimately involves (though is not limited to) being able to recognize groups of letters as words, with a minimum investment of effort. This requires that readers develop automatic word identification, meaning that decoding (translating print into speech) occurs without needing to attend to it consciously. In English, letters and letter combinations represent approximately 40 speech sounds (Moats, 2000; Venezky, 1999). Experience with print (i.e., degree of exposure) is thought to be related to one's ability to deal with letter-sound relationships automatically, enabling automatic processing (without conscious effort), thus allowing readers to focus all of their available attention on

comprehending what is being read (Perfetti, 1985). For the most part, under normal circumstances, these letter-sound relationships are mastered by the time students reach 5th grade. However, these kinds of print-based processing are thought to be a source of reading problems for readers of all ages (Curtis, 2004).

According to Adams (1990), the most salient characteristic of skilful reading is the speed with which text is reproduced in spoken language. This is often termed "oral reading fluency" (Fuchs, Fuchs, Hosp, & Jenkins, 2001, p. 239). Reading fluency involves several component skills, such as quickly translating individual letters into graphemes (letters, singly or in combination), which themselves become coherent sound units with associated meanings. Although certain aspects of fluent reading continue to develop in the later elementary grades and beyond (Stahl & Kuhn, 2002), its attainment is regarded as one of the vital stages of reading achievement (Chall, 1983; Frith, 1985).

Text comprehension is demanding and requires high amounts of cognitive control. If subtasks such as reading processes do not take place quickly and effortlessly, they may draw upon the reader's limited attentional capacities and impede higher-order processing and flow of thought conducive to text comprehension (Therrien, 2004). Although decoding consumes a large proportion of cognitive resources among weak readers, decoding is achieved with relative ease among fluent readers and allows them to attribute more available resources for processing the meaning of text.

Reading fluency has become a recognized key element in successful reading programs among English-speaking (L1) students in the primary grades (Grabe, 2004), although recent research suggests that the importance of reading fluency extends into later grades as well. Rasinski et al. (2005) found that a sample of 303 monolingual (anglophone) ninth-graders had strong word reading accuracy when reading a grade-level

passage out loud, achieving an accuracy level of 97.4%. However, 61% of the sample scored at or below the 25th percentile in reading fluency. The authors worked with the best available norms (reading fluency norms for eighth grade students in spring of the school year), and concluded that the reading fluency level exhibited by their sample of ninth graders was 80% of what the norm is for students in the eighth grade. The students in grade 9 had not attained average level expectations in reading fluency. A correlation analysis was performed between the students' reading fluency and reading comprehension scores on a state high school graduation test. A moderately strong relation emerged from this analysis (r = .53). Although not accounting for the majority of variance in reading comprehension performance, 28% of the variance in reading comprehension scores was attributed to reading fluency. Rasinski et al. concluded that reading fluency is an important component in reading comprehension beyond the primary grades, particularly among students who experience difficulty with reading. Although more research centering on word recognition fluency and reading comprehension is needed in order to sort out relationships between these variables, the message at this stage seems to be that word reading fluency may enhance reading comprehension (e.g., Levy, Abello, & Lysynchuk, 1997).

As with L1 reading, word reading in L2 is a central aspect of reading performance. Word-reading ability in L1 is a good candidate for transfer, and can predict word-reading ability in L2 (Cummins, 1980; Manis, Seidenberg, & Doi, 1999; Nassaji, 2003). Within the context of this research project, which focused on bilingual students reading English and French, "transfer" is intended to refer to positive transfer or to cases where cognitive skills acquired in L1 reading can be leveraged on to promote or facilitate L2 reading development, and vice versa.

Within the L2 stream of word-reading research, a large number of studies have demonstrated that alphabetic L1 and L2 languages interact during word recognition (see citations in Lemhofer et al., 2008). However, the relationship seems to go beyond a simple transfer of word-reading skill from one language to another. For example, even though they share the same script, alphabetic languages differ in terms of their orthographic depth (Katz & Frost, 1992). Orthographic depth is the degree of regularity in sound-symbol correspondence, and is a property of written language that can affect L2 word recognition (Frost, 1994, p. 116). An orthography that represents its phonology following regular letter-sound correspondences is called a shallow orthography; Spanish is an example. Because of the clear and consistent relationships between spelling and pronunciation, the phonological information of a word in a shallow orthography can be easily recovered from its spelling. A deep orthography has a more complex relation between spelling and phonology (e.g., English), and readers must necessarily engage in deeper processing of orthographic information in order to infer phonological coding when processing printed words.

L2 reading studies apply the basic concepts of the orthographic depth hypothesis and argue for the transfer of specific L1 word-recognition processes to L2 reading. For example, there is an abundance of evidence for cross-language effects of phonological awareness in L1 with word reading in L2. Durgunoglu et al. (1993), in their study examining native Spanish-speaking children who were beginning readers of English, found that Spanish word recognition and phonological awareness were significant predictors of performance on English (L2) pseudoword-reading and word-reading tests. Cisero and Royer (1995) found that accuracy on phoneme deletion in Spanish (L1) was a significant predictor of performance on a similar task in English (L2) pseudoword-

reading and word-reading tests. Speed of lexical access is a further processing measure related to word reading ability for which cross-language transfer has been found. This is often measured with a rapid naming task of lists of highly familiar items (i.e., letters, digits, objects). Evidence of cross-language transfer of performance on rapid naming tasks to reading ability is well documented (e.g., Chiappe & Siegel, 1999; Lindsey, Manis, & Bailey, 2003). Essentially, the "commonality" feature (i.e., metalinguistic nature) of word-reading processes facilitates reading in L2 by allowing such skills to transfer from one language to another.

Metacognitive skills for reading comprehension. The LIH has also helped explain the relation between L1 and L2 reading at the comprehension level. A large proportion of this particular body of literature has focused on experienced readers. Experienced readers are of interest for their metacognitive knowledge and strategies related to reading-how they manage their interaction with written text, and how these strategies are related to their level of text comprehension (Singhal, 2001). Furthermore, it is especially important to consider, in a discussion about L2 readers' metacognitive skills, the level of oral language proficiency in L2 (Hoover & Gough, 1990; Oakhill et al., 2003). Oral skills such as vocabulary, syntax, grammar, and listening comprehension have been found to be significantly associated with processes operating beyond the level of individual words when readers are required to read and understand connected text (Cutting & Scarborough, 2006; Gough & Tunmer, 1986; Hoover & Gough, 1990; Scarborough, 2005). Individuals with (nonphonological) language weaknesses often have reading problems as well (Menyuk et al., 1991). Oral proficiency in L2 is closely related to the extent to which metacognitive skills, developed in L1, transfer to L2

comprehension. This notion is the basis of the Linguistic Threshold Hypothesis (Cummins & Swain, 1986), which will be further explained in an upcoming section.

Metacognition is often referred to as one's ability to reflect on his or her cognitive experiences, or, "thinking about thinking" (McCormick, 2003, p. 81). They enable one to plan, monitor, and evaluate performance during a task (Flavell, 1979). Metacognitive processes are internal, executive processes that control and organize cognitive processes.

With regard to literacy, metacognitive processes are of interest for what they reveal about a reader's "resources for understanding" (Block, 1986, p. 465). Reading researchers have investigated several aspects of the relation between metacognitive ability and effective reading. Two dimensions of metacognitive ability have been recognized. First, *knowledge of cognition,* or *knowing that,* refers to a reader's knowledge about his or her own cognitive resources, and the compatibility between oneself as a reader and the reading task (Baker & Brown, 1984; Garner, 1987; Paris, Wasik, & Turner, 1991). Therefore, if a metacognitively-oriented reader is aware of what is needed to effectively understand the message in written text, then it is possible to take steps to meet the demands of a reading situation more effectively. Second, *regulation of cognition*, or *knowing how*, refers to the application of reading strategies. Readers need a number of strategies to self-regulate and attain specific reading goals (Alexander & Jetton, 2000; Pressley, 2000). For example, scanning a text to find a specific piece of information requires a different kind of strategy than reading a text to memorize details (Schoonen et al., 1998). Other strategies include, for example, guessing word meanings from context, skimming, predicting, making inferences, and separating main points from supporting details (Barnett, 1988), as well as constructing self explanations, consciously constructing a summary, and identifying the gist of the message (Block & Duffy, 2008).

The use of strategies has been found to be effective in improving students' reading comprehension. Good comprehenders have been found to be more strategic than those who are less competent comprehenders, and typically execute more strategies as they read (Swanson & De La Paz, 1998). Further examples include using pre-reading strategies (e.g., establishing a specific goal for reading a given text or skimming a text), engaging in strategies during reading (e.g., rereading information that seems important; monitoring the problems they experience as they read), and applying strategies after completing a text (e.g., summarizing the ideas or deciding how to use the information that was read; Pressley, 2002).

Problems can arise with regard to the application of strategies to process text. For example, students may not apply appropriate strategies in problem situations. They might not realize that they should actively monitor their comprehension and consequently do not go back to reread passages that are confusing, as proficient readers do. In addition, they may not know when to use a strategy they actually do possess (Gersten, Fuchs, Williams, & Baker, 2001). Poorer readers are unlikely to notice when their comprehension fails (Garner & Reis, 1981). Bos and Vaughn (1994) demonstrated that even when poor readers were able to decode words correctly, they typically did not attend to the meaning of the passage, relate what was being read to their previous knowledge, or monitor their own comprehension.

Linguistic threshold hypothesis. The role of metacognitive knowledge for L2 reading comprehension has been the target of a large amount of research over the past decade (Upton, 1997). Specifically, among readers with greater experience in reading, metacognitive strategies have been identified as an important source of variability in L2 reading because metacognitive strategies *transfer* (i.e., LIH) from L1 to L2. However, at

the center of this L1-L2 dynamic is readers' level of oral proficiency in L2, which can mediate the extent to which L1 reading ability, or metacognitive strategies, contribute to L2 reading performance. This notion is the foundation of the Linguistic Threshold Hypothesis (LTH; Clarke, 1979; Cziko, 1980). It is now widely acknowledged that reading comprehension is an activity that depends on oral language abilities (Hoover & Gough, 1990; Oakhill et al., 2003). Individuals with nonphonologically-based language problems may exhibit reading-comprehension problems (Menyuk et al., 1991; Scarborough, 2005).

Interest in the connection between L2 oral language skills and L2 reading grew with the publication of Alderson's (1984) review article, in which he stated that reading level is closely linked to the level of oral proficiency one has in L2. Around the same time, this same point of view was expressed by others: Reading develops on a par with one's linguistic competence, and reading is a result of the L2 acquired (Clarke, 1979; Cziko, 1980; Macnamara, 1970). Following this line of thinking, one of the main guiding assumptions that underlies investigations into L2 oral contributions to L2 reading ability is that in order to learn to read in L2, it is necessary to ensure adequate levels of oral proficiency in that language (Geva, 2000). Low levels of oral knowledge in L2 seem to impede one's reading ability in L2. A further tenet is that L2 reading problems are due to a lack of oral expertise with the L2. Poor knowledge of the target language inhibits comprehension of important information in text during reading, since poorer L2 readers spend most of their energy, for example, trying to make sense of unknown word meanings, and dealing with other demanding text features (Geva, 2000).

An early study that encapsulated the notion of the LIH and LTH was conducted by Brisbois (1995). She examined the contributions of L1 reading and L2 knowledge to L2

reading ability in a sample of native English-speaking learners of French in the U.S. Air Force Academy. Students in this study were required to complete a number of reading tasks, including (a) the Nelson-Denny Reading Test (a timed reading-comprehension test in English; Brown, Vick-Fishco, & Hanna, 1993), (b) a timed written recall activity, (c) a French grammar test, (d) a French vocabulary test, and (e) a French reading-comprehension test. A series of multiple regression analyses was performed. L2 vocabulary contributed more to L2 reading comprehension than did L2 grammar. In particular, for beginning readers of French, L2 vocabulary was the primary contributor, accounting for approximately 10% of variance in L2 reading. The contribution of L1 reading, although significant, was considerably lower (5.7%), suggesting that some native language skills transferred to influence L2 reading. Further analyses showed that L1 reading scores contributed nearly twice the variance for upper level L2 readers (20.5%) compared to beginning readers (11.1%), suggesting that, as L2 oral skills increase, the ability to use L1 skills to understand L2 text increases as well.

In another study, Taillefer (1996) also found that L1 reading contributed significant variance to L2 reading, though the extent of this relationship varied with the complexity of the L2 reading task. For example, the simple task of scanning a text in L2 involved only L1 scanning ability. L2 oral proficiency did not explain any further variance on such a simple task. On the more difficult task of reading a text in L2 to understand the author's message, L1 reading ability contributed much less variability, with L2 oral language proficiency accounting for three times more variance, presumably because of the greater amount of semantic involvement required by the comprehension task, compared to scanning.

In the following year, Garcia-Vazquez, Vazquez, Lopez, and Ward (1997) compared the reading scores of Hispanic middle- and high school students with measures of their proficiency in English (their L2) and Spanish (L1). They found that both predictor variables were statistically significant contributors to L2 reading, although oral language proficiency proved to be the key factor underlying L2 reading, suggesting that those students probably had not reached an adequate level of oral proficiency in L2 for their L1 skills to contribute significant variance.

Carrell (1989) conducted a study of ESL readers in the United States in which she examined readers' conceptualization of the reading process during a reading event. She used a questionnaire that she modified from prior research (Barnett, 1988) in order to gather readers' responses to 36 items related to their strategy use in reading comprehension. The items were divided into four general categories: (a) readers' confidence in their ability to read in that language, (b) what readers do when they do not understand something, (c) what aspects of text readers focus on to read effectively, and (d) what makes reading in that language difficult. There was a significant difference between strategies used by L2 readers according to L2 oral proficiency level. Specifically, low-proficiency readers reported more text-bound, local strategies than higher-proficiency readers, suggesting that L2 proficiency could affect readers' perceived use of strategies.

Similarly, Zhang (2001) reported a study of Chinese EFL readers' metacognitive knowledge of strategies in learning to read English as a foreign language (EFL) in China. The students' metacognitive strategy use was elicited by means of a semi-structured interview conducted in Chinese. A total of 12 distinct strategy categories were defined. Participants' metacognitive knowledge of which strategy they used during L2 reading

tasks varied across L2 proficiency level. High scorers generally showed greater awareness of strategy use, compared to the low scorers who did not realize or recognize that reading in L2 required them to use different strategies to acquire the best possible understanding of the text in L2. Zhang further discussed that the high L2 scorers were distinct from the low L2 scorers in their understanding of when and how they used these strategies. For example, the high L2 scorers reported elaborate reading strategies such as anticipating text contents (reported by 45% of high L2 scorers, compared to 15% of low scorers), skimming for main ideas (56% versus 32%), guessing meaning from context through inferences (55% versus 20%), and analyzing syntax or grammatical structures (34% versus 24%). One of the most important and useful strategies reported by the high scorers was comprehension monitoring (80% versus 20%). Of particular importance for the current discussion was Zhang's observation that the low scorers' L2 proficiency appeared to have "short-circuited" their use of efficient reading strategies for comprehension.

L2 oral language skills. Some have argued that the different domains comprising language (e.g., phonology, semantics, grammar) may influence the development of reading skills in a different manner and at different developmental periods (e.g., Vellutino, Scanlon, & Tanzman, 1994). Although the literature focusing on linguistic skills and reading comprehension is plentiful, several studies included only single measures of oral language (Wise, Sevcik, Morris, Lovett, & Wolf, 2007). Reading comprehension may involve different types of language skills, depending on the nature of the reading task. Without the inclusion of multiple measures of oral language skills, only a narrow range of L2 oral ability is assessed, making it difficult to draw firm conclusions about the range of oral language skills that play a role in reading comprehension within a

given reader group. Analyzing different types of language skills allows for deeper examination of the potentially unique relationships that may exist between different aspects of oral language skills and reading comprehension in L1 and L2. The following section provides a short discussion of three types of oral language skills that have been studied within the context of second language reading research, particularly as they relate to reading comprehension among experienced readers. Each of the language skills described has been found to play a unique role in reading comprehension performance.

L2 vocabulary knowledge. The close relation between vocabulary knowledge and reading comprehension in L2 is well recognized (Hinkel, 2006; Lesaux, Kieffer, Faller, & Kelley, 2010; Qian, 1999). Investigations into the relation between L2 vocabulary knowledge and L2 reading comprehension have revealed large individual variation in the vocabularies of L2 learners (e.g., Bernhardt & Kamil, 1995; Bossers, 1991; Carrell, 1991; Laufer, 1997; Taillefer, 1996). Estimates for beginning L2 learners vary from 2000 to 7000 words (Grabe, 1991). Low levels of vocabulary knowledge have consequences for students' reading comprehension in L2, such as poorer comprehension of grade-appropriate text (August, Carlo, Dressler, & Snow, 2005), difficulties using contextual constraints to narrow down lexical ambiguities (Verhoeven, 2000), and misinterpretation of the message conveyed in text (Parry, 1987).

For L2 groups, the influence of vocabulary on reading comprehension seems much greater than for L1 groups. This tendency has been observed in children as early as grade 1 (Verhoeven, 2000), and persists well into the high school years (Van Gelderen et al., 2004; Verhoeven, 1994). For example, a study by Schoonen et al. (2003) compared the reading results of grades 8 and 10 students who spoke Dutch (L1) and English (L2). They showed that, at grade 8, the role of vocabulary knowledge for reading differed

between L1 and L2 reading. In L2 reading, it played a major role, whereas its influence in L1 reading was more moderate. L2 vocabulary knowledge was an important predictor of L2 reading comprehension, although its importance weakened by grade 10, compared to grade 8. It appeared that metacognitive knowledge, involved in the application of reading strategies for comprehension, became important, because it explained additional variance in L2 reading comprehension beyond L2 vocabulary knowledge. In another study, Schoonen et al. (1998) studied a similar population and examined the contribution of L2 vocabulary to students' L2 reading comprehension in grades 6, 8, and 10. Vocabulary knowledge, as a predictor, appeared to contribute an important amount of variance in reading comprehension in all grades. However, comparisons between the role of vocabulary in grade 8 versus grade 10 revealed a decrease in the contribution of vocabulary to reading comprehension. In this sample, the influence of metacognitive reading strategies increased with age and the effect of vocabulary diminished, apparently due to the skilled level of L2 reading the 10th graders had attained.

L2 syntactic and grammatical knowledge. Syntax refers to the rules that govern the combination of morphemes (small units of meaning in a given language: words, parts of words, prefixes, and suffixes) in phrases and sentences (Solso, 1998). Syntax is the systematic way that words can be put together in a specific order to make meaningful phrases and sentences (Carroll, 1986). These language processes are associated with processes operating beyond the level of individual words during reading to understand connected text (Chaney, 1992; Snow, Barnes, Chandler, Goodman, & Hemphill, 1991; Tunmer, Herriman, & Nesdale, 1988; Whitehurst, 1996), for instance, to help readers understand the associations among the words. However, when the associations are ambiguous or unclear, or if the syntax is complex, students must have a good

understanding of syntax to work out how each word fits into the sentence structure and, ultimately, to comprehend the sentence. Therefore, students must learn the rules of formal syntax in order to become fluent readers.

Research into the relation between syntax and reading abilities in L2 has not been as extensive as the connection between vocabulary knowledge and reading ability (Waltzman & Cairns, 2000). Results from the studies that are available suggest that the role of syntactic abilities in L2 reading is largely variable. For example, Barnett (1988) investigated the relationships among semantic and syntactic abilities on reading comprehension in 124 French language students in university. The initial part of the study required participants to complete a multiple-choice "cloze" test. This test consisted of reading a text which contained a total of fifty word deletions (i.e., every fifth to ninth word). Three possible answers for each deletion were provided. The correct choice for half the blanks depended on knowledge of syntax. The other half required knowledge of vocabulary in the text. The second part of the study required participants to read an original version of the same story they had first seen. They were asked to write, in English, as much as they could remember of what they had read. Scores for analyses included syntactic-analysis scores and vocabulary-analysis scores from the cloze test, and recall scores from the protocols, which were scored by a prepositional analysis completed in English. Syntax and vocabulary scores were divided into three levels: high, medium, and low. Both syntactic and vocabulary-analysis skills were related to comprehension (recall of text). Further, an interaction between syntax and vocabulary scores was found to have a statistically significant effect on level of recall, indicating that recall or comprehension is better at greater knowledge levels of vocabulary and syntax. Barnett concluded that vocabulary and syntax are equally important for text comprehension, and

that reading comprehension increases according to levels of vocabulary *and* syntactic proficiency.

L2 listening comprehension. Listening is the most frequently used language skill in everyday life (Fang, 2008). It is now well recognized as a critical dimension of language learning (Gough & Tunmer, 1986; Hoover & Gough, 1990; Morley, 2001). In order to comprehend spoken messages, listeners integrate information from a range of sources, which may be grouped into two general categories of information. First is decoding, or bottom-up processing (Vandergrift, 2004), that deals with the processing of acoustic input into a language unit and involves phonology, syntax, semantics, and pragmatics of the language. Processing acoustic information involves, for example, segmenting the stream of sounds and recognizing word boundaries; recognizing language-related features such as intonation, as well as changes in pitch, tone, and speed of delivery (McDonough & Shaw, 2003). Although native-language listeners accommodate these processes quite automatically, requiring little conscious effort, they are aspects of listening comprehension that beginning second- language learners may lack the most (Chang & Read, 2007). Second-language learners need to consciously focus on details of what they hear, and given the limitations of working memory and the speed of speech, comprehension suffers (Vandergrift, 2004).

Second is the processing of meaning, or top-down processing (Vandergrift, 2004) which draws upon sources of nonlinguistic information (e.g., relevant knowledge of the topic, memory, and individual experience; identifying redundant material). This allows learners to integrate what they hear with what they know to build a meaningful interpretation (McDonough & Shaw, 1993; O'Malley & Chamot, 1990).

Traditionally, it was assumed that comprehension was a general construct that applied to both reading and listening (e.g., Anderson, 1985). For example, Danks and End (1987) stated that listening and reading were highly similar because they use the same knowledge base during comprehension. Both in listening and reading comprehension, learners need to decode the linguistic input rapidly and accurately and use background knowledge for interpretation. However, it is now recognized that listening encompasses a set of skills in its own right (Osada, 2004). Significant processing differences have been pointed out between listening and reading comprehension to support this view, including a difference of medium (sound versus print), the real-time nature of spoken language (a message must be understood as it is heard), and several types of linguistic differences such as shorter speech units, aspects of dialect, and slang (Buck, 2001).

The development of listening skills supports the growth of reading (Grabe & Stoller, 2002). Significant correlations have been reported between reading- and listening- comprehension abilities (e.g., De Jong & Van Der Leij, 2002; Shankweiler et al., 1999), and there is evidence to suggest that the relation between reading comprehension and listening comprehension becomes stronger as readers gain experience with connected text. Diakidoy, Styllianou, Krefillidou, and Papageorgiou (2004) conducted a cross-sectional study of a large sample of 612 Greek-speaking students who were enrolled in grades 2, 4, 6, and 8. The correlation between listening comprehension skills and reading comprehension was significant at all grades; however, the strength of the correlation coefficients increased with increasing grade levels, with a significantly lower correlation noted between the grade 2 readers and those in grades 4, 6, and 8.

The assessment of listening comprehension in a second language has received relatively little attention until recently. There has been an increased focus on L2 listening ability because of its perceived importance in language learning and acquisition (Long, 1989; Sadighi & Zare, 2006). Furthermore, the literature on L2 listening comprehension is now attracting more attention in L2 reading studies, not only for what it can reveal about language learners' general competency in a second language (Laija-Rodriguez, Ochoa, & Parker, 2006), but also to determine whether specific listening subskills can be pinpointed (e.g., Levine & Revers, 1988) and related specifically to reading comprehension ability (e.g., Song, 2008).

Several studies have offered evidence for a strong relation between L2 listening-comprehension ability and reading comprehension (e.g., Droop & Verhoeven, 2003; Geva, 1999; Verhoeven & van Leeuwe, 2008). There is evidence that younger and poorer readers have more problems with different aspects of listening comprehension, which may constrain the process of reading comprehension, including parsing sentences into components, drawing inferences, and identifying text structure both at local and global levels (Cain & Oakhill, 1998). L2 learners may lack sufficient understanding of linguistic cues that signal relationships among words, which can result in an impaired ability to exploit these cues to construct understanding as they read which leads to difficulties in reading comprehension (Verhoeven & Van Leeuwe, 2008).

Problems in the Research on L2 Reading Comprehension

The discussion thus far has described L2 reading comprehension ability within two complementary frameworks that are built upon the following components: L1-based reading skills (which in many cases are transferred to the L2 reading activity), and L2 oral language skills. This conceptualization has contributed to an understanding of several

different L2 groups' success or difficulty acquiring L2 reading. However, progress in L2 reading research within these complementary frameworks has been limited by two important methodological issues, which will be discussed in turn in the next section.

Focus on ESL learners. Of the substantial amount of L2 reading research currently available, a large proportion utilizes participants who are learning English as their second language (ESL). The focus that ESL learners have received in the L2 reading literature is understandable if one considers the population demographics of areas where most L2 research is conducted. For example, English second language users of Hispanic origin living in the United States constitute the largest ethnic minority group in that country, comprising 18% of the nation's elementary and high school students (U.S. Census Bureau, 2005). Furthermore, according to a recent report by the American National Assessment of Educational Progress, 72% of the fourth graders who come from non-English-speaking homes read below basic level (cf. Butler & Hakuta, 2006). This finding has added increased momentum to the effort to better understand the variables that make reading in English difficult for ESL students. As a result of significant enrolment shifts in American and British schools (Grabe, 1991) the 1980s was a decade in which much ESL reading research and pedagogy emerged. At this time, a primary goal of L2 reading theory and instruction was to better understand ESL students in order to move them in a direction that would better equip them with the literacy skills required for academic success (Brown & Haynes, 1985).

Lack of control over L1 background. A large proportion of L2 reading studies that have examined components related to reading comprehension, particularly reading strategies and metacognitive knowledge about reading, have recruited experienced readers enrolled in tertiary education (college or university; e.g., Carrell, 1991; Kern,

1989; Lee, 1986). A limitation of several of these studies is the absence of sampling control methods or criteria during the participant-recruitment process. Although reading ability in a given L2 is a variable that becomes a common feature among research participants, the groups are likely quite heterogeneous in terms of their L1 background. The potential effects of L1 variability are often left unmentioned in research reports (e.g., Leeser, 2007; Pulido, 2007). Yet, this has long been cited as an issue that should be addressed (Carrell, 1991; Brown & Haynes, 1985).

Contextual variables such as home language use and the nature of L2 exposure are related to personal experience, and can possibly influence reading comprehension performance in an L2 context (Singhal, 2001). Knowledge representations, or schemata, which originate from one's L1 language-learning history are another background variable that may influence L2 reading performance, and reading comprehension in particular. A schema is an abstract structure for the representation of knowledge in memory (Rumelhart, 1975; Schank, 1975). Schemata allow us to relate incoming information to already known information. They encompass a wide variety of knowledge, from very general information about one's world, environment, and background (content schema) to more specialized knowledge representation (formal schema), that deal with knowledge of different text types and language structures. Schemata serve as a cognitive organizer of knowledge and information. Schooling and culture play the largest role in providing one with a knowledge base of formal schemata (Singhal, 1998). Since formal reading instruction occurs in a specific learning context, the strategies and skills acquired from one's language experience in L1 may serve as a schema and influence readers' overall conceptualization of how the reading process actually works and what strategies should be applied in mastering it. This being said, there is the possibility that transfer or

interference of reading comprehension skills and strategies may occur as a function of the pattern of similarities and differences between how the two languages are taught (Brown & Haynes, 1985).

The Present Study

Strengths and Original Contributions of the Present Study

Increasing sample homogeneity. Numerous authors have claimed that advances in our understanding of the processes that underlie reading comprehension among bilinguals can be made by exploring skills involved in reading among clearly defined bilingual groups (Koda, 2005). The present research addressed this claim by creating a set of criteria that helped recruit a homogeneous sample of participants: (a) they spoke English as their mother tongue and French as their second language; (b) they were schooled in an English public high school and attended French in second language classes; (c) they attended a public English elementary school (i.e., no history of having attended a French Immersion program or French school); (d) participants did not have any known learning disabilities or language impairments. Studying a specifically-defined subgroup of bilingual readers enabled a focused discussion about the potential effects of oral language and metacognitive variables on reading comprehension. It further led to consideration of how contextual components may influence reading comprehension; this latter point was not possible in many past studies, because they focused on more heterogeneous bilingual groups.

Exploring the language-learning context surrounding participants' formal learning experience. Becoming proficient in a second language is a skill that youth the world over need to acquire. Educators recognize its importance and are faced with the task of preparing students to meet this challenge. Becoming skilled in a second language,

however, has different implications for different individuals or groups of language learners; that is, the language competencies that students acquire may vary depending on why they need to acquire them. The target population of the current research, anglophone students learning French as their second language, represents a significant learner group in Quebec that forms part of the mosaic of bilinguals in Canada. For these students, the objective of learning French is to develop oral, reading, and writing skills in this second language, competencies that they need to acquire to be functionally independent in a primarily francophone society.

The objectives set by the Ministère de l'Éducation, du Loisir et du Sport (MELS) L1 and L2 for language arts curricula are discussed in a later section of this thesis. The main differences between these curricula with regard to the objectives of language learning as well as the approaches taken to teach language in school are then compared. Highlighting these aspects of the curricula helped put into perspective plausible links between oral language abilities, metacognitive reading skills and strategies, and reading comprehension performance in English and French. Overlooking similarities and differences in L1 and L2 language teaching may result in omitting relevant information that has key interpretive value in relating potential influences from oral language skills or metacognitive reading strategies and reading performance within each language. For this reason, the present study represents a further contribution to the field of L2 reading research. Prior research has shown that different language learning experiences may subsequently influence how written language is processed (e.g., Geva, 2006; Singhal, 1998; Yang, 2010). However, many of these investigations did not provide details about participants' educational L1 background due to a wide range of L1 differences, thus

making it difficult to control for specific experiential contributors such as how language in L1 was taught, and rendering the task of comparing and contrasting L1 and L2 reading strategies less feasible.

With bilingualism becoming a societal norm around the world, the field of L2 reading research will likely continue to focus on bilingual groups that characterize the unique language mixtures of different communities. Consequently, this may lead to further inquiries into relationships between bilingualism and reading ability that are specific to a particular language-learning context. Such a trend is foreseeable, as bilingualism will likely continue to be a defining characteristic of students in our nation as well as in other countries.

Exploring "reverse" relationships of L2 oral language and metacognitive knowledge and strategies in L2 with reading comprehension in L1. The transfer notion has traditionally been understood to mean the effects of L1 on the acquisition and use of L2 (Gass & Selinker, 1992). Within the L2 literature, in general, the idea of transfer is usually discussed in reference to metacognitive skills. Although oral skills involved in reading comprehension have not been a focus of transfer in the L2 reading research, Singhal (1998) suggested that students' prior experiences with language, particularly as they occur within a formal educational context, might be potential factors that underlie this occurrence. The present study addresses this gap in the literature and looks at transfer of L1 oral skills to L2 reading comprehension, as well as whether L2 oral skills relate to L1 reading comprehension.

Implications for instruction. A long-standing recommendation in the literature on second language reading is to clearly define groups for study (Bernhardt, 2010; Koda, 1994; 2005). Investigations are following suit and are becoming more focused in their

sampling procedures, and they are more explicit in their descriptions of participants' learning background, for example whether the readers featured in the study are learning a particular language curriculum, or whether they are students from a particular region who represent a specific bilingual group. This has translated into more valid and relevant conclusions and recommendations for practice. The present study makes a contribution to the field of L2 reading as its focus is on a specific bilingual group in Quebec for which no known research has examined reading from the L2 theoretical frameworks as outlined in this thesis. Furthermore, the practical implications drawn from the results may serve as a platform to facilitate dialogue with educators who are involved in teaching the demographic represented in this study, and who are searching for ways to improve students' reading performance. There is a clear desire expressed in research and educational circles to improve students' reading performance, with a particular emphasis upon youth beyond the primary grades (Birr-Moje, Peyton-Young, Readence, & Moore, 2000; Birr-Moje, 2002). This topic is especially relevant within the educational community in Quebec (MELS, 2011). The present research is of particular value to educational circles for the practical recommendations it bears for instruction.

Summary of the Present Investigation and Research Questions

This research will explore the components that underlie L2 reading comprehension, as described within two popular L2 reading frameworks: the Linguistic Interdependence Hypothesis (LIH; Cummins, 1979, 1981) and Linguistic Threshold Hypothesis (LTH; Cummins & Swain, 1986). The target population for this study is a bilingual group that is non-ESL, and for whom L1 is generally representative of a homogeneous population: anglophone students in the province of Quebec. In several communities across Quebec, children are raised to first speak English as a mother tongue

and may develop some mastery of oral French from a parent or through participating in community activities in French. These children attend English school, where they learn French as a second language, which is the majority language of the province. Extensive Canadian research has been conducted on the bilingual development and academic achievement of majority (i.e., English) language students in bilingual education, particularly French Immersion programs (see studies cited in Genesee, 2004). However, another Canadian L2 language group that merits research attention consists of anglophone students from Quebec who attend regular English schools and speak French as their L2. This student community is significant, if only because of its size in Quebec. For example, according to statistics supplied by MELS (2008), of the 1.1 million preschool, primary- and secondary-aged students who were enrolled in Quebec schools during the 2004-2005 school year, approximately 123 000 were enrolled in English education, with 75 000 categorized as speaking English as their L1 (MELS, 2008).

The current research also affords an opportunity to address the issue of improving L2 reading comprehension performance among Canadian high school students, a goal that was proposed by the federal government's Official Languages Support Program Branch (OLSPB, 2004) of the Department of Canadian Heritage. The current study can help contribute to the attainment of this objective by examining the important variables known to underlie L2 reading comprehension performance among Quebec anglophone students learning French as their second language. In order to recognize possible barriers to developing skilled comprehension (Bernhardt, 1991), variables that contribute to success in L2 reading need to be identified.

The present study intends to investigate five main questions regarding the relationships between oral language, metacognitive knowledge and strategies, and reading comprehension in English and French.

Question 1: What oral language skills contribute to reading comprehension in English (L1) and French (L2)? To follow several authors who have recommended inclusion of a range of measures to assess different types of oral language skills in order to gain insight into the most salient language skills that underlie reading comprehension, the present investigation included four measures of oral language in English and French: vocabulary, listening comprehension, syntactic knowledge, and grammar skills.

Question 2: How do metacognitive knowledge and strategies for reading comprehension compare and contrast in English and French? Metacognitive knowledge and strategies related to reading reveal how readers may manage their interaction with written text (Singhal, 1998, 2001). Although numerous studies have described readers' metacognitive strategies in L2, knowledge about how these L2 strategies compare to those in readers' L1 is still quite limited. The present investigation responded to this gap in the literature by comparing readers' strategies in their mother tongue and second language.

Question 3: What metacognitive knowledge and reading strategies contribute to reading comprehension in English and French? Both within- and between-language analyses were conducted to determine whether metacognitive components contributed to reading within participants' mother tongue and second language. Although the between-language analysis is a replication of what previous studies have done with regard to L1 to L2 influences, a novel aspect of the analysis is in its verification for whether reverse transfer of metacognitive skills can be observed from the L2 to the L1.

Question 4: What is the relative influence of oral language and metacognitive knowledge and reading strategies on reading comprehension in English and French? The final section of statistical analyses consisted of placing both oral language and metacognitive factors in the same regression to compare their relative contribution to reading comprehension scores. This represents a contribution to the literature in the sense that the influence of L1 and L2 oral and metacognitive factors were investigated for L2 reading comprehension as well as L1 reading comprehension; reading in the mother tongue has typically not been a point of interest in previous studies.

Question 5: Which theoretical framework (Linguistic Interdependence Hypothesis; Linguistic Threshold Hypothesis) is better supported by the results from this study? A large proportion of L2 reading research focused on cognitive processes involved in reading comprehension: Lower-level, bottom-up processes (e.g., word reading; vocabulary knowledge) and higher-level, top-down processes (e.g., activating background knowledge; applying reading strategies). In many cases the main points of discussion centered on relations between variables and how they contributed to reading performance, without explicitly stating how results advanced L2 reading theory. An original contribution of this research is that the Linguistic Interdependence Hypothesis and the Linguistic Threshold Hypothesis were compared in light of the results from this study, and implications were drawn for framing testable hypotheses for future research.

CHAPTER 3

Method

Description of Participants

A total of 53 participants were recruited for this study. Based on their responses to a background questionnaire (to be further described in a later section of this chapter), 10 students responded that they had attended French school or a French Immersion program. Specifically, three students indicated they had attended only Kindergarten in French, and two students indicated they had attended one grade level in French at the elementary level (i.e., grade 1 and grade 4). All other grades were completed in an English school. These five students were kept in the final sample because they had completed only one year of French school at the elementary school level and this early experience likely did not have a significant influence on their reading comprehension performance in high school. Furthermore, it was important to maintain as many students in the sample as possible since the sample size was small to begin with. Therefore, although the final sample was not completely homogeneous, it was deemed critical to include the five students with minimal exposure to education in French in an effort to preserve as much data as possible. The remaining five students were not maintained in the final sample because they attended a French school for more than one year (i.e., varying between three and seven years). The likelihood was much greater for these five students that reading comprehension strategies had developed and that they were exposed to many more opportunities for practice with reading comprehension strategies.

The final sample consisted of 48 participants. Thirty-seven were recruited from the first high school visited, and 11 were recruited from the second location. Participants were adolescents aged between 15 and 18 years, enrolled in grade 10. Within this group,

20 were male and 28 were female. Participants were recruited from two public high schools located in the eastern region of the province of Quebec. All participants spoke English as their mother tongue and French as their second language, with the exception of one student who reported learning both French and Chinese as second languages. All participants were enrolled in an anglophone school, received one daily period (50 minutes) of language arts instruction in French as a second language, had completed all of their high school education in English, and did not have any diagnosed learning disabilities. Thirty-six participants (75% of the sample) reported that they were born and raised in Quebec. The remainder of the sample reported having been born in one of several other Canadian provinces.

French as a second language instruction in Quebec. The FSL program at the secondary level builds upon the skills that students leave with at the elementary level after having gone through the FSL curriculum from grades 1 through 6. The FSL program aims to develop students' skills in reading, writing, listening and speaking according to three global competencies (MELS, 2004).

The first competency is a central element of the FSL curriculum: the ability to interact and react in French. Students develop this capacity in their classroom through discussions, debates, and improvisations about projects and express their ideas and appreciation for texts they are exposed to throughout the year.

The second competency consists of the ability to read a variety of texts in French. This capacity involves exploring and comprehending written material. It draws upon the first skill set (interact spontaneously in French) because it requires students to discuss texts with their peers as well as participate in different projects concerning written material. As a result, students are expected to develop their vocabulary in, develop a

deeper sense and appreciation for French culture and society, and acquire general knowledge.

The third competency consists of production of a variety of texts in French. The purpose of this aspect of the FSL curriculum is to help students develop their abilities to express ideas in a reflective and structured manner, in writing as well as in speaking. This ability emerges as students produce texts of differing levels of complexity.

The FSL curriculum is set out to help students function effectively, in French, within all spheres of life in school. Furthermore, it aims to bring students to a level of functioning in French that will allow them to transfer their skills beyond their scholastic experience, to participate actively in Quebec society either in their personal lives, in social situations or for employment. Activities are designed to be authentic; that is, while students acquire language skills in French, they also develop an appreciation of French culture through independent and collaborative projects and assignments (MELS, 2004).

Measures

Participants completed a mixture of standardized and informal measures in English and French, which were either group administered or completed individually. The breakdown of measures included: (a) nonverbal intelligence subtest, (b) background questionnaire, (c) metacognitive knowledge and reading strategies questionnaire, (d) oral language tests administered in English and French, and (e) reading comprehension tests administered in English and French. Finally, a measure of single word reading, in English and French, was included in the assessment battery. All measures were administered by the investigator who conducted this research, who is fluently bilingual in English and French. A detailed description of each measure is provided in the following sections.

The standardized tests used in this study, described in detail below, included the Matrix Reasoning subtest from the WASI to provide an estimate of nonverbal intelligence. Oral language measures of vocabulary (CAT; TRF), listening comprehension (GORT-4) and grammar (CELF-3; TRF) were administered and used as independent measures. Single word reading was measured in English and French (WIAT-II; WIAT-II CDN;F). A reading comprehension test (NDRT), consisting of two different versions, was administered in both English and French. The NDRT was used as a dependent measure. Two non-standardized measures were administered. A questionnaire designed to assess metacognitive knowledge and strategies related to reading in English and French was used as an independent measure and a questionnaire was developed to gather demographic and background data.

Screening measures.

Wechsler Abbreviated Scales of Intelligence (WASI): Matrix Reasoning Subtest. The WASI (Psychological Corporation, 1999) is a short measure of intellectual potential for individuals aged 6 to 89 years, designed to estimate verbal, nonverbal, and general cognitive functioning. Although the WASI does not provide a comprehensive cognitive assessment, it is considered adequate to use for cognitive screening (Psychological Corporation, 1999). For the purpose of the current research, the Matrix Reasoning subtest from the WASI was administered to obtain a measure of nonverbal intellectual ability to verify that participants fell within the average range. Matrix-analogy tasks have been recognized as good measures of fluid reasoning (Sternberg, 1995) and reliable estimates of general intellectual ability (Brody, 1992; Raven, Raven, & Court, 1991). The Matrix Reasoning subtest from the WASI consists of a series of 35 incomplete patterns that an individual completes by selecting the correct response from five possible options. This

subtest was administered following the standardized procedure in the WASI manual (Psychological Corporation, 1999).

Reliability coefficients for the Matrix Reasoning task of the WASI were calculated with Fisher's *z* transformation procedure. Coefficients ranged from .86 to .96 for the children's sample (i.e., ages 6 to 16) and from .88 to .96 for the adult sample (i.e., ages 17 to 89). Stability scores of the WASI were assessed with a test-retest method. Participants were tested twice within an interval ranging from two to 12 weeks. Test-retest stability coefficients showed adequate stability across time. For the children's sample, stability coefficients for the Matrix Reasoning task ranged from .76 to .77; for the adult sample, stability coefficients ranged from .72 to .85. The convergent validity and discriminant validity of the WASI is based on the intercorrelations of the WASI subtests. Correlations between the WASI subtests range from the .50s to the .70s for both the children and adult samples. This pattern of subtest intercorrelations supports the notion of a g factor, and provides evidence of convergent and discriminant validity for the subtests (Campbell & Fiske, 1959, cited in Psychological Corporation, 1999).

Background questionnaire. A questionnaire was developed in order to gather participants' basic information about demographics, as well as exposure to and use of the English and French languages (Appendix A). This questionnaire was completed in English.

Independent measures.

Metacognitive knowledge and reading strategies questionnaire. There is no single appropriate questionnaire to use with a given adolescent sample (Pressley & Hilden, 2006). At the time this study was conducted, there was no normed questionnaire tapping metacognitive knowledge and strategies for the targeted population of students in

this study. Therefore in selecting a questionnaire to assess metacognitive knowledge and strategies for the purpose of the current study, two points were taken into account. First was a consideration of the over-arching paradigm in which this study was set. It was deemed appropriate to select a measure that would yield data interpretable within a component or process approach to reading comprehension, wherein reading comprehension consists of skills in word reading and oral language, as well as metacognitive variables. Second, it was important to select a measure containing items that provided a good fit with reading strategies that high school students use during leisure reading or typical reading tasks encountered on a daily basis.

The questionnaire that best tapped strategies spontaneously used by high school students was the metacognitive knowledge and awareness questionnaire designed by Carrell (1989; Appendix B), who redesigned Barnett's (1988) instrument. The decision was made to use Carrell's questionnaire for a number of reasons. First, it was used successfully in three prior investigations of elementary, high school, and college students reading in L2 (Carrell, 1989; Hassan, 2003; Monteiro, 1992). Second, the questionnaire is designed to reflect two important dimensions of the relation between metacognitive ability and effective reading comprehension: *knowledge* of one's cognition and *regulation* of one's cognition (Flavell, 1979). The items elicit responses dealing with these two aspects of metacognition, with response choices reflecting knowledge and regulatory reading behavior of both good and weak readers (i.e., elaborate knowledge and intricate reading strategy use reflect skilled readers, whereas lower-level reading skills correspond to the ineffective metacognitive knowledge and strategies of weaker readers).

This questionnaire consists of 36 items divided into four main sections. The first section contains six statements designed to assess participants' *confidence as readers*

regarding their perceived ability to read in the language. The second section contains five statements designed to assess readers' *repair strategies used when comprehension fails*. The third section consists of 17 statements designed to assess readers' *perception of efficient reading strategies*. The final section of the questionnaire consists of eight statements designed to assess readers' *perception of what makes reading difficult*. All of these strategies had been suggested in the literature as reading strategies related to comprehension performance (Baker & Brown, 1984; Barnett, 1988; Block, 1986; Brown, 1980; Devine, 1984; Hosenfeld, 1977). Responses to each item were made according to a five-point Likert scale (1 = strongly agree; 5 = strongly disagree). Each participant completed two versions of this questionnaire, both of which were administered in English, one to assess readers' conceptualization of reading in English (L1), and a second time to assess their conceptualization of reading in French (L2) (Appendix C).

Carrell's questionnaire imposes a methodological limitation to this study because it assesses metacognitive reading strategies from a more traditional perspective (e.g., recognizing text structure, inferring, monitoring comprehension). Strategies appearing in more recent research than Carrell's study (see studies cited in Grabe, 2004) are not represented in the questionnaire. Nevertheless, for the purpose of the current study, the constructs in Carrell's questionnaire are relevant because they tap into common reading problems experienced by adolescents. It was deemed an appropriate tool that would allow participants to evaluate their abilities and weaknesses as they relate to reading comprehension. This will help to make informed decisions on which interventions may be effective in helping them become more successful in their reading.

Vocabulary knowledge. English vocabulary knowledge was assessed with the Canadian Achievement Test–Third Edition (CAT-3; Canadian Test Centre, 2001). The

CAT-3 is an achievement test normed on Canadian students, the content of which is designed to reflect Canadian society and values, and the cultural, ethnic, geographical, and occupational diversity of Canadian society. The Vocabulary subtest of the CAT-3 was used as a measure of English receptive vocabulary knowledge. This subtest consists of 24 multiple-choice questions, subdivided into sections to assess participants' knowledge of antonyms, synonyms, and short paragraph comprehension. It was administered as described in the manual. Correct responses were tallied and the total raw score was used for analysis.

French receptive vocabulary was assessed with the Vocabulary subtest from the *Test de rendement pour francophones* (TRF; Pearson Canada Assessment, 2004). The TRF is a battery of tests that measures academic achievement, in French, in the core subjects for students enrolled in a regular academic program. It was developed to be analogous to the CAT and the Canadian Adult Achievement Test (Psychological Corporation, 1991) in terms of its structure and objectives. Published norms are available for French speakers in Quebec, as well as for French speakers residing outside the province of Quebec. The TRF can be administered to students as early as in grade 1, up to the end of high school (grade 12). Depending on the grade level in which an examinee is enrolled, one of the three levels (A, B, or C) is administered. Level C was administered to the students in this research, because it is designed to assess students who have an equivalent of nine years of education or more (i.e., for students in grade 8 and onwards). The TRF Vocabulary subtest is a 30-item, multiple-choice test designed to evaluate the knowledge and comprehension of words from the French language in general. For each item, the student is asked to select, from three response options, the definition for a word or expression, or to complete a sentence that describes a word. It was administered

according to the procedures described in the manual. Correct responses were tallied to derive a raw score, which was used for analysis.

Grammar and syntax knowledge. Subtests were selected from The Clinical Evaluation of Language Fundamentals–Third Edition (CELF-3; Psychological Corporation, 1995). The CELF-3 is an individually-administered clinical tool for the identification, diagnosis, and follow-up evaluation of language skill deficits in school-age children, adolescents, and young adults. The CELF-3 is designed for use with individuals between the ages of 6 years 0 months to 21 years 11 months. This test taps into the following language skills and use: word meanings (semantics), word and sentence structure (morphology and syntax), and the recall and retrieval of spoken language (memory). Administration is streamlined with specific age start-points. Performance-based discontinue rules are imposed. Raw scores are converted into subtest standard scores (with a mean of 10 and standard deviation of 3; based on participants' ages), percentiles, and age-equivalent scores. Subtest intercorrelations are moderate within an acceptable range, ranging from .25 to .63. Construct validity was evaluated by determining the extent to which scores on the CELF-3 correctly identified children and adolescents as having a language disorder. A discriminant analysis, using groups of children with and without language disorders who were matched for age, parent education level, ethnicity, and gender, revealed CELF-3 correctly identified children as having a language disorder 71.3% of the time. With regard to reliability estimates, studies of inter-rater reliability were conducted on subtests that required some degree of subjectivity for scoring. Specifically, the Formulated Sentences and Word Associations subtests require clinical judgment to score a respondent's answers. Two different raters independently scored the CELF-3 subtests. The scores were then compared, and whenever necessary,

differences were resolved by a third, independent rater. A very high degree of inter-rater agreement was reported: .95 for Formulated Sentences and .99 for Word Associations. A description of the subtests selected for this study is given below.

Concepts and Directions. This subtest was selected as a measure of syntactic knowledge. It taps into the ability to interpret, recall, and execute oral commands of increasing length and complexity that contain concepts requiring logical operations. Stimuli consist of small and large black and white circles, squares, and triangles presented on an easel. Color discrimination is not required for this subtest. For each item, participants are required to point to one or a group of shapes in response to a command given by the investigator. Item analysis includes orientation, command level of complexity, and linguistic concept categories. A discontinue rule of five consecutive 0 scores is set (i.e., errors or no response). This subtest was administered individually, in English and French. The English instructions were translated into French by a professional translator (Appendix D). It was administered by the researcher conducting this study following the standardized procedure described in the CELF-3 manual (Psychological Corporation, 1995).

Formulated Sentences. This subtest was selected as a measure of grammatical ability in English. It assesses the formulation of simple, compound, and complex sentences. Participants are shown an illustration of an event (e.g., family members engaged in different types of leisure activities in a living room), and the investigator says a word that participants are required to incorporate into a sentence that describes some aspect of what is going on in the picture. Responses must include reference to the visual stimuli to receive points. A discontinue rule of five consecutive 0 scores (errors or no response) is imposed. Scoring follows a 2-, 1-, and 0-point system outlined in the test

manual. It was administered following the standardized procedure described in the CELF-3 manual (Psychological Corporation, 1995).

Test de rendement pour francophones–Grammaire. This subtest was selected as the French equivalent of the Formulated Sentences measure (CELF-3). It was administered to acquire a measure of participants' grammatical knowledge of French. It is a paper-and-pencil task that consists of a subgroup of 28 items taken from the "Maîtrise de la langue" subtest, a larger, more global language test on the Test de rendement pour francophones (TRF; Harcourt Brace & Company Canada, 1990) designed to evaluate several different aspects of language abilities. This task was selected on the basis of its content and structure, which were deemed to both represent the aspects of French as a second language that have been taught to the sample of participants in this study, as well as the format in which language evaluation takes place. The 28 items selected to assess participants' grammar knowledge in French use a fill-in-the-blank, multiple-choice format designed to tap into one's ability to conjugate verbs into appropriate tenses, understand homonyms, and comprehend sentence structure. It was administered using the procedure described in the manual (Harcourt Brace & Company Canada, 1990). Correct responses were tabulated and raw scores were used for analysis.

Listening comprehension. At the time this study was conducted, there were no known published tests designed to assess listening comprehension in English or French for the targeted grade level of the students in this research. Therefore, it was necessary to create a measure with two complementary versions: one for each target language.

Grey Oral Reading Tests–Fourth Edition (GORT-4). The texts from the Grey Oral Reading Tests – Fourth Edition (GORT-4; ProEd, 2001) were selected for use in measuring listening comprehension. The GORT-4 consists of a norm-referenced test of

oral reading rate, accuracy, fluency and comprehension. It is designed for individuals from 6 to 18 years of age. It has two parallel forms, Form A and Form B, each containing 14 separate stories. Five multiple-choice comprehension questions follow each story.

Reliability coefficients were obtained for the five types of scores which comprise the GORT-4: Reading Rate, Accuracy, Fluency, Comprehension, and the Oral Reading Quotient. The GORT-4 has a high degree of reliability in terms of content sampling, test-retest reliability and scorer differences, with coefficients reported as varying from .78 to .99 across these three categories of error (Wiederholt & Bryant, 2001). Both forms of the GORT-4 are considered to be equivalent versions, correlating .85 or better with each other.

The GORT-4 passages were selected to assess listening comprehension ability in each language due to the passages' brevity, increasing difficulty, availability in two equivalent forms, and simplicity in response format (i.e., multiple-choice), hence facilitating group administration. Passages 7 to 11 from Forms A and B were used to assess listening comprehension in English and French (Appendix E) respectively. This particular series of passages imposed a reasonable difficulty level in terms of ease of listening, especially for the French passages. It was assumed that participants were somewhat less proficient orally in French as their L2, and care had to be taken to avoid the possibility of a floor effect on this particular oral language variable. The selected set of passages and their corresponding multiple-choice comprehension questions, from both forms of the GORT-4, were recorded on tape. The researcher conducting this investigation recorded all passages and their corresponding comprehension questions. Passages and corresponding comprehension questions were read at a rate of 150 words per minute. This is the rate at which people can comfortably hear words that are spoken

(Carver, 1982). The passages and comprehension questions for the French part of this assessment were translated by the same professional translator who provided the French instructions for the Concepts and Directions task. The tape was played on a Sony CFD-G700CP "boom box" radio.

Single word reading. Single word reading was assessed in English and French. The word reading subtest from the Wechsler Individual Achievement Test–Second Edition (WIAT-II; Psychological Corporation, 2003) and its French equivalent, the *Test de rendement individuel de Wechsler–deuxième édition* (WIAT-II CDN-F; Psychological Corporation, 2005) was administered to assess single-word reading ability in English and French, respectively. The English and French versions of the WIAT-II are individually administered tools designed to assess academic achievement in the domains of reading, mathematics, written language and oral language among students from an elementary to end of high school level (WIAT-II CDN;F) and a post-secondary level (WIAT-II). Administration is streamlined with grade-level start points. Performance-based discontinue rules are imposed. Raw scores are converted into subtest standard scores (with a mean of 100 and standard deviation of 15), percentiles, as well as grade- and age-equivalent scores.

Inter-item reliability coefficients were calculated for individuals from ages 6 to 29 at two testing periods: fall and spring. These statistics were obtained with the use of a split-half method, whereby equivalent halves of each subtest, representing parallel forms with approximately equal variances, were selected. The scores on these half-tests were then intercorrelated, followed by a correction method (Spearman-Bowman formula – see p. 22 of Technical Manual). The split-half reliability coefficients for the subtest standard scores, covering ages 5 to19 for the English test and ages 6 to 29 for the French test, are

reported in their respective manuals. Overall, both the English and French versions of the WIAT-II display strong reliability across all measures; specifically, reliability coefficients for the Word Reading tests are reported as .82 to .99 for both languages.

The Word Reading subtest from the WIAT-II and WIAT-II CDN-F is administered on a one-to-one basis. The student is required to read, out loud, single words presented in columns on a word card. The words appear in order of increasing difficulty.

Dependent measure.

Nelson-Denny Reading Test (NDRT). Reading comprehension was assessed in L1 and L2 with the NDRT (Brown, Vick-Fishco, & Hanna, 1993a). The NDRT has two forms, G and H, and is designed to provide a measure of ability in three areas of academic achievement: reading comprehension, vocabulary knowledge, and reading rate. This test is intended for students in grades 9 through 12 at the high school level, and grades 13 to 16 at the two-year college and four-year college-university level.

The format of the NDRT consists of seven reading passages followed by a series of comprehension questions. Approximately half the comprehension items are literal questions regarding explicit details in the text. The other half of the comprehension items involve interpretation–inferencing or deducing answers, drawing conclusions, understanding main ideas or purpose, and making judgments. Discrimination indices (point-biserial correlations) were computed for all items by grade. This statistic examines the difference between the proportion of high-scoring students who correctly answer an item and the proportion of low-scoring students who get the item correct. The value of the discrimination index ranges from -1.00 to +1.00. Items with good discrimination power generally range from .30 to .70. A positive statistic means that more high-scoring

students correctly answered a given item compared to low-scoring students. In light of the wide range of reading abilities that the NDRT covers, the biserial statistics vary considerably. However, the statistics for the Comprehension subtest generally fall within an acceptable range of discrimination, from .22 to .72 for Form G and between .18 to .70 for Form H.

The relative difficulty and discriminating power of the NDRT items were further investigated to ascertain the widest possible range of scores. The final sample of test questions included some very easy items (so that 80 percent or more of students answer them correctly), some very difficult items (to discriminate among the most able students), with the majority of the items being of medium difficulty and discriminating well at all levels of ability. With regard to the Comprehension subtest, the distribution of item difficulty for each grade level is reported in terms of the proportion of correct responses obtained by students scoring at the 10th and 90th percentiles. For Form G, the proportion of correct responses at the 10th percentile varies from .16 (grade 9) to .59 (grade 16); at the 90th percentile, the statistic varies from .75 (grade 9) to .95 (grade 16). For Form H, the proportion of correct responses for students at the 10th percentile ranges from .19 (grade 9) to .60 (grade 16), and for those achieving at the 90th percentile, the proportion of correct items varies from .80 (grade 9) to .96 (grade 16).

According to readability checks, Forms G and H are balanced in terms of difficulty. The passages from both forms range across the reading levels of individuals projected to take the NDRT, with the average readability level placing at the upper high school level.

Form H was used for assessing reading comprehension in English, and Form G was used to assess reading comprehension in French. The French version of the NDRT is

not normed, and was translated from the English version by a group of researchers in the Department of Psychology at l'Université de Montréal, native speakers of French, who use this translation for internal research projects conducted by their research lab (Hébert, personal communication, November 2007; Appendix F). In translating the French version of the NDRT Comprehension subtest, attention was given to using familiar proper names and cities in an effort to provide readers with familiarity in terms of context and background information for comprehension. The Comprehension section of the NDRT contains seven reading passages and a total of 38 questions, each with five answer choices. Under standard administration, the time limit for this section is 20 minutes. Norms are available for both Forms G and H for extended-time administration (i.e., an additional 12 minutes), for a total of 32 minutes administration time. Scores are available for the fall and spring months. Raw scores for the Comprehension, Vocabulary, and Reading Rate measures can be converted into percentile rank, stanine, normal curve-equivalent, scale, and grade-equivalent scores. In light of the fact that raw scores could not be converted into standard scores for the French NDRT due to unavailability of French norms, raw scores from both the English and French measures were used for data analysis. Participants were allowed 20 minutes to complete each version of the NDRT.

Table 1 provides a summary of the questionnaires and tests that were administered for this study, and categorizes each according to whether they were completed individually or in a group.

Table 1

Individual and Group Tests by Language of Administration

	Individual Administration	Group Administration
English	WASI Matrix Reasoning CELF-3 Concepts and Directions CELF-3 Formulated Sentences WIAT-II Word Reading	Metacognitive Questionnaire–English reading Metacognitive Questionnaire–French reading Background Questionnaire CAT Vocabulary GORT-4 Listening Comprehension NDRT Reading Comprehension
French	CELF-3 Concepts and Directions WIAT-II Word Reading	TRF Vocabulary TRF Grammaire GORT-4 Listening Comprehension NDRT Reading Comprehension

Procedure

An initial telephone call to the Educational Services department at two school boards was made in order to describe the nature and purpose of the research (Appendix G). Following approval at the school-board level, the investigator followed up with a telephone call to the principals of several high schools within the two school boards to determine their interest in participation. After receiving approval from the principals, potential research candidates were recruited with a letter distributed by the homeroom teachers (Appendix H), which described the nature and purpose of the study, the types of activities they would be required to complete, the time requirements, and monetary compensation ($20) they would receive for participating in the study. Students were required to bring back to school a signed parental consent form (Appendix I) before participating in the research. The principals at both schools collected the consent forms, which were passed on to the investigator upon her arrival on the first day of testing. Student consent forms (Appendix J) were completed at the beginning of the first test

session. Prior to testing, the investigator reviewed the list of research participants with the principal and asked that students with a diagnosed learning disability be identified. No students that had signed up for the research had a known learning disability.

Participants were seen for group test administration on four different occasions for a period of 30 minutes to 1 hour each, and on two other occasions each for 20 minutes of individual testing. These sessions took place throughout the school day, in the school library. Whenever possible, in the event that a student was absent for a test session, he or she was seen individually on a later occasion. Each participant was assigned a file folder that was identified with his or her name and an ID number. The file folders were organized prior to the beginning of data collection so that they each contained the questionnaires, test protocols, student response sheets and answer booklets. With regard to the group test administration, the procedure consisted of having students read and sign the Participant Consent Form, followed by completion of the Student Background Questionnaire at the start of Group Session 1. This was followed by the NDRT and metacognitive questionnaires. In order to control for possible order effects between the reading comprehension tests and metacognitive questionnaires, a simple randomization procedure was imposed for the L1 and L2 reading comprehension tests and L1 and L2 metacognitive questionnaires across the four group sessions. Therefore, students completed the NDRT and metacognitive questionnaires (along with the other group-administered tests) according to one of four schedules. Table 2 outlines the four schedules.

Table 2

Schedules for Group-Administered Tests

	Schedule 1	**Schedule 2**	**Schedule 3**	**Schedule 4**
Group Session 1	English Nelson Denny Reading Test	English Metacognitive Questionnaire	French Nelson Denny Reading Test	French Metacognitive Questionnaire
Group Session 2	English Metacognitive Questionnaire	English Nelson Denny Reading Test	French Metacognitive Questionnaire	French Nelson Denny Reading Test; CAT Vocabulary
Group Session 3	French Nelson Denny Reading Test	French Metacognitive Questionnaire	English Nelson Denny Reading Test	English Metacognitive Questionnaire; TRF Vocabulary; English Listening Comprehension
Group Session 4	French Metacognitive Questionnaire	French Nelson Denny Reading Test	English Metacognitive Questionnaire	English Nelson Denny Reading Test; French Listening Comprehension

Before data collection began, the investigator created a student test progression sheet in order to help keep track of which students were assigned to each group test schedule. Given that for both schools participants were grouped into 3 or 4 different homerooms, individual sessions were booked between the scheduling of the four group test sessions. Students were seen independently depending on when their schedules permitted. All students began with Group Session 1. Then students were seen individually after the first, second, third, or fourth group session. The investigator consulted with teachers to determine when the most appropriate time for individual testing should be. Some students volunteered to come for individual testing during their lunch hour or immediately after school hours. Participants were randomly assigned to

one of two schedules to complete the individually-administered tests, as indicated by Table 3.

Table 3

Schedules for Individually-Administered Tests

	Individual Schedule 1	**Individual Schedule 2**
Session 1	French Concepts and Directions English Formulated Sentences English Word Reading	English Concepts and Directions Matrix Reasoning English Word Reading
Session 2	English Concepts and Directions Matrix Reasoning French Word Reading	French Concepts and Directions English Formulated Sentences French Word Reading

CHAPTER 4

Results

The initial part of this section will summarize the data-screening procedures conducted prior to data analysis. The second part will deal with the findings from correlations, Principal Components Analysis (PCA) and Multiple Linear Regression (MLR) procedures to address the three goals, as stated in the Literature Review, from which the following first four research questions were derived: (a) What oral language skills contribute to reading comprehension in English and French, respectively?; (b) How do metacognitive knowledge and strategies for reading comprehension compare and contrast in English and French?; (c) What metacognitive knowledge and skills contribute to reading comprehension in English and French?; and (d) What is the relative influence of oral language and metacognitive knowledge and strategies on reading comprehension in English and French?

Analyses were done using SPSS for Windows, Graduate Student Version 16.0 (SPSS Inc., 2007) and IVEware (Raghunathan, Lepkowski, VanHoewyk, & Solen-Berger, 2001).

Pre-Analysis Screening

Prior to the main analyses for this research, the independent variables (IV), dependent variables (DV), and control variables were examined to assess the test assumptions for correlational research: accuracy of data entry, dealing with missing data, linearity, heteroscedasticity, screening for univariate and multivariate outliers, verifying for normality of distributions (i.e., skewness and kurtosis), and multicollinearity.

Accuracy of Data Entry

As Tabachnick and Fidell (2001) have suggested, one way to ensure accuracy of data entry is to examine variables using descriptive statistics. This was performed by generating the minima, maxima, means, and standard deviations for the control, independent, and dependent variables, as well as the responses to the English and French metacognitive reading questionnaires. The frequencies of continuous variables were examined to ensure that values entered were within the acceptable range. No evident data entry mistakes were made, as descriptive statistics fell within expected ranges.

Missing Data

There were missing values for the independent, dependent, and control variables, as well as the metacognitive reading questionnaires. The missing data were random (i.e., no pattern to the missing data), as this was a result of participant absenteeism on the days scheduled for data collection, and therefore was not considered a serious problem as there was no obvious effect to the generalizability of the results (Tabachnick & Fidell, 2001). Table 4 specifies the number of missing data points for each measure.

Table 4

Missing Values by Measure

Measure	Number of Missing values	Percentage of total sample
Control Variables		
Age	3	6.25
Matrix Reasoning	4	8.33
English Word Reading	11	22.92
French Word Reading	12	25
Independent Variables		
English Vocabulary	4	8.33
English Listening Comprehension	7	14.58
English Syntax	7	14.58
English Grammar	5	10.42
French Vocabulary	4	8.33
French Listening Comprehension	6	12.5
French Syntax	6	12.5
French Grammar	6	12.5
Dependent Variables		
English Reading Comprehension	2	4.12
French Reading Comprehension	4	8.33

To date, no empirical guidelines are available to suggest what constitutes excessive missingness. Fox-Wasylyshyn and El-Marsi (2005) cited Cohen and Cohen (1983) who suggested that under 10% of cases with missing data may be acceptable. A cut-off of 15% was proposed by Hertel (1976). Raymond and Roberts (1987) stated that up to 40% of missing data on a given variable was acceptable. With regard to the present study, eight out of 14 variables exceeded Cohen and Cohen's (1983) suggestion of a 10% cut-off, while two exceeded Hertel's (1976) 15% cut-off. None of the variables exceeded Raymond and Roberts's (1987) cut-off of 40% missing data on a single variable. Although all these authors suggested deleting variables when the missing data surpassed

their proposed cut-off points, the decision was made to retain all the variables in the dataset in order to maintain the symmetry between the English and French measures, thus allowing examination of within- and cross-language influences of language skills on reading comprehension in L1 and L2.

Multiple imputation (MI) was applied to the dataset to deal with missing values for the control, independent and dependent variables. This technique consists of generating more than one estimate for each missing value. The missing values for a given variable are predicted using existing values from other variables. The predicted values, or "imputes," are substituted for the missing values, resulting in a full data set, called an "imputed data set". This process is performed multiple times, producing multiple imputed data sets. Standard statistical analysis is carried out on each imputed data set, producing multiple analysis results. Specifically, from each imputed data set, one must first calculate and save the estimates and standard errors, then calculate the overall standard error and confidence intervals. These results are then combined (see Rubin, 1987 for a detailed explanation of the statistical formulae for this procedure) to produce one overall analysis. MI accounts for missing data by restoring not only the natural variability in the missing data, but also by incorporating the uncertainty caused by estimating missing data. Imputed values produced from an imputation model are not intended to be guesses as to what a particular missing value might be; rather, this modeling is intended to create an imputed data set which maintains the overall variability in the population while preserving relationships with other variables. MI allows one to use more of the available data, thereby reducing biases that may occur when observations with missing data are simply deleted (Penn, 2007).

The performance of MI in a variety of missing-data situations has been shown to perform favorably (Graham & Schafer, 1999). MI gives unbiased parameter estimates which reflect the uncertainty associated with estimating missing data. Furthermore, MI is robust to departures from normality assumptions and provides adequate results in the presence of low sample size (which is particularly important for the small sample size in the present study) and high rates of missing data (Wayman, 2003). MI has been shown to outperform other methods of estimating missing values in simulation studies (Vriens & Melton, 2002) including simple imputation and *ad hoc* imputation methods (Penn, 2007).

Fox-Wasylyshyn and El-Masri (2005) cited authors who maintained that the *pattern* of missing data is more important than the extent of the missing data (e.g., Tabachnick & Fidell, 2001; Kline, 1998), stating that the impact on the generalizability of results is more serious when there is an underlying reason for missing data. With regard to the present study, missing data were the result of participant absenteeism from school on the days that data collection took place. Although it was possible to see several of those students on a different day, this was not feasible for other participants because their teachers requested that they remain in class for end-of-year revisions for Ministry of Education exams.

When the probability of missing data on a given variable is independent of the values of that variable, and of the values of other variables in the dataset, the data are assumed to be missing completely at random (MCAR). As a result, the nature of the missing data is such that there is no bias in the dataset (Duffy & Jacobsen, 2005) and poses no threat to the generalizability of the results (Tabachnick & Fidell, 2001). Data that is MCAR may be a result, for example, of participants' illness or inability to be present for testing due to no available transportation (Fox-Wasylyshyn & El-Masri,

2005). Although MCAR seems to fit the scenario for the present study (i.e., no pattern to the missing data), the assumption that no underlying pattern existed in the missing data was further examined by creating a dummy code for each of the control, independent and dependent variables in the dataset. A code of 0 (zero) was given to cases with missing values and a code of 1 was given to cases without missing values. Each dummy variable was then correlated with the other variables in the dataset. Fox-Wasylyshyn and El-Masri (2005) noted that strong correlations may indicate that the missing data are related to other variables in the dataset and cannot be considered MCAR. Results of this procedure are displayed in Table 5.

Table 5

Significant Correlations from Dummy Coding Procedure for Verification of Randomness of Data

Dummy Coded Variable	Significant Correlations	Pearson *r*	*p*
English Variables			
Word Reading	English Reading Comprehension	-.400	.006
	French Listening Comprehension	-.457	.002
Grammar	English Syntax	-.320	.035
	French Vocabulary	-.452	.002
	French Grammar	-.345	.025
	English Reading Comprehension	-.350	.015
French Variables			
Word Reading	English Word Reading	.441	.007
	Nonverbal Reasoning	-.370	.013
Grammar	English Reading Comprehension	-.294	.047
	French Reading Comprehension	-.484	.001
Syntax	English Grammar	.386	.011
Reading Comprehension	French Vocabulary	-.427	.004
	English Reading Comprehension	-.326	.027

Significant correlations observed from the dummy coding procedure were, for the most part, weak (i.e., < .400). A small number were moderate in strength, varying from *r* = .400 to *r* = .484. Overall, these results were not interpreted as indicative of an underlying pattern to the missing data.

Handling of missing data for the metacognitive knowledge and reading strategies questionnaire. Suggestions for handling missing Likert data consist of deleting cases, either in a listwise fashion (i.e., omitting cases with missing data and running analyses with what remains; Howell, 2009) or a pairwise method (i.e., excluding from a given analysis cases that have missing data on a variable included in the analysis; Peugh & Enders, 2004). One major downfall of deleting cases is the resulting loss of statistical power due to a reduction in the number of participants in the sample (Raaijmakers, 1999). Another problem that may arise as a result of deleting cases with missing data is a potential bias in the results because of potential underlying differences between cases with and without missing data (Jonsson & Wohlin, 2004; Schafer & Graham, 2002). Applying listwise deletion is less problematic in circumstances in which the missing data are minimal (i.e., less than 5%, as cited by McDermeit, Funk, & Dennis, 1999) or if it is used in a dataset that contains a large sample size, which was not the case in the present study.

Another suggestion for handling missing Likert-scale data is mean replacement. While several disadvantages have been associated with this procedure including underestimation of the standard error (Howell, 2009) and an artificial inflation of the significance of any statistical analyses based on those data (McDermeit, Funk, & Dennis, 1999), others (e.g., Roth, 1994) noted that mean replacement may be used when there is a very small number of missing data and the pattern of missingness is completely at

random. Downey and King (1998) reported that mean replacement can be used when cases with missing data do not exceed 20%. For both the English and French metacognitive knowledge and strategies questionnaires, the rates of missing data fell well below the 15% cut-off proposed by Downey and King (1998), with the English questionnaire missing 4.17% of cases (i.e., 2 participants did not complete the English questionnaire) and the French questionnaire missing 8.33% of cases (i.e., 4 participants did not complete the French questionnaire).

The English and French metacognitive knowledge and reading strategies questionnaire data were each projected to be analyzed following a Principal Components Analysis procedure (PCA). The decision was made to compare the outcome of listwise deletion and mean replacement by applying each procedure to the dataset and to then proceed with the PCA analyses to determine any differences in the resulting item structure of the components. Listwise deletion was applied to the dataset eliminating individuals with missing questionnaire data. Mean replacement was applied to the dataset by inserting the mean response of the questionnaire item containing a missing value.

With regard to the English questionnaire, both procedures resulted in four components, accounted for similar amounts of variance, and shared the same items with the exception of one component on which two out of three items differed. However, this difference was not regarded as important in light of the fact that for both replacement methods, this particular component accounted for the least amount of variance out of the four that were retained for further analyses. Furthermore, the questionnaire items could be similarly categorized (e.g., aspects of reading that make comprehension difficult to achieve).

Concerning the French questionnaire, both data replacement procedures resulted in three components that accounted for the same amount of variance. The components shared the same items, with the exception of the third component, for which one out of the four items was different.

In light of the high degree of similarity in results between both data replacement techniques, the decision was made to use item mean replacement to estimate missing data for the English and French metacognitive knowledge and strategies questionnaires. The decision to use mean replacement was made with an understanding of its downfalls, the most critical being that using the mean of a variable adds no new information; the overall mean, with or without replacing the missing data, remains the same, and may also lead to an underestimate of error (Little & Rubin, 1987). However, keeping in mind the small sample size in this study, it was crucial to maintain as much data as possible. Resorting to item mean replacement was deemed a better choice in this situation, especially in light of the fact that the amount of missing questionnaire data was very small. Using listwise deletion would result in elimination of potential data points from the dataset. This aspect of the study will be addressed in the Limitations section of this thesis. In the case of both the English and French questionnaires, missing values were replaced with their respective item means.

Linearity

The assumption of linearity is that there is a straight-line relation between two variables. Verification for linearity between variables was carried out following Tabachnick and Fidell's (2001) recommendation of using bivariate scatterplots to observe the nature of relationships between pairs of variables. Given that a primary focus of the current study is the relation between oral language and reading comprehension, two series

of bivariate scatterplots were created. The first group of scatterplots consisted of combining each English oral language variable against the English reading comprehension variable. This procedure was repeated with the French oral language and reading comprehension variables. Inspection of the scatterplots for the English variables revealed oval-shaped distributions for Vocabulary, Listening Comprehension, and Grammar, indicating linear relationships between these variables and reading comprehension in English. The scatterplot illustrating the relation between Syntax and reading comprehension revealed a somewhat curvilinear relationship with reading comprehension, although this one violation was not regarded as posing a serious threat to the statistical analyses to come. However, its consideration would be necessary when interpreting significant relationships with other variables in later analyses. All the French oral language variables demonstrated linear relationships with French reading comprehension.

Heteroscedasticity

For ungrouped data, the assumption of homoscedasticity is that the variability in scores for one continuous variable is roughly the same at all values of another continuous variable. That is, the variance of the error term is constant. As recommended by Tabachnick and Fidell (2001), to examine this assumption, scatterplots of residuals were created (i.e., standardized residuals plotted against standardized predicted values). When the assumption of homoscedasticity is met, no trend is observed in the scatterplot. Inspection of the scatterplots for the residuals of English variables revealed one occurrence of heteroscedasticity, for the Concepts and Directions test (i.e., English syntax). This particular variable presented a slightly funnelled shape. Inspection of the

scatterplots for the residuals of the French variables did not reveal any significant occurrences of heteroscedasticity.

Univariate Outliers

To detect univariate outliers, a *z*-score was created for each case, for the English and French oral language and reading comprehension tests as well as the Matrix Reasoning subtest. The acceptance range for *z*-score values was set at ± 3.29 (Tabachnick & Fidell, 2001). Verification for univariate outliers along the aforementioned variables revealed a wide range of *z*-scores, from -2.61 to +2.86. All *z*-scores fell within the set limit of acceptance, which confirmed that no univariate outliers were present in the dataset.

Multivariate Outliers

Given that the data were ungrouped, two analyses for multivariate outliers were performed by computing the Mahalanobis distance (D^2) on all the test data, first on the English language and reading tests, followed by the French language and reading tests (five variables within each language). For the current dataset, the critical value for the D^2 statistic, located in a Critical Values of Chi Square table (Tabachnick & Fidell, 2001, p. 933), was set at 20.515 ($\chi^2 = 20.515$; $p < .001$). The highest D^2 statistics, for English and French variables respectively, were 10.93 and 10.26, thus confirming the absence of multivariate outliers for this dataset.

Normality

Normality statistics for the language and reading test variables in both languages were computed. A conservative alpha level was set at .001 for this small sample. The Shapiro-Wilk (*S-W*) statistic was calculated for the test variables. The null hypothesis for the *S-W* test is that a sample comes from a normally distributed population, and therefore

the data follow a normal distribution. Statistical significance, which leads to a rejection of the null hypothesis, implies a non-normal distribution. This test is robust, even to small departures from normality. The *S-W* statistic for the matrix reasoning subtest confirmed that this variable was normally distributed. Within the English variables, all measures fell within an acceptable range for normality (i.e., the criterion was not met regarding the *S-W* statistic, thus accepting the null hypothesis). With regard to the French tests, the *S-W* statistic was significant for the Concepts and Directions subtest (i.e., the *p* value for the *S-W* test was .011, thus the null hypothesis was rejected for this variable to confirm that the French Concepts and Directions test was non-normal). Therefore, given the Nonverbal Reasoning subtest (i.e., Matrix Reasoning test), as well as all the English and French reading and oral language measures, only the French Concepts and Directions test did not meet the normality criterion and this was a very slight deviation from normality.

Multicollinearity

Multicollinearity is a statistical phenomenon in which two or more predictor variables are highly correlated with each other so that it is difficult to come up with reliable estimates of their individual regression coefficients. When two variables are highly correlated, they are basically measuring the same phenomenon or construct. In other words, when two variables are highly correlated, they both convey the same information. Multicollinearity was assessed by inspecting the correlations between the oral language variables, first in English and then in French. Following procedures recommended by Tabachnick and Fidell (2001), correlations of .9 or higher were considered as evidence of multicollinearity. Correlations between the English language variables ranged from .13 to .66, while correlations between the French variables ranged

from .37 to .78. These results were not taken as evidence of multicollinearity given that they fell beneath the cut-off point of .9 as proposed by Tabachnick and Fidell (2001).

Multicollinearity was further explored by calculating the Variance Inflation Factor (VIF), which measures how much the variance of the estimated coefficients are increased over the case of no correlation among the independent variables. If none of the independent variables is correlated with another variable, then all the VIF values will be 1. There has been a range of cut-off values to indicate when the values of VIF have attained unacceptably high levels, from as low as 4 to as high as 10 (O'Brien, 2007). A linear regression analysis was performed on the English variables and again on the French variables, requesting collinearity statistics for each procedure which have VIF values for each IV-DV combination. With regard to the analysis with the English variables, English reading comprehension was entered into the model as the DV and English vocabulary, listening comprehension, syntax, and grammar were entered as IVs. Verification of the VIF values for each IV-DV combination revealed that they fell between 1.16 and 1.83, thus confirming an absence of multicollinearity between the English variables. The regression procedure was repeated with the French variables, with French reading comprehension entered into the model as the DV and French vocabulary, listening comprehension, syntax, and grammar entered as IVs. Verification of the VIF values for each IV-DV combination revealed that they fell between 1.71 and 2.53, which confirmed absence of multicollinearity between the French variables.

Summary of Data-Screening Procedures

The main goal of the data-screening procedures as described in the preceding sections was to determine the adequacy of the data for correlational statistical analyses. Based on the series of procedures described above, some issues that were uncovered with

the dataset included missing data on all the measures, nonlinearity and heteroscedasticity for English syntax (Concepts and Directions test), and non-normality for the French syntax test (Concepts and Directions test). However, these violations were slight deviations and therefore the decision was made to not perform any type of data transformation procedure.

Performance on Measures of Oral Language, Reading Comprehension, and Word Reading

Before addressing the research questions, participants' performance on the English and French reading and oral language measures was analyzed in order to gain a sense of their abilities in these domains, and to provide a context within which to interpret and discuss results in the following sections. The means, standard deviations, minimum, and maximum scores for the English and French oral language and reading comprehension tests were calculated. Table 6 displays this information.

Table 6

Mean, Standard Deviation, Minimum, and Maximum Scores for English and French Reading Comprehension and Oral Language Tests

Measure	Mean (SD)	Minimum	Maximum
English (L1)			
Reading Comprehension	17.59 (7.33)	8	35
Vocabulary	14.45 (4.31)	6	22
Listening Comprehension	15.17 (3.07)	10	21
Syntax	26.29 (3.10)	19	30
Grammar	36.28 (3.92)	26	44
French (L2)			
Reading Comprehension	9.25 (6.02)	0	23
Vocabulary	12.32 (4.71)	5	23
Listening Comprehension	10.64 (4.65)	3	23
Syntax	21.00 (6.82)	5	28
Grammar	10.14 (4.49)	4	23

Note. Values are based on participants' raw scores.

Between-language comparisons of the minimum values show that the participants were more successful on the English tests, obtaining a higher minimum score on all the oral language tests in English, as well as the English reading-comprehension test. This result was expected, given that the participants' mother tongue was English and thus presumed to be their dominant language.

The mean standard scores, grade equivalents, and percentile ranks were derived for the English measures to determine how the sample of participants compared to the norming sample in their primary language of instruction. These results are displayed in Table 7.

Table 7

Mean Standard Scores, Percentile Ranks, and Grade Equivalent Scores for the English Reading Comprehension and Oral Language Tests

Measure	Standard Score	Percentile Rank	Grade Equivalent
NDRT Comprehension	93.00	32.35	8.7
CAT Vocabulary	96.00	39.95	9.1
CELF-3 Concepts and Directions	91.71	36.78	
CELF-3 Formulated Sentences	85.35	21.49	

Note. Grade equivalent scores are not available for the CELF-3.

The participants' L1 reading comprehension ability, under timed conditions, fell toward the lower limit of the average range, with average encompassing scores between the 25th and 75th percentiles. Furthermore, their L1 reading comprehension performance, under timed conditions, is comparable to a late grade 8 level of achievement. At the time this test was administered, this score was approximately 2 years behind their actual grade placement. These results imply that the students in this sample, on average, had weak comprehension when reading in their mother tongue. Their vocabulary skills were below grade level by more than one year as per national (Canadian) norms. While their syntactic ability placed at the low end of the average range for their grade placement, their grammatical skills, in English, were weaker and below average.

Finally, standard scores were derived for participants' performance on the English and French measures of word reading. These results are displayed in Table 8.

Table 8

Mean Standard Scores and Percentile Ranks for English and French Word Reading

Measure	Standard Score	Percentile Rank
English word reading	96.36	44.22
French word reading	68.30	14.01

Students' word reading was average in English, their mother tongue. When reading words in French, their second language, they were far below average compared to native speakers of French.

Intercorrelations among English and French Oral Language Variables, Reading Comprehension Tests, and Word Reading

Reading comprehension ability in L1 is heavily influenced by one's level of oral language proficiency (Nation & Snowling, 2004), and even stronger relationships have been observed with readers' comprehension in L2 (Berhnardt, 2000; Birch, 2002). Consistent with this line of literature, an important first step to understanding the types of skills that underlie reading ability in L1 and L2 for the population portrayed in this research was to identify relationships between oral language skills and reading comprehension in each language. This was achieved by computing a Pearson correlation matrix, taking into consideration the control variables as well as the independent variables (English and French oral language tests) and the dependent variables (reading comprehension tests). The correlations are displayed in Table 9.

Table 9

Correlations Between the Control, Independent, and Dependent Variables in English and French

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	-	.10	-.28	-.13	-.23	.06	-.21	-.41*	-.07	-.32*	-.13	-.07	-.21	-.48*
2. NIQ		-	.21	.06	.05	.22	.06	-.00	.25*	.30*	.25	.32	-.05	.21
3. ERC			-	.66**	.42**	.48**	.47**	.57**	.66**	.73**	.60**	.74**	.48**	.53**
4. EV				-	.31	.53**	.29	.61**	.65**	.59**	.45**	.46**	.55**	.51**
5. ES					-	.25	.41*	.02	.30	.18	.34*	.18	.14	.02
6. ELC						-	.13	.16	.29	.37*	.13	.27	.25	.16
7. EG							-	.13	.33*	.17	.29	.21	.36*	.13
8. EWR								-	.55**	.68**	.16	.35	.56**	.85**
9. FRC									-	.67**	.60**	.76**	.55**	.55**
10. FV										-	.52**	.67**	.62**	.71**
11. FG											-	.59**	.37*	.47*
12. FLC												-	.42*	.46*
13. FS													-	.60**
14. FWR														-

Note. NIQ = Nonverbal Intelligence; ERC = English Reading Comprehension; EV = English Vocabulary; ES = English Syntax; ELC = English Listening Comprehension; EG = English Grammar; EWR = English Word Reading; FRC = French Reading Comprehension; FV = French Vocabulary; FG = French Grammar; FLC = French Listening Comprehension; FS = French Syntax; FWR = French Word Reading. Samples for the estimation of each correlation are slightly different in sizes due to missing data.
* $p < .05$.
** $p < .01$.

Within each language, all the oral language tasks were significantly related to reading comprehension. The strength of the relation between vocabulary and reading comprehension was similar across both languages, with Pearson $r = .66$ for English reading comprehension and English vocabulary, and Pearson $r = .67$ between French reading comprehension and French vocabulary. However, stronger correlations were

noted between French reading comprehension and French listening comprehension, syntax, and grammar, compared to English reading comprehension and English listening comprehension, syntax, and grammar. Furthermore, Word Reading was significantly related to reading comprehension in both languages, exhibiting similar correlation strength, with Pearson r = .57 between English reading comprehension and English Word Reading, and Pearson r = .55 between French reading comprehension and French Word Reading. Finally, for both English and French oral language tests, correlations of moderate strength were noted between measures. Because each test measures a different, but related language skill, intercorrelations are expected to be within this range.

Main Data Analyses

Question 1: What Oral Language Skills contribute to Reading Comprehension in English (L1) and French (L2)?

A series of multiple linear regression analyses (MLRs) was conducted to determine which oral language skills contributed significant variance to reading comprehension performance. This procedure was performed to determine the presence of within-language and cross-language relationships between oral language skills and reading comprehension performance in English and French. For all regression analyses, Age and Nonverbal Intelligence (Matrix Reasoning task) were entered into the regression model as control variables. Furthermore, for all regression analyses, the "enter" or "simultaneous" method of adding control variables and independent variables into the model was used: All the predictor variables were given equal treatment and entered into the regression in one step (Tabachnick & Fidell, 2001). This strategy is most appropriate when no logical or theoretical basis for considering any variable to be prior to any other,

either in terms of a hypothetical causal structure of the data or in terms of its relevance to the research goals (Osborne, 2000).

It is important to make a cautionary note here that the small sample size in this research study placed limitations on the nature of the results of the statistical analyses, in the sense that a number of multiple regression analyses revealed significant overall *F* tests, although none of the individual variables in the regression model contributed significant variance by itself to the reading comprehension scores. One reason cited by the literature for this occurrence would be presence of multicollinearity among the variables. However, pre-analyses screening procedures into multicollinearity revealed that correlations between variables fell within acceptable ranges. A more likely explanation for the significance of the overall model without any of the independent factors demonstrating statistical significance is that the sample size in this study was too small for some of the effects between variables to be observed in univariate analyses. Probably each variable individually contributes too little to the proportion of explained variance to be significant, but together their contribution is big enough to make the overall *F*-test significant. Some of the regression coefficients may deviate from zero in the population but the effects are too small to detect in this sample (Joost van Ginkel, personal communication, November 2011). This aspect of the study will be further discussed in the Limitations section of this thesis.

The first step in the main analyses consisted of verifying within-language relationships, using the English oral language variables to predict English reading comprehension, then performing a second analysis to determine whether the French oral language variables predicted French reading comprehension. Using a simultaneous enter method, a significant model emerged for the English oral language variables, $F(6, 141) =$

17.31, $p < .001$, with $R^2 = .422$. Specifically, English vocabulary was the only variable in the model to contribute significant variance to English reading-comprehension scores. The full model is shown in Table 10.

Table 10

Results of the Multiple Linear Regression on the English Oral Language Tests and English Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	4.270	26.075	.164	.870
Age	-1.251	1.302	-.961	.338
NIQ	.601	.659	.918	.360
EV	.638	.267	2.384	.018*
ELC	.297	.369	.807	.420
ES	.148	.292	.505	.614
EG	.290	.308	.943	.347

Note. NIQ = Nonverbal Intelligence; EV = English Vocabulary; ELC = English Listening Comprehension; ES = English Syntax; EG = English Grammar. Dependent variable = English Reading Comprehension.
*$p < .05$.

A MLR procedure was repeated with the French oral language tests as independent variables and French reading comprehension as the dependent variable. Using the simultaneous enter method, the overall model emerged as significant, $F(6,126) = 17.73$, $p < .0001$, $R^2 = .456$ although none of the independent French oral language factors singly accounted for any significant variance in the French reading comprehension scores. Results are presented in Table 11.

Table 11

Results of the Multiple Linear Regression on the French Oral Language Tests and French Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	-16.076	23.842	-.674	.501
Age	.678	1.559	.435	.664
NIQ	.162	.786	.207	.836
FV	.503	.312	1.611	.109
FLC	.228	.306	.746	.457
FS	.112	.164	.684	.496
FG	.257	.258	.996	.321

Note. NIQ = Nonverbal Intelligence; FV = French Vocabulary; FLC = French Listening Comprehension; FS = French Syntax; FG = French Grammar. Dependent variable = French Reading Comprehension.

Two additional MLR procedures were conducted to determine whether or not word reading ability contributed significant variance to both English and French reading comprehension. The independent variables for the English MLR were vocabulary, listening comprehension, syntactic ability, grammatical ability, and word-reading ability, with English reading comprehension as the dependent variable. Using the simultaneous enter method, a significant model emerged $F(7, 138) = 14.95$, $p < .0001$, with $R^2 = .430$. While vocabulary again emerged as a significant variable, word reading ability was not a significant factor in explaining variance in the English reading comprehension scores. Results are displayed in Table 12.

Table 12

Results of the Multiple Linear Regression on the English Oral Language Tests, English Word Reading, and English Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	5.869	27.976	.209	.834
Age	-1.326	1.338	-.991	.324
NIQ	.609	.665	.916	.361
EWR	-.011	.053	-.213	.831
EV	.645	.270	2.385	.018*
ELC	.305	.369	.824	.411
ES	.152	.292	.519	.604
EG	.305	.312	.966	.336

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; EV = English Vocabulary; ELC = English Listening Comprehension; ES = English Syntax; EG = English Grammar. Dependent Variable = English Reading Comprehension.
* $p < .05$.

A MLR was then performed on the French variables: vocabulary, listening comprehension, syntactic ability, grammatical ability, and word-reading ability, with French reading comprehension as the dependent variable. Using the simultaneous enter method, the overall model was significant, $F(7, 125) = 16.44$, $p < .0001$, with $R^2 = .479$, although none of the independent variables contributed significant variance to the reading scores. Table 13 displays the results.

Table 13

Results of the Multiple Linear Regression on the French Oral Language Tests, French Word Reading, and French Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	-23.463	26.296	-.892	.374
Age	.949	1.602	.593	.554
NIQ	.201	.798	.252	.802
FWR	.040	.059	.678	.449
FV	.448	.311	1.438	.153
FLC	.205	.303	.677	.499
FS	.079	.169	.468	.347
FG	.267	.260	1.025	.307

Note. NIQ = Nonverbal Intelligence; FWR = French Word Reading; FV = French Vocabulary; FLC = French Listening Comprehension; FS = French Syntax; FG = French Grammar. Dependent Variable = French Reading Comprehension.

A series of MLR was performed to investigate cross-language relationships between oral language skills, word-reading ability, and reading-comprehension performance. Using the simultaneous enter method, English oral language variables were entered as predictors (vocabulary, syntactic ability, grammatical ability, and listening comprehension) with French reading comprehension as the dependent variable. While the overall model emerged as significant $F(6, 132) = 11.32$, $p < .0001$, with $R^2 = .339$, none of the English oral language factors contributed significant variance to French reading comprehension. Table 14 displays these results.

Table 14

Results of the Multiple Linear Regression on the English Oral Language Tests and French Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	-11.447	28.638	-.399	.690
Age	-.355	1.509	-.235	.814
NIQ	.857	.775	1.106	.271
EV	.551	.354	1.554	.122
ELC	.099	.335	.296	.768
ES	.216	.359	.601	.549
EG	.120	.330	.364	.716

Note. NIQ = Nonverbal Intelligence; EV = English Vocabulary; ELC = English Listening Comprehension; ES = English Syntax; EG = English Grammar. Dependent variable = French Reading Comprehension.

The model remained significant when English word reading was entered as an independent variable, along with the English oral language factors $F(7,130) = 10.44$, $p < .0001$, with $R^{2} = .359$, but none of the variables independently contributed any significant variance. Therefore, no cross-language transfer was observed between the English oral language and word reading variables to explain any significant variance among the French reading comprehension scores. These results are presented in Table 15.

Table 15

Results of the Multiple Linear Regression on the English Oral Language Tests, English Word Reading, and French Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	-5.178	30.915	-.167	.867
Age	-.549	1.521	-.361	.718
NIQ	.867	.776	1.117	.266
EWR	-.033	.058	-.576	.565
EV	.565	.353	1.599	.112
ELC	.106	.329	.322	.748
ES	.218	.359	.607	.545
EG	.124	.339	.366	.347

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; EV = English Vocabulary; ELC = English Listening Comprehension; ES = English Syntax; EG = English Grammar. Dependent variable = French Reading Comprehension.

When the French oral language variables (vocabulary, syntactic ability, grammatical ability, and listening comprehension) were entered simultaneously as predictors for English reading comprehension (dependent variable), a significant model emerged $F(6,145) = 27.82$, $p < .0001$ with $R^2 = .534$. French vocabulary accounted for significant variance among the English reading comprehension scores, indicating cross-language transfer from L2 (vocabulary) to L1 (reading comprehension). Table 16 displays the results of this MLR.

Table 16

Results of the Multiple Linear Regression on the French Oral Language Tests and English Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	4.405	21.308	.207	.837
Age	-.136	1.279	-.106	.916
NIQ	-.059	.636	-.092	.927
FV	.489	.236	2.073	.039*
FLC	.363	.223	1.627	.106
FS	.158	.141	1.121	.264
FG	.265	.253	1.049	.296

Note. NIQ = Nonverbal Intelligence. FV = French Vocabulary; FLC = French Listening Comprehension; FS = French Syntax; FG = French Grammar. Dependent variable = English Reading Comprehension.
* $p < .05$.

When French word reading was entered into the regression model simultaneously with the rest of the French oral language variables, the overall model remained significant, $F(7,145) = 25.55$, $p < .0001$ with $R^2 = .552$. However, the cross-language relation between French vocabulary and English reading comprehension was reduced to a trend toward significance. These results are displayed in Table 17.

Table 17

Results of the Multiple Linear Regression on the French Oral Language Tests, French Word Reading, and English Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	-3.296	23.719	-.139	.889
Age	.152	1.324	.115	.909
NIQ	-.027	.633	-.043	.966
FWR	.042	.049	.850	.397
FV	.433	.244	1.772	.079
FLC	.341	.218	1.566	.119
FS	.125	.143	.878	.382
FG	.275	.248	1.109	.269

Note. NIQ = Nonverbal Intelligence; FWR = French Word Reading; FV = French Vocabulary; FLC = French Listening Comprehension; FS = French Syntax; FG = French Grammar. Dependent variable = English Reading Comprehension.

Question 1: Summary of results. Within-language analyses revealed that English vocabulary significantly predicted English reading comprehension. This relationship remained significant when age and nonverbal reasoning were entered into the regression model as control variables. None of the French oral language variables significantly predicted French reading comprehension. Controlling for age and nonverbal reasoning did not change this result.

With regard to cross-language analyses, no significant relationships were observed between the English oral language variables and French reading comprehension. Entering age and nonverbal reasoning into the regression model did not change this result: No cross-language transfer was observed between English oral language variables and French reading comprehension. French vocabulary significantly predicted English reading comprehension, although this effect was reduced to a trend toward significance when age and nonverbal reasoning were entered into the regression model as control variables.

Question 2: How do Metacognitive Knowledge and Strategies for Reading Comprehension Compare and Contrast in English and French?

An exploratory factor analysis (EFA) was carried out in order to summarize and understand the patterns of correlations among the 36-item metacognitive questionnaires, and to reduce these items to a smaller number of factors for use in subsequent multiple linear regression (MLR) analyses. Traditionally, exploratory analysis of a dataset (as opposed to confirmatory analysis) has been used to explore the possible underlying factor structure of a set of observed variables without imposing a preconceived structure on the outcome. On the other hand, a confirmatory analysis is designed to test a hypothesis that a relationship exists between the observed variables and their underlying latent constructs.

When conducting confirmatory analysis the researcher uses knowledge of the theory and empirical research to postulate the relationship pattern *a priori* and then tests the hypothesis statistically. An exploratory analysis does not impose any preconceived structure on the outcome. Given that the purpose of the present research was to examine and compare the nature of the metacognitive constructs related to reading comprehension in L1 and L2, an exploratory analysis was deemed appropriate.

Principal Components Analysis (PCA) was chosen as the extraction method for this analysis because I was interested in obtaining an empirical summary of the dataset, as opposed to estimating the underlying factors as in factor analysis (FA) (Field, 2005). Field (2005) explained it well: "PCA is concerned only with establishing which linear components exist within the data and how a particular variable might contribute to that component" (p. 630). Costello and Osborne (2005) suggested that PCA is suitable for use as a data-reduction method. Maitra and Yan (2008) also indicated that PCA can be used to reduce a large number of predictive variables to a smaller number of factors (components) for use in regression analyses. This is what I intended to do with the scores; thus PCA was the most appropriate choice. A PCA computes a correlation matrix of all the variables with each other. For this study, the variables consist of the 36 items on the metacognitive reading questionnaire. Sets of items that are highly correlated are assumed to measure the same underlying factor. The first PCA was conducted using responses to the English metacognitive questionnaire, and the second PCA was carried out using the responses to the French questionnaire. The analyses were carried out in SPSS.

Principal components analysis: English metacognitive questionnaire. The initial PCA was run with all 36 English questionnaire items, using an orthogonal rotation

of the factors in order to assure maximum interpretability. While oblique rotation allows the components to be correlated, orthogonal rotation results in uncorrelated components (Costello & Osborne, 2005). Although one might expect the components to be correlated in the present study, a simple structure was obtained using orthogonal rotation, which provides results easier to interpret. The orthogonal rotation method used was varimax, in which each factor tends to have high loadings on a small number of variables and low loadings on the other variables. This generally makes interpretation of the resulting factors easier (Stevens, 2002). Varimax is also the most commonly used orthogonal rotation (Costello & Osborne, 2005).

The first iteration revealed a Kaiser-Meyer-Olkin measure of sampling adequacy of .201, which was below the commonly recommended value of .6 for factorability of a dataset (Tabachnick & Fidell, 2001). Furthermore, inspection of the diagonals of the anti-image correlation matrix revealed that the lowest value at .098 fell below the .5 cut-off of recommended acceptable sampling adequacy (Tabachnick & Fidell, 2001). The PCA procedure was therefore repeated 12 times, each time removing one questionnaire item corresponding to the lowest absolute value along the anti-image diagonal. After the eleventh iteration, the KMO measure was .645, and the values along the diagonal of the anti-image correlation matrix ranged from .519 to .776, thus satisfying the sampling adequacy criterion. A total of seven components emerged with Eigenvalues of 1.0 or more. Inspection of the total variance explained by each of these seven components revealed that a small amount (i.e., 5.9%) of the total variance was accounted for by the fifth and greater factors. Inspection of the Scree plot (see Figure 1) confirmed this observation; the greatest amount of variance was explained by the first four components,

with those beyond levelling off, adding little useful interpretive value to the overall variance.

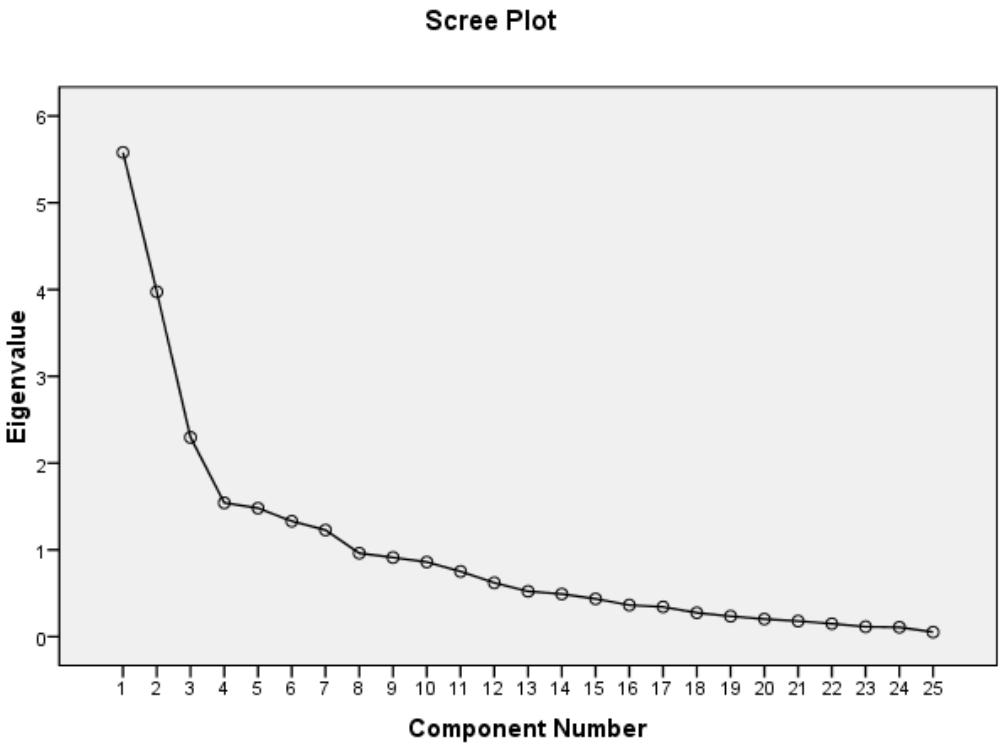

Figure 1. Scree plot for the final iteration of the English metacognitive questionnaire items.

The rotated component matrix was used to identify the questionnaire items that loaded most heavily onto each component retained from the final PCA. The rotated component matrix offered an amplified solution to the item loadings on each component (i.e., small correlations become smaller and high correlations are made larger). The idea behind this is to facilitate interpretation and to make the loadings more obvious upon inspecting the data.

Comrey and Lee (1992) proposed that loadings of .71 and above are excellent, .63 as very good, .55 as good, .45 as fair, and to not consider loadings of .32 and below. The

item loadings are shown in Table 18. Items in bold type were retained as the defining items for each of the four English metacognitive components.

Table 18

Item Loadings of the Rotated Component Matrix for the Final PCA Iteration on the Responses to the English Metacognitive Questionnaire

Item Number	Item Description	Component 1	Component 2	Component 3	Component 4
2	Confidence[a]	-.386	.058	-.276	-.229
3	Confidence	-.181	.036	-.111	-.249
4	Confidence	-.088	.176	.180	-.134
5	Confidence	-.540	.171	.197	-.211
6	**Confidence**	-.133	.071	.198	**-.734**
9	Repair[b]	-.245	.103	-.097	-.057
11	**Repair**	.265	**-.652**	.288	.177
12	**Effective[c]**	.045	-.103	**.818**	.028
13	**Effective**	.093	.354	**.630**	-.277
14	**Effective**	-.061	**.686**	-.345	-.194
15	**Effective**	.190	-.002	**.820**	.084
16	Effective	.242	.551	.476	-.109
17	Effective	.115	.313	.052	-.369
19	**Effective**	-.118	**.747**	.102	.065
20	Effective	.253	.563	.314	.006
21	**Difficulty[d]**	**.916**	-.028	.145	.127
22	**Difficulty**	**.846**	-.175	.113	.168
23	**Difficulty**	**.736**	-.097	.112	.130
24	**Difficulty**	**.612**	.221	.380	.240
26	**Difficulty**	.280	-.028	-.029	**.723**
27	**Difficulty**	.110	-.059	.141	**.812**
28	**Difficulty**	.188	-.052	.126	**.634**
30	Effective	.169	-.008	.256	-.079
31	**Effective**	-.193	**.784**	.087	-.018
36	Effective	.193	.131	.121	.025
	Percentage of total variance	22.3%	15.90%	9.19%	6.17%

Note. Items selected for inclusion to a component are in bold.
[a]Statements related to various aspects of a reader's perceived ability to read in the language.
[b]Statements related to repair strategies a reader uses when comprehension fails.
[c]Statements related to reading strategies the reader feels make reading effective.
[d]Statements related to aspects of reading which make reading difficult.

In keeping with these guidelines, the items within the four factors were first screened for poor loadings (i.e., ±.32), and were eliminated from further analyses. Following this, each item loading was inspected for strength of the loading and also to ascertain that the item did not load highly onto another component. The final selection of items retained within each component is defined in Table 19.

Table 19

Questionnaire Items Retained for Defining Metacognitive Components Underlying English Reading Comprehension

Component	Item Number	Item Description
1	21	When reading silently in English, things that make the reading difficult are the sounds of the individual words
	22	When reading silently in English, things that make the reading difficult are pronunciation of the words
	23	When reading silently in English, things that make the reading difficult are recognizing the words
	24	When reading silently in English, things that make the reading difficult are the grammatical structures
2	11	When reading silently in English, if I don't understand something, I give up and stop reading
	14	When reading silently in English, the things I do to read effectively are to focus on getting the overall meaning of the text
	19	When reading silently in English, the things I do to read effectively are to focus on the details of the content
	31	The best reader I know in English is a good reader because of his/her ability to understand the overall meaning of a text
3	12	When reading silently in English, the things I do to read effectively are to focus on mentally sounding out parts of the words
	13	When reading silently in English, the things I do to read effectively are to focus on understanding the meaning of each word
	15	When reading silently in English, the things I do to read effectively are to focus on being able to pronounce each whole word
4	6	When reading silently in English, I have a good sense of when I understand something and when I do not
	26	When reading silently in English, things that make the reading difficult are relating the text to what I already know about the topic
	27	When reading silently in English, things that make the reading difficult are getting the overall meaning of the text
	28	When reading silently in English, things that make the reading difficult are the organization of the text

Based on the individual item loadings for each of the four components, a descriptive label was given to each metacognitive component. The first component was labelled *Perceived Difficulty–Word Reading;* the second component was labelled *Effective Reading Comprehension Behavior;* the third component was labelled *Effective*

Word Reading Behavior, and the fourth component was labelled *Perceived Difficulty–Reading Comprehension*.

Principal components analysis: French metacognitive questionnaire. The same PCA process was applied to participants' responses to the French metacognitive questionnaire to determine the type of metacognitive components that characterized their responses to French reading. The same criteria were applied as in the PCA procedure with the English questionnaire items: maintaining the minimum level of acceptable sampling adequacy (i.e., KMO value) at .6; using a Varimax rotation; retaining Eigenvalues of 1 or above; and dropping anti-image diagonal values below .5.

The initial iteration completed with all 36 items of the French questionnaire revealed a KMO value of .460, which falls below the minimum recommended value, and a total of 24 values along the diagonal of the anti-image correlation matrix fell short of the set criterion of .5, falling below the minimum standards for factorability. Additional iterations were necessary to do in order to attain the minimum criteria recommended for the KMO as well as for the values along the anti-image diagonal.

A total of 10 iterations were completed with the French questionnaire dataset. Each time, the KMO value and diagonals along the anti-image correlation matrix were inspected. The final iteration revealed a KMO value of .683, with anti-image diagonal values falling above the .5 cut-off, ranging from .520 to .764, thus satisfying the minimum recommended levels to factor analyse the dataset.

A total of 7 components had Eigenvalues of 1 or above, accounting for a cumulative variance of 76.15%. Inspection of the Scree plot (see Figure 2) revealed that only the first three components clearly contributed significant variance, with a levelling-off occurring between the third and fourth components. Only 6.5% of total variance was

explained by the fourth component. Components 1 through 3 were retained, because inspection of the items loading onto factors 4 to 7 did not relate to each other in a way that could create an interpretable component.

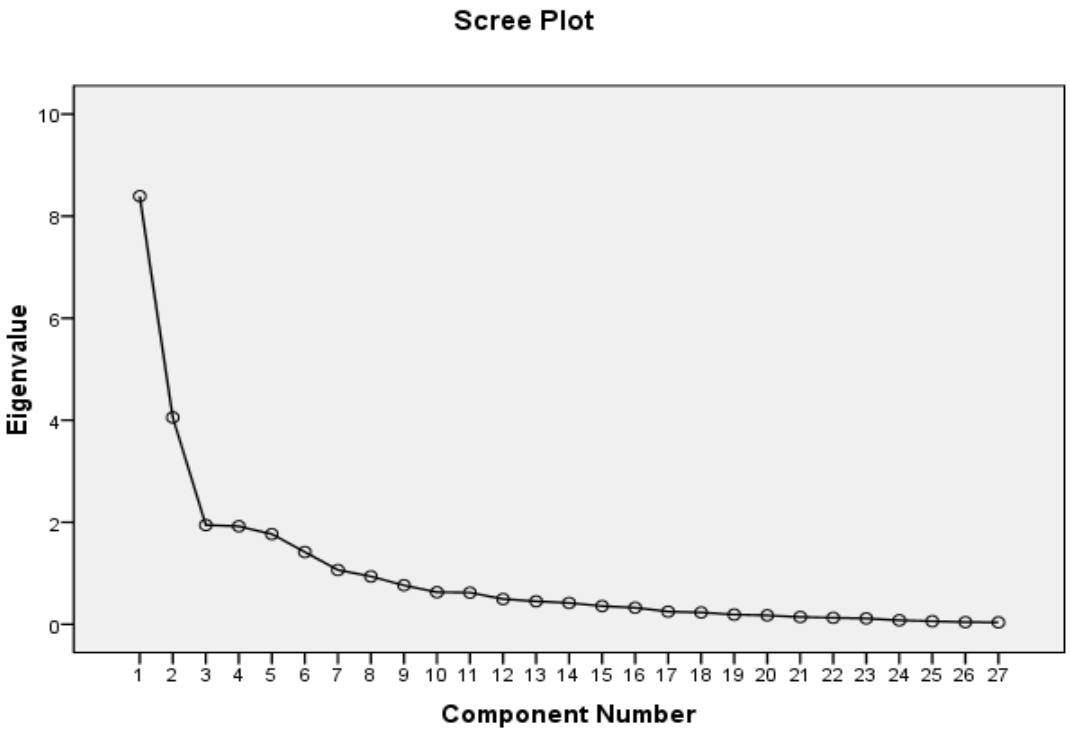

Figure 2. Scree plot for the final iteration of the French metacognitive questionnaire items.

The rotated component matrix was used to identify the questionnaire items that loaded most heavily onto each component retained from the final PCA. As was done for the procedure for the PCA for the English questionnaire items, the items within the three French factors were screened for poor loadings (i.e., ±.32; Comrey & Lee, 1992) and were eliminated from further analyses. Following this, each item loading was inspected for strength of the loading and also to ascertain that the item did not load highly onto another component. The item loadings for the three components retained from the final

PCA iteration are listed in Table 20. Items in bold type were retained as the defining items for each of the three French metacognitive components.

Table 20

Item Loadings of the Rotated Component Matrix for the Final PCA Iteration on the Responses to the French Metacognitive Questionnaire

Item Number	Item Description	Component 1	Component 2	Component 3
1	**Confidence**[a]	**.737**	.188	-.367
2	**Confidence**	**.653**	.414	-.324
3	**Confidence**	**.818**	.131	-.243
4	**Confidence**	**.890**	.046	-.030
5	**Confidence**	.488	**.686**	.031
6	**Confidence**	.158	**.757**	-.011
8	**Repair**[b]	.109	**.746**	-.209
9	**Repair**	.083	**.801**	-.128
11	Repair	-.067	-.795	.176
13	Effective[c]	.007	.166	-.059
14	Effective	.457	.310	-.049
15	Effective	-.124	.074	.230
16	Effective	.100	.239	-.130
17	Effective	.523	.472	.070
19	Effective	.525	.511	-.052
20	Effective	.433	.467	-.115
21	**Difficulty**[d]	-.246	-.179	**.860**
22	**Difficulty**	-.183	-.126	**.870**
23	**Difficulty**	-.092	.067	**.516**
24	Difficulty	-.263	.074	.096
25	Difficulty	.050	-.173	.410
26	Difficulty	-.279	-.126	.153
27	Difficulty	-.391	-.020	.118
28	Difficulty	-.027	-.230	-.116
30	**Effective**	-.314	-.117	**.613**
35	Effective	.044	-.124	.236
36	Effective	-.060	.022	.069
	Percentage of total variance	31.08%	15.02%	7.21%

Note. Items selected for inclusion as part of a component are in bold.
[a]Statements related to various aspects of a reader's perceived ability to read in the language.
[b]Statements related to repair strategies a reader uses when comprehension fails.
[c]Statements related to reading strategies the reader feels make the reading effective.
[d]Statements related to aspects of reading which make the reading difficult.

Table 21 gives an item description for each questionnaire item included in the three French metacognitive reading components. Based on the individual item loadings for each of the three components, a descriptive label was given to each one. The first component was labelled *Effective Reading Comprehension Behavior*; for the second component, the term *Perceived Competence–Reading Comprehension* was attributed; the third component was labelled *Perceived Difficulty–Word Reading*.

Table 21

Questionnaire Items Retained for Defining Metacognitive Components Underlying French Reading Comprehension

Component	Item Number	Item Description
1	1	When reading silently in French, I am able to anticipate what will come next in the text
	2	When reading silently in French, I am able to recognize the difference between main points and supporting details
	3	When reading silently in French, I am able to relate information which comes next in the text to previous information in the text
	4	When reading silently in French, I am able to question the significance or truthfulness of what the author says
2	5	When reading silently in French, I am able to use my prior knowledge and experience to understand the content of the text I am reading
	6	When reading silently in French, I have a good sense of when I understand something and when I do not
	8	When reading silently in French, if I don't understand something, I reread the problematic part
	9	When reading silently in French, if I don't understand something, I go back to a point before the problematic part and reread from there
3	21	When reading silently in French, things that make the reading difficult are the sounds of the individual words
	22	When reading silently in French, things that make the reading difficult are pronunciation of the words
	23	When reading silently in French, things that make the reading difficult are recognizing the words
	30	The best reader I know in French is a good reader because of his/her ability to sound out words

Table 22 illustrates the Pearson correlations between the English and French metacognitive knowledge and reading factors, reading comprehension in English and French, as well as the variables used as control factors in this study: English and French word reading ability, age, and nonverbal intelligence (Matrix Reasoning subtest).

Table 22

Correlations Between Age, Nonverbal IQ, L1 and L2 Metacognitive Knowledge and Reading Strategy Components and Reading Comprehension

Measures	1	2	3	4	5	6	7	8	9	10	11
1. Age	-	.11	-.09	.06	-.01	.06	.25	-.057	-.13	-.29	-.11
2. NIQ		-	.09	-.16	.09	-.16	.02	-.12	.14	.11	.21
3. L1 DifficultyWR			-	.12	.05	-.09	-.16	.13	.38*	.39	.22
4. L1 EffComprBeh				-	-.06	.02	.03	.33*	.02	.09	.11
5. L1 EffWRBeh					-	-.09	-.07	-.20	-.06	.26	.19
6. L1 DifficultyRC						-	-.09	.04	-.29	.12	-.04
7. L2 EffComprBeh							-	.03	.20	-.36*	-.22
8. L2 CompRC								-	-.04	-.09	-.18
9. L2 DifficultyWR									-	.26	.26
10.ERC										-	.63***
11.FRC											-

Note. NIQ = Nonverbal IQ; L1 DifficultyWR = Perceived Difficulty–English Word Reading; L1 EffComprBeh = Effective English Reading Comprehension Behaviors; L1 EffWRBeh = Effective English Word Reading Behaviors; L1 DifficultyRC = Perceived Difficulty–English Reading Comprehension; L2 EffComprBeh = Effective French Reading Comprehension Behaivors; L2 CompRC = Perceived Competence in French Reading Comprehension; L2 DifficultyWR = Perceived Difficulty–French Word Reading; ERC = English Reading Comprehension; FRC= French Reading Comprehension.

*$p < .05$. ***$p < .001$.

Question 2: Summary of results. Results of PCA procedures conducted with the responses to the English and French metacognitive questionnaires revealed four English metacognitive components and three French metacognitive components. The English components were labelled as: (a) Perceived Difficulty–Word Reading; (b) Effective Reading Comprehension Behavior; (c) Effective Word-Reading Behavior; and (d) Perceived Difficulty–Reading Comprehension. The French components were labelled as: (a) Effective Reading-Comprehension Behavior; (b) Perceived Competence–Reading Comprehension; and (c) Perceived Difficulty–Word Reading.

Question 3: What Metacognitive Knowledge and Strategies for Reading Contribute to Reading Comprehension in English and French?

The next research question looked into whether the English metacognitive components discussed in the previous section related to participants' reading comprehension in English.

To address the research question stated above, four separate analyses were conducted to determine (a) the relative contribution of English metacognitive reading knowledge and strategies to English reading comprehension; (b) the relative contribution of French metacognitive reading knowledge and strategies to French reading comprehension; (c) whether or not there is cross-language transfer of English metacognitive reading knowledge and strategies to French reading comprehension; and (d) whether or not there is cross-language transfer of French metacognitive reading knowledge and strategies to English reading comprehension.

The statistical procedure selected to answer the above-stated research questions was MLR. For the research questions in this section of analyses, the predictor variables were the metacognitive components derived from the PCA conducted on the English and

French metacognitive reading questionnaires (i.e., four English and three French metacognitive components). The criterion (dependent) variables were the reading comprehension test scores, obtained in English and French. As with the MLR using oral language variables as predictors, separate analyses were conducted using nonverbal reasoning and word reading ability in English and French as control variables.

Contribution of L1 metacognitive knowledge and strategies for reading to L1 reading comprehension. The four English metacognitive reading components were used to predict English reading comprehension, as measured by the NDRT. Since no *a priori* hypotheses had been made to determine the order of entry of the metacognitive factor predictor variables, a simultaneous method was used for the multiple linear regression procedure. A significant model emerged, $F(6, 236) = 21.801$, $p < .0001$ with $R^2 = .357$. Specifically, while the English metacognitive component Perceived Difficulty–Word Reading was found to relate significantly to reading comprehension in English, the other components Effective Reading Comprehension Behavior, Effective Word Reading Behavior and Perceived Difficulty–Reading Comprehension were not. The full model is presented in Table 23.

Table 23

English Metacognitive Knowledge and Reading Strategy Components Significantly Related to English Reading Comprehension

Model	b	Std. Error	*t*	*p*
Intercept	39.684	21.065	1.883	.061
Age	-1.860	1.286	-1.447	.149
NIQ	.829	.606	1.367	.173
L1DiffWR	2.879	1.209	2.383	.018*
L1DiffRC	1.764	1.013	1.741	.083
L1EffWR	2.096	1.172	1.788	.075
L1EffRC	.597	1.048	.570	.569

Note. NIQ = Nonverbal Intelligence; L1DiffWR = Perceived Difficulty–English Word Reading; L1DiffRC = Perceived Difficulty–English Reading Comprehension; L1EffWR = Effective English Word Reading Behavior; L1EffRC = Effective English Reading Comprehension Behavior. Dependent variable = English Reading Comprehension.
* $p < .05$.

The regression analysis was repeated with the same variables, this time with English word reading entered as a control variable. Using a simultaneous method of entry, a significant model emerged $F(7, 162) = 15.02$, $p < .0001$ with $R^2 = .392$. Again, the English metacognitive component Perceived Difficulty–Word Reading emerged as a significant contributor to English reading comprehension, while the other English metacognitive variables (i.e., Effective Reading Comprehension Behavior, *Effective* Word Reading Behavior, and Perceived Difficulty–Reading Comprehension) remained non-significant. The full model is presented in Table 24.

Table 24

English Metacognitive Knowledge and Reading Strategy Components Significantly Related to English Reading Comprehension, Controlling for English Word Reading

Model	b	Std. Error	*t*	*p*
Intercept	19.687	33.790	.583	.561
Age	-1.498	1.412	-1.061	.290
NIQ	.886	.611	1.449	.149
EWR	.118	.146	.809	.419
L1DiffWR	2.517	1.179	2.136	.034*
L1DiffRC	1.760	1.001	1.759	.080
L1EffWR	2.049	1.176	2.136	.083
L1EffRC	.952	1.073	.888	.376

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; L1DiffWR = Perceived Difficulty–English Word Reading; L1DiffRC = Perceived Difficulty–English Reading Comprehension; L1EffWR = Effective English Word Reading Behavior; L1EffRC = Effective English Reading Comprehension Behavior. Dependent variable = English Reading Comprehension.
* $p < .05$.

Contribution of L2 metacognitive knowledge and strategies for reading to L2 reading comprehension. For the next set of analyses, the French metacognitive components were entered into the regression model as predictors. French reading comprehension ability, as measured by the NDRT, was the criterion variable. Using the simultaneous entry method, while the overall model was significant $F(5, 305) = 11.62$, $p < .0001$, with $R^2 = .160$, though none of the French metacognitive components independently predicted French reading comprehension ability. The full model is presented in Table 25.

Table 25

Results of the Multiple Linear Regression on the French Metacognitive Knowledge and Reading Strategy Components and French Reading Comprehension

Model	ß	Std. Error	*t*	*p*
Intercept	5.174	26.070	.198	.843
Age	-.102	1.689	-.060	.952
NIQ	.758	.789	.960	.338
L2DiffWR	1.965	1.238	1.587	.114
L2EffRC	-1.727	1.186	-1.456	.146
L2COMPRC	-.188	1.185	-.158	.874

Note. NIQ = Nonverbal Intelligence; L2DiffWR = Perceived Difficulty–French Word Reading; L2EffRC = Effective French Reading Comprehension Behaviors; L2COMPRC = Perceived Competence in French Reading Comprehension. Dependent variable = French Reading Comprehension.

The previous multiple regression was repeated with French word reading ability included as a control variable. No change was observed in the results. The overall model was significant, $F(6, 184) = 7.16$, $p < .001$ with $R^2 = .188$, however, none of the French metacognitive reading components predicted French reading comprehension. The full model is displayed in Table 26.

Table 26

Results of the Multiple Linear Regression on the French Metacognitive Knowledge and Reading Strategy Components and French Reading Comprehension Controlling for French Word Reading

Model	ß	Std. Error	*t*	*p*
Intercept	.644	28.589	.023	.982
Age	.025	1.715	.015	.988
NIQ	.823	.832	.987	.325
FWR	.019	.061	.318	.751
L2DiffWR	1.805	1.326	1.362	.175
L2EffRC	-1.686	1.203	-1.401	.163
L2COMPRC	-.276	1.217	-.226	.821

Note. NIQ = Nonverbal Intelligence; FWR = French Word Reading; L2DiffWR = Perceived Difficulty–French Word Reading; L2EffRC = Effective French Reading Comprehension Behaviors; L2COMPRC = Perceived Competence in French Reading Comprehension. Dependent variable = French Reading Comprehension.

Contribution of L1 metacognitive knowledge and strategies for reading to L2 reading comprehension. The next set of multiple regression analyses consisted of cross-language comparisons to examine whether reading-related metacognitive knowledge and skills associated with one language can transfer to influence reading comprehension ability in the other language. For the first multiple regression, the four English metacognitive components were entered simultaneously as predictors, while French reading comprehension was used as the criterion variable. While this overall model was significant $F(6, 291) = 8.77$, $p < .0001$, with $R^2 = .153$, none of the English metacognitive reading factors alone predicted significant variance in French reading comprehension performance. The full model is presented in Table 27.

Table 27

Results of the Multiple Linear Regression on the English Metacognitive Knowledge and Reading Strategy Components and French Reading Comprehension

Model	ß	Std. Error	*t*	*p*
Intercept	13.738	25.799	.532	.595
Age	-.744	1.687	-.441	.659
NIQ	.944	.815	1.158	.248
L1DiffWR	1.268	1.205	1.053	.293
L1DiffRC	.883	1.200	.736	.462
L1EffWR	1.726	1.179	1.465	.144
L1EffRC	.879	1.271	.691	.489

Note. NIQ = Nonverbal Intelligence; L1DiffWR = Perceived Difficulty–English Word Reading; L1DiffRC = Perceived Difficulty–English Reading Comprehension; L1EffWR = Effective English Reading Comprehension Behavior; L1EffRC = Effective English Reading Comprehension Behavior. Dependent variable = French Reading Comprehension.

When the multiple linear regression was repeated, this time controlling for English word-reading ability, the overall model was significant, $F(7, 179) = 5.93$, $p < .0001$ with $R^2 = .188$, however, none of the independent variables (i.e., English metacognitive knowledge factors) contributed significant variance to French reading comprehension. This model is presented in Table 28.

Table 28

Results of the Multiple Linear Regression on the English Metacognitive Knowledge and Reading Strategy Components and French Reading Comprehension Controlling for English Word Reading

Model	ß	Std. Error	*t*	*p*
Intercept	7.831	41.486	.189	.850
Age	-.676	1.829	-.369	.712
NIQ	.957	.815	1.173	.242
EWR	.039	.175	.228	.819
L1DiffWR	1.128	1.304	.865	.388
L1DiffRC	.879	1.193	.737	.462
L1EffWR	1.711	1.172	1.461	.146
L1EffRC	.987	1.308	.754	.452

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; L1DiffWR = Perceived Difficulty–English Word Reading; L1DiffRC = Perceived Difficulty-English Reading Comprehension; L1EffWR = Effective English Word Reading Strategies; L1EffRC = Effective English Reading Comprehension Strategies. Dependent variable = French Reading Comprehension.

Contribution of L2 metacognitive knowledge and strategies for reading to L1 reading comprehension. The next set of multiple regression analyses consisted of an inverse analysis of the typical L1 cognitive component to L2 reading comprehension ability, wherein the three French metacognitive predictors, defined earlier in this chapter, were entered simultaneously into the regression model to predict reading comprehension ability in English. Results of this analysis produced a significant overall model, $F(5, 345) = 19.66$, $p < .0001$, with $R^2 = .221$; however, none of the French metacognitive reading components independently contributed significant variance to English reading comprehension. The full model is presented in Table 29.

Table 29

Results of the Multiple Linear Regression on the French Metacognitive Knowledge and Reading Strategy Components and English Reading Comprehension

Model	ß	Std. Error	*t*	*p*
Intercept	31.640	24.206	1.307	.192
Age	-1.263	1.472	-.858	.391
NIQ	.663	.651	1.019	.309
L2DiffWR	1.851	1.152	1.607	.109
L2EffRC	-2.195	1.175	-1.868	.063
L2COMPRC	-.683	1.156	-.591	.555

Note. NIQ = Nonverbal Intelligence; L2DiffWR = Perceived Difficulty–French Word Reading; L2EffRC = Effective French Reading Comprehension Strategies; L2COMPRC = Perceived Competence–French Reading Comprehension. Dependent variable = English Reading Comprehension.

The overall model remained significant when the multiple regression was repeated, this time controlling for French word reading ability, $F(6, 175) = 10.12$, $p < .0001$ with $R^2 = .256$. Although none of the French metacognitive components contributed any significant variance to English reading comprehension, a trend toward significance was noted for one predictor: Effective French Reading Comprehension Behavior. This model is displayed in Table 30.

Table 30

Relations between French Metacognitive Knowledge and Reading Strategy Components and English Reading Comprehension Controlling for French Word Reading

Model	ß	Std. Error	*t*	*p*
Intercept	27.098	28.041	.966	.335
Age	-1.112	1.544	-.720	.472
NIQ	.767	.661	1.155	.249
FWR	.013	.062	.207	.836
L2DiffWR	1.519	1.209	1.257	.210
L2EffRC	-2.220	1.180	-1.881	.062
L2COMPRC	-.783	1.179	-.664	.507

Note. NIQ = Nonverbal Intelligence; FWR = French Word Reading; L2DiffWR = Perceived Difficulty–French Word Reading; L2EffRC = Effective French Reading Comprehension Strategies; L2COMPRC = Perceived Competence–French Reading Comprehension. Dependent variable = English Reading Comprehension.

Question 3: Summary of results. Within-language MLR analyses revealed that the English metacognitive component Perceived Difficulty-Word Reading emerged as a significant contributor to English reading comprehension. This relationship remained significant when the effects of age and nonverbal reasoning were controlled. None of the French metacognitive components significantly predicted French reading comprehension. This result remained unchanged when the effects of age and nonverbal reasoning were controlled.

Cross-language MLR analyses revealed that none of the English metacognitive components significantly predicted French reading comprehension. Even when the effects of age and nonverbal reasoning were controlled, none of the English metacognitive components significantly contributed to French reading comprehension. With regard to the French metacognitive components, no significant relationships were observed with English reading comprehension. However, a trend toward significance

was observed between the component Effective (French) Reading Comprehension Behavior and English reading comprehension. This result remained unchanged when the effects of French word reading were controlled; none of the French metacognitive components contributed significant variance to English reading comprehension; a trend toward significance was observed between Effective Behavior-Reading Comprehension (French) and English reading comprehension.

Question 4: What is the Relative Influence of Oral Language and Metacognitive Knowledge and Strategies on Reading Comprehension in English and French?

Although one possibility in the course of this analysis was to create an oral language composite score as well as a metacognitive knowledge and strategies composite score for each participant, this choice was not made in light of the fact that most of the oral language and metacognitive knowledge and strategies factors in both L1 and L2 turned out nonsignificant in the MLRs. Instead, the decision was made to retain only the significant oral language and metacognitive factors from the preceding analyses. Therefore, the following predictor variables were included in the MLR were: L1 vocabulary, L2 vocabulary, and the English metacognitive component L1DiffWR. English reading comprehension was the only dependent variable that was significantly predicted by the oral language and metacognitive factors, and therefore was the dependent variable in this analysis. Entering all independent variables simultaneously into the model, results of this analysis were significant $F(5, 182) = 33.79$, $p < .0001$ with $R^2 = .480$. Specifically, L2 vocabulary was the only variable in the model to contribute significant variance to reading comprehension in English. The full model is displayed in Table 31.

Table 31

Contribution of English and French Oral Language and Metacognitive Knowledge and Reading Strategy Components to English Reading Comprehension

Model	ß	Std. Error	*t*	*p*
Intercept	11.628	21.211	.548	.584
Age	-.496	1.297	-.382	.702
NIQ	.126	.589	.214	.831
EV	.411	.229	1.794	.075
FV	.535	.237	2.259	.025*
L1DiffWR	1.897	1.274	1.489	.138

Note. NIQ = Nonverbal Intelligence; EV = English Vocabulary; FV = French Vocabulary; L1DiffWR = Perceived Difficulty–EnglishWord Reading. Dependent variable = English Reading Comprehension.
* $p < .05$.

The overall model remained significant when French reading comprehension was entered as the dependent variable, $F(5, 135) = 23.22$, $p < .0001$ with $R^2 = .462$. The full model is presented in Table 32.

Table 32

Contribution of English and French Oral Language and Metacognitive Knowledge and Reading Strategy Components to French Reading Comprehension

Model	ß	Std. Error	*t*	*p*
Intercept	-14.834	22.915	-.647	.519
Age	.619	1.442	.429	.669
NIQ	.143	.726	.196	.845
EV	.363	.391	.928	.355
FV	.699	.337	2.071	.040*
L1DiffWR	.094	1.059	.089	.929

Note. NIQ = Nonverbal Intelligence; EV = English Vocabulary; FV = French Vocabulary; L1DiffWR = Perceived Difficulty–English Word Reading. Dependent variable = French Reading Comprehension.
* $p < .05$.

The results remained unchanged when both of the above analyses were repeated with a control for English and French word reading ability, $F(7, 136) = 20.81$, $p < .0001$ with R^2

= .517 for English reading comprehension and $F(7, 126) = 17.59$, $p < .0001$ with $R^2 =$ .494 for French reading comprehension. Tables 33 and 34 below present the full models for English reading comprehension and French reading comprehension, respectively.

Table 33

Contribution of English and French Oral Language and Metacognitive Knowledge and Reading Strategy Components to English Reading Comprehension Controlling for English and French Word Reading

Model	ß	Std. Error	*t*	*p*
Intercept	8.468	32.813	.258	.797
Age	-.464	1.443	-.322	.748
NIQ	.148	.612	.241	.809
EWR	.026	.146	.181	.857
FWR	-.006	.049	-.121	.904
EV	.409	.255	1.604	.111
FV	.538	.237	2.170	.032*
L1DiffWR	1.815	1.182	1.535	.127

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; FWR = French Word Reading; EV = English Vocabulary; FV = French Vocabulary; L1DiffWR = Perceived Difficulty–English Word Reading. Dependent variable = English Reading Comprehension.
* $p < .05$.

Table 34

Contribution of English and French Oral Language and Metacognitive Knowledge and Reading Strategy Components to French Reading Comprehension Controlling for English and French Word Reading

Model	ß	Std. Error	*t*	*p*
Intercept	-15.032	35.521	-.423	.673
Age	.624	1.639	.381	.704
NIQ	.133	.762	.175	.862
EWR	-.007	.140	-.051	.959
FWR	.009	.044	.226	.822
EV	.349	.399	.875	.383
FV	.712	.342	2.078	.034*
L1DiffWR	.025	1.173	.021	.983

Note. NIQ = Nonverbal Intelligence; EWR = English Word Reading; FWR = French Word Reading; EV = English Vocabulary; FV = French Vocabulary; L1DiffWR = Perceived Difficulty–English Word Reading. Dependent Variable = French Reading Comprehension.
* $p < .05$.

Question 4: Summary of results. The final set of MLRs consisted of combining only the oral language variables and metacognitive components that turned out significant in the previous analyses (i.e., English vocabulary, French vocabulary, and the English metacognitive component Perceived Difficulty–Word Reading) to determine which of these variables significantly predicted English and French reading comprehension. Controlling for the effects of age and nonverbal reasoning, French vocabulary was the only variable that significantly predicted both English and French reading comprehension.

Question 5: Which Theoretical Framework (Linguistic Interdependence Hypothesis; Linguistic Threshold Hypothesis) is Better Supported by the Results Obtained in this Study?

The fifth research question will be addressed in the Discussion and Conclusion of this thesis (Chapter 5) because it is derived from the synthesis of the other four empirical questions.

Chapter 5

Discussion

The general purpose of this study was to explore the relationships between oral language, metacognitive skills, and reading comprehension among a sample of bilingual high school students. The first goal of the study was to determine whether oral skills in English and French contribute to reading comprehension in both languages. The second goal was to explore the nature of metacognitive knowledge and reading strategies related to reading comprehension in English and French. The third goal was to examine relationships between metacognitive knowledge and reading strategies to reading comprehension in English and French. The fourth goal was to compare the relative contribution of oral language skills and metacognitive knowledge and reading strategies to reading comprehension in English and French. The fifth goal was to discuss which of the two theoretical frameworks that guided this research (i.e., LIH; LTH) best explained the results obtained in this study. The following sections discuss the results and their implications as they relate to each of the four empirical goals of this research, and lead to a discussion of the fifth goal, to compare the ability of the two theories to explain the results.

Question 1: What Oral Language Skills Contribute to Reading Comprehension in English (L1) and French (L2)?

The significant positive correlations between all measures of oral language and reading comprehension in L1 and L2 echo one of the basic tenets of the Simple View of Reading (Hoover & Gough, 1990), which posits that language comprehension, such as understanding semantic and syntactic relationships between words and sentences, is linked to a person's ability to read and understand text. Oral language skills have been

identified as potential sources of variability in reading comprehension in one's mother tongue. The relations between these variables in L2 are just as crucial (e.g., Gottardo & Mueller, 2009). Even with average word-reading skills, some readers may exhibit comprehension problems as a result of language-based weaknesses. For the present study, in which the average grade equivalent score obtained for the NDRT in English (the participants' mother tongue) was almost two years below their grade placement, we can infer, given the significant positive correlations between oral skills and reading comprehension, that language-related skills were potential sources of variability in reading performance in both languages.

Of the four areas of oral language assessed in English, vocabulary was the only significant predictor of reading comprehension in English. This result is in line with a long series of investigations that also demonstrated consistent relationships between these variables (e.g., Hirsch, 2003; Nagy, 1988; Stanovich, 1986). Furthermore, English oral skills did not transfer to influence reading comprehension in French. This result is consistent with previous studies documenting that, with the exception of phonological skills, measures of oral language have the greatest impact on reading within the same language; evidence for transfer of oral skills across languages has been minimal (August & Hakuta, 1997).

That vocabulary emerged as a significant predictor of reading comprehension is consistent with results from other studies that featured anglophone individuals (e.g., Cain, Oakhill, & Lemmon, 2004; Deiterich, Assel, Swank, Smith, & Landry, 2006), several of which have discussed findings within the parameters of the Lexical Quality Hypothesis (Perfetti & Hart, 2002) which portrayed word representations (i.e., word knowledge) of higher ability and lower ability readers. Mastery of a word involves knowing many

different types of information associated with it: phonological, orthographic, morphological, syntactic, semantic, articulatory, idiomatic and pragmatic (Laufer, 1997). According to De Groot (2010), fluency is a key aspect of word knowledge-i.e., how well one can retrieve and apply aspects of word knowledge easily, quickly and reliably the moment a word is targeted in production or comprehension. Perfetti and Hart (2002) give the following example to demonstrate the defining constituents of a word:

> The lexical representation of the word "cat" is the (unitary) linguistic object such that it has spelling C-A-T, phonology [kaet] and meaning (whatever it is that cat means). In general terms, all words are triples of (phonological, orthographic, and semantic/grammatical) specification. People vary in the quality of their lexical representations. Any representation that does not specify the value of one of its constituents is of low quality. (p. 191)

Skilled readers can have low quality representations of many words, often low frequency words from general vocabulary and words from specialized vocabularies. What skilled readers have by way of an advantage are resources that can maximize the information available from impoverished representations in order to assist learning. Share (1995) captured this idea in his self-teaching hypothesis, which posits that a certain minimum level of phonological sensitivity, letter-sound knowledge and contextual information acquired from text are used to derive the meaning of new or unfamiliar words. A skilled reader has a better chance of adding new information (about spelling, pronunciation or meaning) to an impoverished representation.

Less skilled readers have fewer high quality representations. This point seems to characterize the level of vocabulary of the students in this research, as the mean grade equivalent score on the CAT vocabulary subtest was 9.2. At the time the test was

administered, this score was approximately 1.5 years below national norms for the participants' grade placement. Weak word representations in English may have impeded participants' comprehension on the English NDRT.

Experience with reading promotes the development of quality word representations. While early word reading in English is largely centered on acquiring the sound-symbol correspondence rules, Cunningham and Stanovich (1998) maintained that continued practice with reading can lead to qualitative differences in readers' word knowledge. The development of word knowledge can occur through different learning modalities, including listening, speaking and writing. Furthermore, these authors argued that the benefit accrued by the amount of reading one achieves has consequences for cognitive development:

> Reading has cognitive consequences that extend beyond its immediate task of lifting meaning from a particular passage. Furthermore, these consequences are reciprocal and exponential in nature. Accumulated over time–spiralling either upward or downward–they carry profound implications for the development of a wide range of cognitive capabilities. (p. 1)

As a result of less exposure to print, particularly for weak readers, "reading for meaning is hindered; unrewarding reading experiences multiply; and practice is avoided or merely tolerated without any real cognitive involvement" (p. 1). Many differences in cognitive abilities seen in children who read at different levels can be attributed to the difference in the amount of reading. In this study, the students reported an average of two hours of weekly reading outside of school hours. While attributing causes for lower quality representations among the students extends beyond the scope of the current study, one possible hypothesis is that the students who participated in this research simply do not

read enough outside of school, whether for pleasure or school work, to enable the development of a solid lexical repertoire for words they need to know for successful reading at their grade level.

The ramification of a weak vocabulary base in L1 has consequences beyond just for first language reading. Among bilinguals, the initial stage of word recognition is basically language nonselective in nature (de Groot, Borgwaldt, Bos, & Van Den Eijnden, 2002; Schwartz, Kroll, & Diaz, 2007) and not under the conscious control of the reader (Dijkstra, 2005). For bilinguals reading in either L1 or L2, the early processes involved in word recognition activate orthographic, phonological, and semantic candidates from both L1 and L2. Investigations with bilinguals on reading tasks using cognates (i.e., words that are similar across languages, such as *chat*, which refer to casual talk in English and cat in French) show interference effects, compared to monolingual control words (see Libben & Titone, 2009). This has been taken as indicative of the activation of target and nontarget language representations which diverge onto two separate meanings.

Within a bilingual context, the "subordinate bias effect" (e.g., Sereno, O'Donnell, & Rayner, 2006) is a term used in reference to competition for access to the dominant meaning of a word (or cognate) by virtue of being shared across both languages (Schwartz, Yeh, & Shaw, 2008). Although research has shown that cognates facilitate vocabulary acquisition and reading comprehension for language learners compared to noncognate words, the subordinate bias effect can negatively affect the *efficiency* with which meanings, particularly for less frequent words, can be retrieved for comprehension or production. Even when contextual support is provided for a given meaning, bilinguals must negotiate cross-language lexical competition. Ambiguous words or phrases in text, as well as low-frequency words, can inhibit reading performance when lexical

representations are poor since competition for meaning arises from the co-activation of shared cognates in L1 and L2. The result is delayed processing as meaning is negotiated. However, robust lexical representations that allow for quick and efficient access of (intended) meaning can help deter comprehension failures by suppressing meanings that are not relevant for a given context and override the cognitive cost associated with lexical competition. The implication for reading comprehension is that high-quality word knowledge is important for both languages of a bilingual individual, because reading efficiency can potentially be affected by impoverished lexical representations in either language. Vocabulary learning that emphasizes learning words and their application in a variety of contexts, as well as how they can be used in less-typical situations, are all practices conducive to comprehending written text quickly and efficiently (Schwartz, Yeh, & Shaw, 2008).

For the participants in this research, honing vocabulary skills in both L1 and L2 would likely be a suitable way to begin to improve comprehension. This recommendation aligns well with the LIH, discussed in detail earlier in this thesis. Specifically, it is interesting to speculate about the possibility for the students who participated in this research that acquiring proficiency in word knowledge in L1 (English) may enable them to read more effectively in French, their L2, since the development of higher-quality word representations in L1 may alleviate the amount of competing information activated in both languages. This prediction echoes some of the general tenets of the LIH: Competence in L2 is partially a function of the type of competence developed in L1, and that acquisition of a particular type of knowledge or skill in L1 corresponds to improvement in reading in L2 (Cummins, 1979).

When analyzed together, none of the French oral language variables accounted for significant variance with regard to French reading comprehension. However, upon combining only the significant oral language factors and metacognitive component from the regression analyses (i.e., L1 vocabulary, L2 vocabulary and the English metacognitive component Perceived Difficulty–Word Reading), entering them simultaneously into one regression analysis, a significant relationship emerged between French vocabulary and reading comprehension in French. This relationship has long been established in previous research in the L2 reading literature (e.g., Bossers, 1992; Carrell, 1991; Taillefer, 1996) which has highlighted L2 language competency as a significant factor in explaining L2 reading comprehension performance.

Question 2: How do Metacognitive Knowledge and Strategies for Reading Comprehension Compare and Contrast in English and French?

Components derived from the PCA on the English metacognitive questionnaire. The PCA of the English reading questionnaire revealed four factors. The factors fell into two general categories: word reading and comprehension. At the word level, the components were named: *Perceived Difficulty–Word Reading*; *Effective Word Reading Behavior*. At the comprehension level, the components were: *Effective Reading Comprehension Behavior*; *Perceived Difficulty–Reading Comprehension*.

Components derived from the PCA on the French metacognitive questionnaire. The PCA of the French reading questionnaire revealed three factors. As with the L1 strategies, the L2 factors were categorized as either word or decoding related, or comprehension related. At the word level, the Perceived Difficulty–Word Reading component deals with difficulties readers encounter when reading words, such as the sounds, the pronunciation, and recognition of the words. The two remaining factors had

to do with reading comprehension: Effective Reading Comprehension Behavior; Perceived Competence– Reading Comprehension.

Overlapping strategies. The above description of the reading strategies discovered in L1 and L2 showed that a word-level difficulty component, in which three out of four questionnaire items in this component were the same across both languages, emerged in L1 and L2. Decoding skill requires readers to know the systematic sound-symbol relationships of the language, as well as words that do not entirely follow those rules (e.g., mischief; seize). By the secondary grades, even struggling readers have acquired (through print exposure) a store of words they recognize by sight. However, at this level, several of the words that cause difficulty may be exception words (Johnson, 1985). For students reading in a second language, the exception words can be particularly difficult, as, for the majority of these words, applying first-language cognates or English rule regularity does not help much.

In English, basic decoding skill depends upon readers mastering the mappings between the 26 letters and their various combinations, including vowels and consonant digraphs (e.g., "ee" and "th"). Children who are meeting expectations in reading have mastered these by the fifth grade. Although the importance of such print-based processing has been well established with younger readers, it constitutes a primary source of reading problems among several struggling readers at the secondary level as well (Curtis, 2004). In the present study, a word-level difficulty component constituting of difficulty processing words and letter sounds emerged in both L1 and L2; furthermore, the L1 construct predicted significant variance in L1 reading comprehension scores. This finding is consistent with research that highlights the importance of the speech sound processing system (i.e., functions such as segmenting and blending the speech sounds that

combine to make words, as well as identifying words, syllables and phonemes) in reliably distinguishing good and poor readers (Moats, 2000), and is in line with a fundamental premise of the Simple View of reading (Hoover & Gough, 1990) which posits that word recognition processes are important for successful reading. Readers who cannot adequately recognize the words on the page are by that fact alone prevented from fully understanding the text. This seems to be the case for the sample of readers in the current study, who are lower-achieving comprehenders, when reading in L1 and L2.

Differing strategies. For L1 comprehension, the PCA revealed two levels of focus on text content: details and overall meaning (Effective Reading Comprehension Behavior). Another L1 comprehension component (Perceived Difficulty–Reading Comprehension) consisted of items that dealt with global comprehension: difficulty getting the overall meaning of text, grasping the organization of text, and relating text to what readers already know about the topic. Overall, therefore, the L1 metacognitive comprehension components derived from this sample include text-based aspects readers focus on to understand (i.e., text details and overall meaning), as well as readers' perceptions of what makes reading comprehension difficult (e.g., organization and acquisition of overall meaning).

Interestingly, the L1 comprehension components did not contain a factor for reader-initiated behaviors that are conducive to better understanding of text–deliberate and intentional strategies that would support cognitive control, self-regulation, and lead to high-quality comprehension. Rather, it seems that the L1 components resemble what Dole et al. (1991) referred to as reading skills–actions that are automatic and routine, associated with lower levels of thinking and learning, and are rigid. This is in contrast to what they group as reading strategies, which are "intentional and deliberate plans under

the control of the reader. Strategies emphasize reasoning; readers use reasoning and critical thinking abilities as they construct and reconstruct evolving meanings from the text…(and) are inherently flexible and adaptable" (p. 242). Indeed, many skills and strategies are necessary for comprehension to occur. For example, McNamara, Ozuru, Best and O'Reilly (2007) discussed a model of reading comprehension strategies that included use of word-level and sentence-level information to aid text comprehension. They asserted that word meanings must be accessed for comprehension of text; if words are unfamiliar, then action must be taken to understand their meanings. Along the same lines, Kintsch (1998) discussed successful reading as dependent on whether the reader is able to construct a coherent textbase level of understanding. The textbase level of understanding is constructed from the information explicitly stated in the text. Forming a textbase representation requires efficient decoding and rapid access to word meanings and the efficient construction of sentence meaning based on the syntactic information contained in the sentence. However, for deep processing of text to occur, readers also need to engage with text in a way that will lead to that goal. This means knowing how to select appropriate strategies, use them, and monitor the effectiveness of strategies and the readers' own learning. Such a level of self-regulation and insight is characteristic of high-ability readers (e.g., Oakhill, 1993; Vosniadou, Pearson, & Rogers, 1988).

A somewhat different scenario was observed in the nature of comprehension components in L2, particularly in terms of the individual questionnaire items that defined each one. That such differences emerged between L1 and L2 is in contrast to the findings of previous studies, such as Sarig (1987) and Tang (1997), who posited that readers used similar strategies in both languages. The first difference was noted at the level of readers' confidence during reading in L2 (Perceived Competence–Reading Comprehension), an

aspect that did not emerge among the L1 components. The questionnaire items contributing to this component reflected readers' confidence in what they extract from text in L2, anticipating what will come next, and relating text information to information presented earlier on in the text. Although this component was not significantly related to L2 reading comprehension, it was, nonetheless, interesting to note that an affective variable emerged as a distinguishing component between L1 and L2 reading.

Second, participants perceived themselves as taking initiatives to resolve comprehension difficulties when they encountered reading problems in French L2 (Effective Reading Comprehension Behavior). Essentially, this component encompassed repair strategies for dealing with comprehension difficulties: re-reading parts of a passage, going back to a point before the problematic part and re-reading from there, and continuing on with reading when difficulty with comprehension arises. The L2-based Effective Reading Comprehension Behavior component may be a reflection of readers' tendency to search for meaning-related aspects in French written text. They dealt with their limited knowledge of French by rereading parts of text or revisiting problematic sections and rereading from there, in an attempt to pick up key words or phrases to facilitate comprehension. In this sense, this component may not be conducive to better comprehension as such in L2, but rather is an indication of how readers handle unknown or difficult language forms in French. Nambiar (2009) reported similar results. In his study with bilingual Malay-English university students, the learners did not use similar strategies to help them comprehend the reading passages in L1 and L2. Nambiar concluded that the readers in his study processed text in L1 with a minimal number of strategies, and reasoned that they were aware of the text structure and had conceptual knowledge of the L1 text. However, the readers seemed to need to become familiar with

the L2 text structure and vocabulary to help them process the L2 text more easily. The metacognitive strategies uncovered from the questionnaire used in the present study did not include items that tapped into all possible reading comprehension strategies covered in the literature, and therefore may have omitted other strategies that readers possibly used in L1 or L2. The questionnaire may have missed other strategies that may have shed more light on the differences between the L1 and L2 components. This methodological issue will be further discussed later on in the Limitations section.

It is difficult to ascertain reasons for the L1-L2 differences, because controlling for external factors that could have potential influence on reading achievement was beyond the scope of this study. For this reason, the current discussion is limited to descriptions and comparisons of the readers' metacognitive strategies. The item structure of the L1 and L2 comprehension components suggested that some of the mental activities and reading behaviors involved in reading comprehension in either language are different. At the very least, it can be concluded that the metacognitive questionnaires evoked a repertoire of metacognitive knowledge and strategies for reading comprehension that was somewhat more strategic and reader-directed in L2 than in L1 for this sample of bilingual readers.

Question 3: What Metacognitive Knowledge and Strategies for Reading Comprehension Contribute to Reading Comprehension in English and French?

Question 4: What is the Relative Influence of Oral Language and Metacognitive Knowledge and Strategies for Reading on Reading Comprehension in English and French?

The significance of L2 vocabulary, an oral language component, in predicting both L1 and L2 reading comprehension, superseding the influence of an L1-based

strategy component and an L1-based oral language variable, marks an important distinction from several previous studies with bilingual readers that instead highlighted the significance of L1 metacognitive skills (e.g., Van Gelderen et al., 2004; Zhang, 2001). In fact, for this study, there was no evidence that any of the L1 strategies transferred to influence L2 reading comprehension, not even for the L1 word-level difficulty items that encompassed aspects of letter sounds and pronunciation that are known to be easily transferrable between languages. This goes against the general tenet of the Linguistic Interdependence Hypothesis, proponents of which argue that "reading is reading", that once L1 reading skills are acquired in the L1, they are available for use (i.e., are "transferable"), and highlights instead the LTH: A minimum level of L2 oral language ability is required before reading skills from L1 are transferred to L2 reading. The students in this study had likely not acquired a sufficient amount of oral proficiency in French to allow transfer of their metacognitive skills for English reading. For example, the average performance on the French Vocabulary task was quite weak, approximately at the 10th percentile.

Although the correlational nature of these results prevents making causal links to explain the specific relationships observed in this study, it is nevertheless possible to identify differences between the contexts that surround L1 and L2 reading acquisition (for language learning in general, and for the sample of students in this study in particular) that may surround the dynamic between the variables under investigation. This idea comes from claims by authors who asserted that explaining reading ability should be done from a situational perspective (e.g., Bernhardt, 2010; Koda, 2005). In this view, a reader's strategic approach will differ from one situation to another, depending on the unique balance of personal strengths and weaknesses in L1 and L2 on certain important

predictors of reading comprehension. Furthermore, the type of environment (foreign versus second language), directionality of language learning (e.g., L1 English–L2 French; L1 French–L2 English) and the nature of the reading task will determine the relative influence of L1 reading skills and L2 oral abilities in reading comprehension (reference Cummins, 2000).

Efforts to describe sources of reading ability have given detailed accounts of readers' personal characteristics (i.e., cognitive abilities–what the learner brings to the task; Grabe, 2009). However, often overlooked are how such personal characteristics play out according to the language-learning demands imposed in learners' L1 and L2. It has long been acknowledged that language should be studied in a way that is connected to its situational use (Breen, 1985; Duranti & Goodwin, 1992). This idea is directly applicable to the present study by looking at differences in instructional approaches in English and French language arts to see whether they may account for differences in the demands made for processing language.

In the L2 teaching literature, language teaching focuses on a formal knowledge of the L2 and its rules. This may contribute to growth in metalinguistic awareness, through which learners make a conscious and deliberate effort to acquire explicit knowledge of the language that can be characterized as "knowledge about language" (Bialystok, 2001, pp. 123). Language learning in the L2 classroom leads students to engage in activities that have been specifically designed to teach specific linguistic features. Following this practice, the Quebec provincial curriculum for teaching French as a Second Language (FSL) encourages active engagement between learners and text structure in L2. For students learning French as their second language in Quebec, a focus on language form and structure is a fundamental aspect of the curriculum at the primary and secondary

levels. To encourage development in both reading and writing, curriculum goals draw students' attention to the linguistic structure of the language by having them engage in a variety of language learning activities. The following is an extract of the provincial curriculum for French as a second language that outlines this point as a general objective:

> Le programme du français, language seconde, vise la maîtrise de la langue française et non une simple connaissance de la grammaire, détachée de la pratique. Pour progresser dans le développement de ses compétences langagières, l'élève doit néanmoins développer une attitude réflexive à l'égard de la langue parlée et écrite. Il lui faut en observer le fonctionnement et découvrir les éléments qui assurent la cohérence et la structure d'un texte, les marqueurs d'organization graphique et textuelle ainsi que les codes et techniques propres du langage médiatique. (Ministère de l'Éducation, du Loisir et du Sport, 2004, p. 173)

Deeply embedded within this general objective is the development of students' appreciation of the grammatical, syntactic, and semantic composition of the French language:

> Lorsque l'élève produit des textes ou interagit en français, il sélectionne et met en relation un certain nombre de mots ou de groupes de mots dans des phrases ou des énoncés. Il analyse et adapte au contexte langagier de nombreuses notions liées à la grammaire de la phrase, qu'il organise selon les règles de la syntaxe et de la sémantique. D'autre part, lorsqu'il lit, l'élève repère les éléments de la phrase de base, comme les groupes du nom, les groupes du verbe et les groupes compléments de phrase, pour les mettre en relation. (Ministère de l'Éducation, du Loisir et du Sport, 2004, p. 175).

Therefore, within the FSL curriculum, acquiring a sensitivity toward French linguistic structures includes, for example, making appropriate conjugations between verbs and their subjects, understanding the functions of adverbs, prepositions, conjunctions, relations between graphic spelling patterns, sounds and meaning (e.g., an versus ent; è versus ais).

The Quebec English Language Arts (L1) curriculum is quite different in the sense that its global objective is communicative in nature, focusing on the oral and written domains:

> The secondary ELA program will lead students to realize that effective use of language in formulating their ideas, and effective participation in the communication process are essential to their intellectual, emotional, and aesthetic growth, and to their development as contributing members of society (Ministère de l'Éducation, du Loisir et du Sport, 1982, p. 15).

In aspiring to this goal, the secondary English Language Arts curriculum in Quebec has four major aims: (a) Foster effective participation in the communication process, (b) lead students to use language effectively in formulating their ideas, (c) value the ability to participate effectively in the communication process, and (d) value the ability to use language effectively in formulating their ideas. Students respond to different types of literary works (i.e., reader response), expand upon ideas (brainstorming, exploratory talks), assume a role in communication contexts (express oneself with clarity; determine the validity of one's own expression in light of others' responses). Globally speaking, the English language arts curriculum emphasizes language development through the formulation of ideas, views, and opinions in response to different types of literary works (e.g., novels, plays, poems) and written activities (essays, reports, short

stories). There is little mention of understanding the structure of the language in and of itself.

An important distinction, therefore, between the ELA and FSL curricula is that the FSL curriculum focuses more obviously and explicitly on the form of the French language: understanding the composition and structure of the language, and how the linguistic pieces fit together into strings of syntactically appropriate words and sentences. This approach to teaching L2 has been noted as a common approach to teaching a second language (Bernhardt, 1992; Genesee, 1987). Although instruction on form was developed in the context of grammar learning, it has been extended to vocabulary as well, wherein learners' attention is drawn to lexical items–single words and multi-word units (Fisher, Blachowicz, & Watts-Taffe, 2011).

The implication is that the way that learners are accustomed to think about and process language in L1 differs in many aspects from how this is done in L2. It follows that the instructional events designed to meet the objectives in either language curriculum (i.e., grammar drills, sentence analysis, learning verbs in L2; reader response, text analysis in L1) also differ, with tasks in L2 designed to help students acquire a grasp of linguistic features of the language.

Highlighting some of the main features of the language-learning context in English L1 and French L2 serves as a framework to help interpret the results from this study, taking an information-processing perspective on language learning: How an individual deals with incoming information is a function of past experience and characteristics of the input (McLaughlin, Rossman, & McLeod, 1983). Within this theoretical view, sets of cognitive abilities are differentially related to language learning under different language processing conditions. These conditions can be situational, and

therefore can involve specific learning tasks that are performed in classrooms, or cognitive, and relate to different levels of processing complexity involved in completing language tasks (Robinson, 2002). Could it be that metalinguistic processing exerted by the L2 vocabulary task tapped into students' ability to focus on form and language structure? This could have facilitated or mediated their comprehension of text. Further investigations on similarities and differences in L1 and L2 language-learning contexts, and the various processing demands imposed therein, is worth pursuing, especially with regard to what can be revealed about students' conceptions of learning language and whether or how such conceptions may impact reading ability (e.g., Baynham, 1995).

No significant relationships were observed between the metacognitive components and reading comprehension beyond that noted between Effective Word Reading Behaviors and comprehension in English. Furthermore, with regard to metacognitive strategies and reading in French, no significant relationships were found. This was unexpected, given that students approaching the end of high school should be capable of resorting to metacognitive strategies to comprehend text. It is plausible that the metacognitive strategies questionnaire did not fully tap into the reading strategies students already possessed; this may especially have been the case for reading in French. Specifically, the questionnaire used in this study did not include items related specifically to second-language reading comprehension strategies, such as translating, production strategies (i.e., searching for explicit textual signals of cohesion; Cohen, 1994) and changing unfamiliar words to more familiar ones (Sasaki, 2000). Use of a metacognitive reading strategies questionnaire that addresses a broader range of reading comprehension strategies in L2 is an issue that remains to be addressed in future research.

With regard to the goal set by the OLSPB, which was to double, by 2013, the number of bilingual high school graduates who can successfully comprehend written text in their L2, it seems fair to suggest that the variables in this study that reflected significant relationships with reading comprehension fell short of the types of reading strategies that students would normally use to develop a deep understanding of what they read. Metacognitive skills have long been acknowledged to be conducive to comprehension at the secondary (Alfassi, 2004) and post-secondary levels (Taraban, Kerr, & Rynearson, 2004). In particular, awareness and monitoring of reading comprehension are regarded as "critically important aspects of skilled reading" (Mokhtari & Reichard, 2002, p. 249). Given that the participants in this study are one year from graduating from high school, there is a cause for concern in terms of their preparedness to enter the workforce or handle a heavier course load in college that involves a lot more reading, comprehending and retaining of information. The readers in this study appear to rely on word decoding and word knowledge to comprehend text–a rather limited repertoire of skills in light of their transition to post-secondary education in approximately one year's time. There is indeed a need for these students to develop methods of comprehending text beyond word reading skills and language comprehension, and to encourage their use of appropriate reading strategies for successful reading of material at their grade level.

Combining only the significant oral language and metacognitive knowledge factors revealed French vocabulary to be a significant predictor of reading comprehension in English. Even when controlling for nonverbal reasoning and word reading in English and French, this cross-language effect remained unchanged. In comparison to the voluminous research geared toward L1 influences on L2 reading ability, there is a wide range of empirical issues that remain unaddressed with regard to L2 influences on L1

reading ability. Since this "reverse transfer" relationship is correlational in nature, and also considering the limits in generalizing the results from this study due to its small sample size, the following section addresses specific points as cautionary considerations in interpreting this finding.

The first issue concerns the comparability of the relationship observed between French vocabulary and French reading comprehension, and French vocabulary and English reading comprehension: Is the nature of these relationships the same? The within-language relationship is commensurate with the general tenet of the Linguistic Threshold Hypothesis, which maintains that language proficiency is needed to read well in L2 and that improvement in L2 reading ability comes with L2 language development. However, in light of a number of sources (e.g., Droop & Verhoeven, 2003; Jiang, 2011; Verhoeven, 1994, 2000) that have discussed the facility with which some reading skills transfer compared to other skills, there is reason to suspect that the processes that underlie the cross-language relationship may not represent a direct mapping of the processes responsible for the within-language vocabulary-reading comprehension relationship.

The bulk of the literature on skill transfer in bilingual reading involves *metalinguistic* skills of various forms and levels. Metalinguistic skills are general (i.e., not language-specific) and transferable. Vocabulary usually falls under the category of *language* skill, and not a metalinguistic component in the traditional sense of the term. Prior investigations have repeatedly shown that various forms and levels of metalinguistic knowledge can transfer from L1 to affect reading performance in L2. For example, in alphabetic languages, there is a general consensus that, among younger readers, knowledge of the sounds of words (phonological awareness, sight-word reading, decoding ability), and the spelling of words (orthographic knowledge) in L1 can transfer

to the L2 (Deacon, Wade-Woolley, & Kirby, 2009; Lindsey, Manis, & Bailey, 2003; Lopez & Greenfield, 2004) and helps learners build similar abilities in their L2. It has therefore been possible to make predictions about L2 performance in these word-level domains based on the nature of these same representations in L1 (Durgunoglu, 2002). Among more experienced readers, for whom the goal of reading shifts to comprehension, metacognitive knowledge and reading strategies are presumed to play a prominent role (Carrell, 1989). The literature on metacognitive knowledge and strategies is based on the assumption that bilingual readers, when reading in L2, have at their disposal their L1 and may use this as a strategy (i.e., transfer) to help them in their reading (Cook, 1992; Kern, 2000; Nambiar, 2009).

Recently, within the monolingual literature, theorists have expanded their conceptual view of "vocabulary", traditionally defined as knowledge of individual words, to include the notion that the process of learning word meanings is in itself a metalinguistic activity (Blachowicz & Fisher, 2011; Nagy, 2007). Specifically, three distinct metalinguistic dimensions were proposed as contributors to one's concept of a word: breadth (i.e., the definition), contextual sensitivity (i.e., the word's relationship to other words and connotations in different contexts), and morphological awareness (i.e., its transformation into other morphological forms; Kieffer & Lesaux, 2012; Nagy & Scott, 2000; Stahl, 1999). The process of acquiring knowledge of a word–particularly an abstract, conceptually sophisticated word–is thought to develop incrementally over time, with students gaining additional information about a word with each meaningful, contextualized encounter with it. In this view, vocabulary learning is a comprehensive process (Graves, 2006).

The L2 literature has also initiated discussions about L2 vocabulary along metalinguistic terms. Jiang (2000) addressed this idea in his proposal of a framework for L2 vocabulary development in which he described how L2 word meanings are made up of features beyond the simple recognition that a letter string is a legitimate word in the target language and as knowing the meaning of this letter string. Jiang discussed the internal structure of lexical entries in L2 being constrained by a pre-existing L1 semantic system and learners' reliance on this L1 system in learning new words in L2. At the same time, although a lexical entry is established for formal information of the L2 word, semantic and syntactic information of its L1 translation is also added. Jiang noted that the majority of L2 words fossilize at the second stage. A final, third stage follows, which consists of the addition of L2 information other than formal specifications. Conscious effort is put forth on behalf of the language learner into selecting appropriate lexical items to fit the context. Jiang's (2000) proposal of the nature of L2 vocabulary knowledge complemented current psycholinguistic research about the development of semantic knowledge among bilinguals. Current studies on the organization of the bilingual lexicon have concluded that mental representations for lexical information among bilingual individuals appear to be a lot more connected than originally depicted. One such proponent is Libben (2000). His proposal of the Homogeneity Hypothesis asserted that bilinguals possess a single lexical store and lexical architecture. He claimed that "monolinguals, bilinguals, and second language learners possess the same kinds of lexical representations and employ the same kinds of processes in the activation of words in the mental lexicon. Thus, monolingual, bilingual, and second language lexical knowledge can be represented in a single lexical architecture and there is no need to postulate individual lexicons for individual languages" (p. 229). His theory was consistent with

monolingual investigations into word association effects, which had a lot to do with demonstrating the connectivity among semantic structures. Psycholinguistic research with monolinguals has shown that activation of one element in the mental lexicon results in the activation of other lexical elements that are related semantically, morphologically and formally. The activation of associated units occurs without conscious awareness or control. Libben (2000) proposed that the same occurs in bilingual processing. Therefore, for an individual whose lexicon contains words of more than one language, all representations linked by meaning, sound, or visual form should show activation effects, particularly in the early stages of processing (see Libben, 2000, p. 238 for a list of experimental studies supporting these claims).

In light of recent discussions expanding the notion of what constitutes "vocabulary knowledge" (e.g., Jiang, 2000; Kieffer & Lesaux, 2007; Nagy, 2007), further research is needed to acquire a better understanding of the cross-language relation between L2 vocabulary and L1 reading comprehension. Is this correlation representative of knowing the meaning of words, or are more comprehensive linguistic processes at work? Priority should be given to carefully defining the term "vocabulary knowledge". Some researchers (e.g., Melby-Lervag & Lervag, 2011) have discussed the benefits of using more than one type of task so as to acquire a more reliable measure of a particular language skill. Although not feasible given the context of the present study, future research should indeed assess oral competence through different modalities (e.g., oral and written) using different types of tasks in an effort to better isolate potential relationships between language and reading. While speculative at this point, it is possible that the L2 vocabulary task may have prompted processes beyond those implicated in semantic

knowledge, hence not measuring vocabulary knowledge the way it was originally intended.

The reverse relationship observed between L2 vocabulary and L1 reading comprehension in this study seems to align well with the Linguistic Interdependence Hypothesis: A reading skill may be transferred between languages once it has been acquired. While the directionality of this relationship is not consistent with the bulk of previous research findings, it does support Nagy's (2007) suggestion that the vocabulary-reading comprehension relationship may be more complex than formerly believed, particularly for bilinguals, and perhaps more closely related to metalinguistic processing than previously recognized.

A further issue that suggests caution should be exerted in interpreting the reverse relation between L2 vocabulary and L1 reading comprehension is the fact that the two versions of the NDRT may have been unbalanced in terms of their difficulty level since they were not controlled for aspects of language (words, phrases, and sentences) that can help the reader build a coherent representation of text-and are known to influence comprehension processes in L1 and L2. For example, "logical connectives" are language features–essentially, "chunks" of information, expressed either overtly or covertly in text, which help identify relationships between sentences (Celce-Murica & Larsen-Freeman, 1983, p. 323). They include words and phrases such as *furthermore*, *however*, *on the other hand, in contrast* and *although* that make explicit the functional relationships between different ideas in a text (Nunan, 1999, p. 304). The ability to perceive these connections in text has been shown to be a strong determinant of reading comprehension (Pretorius, 2006). Skilled readers perceive how information in text is connected in a relatively unconscious manner, while less proficient readers have greater difficulty

inferring implicit connections and rely mostly on explicit text signals (Pretorius, 2006). The result is that less-skilled readers may miss vital information in a passage.

Chung (2000) investigated how logical connectives are processed by L2 readers at different proficiency levels. He found that the low-proficiency group, unlike the high and medium groups, relied heavily on explicit discourse signals as meaning-making devices. Others have found evidence showing that some logical connectives (e.g., *because*) are processed more easily than others (e.g., *however*), particularly for low-ability comprehenders and among students of differing L2 proficiency levels (Ozono, 2002; Ozono & Ito, 2003). Regarding the present study, though speculative at this stage, it is reasonable to assume that linguistic aspects in the English test were easier to process than those in the French test (e.g., au contraire; de plus; ainsi) given that the participants' oral skills were weaker overall in their L2 (as shown by comparisons between the scores on the English and French oral language tests in which there were greater numbers of correct responses on the English tests).

Unbalanced comprehension tests complicates the task of analyzing the relationship observed between L2 vocabulary and L1-L2 reading comprehension, as we cannot be certain that the reading tests were comparable with regard to aspects of language that are known to affect comprehension (i.e., logical connectives). The French test was a translation of its English equivalent, and although care was put into rendering the texts authentic and real (e.g., by inserting names and places students would be familiar with in French), less attention was paid to balancing the English and French texts for aspects of language that can affect the difficulty level between the two activities. One study that provided an example of how the reading comprehension tests could have been treated came from Taillefer and Pugh (1998), who explained how they looked at three

criteria in designing their reading comprehension tests: the nature of the task (i.e., ensuring both measures were motivating and initiated appropriate cognitive responses), the tests themselves (i.e., validity, reliability, length) and, most importantly for the issue under discussion, the texts to be read–specifically, their formal and content schema, appropriateness and readability. Taillefer and Pugh noted specifically that their reading tests underwent simulations to ensure "appropriate reading style on two distinct but parallel tasks" (p. 99). Future research should further explore this methodology, which may enable more accurate conclusions when it comes to analysing processes responsible for within- and between-language relationships of oral skills and reading comprehension.

Question 5: Which Theoretical Framework (Linguistic Interdependence Hypothesis; Linguistic Threshold Hypothesis) is Better Supported by the Results Obtained in this Study?

This study was designed within the parameters of two popular theories that have guided a significant proportion of L2 reading research: The Linguistic Interdependence Hypothesis (LIH) and the Linguistic Threshold Hypothesis (LTH). Although the small sample size in this study prevented a statistical comparison of which theory was better supported by the data, it was possible to discuss the findings and their implications taking into consideration the tenets of both views. One particular advantage of this research, compared to many other L2 studies designed according to the same theoretical frameworks, is that information was gathered about participants' L1 oral language skills and L1 reading comprehension performance. This aspect of the research allowed for a more comprehensive evaluation of the processes that could potentially influence participants' reading comprehension in L2. Furthermore, it enabled the formulation of

new predictions about the nature of reading comprehension among this population of bilingual students.

Among this sample of weak bilingual readers, L1 reading skills (metacognitive factors) were not related to L2 reading and the most obvious explanation for this is because the readers had probably not acquired sufficient oral skills in L2 to enable transfer of L1 skills. Although this follows the general reasoning of the LTH, it is important to consider another important variable that may have impeded the transfer of L1 skills to L2 reading (whether or not L2 oral skills were sufficiently developed): The influence of students' L1 and L2 language-learning context. Analysis of the L1 metacognitive reading strategies revealed that the students did not resort to reading strategies that would imply they were capable of deep processing of text. It is important to keep in mind that the only L1 metacognitive strategy that significantly related to L1 reading comprehension was a word-level difficulty component that consisted of aspects of word reading that readers perceived themselves to have difficulty with; this probably does not help a great deal when readers try to understand a text in a second language. Therefore, as weak readers, the students may not have been "equipped" with the appropriate reading comprehension strategies in their L1 in order for transfer to occur. It is possible that the development of reading comprehension strategies was not a focus in students' L1 language arts curriculum, which means that the students may not have had an opportunity to develop the type of reading strategies to the point that they would influence their reading in L2. A similar argument can be made for the finding that no significant relationship was observed between L2 metacognitive reading strategies and L1 reading. Perhaps the nature of reading strategies acquired in L2 did not "fit" with the type of reading skills that would have enabled students to read better in L1.

The relation between L2 vocabulary and L2 reading comprehension as well as with L1 reading comprehension was interesting for several reasons, one being that the directionality of the relationship (L2 vocabulary to L1 comprehension) was not observed in comparable studies that were conducted previously. The LIH provides an appropriate context in which to discuss this result because it affords the opportunity not only to look at reading-related skills that are established in L1 and how they influence L2 (the traditional way of applying this theory), but also the reverse of this relationship: How reading-related skills, established in L2, may influence reading in L1. This line of reasoning resonates well with the reference made to Grosjean (1982) earlier in this thesis (see page 16), that the bilingual mind is not two separate minds but one. Given this conception of bilingualism, it makes sense that a theory of bilingual reading should guide explanations for how L1 variables influence reading performance in L2 as well as how L2 variables influence reading performance in L1.

Both the LIH and LTH provided appropriate theoretical contexts in which to interpret the results obtained in this study; however the LTH provided limited insight into the overall picture that was portrayed by the students' performance in reading comprehension, not only for explaining the absence of transfer of L1 reading strategies to L2 reading comprehension, but also for the finding that L2 vocabulary significantly related to reading comprehension in L1 and L2. On the other hand, the tenets of the LIH are less restrictive in the sense that predictions about reading performance can be made in either direction (from L1 to L2 and from L2 to L1). This is in contrast to the LTH which is more unidirectional in nature because it looks to L1 skills to explain reading in L2. Given that elements of the language-learning context may affect how language is subsequently processed, it is crucial to take environmental influences into consideration

in order to achieve a better understanding of reading performance in bilinguals. An important implication that follows from this last point, which is especially relevant with regard to the present study, is that the tenets of the LIH are better suited to generate questions and propose explanations about how aspects of a bilingual learning context may influence reading in L1 and L2. The need to consider the learning context in order to pinpoint variables that may influence reading ability is a point that was argued early in this thesis, and provided a compelling reason to pursue this research.

Implications for Instruction

The present study will be of interest to educators involved with anglophone high school students who learn French as a second language for the instructional implications of its findings. In order to design effective interventions to help struggling readers, researchers and educators need to understand the variables that affect reading, which in turn will help them focus on the aspects of the reading process students need help with (Cromley & Azevedo, 2007). In a bilingual learning context, in which students are expected to acquire reading skills in two languages, deciding how to ameliorate reading skills begins by recognizing the types of skills that contribute to reading performance in either language. Instruction can therefore be geared in such a way so as to target areas where students need improvement.

Improve Reading Fluency

Teachers should pay particular attention to their students' reading fluency. Wolf and Katzir-Cohen (2001) described reading fluency as "a level of accuracy and rate where decoding is relatively effortless; where oral reading is smooth and accurate with correct prosody; and where attention can be allocated to comprehension" (p. 219).

The L1 reading literature regards fluency as a key component of reading comprehension and processing extended text (Bowey, 2005; Grabe, 2010; National Reading Panel, 2000). Correlations between fluency skills and reading comprehension have been reported as high as $r = .81$ to $r = .90$ (Fuchs et al., 2001). While for grade-level readers this strong relationship appears to diminish by the fifth grade, among weaker readers the strength of the relationship is maintained throughout adulthood (Stanovich, 2000). L2 theorists (e.g., Segalowitz, 2000) have explained L2 fluency along similar

terms as in the L1 literature, citing the importance of word recognition accuracy and automaticity as a basis for processing extended text.

By the time students reach high school, the expectation is that they have acquired sufficient fluency, especially in their L1. However, recent reports have cited problems related to reading efficiency as an important source of learning problems among adolescents. Furthermore, among adolescents in particular, reading fluency is a primary source of reading difficulties (Landerl & Wimmer, 2008).

In the present study, a word-level metacognitive component emerged as a variable that students perceived to cause reading difficulties in both English and French. Specifically, word sounds, as well as their pronunciation and recognition, were noted as sources of their reading problems. Although word reading was not a main target of interest in the present research, the nature of the word-level metacognitive component implied that word-reading accuracy was a source of reading difficulty. Problems and mistakes in working out the correct pronunciation of certain letter strings impedes reading fluency, and results in difficulties with comprehension (Thaler, Ebner, Wimmer, & Landerl, 2004).

Evidence is mounting that fluency instruction is as important for adolescent readers as it is for beginning readers, particularly for those who struggle with reading (e.g., Rasinski et al., 2005). Interestingly, fluency instruction is almost nonexistent in many L1 and L2 reading courses, and many teachers do not know how to include a fluency component in instruction (Grabe, 2009). Among the training studies on reading fluency, one commonly used method cited in the L1 literature is the repeated reading technique (Samuels, 1985) in which certain reading material is read repeatedly until a particular rate is attained. It is theorized that the method develops automatic, effortless

word recognition, freeing readers' cognitive resources and allowing them to direct more attention to higher-order comprehension processes. Samuels's method has learners re-reading a short passage, three or more times, until they are able to read at a criterion level of words per minute. The benefits of increased oral reading rates and accuracy, and consequently reading comprehension, through repeated readings have been noted at length for L1 readers (e.g., Dowhower, 1987; Therrien, 2004).

Within the L2 context, research into reading fluency consists of a newer research endeavor compared to the work that has been done with readers in their L1 (Grabe, 2010). Some recent L2 studies applying a repeated reading approach reported significant gains in silent reading rates (Gorsuch & Taguchi, 2010; Taguchi, 1997) and comprehension level (Gorsuch & Taguchi, 2008). Oral reading activities that allow students repeated exposure to explicit teaching of words, including automatic word recognition and fluent use of words, are conducive to the gradual development of fluency. Closely associated with repeated reading are additional word-level skills that facilitate fluency: building and extending vocabulary, as well as teaching common word parts and spelling patterns (Hickey, 2007). Together, these activities will likely continue to gain recognition as effective means to help both L1 and L2 readers achieve better comprehension.

Engage Students in Extensive (Wide) Reading

Extensive reading is the practice of "exposing learners to large quantities of material within their linguistic competence" (Grabe & Stoller, 2002, p. 259). It is intended to develop good reading habits, to build up knowledge of vocabulary and structure, and to encourage a liking for reading (Pigada & Schmitt, 2006). There is a significant body of L1-based reading studies that supports the relation between extensive reading programs and improvement in students' overall reading skills, including gains in

syntactic knowledge and general knowledge (Nation, 2001), vocabulary knowledge (Horst, 2005), as well as fluency and comprehension (e.g., Bell, 2001; Iwahori, 2008).

The theory in support of extensive reading is based on "comprehensible input" – acquisition of language that is slightly above one's current level of competence. Sufficient amounts of comprehensible input encourages the build-up of linguistic competence by continuously understanding language input which is slightly above one's current level of functioning (Chou, 2011). This rationale supports the implementation of an extensive reading approach to enhance reading comprehension as language competence is developed in large part through reading (Davidse, de Jong, Bus, Stephen, & Swaab, 2011; Mol, Bus, & de Jong, 2009).

Exposing learners to comprehensible input in L2 is regarded as a practice conducive to acquiring different aspects of a second language, including the sounds, writing system, grammatical structures, words and discourse. Some have claimed that comprehensible input is the primary factor in second-language acquisition (e.g., Rezaee & Nourzadeh, 2011). This principle underlying comprehensible input and the role it plays in language development has been extended to the L2 reading literature. Extensive reading in practice consists of readers selecting of high-interest reading material from a wide range of topics (Day & Bamford, 2002) that match their linguistic competencies. Comprehension is the main goal of the activity. Numerous studies have demonstrated the effectiveness of extensive reading as it improves not only reading comprehension, but readers' attitudes toward reading, motivation to read, as well as reading fluency (e.g., Day & Bamford, 1998; Kuhn, 2004; Meng, 2009; Rodrigo, Krashen & Gribbons, 2004; Yamashita, 2008).

Extensive reading is deemed an appropriate approach to incorporate in the classrooms that constitute the L2 learning environment of the target population in this study. The aspect of extensive reading that appears to be a good match for this particular L2 population is the opportunity to process large amounts of written language, including vocabulary, grammar, syntax, and rhetorical features of text in French. Participants' performance on the oral language measures in this study was particularly weak, and likely constituted a significant obstacle to attaining a firm grasp of the texts they were required to read and respond to.

A further contributor to participants' weak reading comprehension appeared to stem from their not having had enough opportunities for reading in French, beyond what they were required to do for their coursework. The students reported that they engaged in nonschool-related reading in French, on average, less than two hours per week, suggesting that their experience with French reading was limited to the activities that took place during French classes. One important objective for these students, therefore, should be to simply get them to read more in French, even if this occurs in large part in the classroom. Stanovich (2000) demonstrated that the amount of overall exposure to print is directly related to comprehension abilities. Therefore, an increase in the amount, variety, and nature of written input in French, at an appropriate level of difficulty, would likely be conducive to students' mastery of the form and meaning of the language.

Teach Reading Strategies that Foster Reading Comprehension

In this study, no student-initiated reading strategies emerged from participants' perception of how they approach reading in English. In contrast, it was aspects of the decoding process (e.g., sounding out words, pronunciation of words, understanding the meaning of words) that were significantly related to English reading comprehension.

None of the French metacognitive components was related to French reading comprehension. In light of the fact that at the time this study was carried out the participants were approaching the end of their fourth year of high school education, the small range of strategies that emerged from their responses to the metacognitive questionnaire was surprising and disconcerting.

One explanation for the students' small repertoire of perceived metacognitive knowledge and skills for comprehension may be that their reading abilities may not have grown automatically to the extent required to accommodate the demands of reading imposed by the curriculum. Reading comprehension does not automatically follow once decoding skills are established (Liang & Dole, 2006). It is now widely acknowledged that the conscious activities that underlie successful comprehension (e.g., rereading, activating background knowledge, and adjusting reading speed) become part of readers' repertoire over time, with effort and practice (McNamara, 2007).

Offering explicit guidance to students as they move along through high school would likely help them to figure out which strategies to apply to achieve better comprehension. This idea alludes to Adams's (1998) statement that reading should be a continuously developing skill, and translates into a practical recommendation for educators involved with the population targeted in this study: Increase students' ability for deep processing of text. In light of students' responses to the metacognitive reading strategies questionnaire, the message to educators is that there is an apparent paucity in the repertoire of reader-initiated comprehension strategies. This sets an important objective for students: To acquire a repertoire of specific behaviours conducive to achieving comprehension–actions they can deliberately select and control to meet specific reading goals (Carrell, 1998).

To learn a strategic approach to reading, struggling readers must be taught how, why and when to use a particular strategy. Research in both first and second language contexts demonstrated that reading strategies can be taught, and that students benefit in terms of the level of comprehension attained (e.g., Janzen & Stoller, 1998). One particularly effective approach is described within a social-constructivist learning framework, in which the learning process is based on building meaning through dialogue, at a level just beyond the current competence of the learner (e.g., Zhang, 2008). Reading-strategy instruction occurs through dialogue, wherein students internalize the strategies demonstrated by their teachers. In the case of reading-comprehension strategy instruction in an L2 setting, the teacher's guided support is helpful in the sense that it provides a "situation where a knowledgeable participant can create supportive conditions in which [students] can participate and extend current skills and knowledge to higher levels of competence" (Donato & McCormick, 1994, p. 40). Teachers can help students develop this awareness by explicitly modeling reading strategies through the use of think-alouds or guided-reading activities, questioning, and group discussions (Pressley, 1999). Sufficient independent practice in applying strategies to different texts is also important, so that students internalize the strategies and become aware of how they can adapt the strategies to different reading situations.

Limitations

Despite the strengths of this study enumerated in the second chapter, this study also included some limitations.

Limitations Related to the Study Design

Time investment to complete tasks. The time required by the participants to complete all language and reading tests placed an important caveat on conducting this study as originally planned. Initially, a multi-group analysis was designed to compare the reading ability of strong and weak readers. Students who volunteered were required to participate in 3½ to 4½ hours of testing, which amounted to approximately five class periods at school. Although the schools were very supportive of their students' participation in this research, a great deal of flexibility and coordination was required on behalf of the school staff to allow students to be excused from class throughout the day, and to reserve space within the school to accommodate group testing. As a result of data collection spanning several class periods over several days in both schools, many participants were absent for at least one of the test sessions, which led to incomplete data sets for most measures. Furthermore, end-of-year preparations and course revisions for provincial exams from the Ministère de l'Éducation, du Loisir et du Sport that took place at the same time this research was conducted required participating students to remain in class for these important course reviews. This factor was a major impediment to recruiting more students for this study, and may have even discouraged potential research candidates from participating (they may have chosen to stay in class, to focus their energies on studying as opposed to participating in a research). Ultimately, recruiting more students would have entailed fitting these participants into what was already a very tight assessment schedule for a single researcher. Furthermore, in light of the fact that the

participating schools were located 3 and 7 hours away from Montreal respectively (home of the researcher), extending a stay was not an option due to the extra costs this would have necessitated.

As a consequence of the issues discussed above, the sample size of the research was smaller than desirable, and the researcher was left with little choice but to downsize the original research design, from a multiple-group design to a single-group correlational research design. Several other types of research designs (e.g., longitudinal study; cross-sectional research design) would have offered advantages over the correlational nature of the single group design of the current study. This point will be discussed in greater detail in the section designated for suggestions for future research.

Limitations Related to Measures

Metacognitive knowledge and reading strategies questionnaire. The metacognitive knowledge and strategies questionnaire selected for this study was chosen based on its use in prior research with diverse bilingual populations who were in comparable grade levels as the participants in the current study. This seemed an appropriate tool to use with readers who were anticipated as average comprehenders, and who had not received any type of formal training in reading comprehension strategies. The disadvantage of using Carrell's (1989) questionnaire, however, is that the nature of the data collected was limited to basic metacognitive knowledge and strategies related to reading. Future research with this population needs to thoroughly address a broader range of metacognitive skills that underlie reading comprehension with measures that are designed to tap into more specific knowledge sources and skills that have been found to relate to reading comprehension in bilingual populations (e.g., Mokhtari & Sheorey, 2002). In addition, the use of a questionnaire, though time-efficient, may have led to

discrepancies between what participants report versus what they actually do while reading. Several researchers have commented on the benefits of incorporating more than one method for gathering reading process data (e.g., Alderson, 2000; Pressley & Afflerback, 1995). Future research may address this limitation by incorporating a think-aloud protocol, which may reveal a richer source of metacognitive knowledge and strategies.

Measures of oral language. Gathering language and reading data in English and French required administering the appropriate tests to measure the variables of interest. To this end, special attention was given to match the L1 and L2 oral language and reading tests to facilitate between language comparisons of results, as well as to present the tests to students in such a way that they were familiar with the response format (e.g., multiple-choice test format). Although several standardized tests were available that met this requirement in English, it was a challenge, given the lack of published assessments, to select suitable methods to assess a number of oral skills in French, such as listening comprehension, syntax, grammar, as well as reading comprehension. In cases in which there were no available standardized French tests, the English tests were translated into French. The downfall of resorting to direct translation of English tests into French is that there was no control set for the level of language difficulty on the French oral language tests, thereby possibly placing the weaker participants at a disadvantage and potentially underestimating their actual oral abilities in L2.

Lack of test-retest reliability and test validity for some measures. Unfortunately, because of limited availability of appropriate French tests including the Concepts and Directions, Listening Comprehension, and the reading-comprehension test, no reliability for these measures could be presented in this study. Nonetheless as

discussed in the Method chapter (Chapter 3), the published test-retest reliabilities and validity for oral language and reading comprehension tests are generally within an acceptable range.

Limitations Related to Statistical Analyses

A limitation was imposed on the generalizability of the results by the use of a principal components analysis (PCA) procedure to reduce the data gathered with Carrell's (1989) metacognitive questionnaire, given the small sample size. Unfortunately, there are few sample-size guidelines for the use of a PCA. Guadagnoli and Velicer (1988), for example, reviewed several studies that ranged in recommendations from a minimum sample size of 50 to 400. Although its use is appropriate to explore trends in the data obtained with the reading strategies questionnaire for a population that has received little research attention, greater generalizability is indeed an additional reason to recommend the inclusion of more participants in future research.

Overall, considering the methodological and limitations issues with the analyses discussed in this section, all results described here should be interpreted with appropriate caution.

Directions for Future Research

Design Studies that Include Readers of Differing Ability Levels.

A cross-sectional study would have been a good alternative to the present investigation, allowing for important savings in time and cost that a longitudinal design entails. Cross-sectional studies are popular in the field of reading research. Applied to my study, a cross-sectional design could have been used to assess the oral language skills and metacognitive abilities in L1 and L2 of students at different grade levels (e.g., grades 6, 8, and 10). This type of design would have allowed me to observe the relative importance of these component skills in terms of their contribution to reading comprehension ability at different levels of reading development. Research teams in Europe have conducted a number of studies using a cross-sectional design, in which they compared the reading-related skills of students beginning in the elementary level and following them through to the secondary level. Future investigations with the population under study in this research, using a larger sample size, should follow suit and combine readers at different grade levels.

Design Studies that Allow Observation of Change among Measures

A longitudinal design would have enabled us to establish the direction and magnitude of causal relationships in this study. This type of design is popular among European reading researchers who have studied the contributions of different types of language skills (e.g., vocabulary and grammar knowledge) and cognitive or processing skills (metacognitive reading strategies; processing speed) to reading comprehension ability among the same group of students at the elementary level and high school level. Verhoeven and Van Leeuwe (2008), for example, looked at word decoding, vocabulary, and listening comprehension abilities among a sample of Dutch children to determine

which of two popular theoretical frameworks best explained their results. This longitudinal design allowed these researchers to map the stability of the predictor variables at each grade level. This type of design would have allowed me to make the same type of observations with my students, from grade 7 to grade 11, with the added component of metacognitive knowledge and strategies for reading comprehension. Specifically, I could have assessed metacognitive knowledge and strategies in grade 7, upon students' entry to high school, and again either at the end of the school year or one year later to investigate how relationships between the variables may have changed or remained the same. A clear disadvantage to this type of study, however, is the amount of time needed to carry out the study to completion. Longitudinal research is demanding: it needs more careful planning than a cross-sectional study at many levels, such as organizationally and financially. Following the same individuals over time poses a risk of participant attrition, and a lengthy period of time to obtain results and, ultimately, to complete the project.

Design Studies that Compare Reading Comprehension among Different Types of Bilingual Groups

The most obvious follow-up study with anglophone bilingual students in Quebec would be to include a comparison group, namely, francophone students who speak English as their second language. Adding more students to the study, from a different L1 background, would allow interesting comparisons between oral language and metacognitive aspects that underlie reading performance in each group, as well as for comparisons of potential influential factors that stem from the learning environments.

Include Measures of Word Reading

When working with adolescent readers, many educators' goal is to develop different types of reading skills, such as study skills and strategies for reading comprehension. However, among adolescents, differences in comprehension may reflect level of decoding skill (e.g., Shankweiler, Lundquist, Dreyer, & Dickinson, 1996). Curtis and Longo (1999) stated that as many as one out of every 10 adolescents has serious difficulties in identifying words. These difficulties usually stem from problems associated with the phonological aspects of word analysis, and are compounded by the tendency to abandon the process of trying to read a word and, instead, to guess at it based on context. This can lead to a sense of frustration, as cognitive resources are invested in a task (i.e., decoding) that should require minimal effort. Differences among adolescents in word-identification skill appear to be strongly related to the extent of their experiences with print (Curtis, 2004). While word analysis skill were included in the current study, measures of word reading need to be made more central to future studies.

Toward the end of the Literature Review of this thesis, there was mention of a national literacy goal set by the Official Languages Support Program Branch (OLSPB) of the Department of Canadian Heritage for the attainment of functional literacy in L2, whether in French or English, by 2013, for Canadian students at high school graduation. The present study has generated some clear research recommendations to help achieve this end. Most importantly, future studies should take a closer look at contextual variables that are specific to reading comprehension skills within the ELA (L1) versus FSL (L2) curriculum, and how they relate to reading comprehension in both contexts. Prior research suggests that differences in students' approach to reading comprehension may be accounted for by differences in the context in which reading was acquired

(Singhal, 1998), and might explain the observed differences in L1 and L2 reading observed in the present study. It is worth examining the standards set by the L1 and L2 language curricula, to determine whether the ELA or FSL curriculum can benefit reading comprehension performance by incorporating some of the methods and instructional goals set by its counterpart: How is language arts taught in the ELA and FSL curriculum, and how might differences in the approaches to teaching these languages contribute to variance in reading comprehension ability?

An interesting further research avenue which would also have important instructional implications would be to look at students' reading behaviour across different L1 and L2 reading tasks. For example, the multiple-choice test used in the present study was based on students' reading of short passages; different metacognitive reading strategies might be applied when students were studying for tests, reading longer texts, or answering different types of test questions (i.e., long-answer or essay type).

Overall Conclusion

Reading comprehension in L2 draws upon several skills that the reader brings to a reading task, including oral language abilities, and strategies for comprehension. However, characteristics of the language-learning contexts within which reading is taught and is developed, in both L1 and L2, can provide further insight into the nature of readers' comprehension performance. This may help explain how bilingual readers conceptualize a reading comprehension task and the strategies they use to understand written text.

One conventional way of investigating L2 reading ability among older readers has been to examine whether or not reading skills, developed in L1, transfer to influence L2 reading. No transfer of L1 word-level or comprehension-level strategies to L2 reading was observed in this study. This result was partly explained by the Linguistic Threshold Hypothesis. Furthermore, the only metacognitive reading strategy that predicted L1 reading comprehension was related to word-reading difficulties the readers perceived themselves as having difficulty with; no reading strategies associated with deep processing of text were related to reading comprehension in L1. Instead, an L2-based oral skill (vocabulary ability) significantly influenced L1 reading. Similarly, vocabulary ability in L2 was found to relate significantly to L2 reading comprehension. The Linguistic Interdependence Hypothesis was more conducive to acknowledging the within-language and cross-language transfer of skills in this study. The results have expanded the literature by drawing attention to the point that differences in the language-learning context may result in differences in how reading is taught and, subsequently, students' performance in reading in L1 and L2. The results also underscore the idea that

a comprehensive understanding of bilingual reading may be achieved by looking at bidirectional relationships from L1 to L2 and from L2 to L1.

This study has provided some insight into the types of language skills and metacognitive strategies that relate to reading comprehension among anglophone students learning French as their second language in Quebec. It has generated suggestions as to how students' oral language abilities and comprehension strategies affect their reading performance within the larger context of L1 and L2 language arts curricula. This snapshot of the current performance of bilingual adolescents' reading in Quebec suggests that the reinforcement of a number of variables related to reading comprehension, including lower-level skills such as word-reading fluency, to more complex abilities that involve proficiency with oral language and metacognitive strategies, need to be at the forefront of literacy education among this population.

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APPENDIX A

Student Background Questionnaire

Student Background Information

Name: _____ Female ____ Male ____

Age: _____

Date of Birth: _____

The following questions are about the languages you speak:

1) **Is ENGLISH your first language (i.e., mother tongue)? Yes ____ No ____**

2) **Is FRENCH your second language? Yes ____ No ____**

3) **Other spoken languages: _____**

4) **What language(s) do you speak at home? (please check one):**

   Mostly English _____

   Mostly French _____

   English and French equally _____

   Other (please specify): _____

5) **How many adults live in your home? _____**

   5a) Please indicate the first language (i.e., mother tongue) of each adult in your home in the table below:

Adult #	**First Language**
1.	English _____ French _____ Other _____
2.	English _____ French _____ Other _____

The following questions deal with whether you have attended French school in past years:

1) **Have you ever attended a French school and/or been in French immersion? Yes _____ No _____**

2) **If yes, for what grades? Please place a check next to the grade level(s) that apply to you, according to whether it was at French School or in a French Immersion program:**

Grade	French School	French Immersion
Kindergarten		
Grade 1		
Grade 2		
Grade 3		
Grade 4		
Grade 5		
Grade 6		
Grade 7		
Grade 8		

The following questions deal with where you live and places you have lived:

1) **Have you lived in the province of Quebec all of your life? Yes ____ No ____**

2) **If not, a) how many years have you been living in the province of Quebec? _____ years**

b) where have you lived outside of the province of Quebec? Please fill in the chart below.

Place	**Amount of Time I Lived There (in months or years)**	**People there spoke: (check one):**
e.g., New Hampshire, USA	10 months	Mostly English ___ Mostly French ___ English and French equally ___ Other (indicate): _____

The following questions are about your reading practices:

1. **How much time do you spend each week reading ENGLISH materials for pleasure (not including assigned reading for school)?**
   a) **less than one hour _____**
   b) **1-2 hours _____**
   c) **More than 2 hours _____**

   Please check whichever apply: **Newspapers_____**
   Popular magazines _____
   Novels, literature _____
   Comic books _____
   Internet _____
   Other (specify) _____

2. **How much time do you spend each week reading FRENCH materials for pleasure (not including assigned reading for school)?**
   a) **less than one hour _____**
   b) **1-2 hours _____**
   c) **More than 2 hours _____**

   Please check whichever apply: **Newspapers_____**
   Popular magazines _____
   Novels, literature _____
   Comic books _____
   Internet _____
   Other (specify) _____

The following statements are about your language experience with different types of leisure activities:

I watch TV in English	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____
I watch TV in French	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____
I listen to the radio in English	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____
I listen to the radio in French	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____
I watch movies in English	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____
I watch movies in French	Yes _____ No _____	Less than 1 hour/week ___ 1-2 hours/week _____ More than 2 hours/week _____

End of Questionnaire
Thank You!

APPENDIX B

English Metacognitive Knowledge and Reading Strategies Questionnaire

Reading Questionnaire

Name: _____

School: _____

The following statements are about silent reading in English. Please indicate the level of your agreement or disagreement with each statement by circling the appropriate number: **1** indicates **strong agreement**, **5** indicates **strong disagreement**.

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
1. When reading silently in English, I am able to anticipate what will come next in the text……..	1	2	3	4	5
2. When reading silently in English, I am able to recognize the difference between main points and supporting details…….	1	2	3	4	5
3. When reading silently in English, I am able to relate information which comes next in the text to previous information in the text……..	1	2	3	4	5
4. When reading silently in English, I am able to question the significance or truthfulness of what the author says…….	1	2	3	4	5
5. When reading silently in English, I am able to use my prior knowledge and experience to understand the content of the text I am reading……..	1	2	3	4	5
6. When reading silently in English, I have a good sense of when I understand something and when I do not…….	1	2	3	4	5

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
Questions 7 – 11 are based on the following statement:					
When reading silently in English, if I don't understand something,….					
7. I keep on reading and hope for clarification further on……	1	2	3	4	5
8. I reread the problematic part……	1	2	3	4	5
9. I go back to a point before the problematic part and reread from there……..	1	2	3	4	5
10. I look up unknown words in a dictionary……...	1	2	3	4	5
11. I give up and stop reading……..	1	2	3	4	5
Questions 12 – 20 are based on the following statement:					
When reading silently in English, the things I do to read effectively are to focus on….					
12. mentally sounding out parts of the words…….	1	2	3	4	5
13. understanding the meaning of each word…….	1	2	3	4	5
14. getting the overall meaning of the text…….	1	2	3	4	5
15. being able to pronounce each whole word……	1	2	3	4	5
16. the grammatical structures……	1	2	3	4	5

	STRONGLY AGREE **1**	**AGREE** **2**	**NEUTRAL** **3**	**DISAGREE** **4**	**STRONGLY DISAGREE** **5**
17. relating the text to what I already know about the topic……..	1	2	3	4	5
18. looking up words in the dictionary……...	1	2	3	4	5
19. the details of the content…….	1	2	3	4	5
20. the organization of the text…….	1	2	3	4	5

Questions 21 – 28 are based on the following statement:

When reading silently in English, things that make the reading difficult are….

21. the sounds of the individual words…….	1	2	3	4	5
22. pronunciation of the words…….	1	2	3	4	5
23. recognizing the words…….	1	2	3	4	5
24. the grammatical structures……..	1	2	3	4	5
25. the alphabet…….	1	2	3	4	5
26. relating the text to what I already know about the topic…….	1	2	3	4	5
27. getting the overall meaning of the text……	1	2	3	4	5
28. the organization of the text…….	1	2	3	4	5

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
Questions 29 – 36 are based on the following statement:					
The best reader I know in English is a good reader because of his/her ability to…..					
29. recognize words……	1	2	3	4	5
30. sound out words……	1	2	3	4	5
31. understand the overall meaning of a text…….	1	2	3	4	5
32. use a dictionary……	1	2	3	4	5
33. guess at word meanings……..	1	2	3	4	5
34. integrate the information in the text with what he/she already knows……	1	2	3	4	5
35. focus on the details of the content……	1	2	3	4	5
36. grasp the organization of the text…….	1	2	3	4	5

APPENDIX C

French Metacognitive Knowledge and Reading Strategies Questionnaire

Reading Questionnaire

Name: _____

School: _____

The following statements are about silent reading in French. Please indicate the level of your agreement or disagreement with each statement by circling the appropriate number: **1** indicates **strong agreement**, **5** indicates **strong disagreement**.

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
1. When reading silently in French, I am able to anticipate what will come next in the text……..	1	2	3	4	5
2. When reading silently in French, I am able to recognize the difference between main points and supporting details…….	1	2	3	4	5
3. When reading silently in French, I am able to relate information which comes next in the text to previous information in the text……..	1	2	3	4	5
4. When reading silently in French, I am able to question the significance or truthfulness of what the author says…….	1	2	3	4	5
5. When reading silently in French, I am able to use my prior knowledge and experience to understand the content of the text I am reading……..	1	2	3	4	5
6. When reading silently in French, I have a good sense of when I understand something and when I do not…….	1	2	3	4	5

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
Questions 7 – 11 are based on the following statement:					
When reading silently in French, if I don't understand something,….					
7. I keep on reading and hope for clarification further on……	1	2	3	4	5
8. I reread the problematic part……	1	2	3	4	5
9. I go back to a point before the problematic part and reread from there……..	1	2	3	4	5
10. I look up unknown words in a dictionary……...	1	2	3	4	5
11. I give up and stop reading……..	1	2	3	4	5
Questions 12 – 20 are based on the following statement:					
When reading silently in French, the things I do to read effectively are to focus on….					
12. mentally sounding out parts of the words…….	1	2	3	4	5
13. understanding the meaning of each word…….	1	2	3	4	5
14. getting the overall meaning of the text…….	1	2	3	4	5
15. being able to pronounce each whole word……	1	2	3	4	5
16. the grammatical structures……	1	2	3	4	5

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
17. relating the text to what I already know about the topic……..	1	2	3	4	5
18. looking up words in the dictionary……...	1	2	3	4	5
19. the details of the content…….	1	2	3	4	5
20. the organization of the text…….	1	2	3	4	5

Questions 21 – 28 are based on the following statement:

When reading silently in French, things that make the reading difficult are….

21. the sounds of the individual words…….	1	2	3	4	5
22. pronunciation of the words…….	1	2	3	4	5
23. recognizing the words…….	1	2	3	4	5
24. the grammatical structures……..	1	2	3	4	5
25. the alphabet…….	1	2	3	4	5
26. relating the text to what I already know about the topic…….	1	2	3	4	5
27. getting the overall meaning of the text……	1	2	3	4	5
28. the organization of the text…….	1	2	3	4	5

	STRONGLY AGREE 1	**AGREE 2**	**NEUTRAL 3**	**DISAGREE 4**	**STRONGLY DISAGREE 5**
Questions 29 – 36 are based on the following statement:					
The best reader I know in French is a good reader because of his/her ability to…..					
29. recognize words……	1	2	3	4	5
30. sound out words……	1	2	3	4	5
31. understand the overall meaning of a text…….	1	2	3	4	5
32. use a dictionary……	1	2	3	4	5
33. guess at word meanings……..	1	2	3	4	5
34. integrate the information in the text with what he/she already knows……	1	2	3	4	5
35. focus on the details of the content……	1	2	3	4	5
36. grasp the organization of the text…….	1	2	3	4	5

APPENDIX D

French Instructions: Concepts and Directions Task

1. Indiques le premier cercle et le triangle du milieu.
2. Indiques le cercle le plus loin du grand carré.
3. Indiques le cercle du milieu et le dernier carré.
4. Indiques le premier carré et le deuxième triangle.
5. Indiques le triangle le plus rapproché du carré noir.
6. Indiques le deuxième triangle et le troisième cercle.
7. N'indiques pas le grand cercle à moins que j'indiques le petit carré.
8. Indiques le petit cercle à la droite du grand triangle.
9. Indiques le petit triangle noir en même temps que tu indiques le grand cercle blanc.
10. Indiques le carré le plus rapproché do grand triangle.
11. Si j'indiques le grand cercle, indiques le petit carré.
12. Indiques le petit triangle noir avant d'indiquer les cercles blancs.
13. Indiques le carré blanc à la gauche d'un cercle noir.
14. Indiques le grand cercle blanc après d'indiquer les carrés noir.
15. Indiques le grand cercle, le petit carré et le triangle noir.
16. Indiques le carré blanc pendant que t'indiques les petits triangles.
17. Indiques le grand cercle noir, le petit carré noir et le petit cercle blanc.
18. Avant d'indiquer le petit triangle blanc, indiques les petits carrés.
19. Indiques les cercles séparés d'un triangle noir.
20. Indiques soit les petits carrés ou les triangles blancs.
21. Indiques le triangle qui est ni grand, ni blanc.
22. Indiques le grand cercle et le triangle noir, mais pas les grands ou petits carrés.

23. Indiques tous sauf un des petits cercles.

APPENDIX E

French Listening Comprehension Task

Histoire 1

Partout dans le monde, les agriculteurs font face à de nombeux problèmes difficiles. Les fruits, les légumes et d'autres plantes sont fréquemment attaqués par des insectes et des maladies qui peuvent anéantir toute une récolte. Les agriculteurs essaient d'enrayer ces insectes nuisibles avec des produits chimiques, mais ces poisons peuvent rendre notre nourriture impropre à la consommation. Ils peuvent aussi nuire aux insectes et aux oiseaux utiles. Pendant n'importe quelle saison, le temps peut aussi détruire les cultures. La chaleur extrême ou le froid intense, trop ou très peu de pluie, la grêle ou le vent fort : n'importe lequel peut diminuer considérablement le rendement des récoltes. Contrairement aux insectes, la prévision et le contrôle des conditions météorologiques sévères sont normalement impossibles.

Histoire 2

Harriet Tubman a vécu la plupart de sa vie dans le but de libérer son peuple. Une jeune esclave, elle s'est enfuie vers le nord. Elle est retournée souvent dans le sud pour aider d'autres esclaves à s'enfuir. Elle est devenue la célèbre fondatrice du mouvement du chemin de fer souterrain, qu'on appelle aussi le Underground Railroad, un réseau secret de familles qui offrait à nourrir et abriter les esclaves fugitifs. Harriet a mené les groupes d'esclaves d'un endroit à un autre pendant ces voyages dangereux vers le nord. Ils voyageaient seulement pendant la nuit, et le jour ils se cachaient dans les sous-sols, les champs et les forêts. Harriet savait très bien comment déjouer les ruses et utiliser des déguisements. À un moment, on avait offert 40 000$ en récompense pour sa capture. Les délivrances osées qu'elle a menées ont aidé à des centaines d'esclaves d'atteindre la liberté. Dans ces propres mots, «Je n'ai jamais perdu un passager.»

Histoire 3

La violence du grand vent s'intensifiait pendant que Winnie traînait le bateau fendu sur le récif déserté. Son petit frère a réussi à trébucher sur la plage à travers les vagues déferlantes, malgré la blessure sur sa jambe et un poignet possiblement fracturé. Sa faible silhouette se blottissait contre un tas de débris au-dessus de la laisse de haute mer, une triste indication d'un autre vaisseau qui a connu une défaite près de ces bancs de sables dangereux. À la tombée de la nuit, Winnie concentre ses énergies à trouver un refuge pour s'abriter des pluies torrentielles qui s'approchent. Si elle pouvait surmonter sa fatigue et retourner le bateau battu par les vagues, il pourrait les protéger jusqu'à ce que la tempête se lève. Elle savait qu'ils finiraient par manquer à leurs proches et les patrouilleurs envoyés par la garde côtière dans les environs verraient sans doute à les chercher. Mais Nat avait besoin de soins immédiats, et attendre l'arrivée du matin semblait être une éternité. Soudainement, un signal lumineux faible et un ronronnement étouffé ont émergé de la noirceur.

Histoire 4

Une légende est une forme de littérature orale traditionnelle que son narrateur et la société dans laquelle elle circule considèrent vraie. Comme d'autres genres de folklore, les légendes sont fréquemment embellies avec des éléments exagérés ou surnaturels qui les rendent fort peu plausibles. Cependant, contrairement aux mythes, qui sont établis dans les temps anciens ou préhistoriques et qui s'intéressent aux dieux et d'autres êtres sacrés, les légendes traitent des personnes, des endroits et des événements qui suscitent un semblant de réalité. Puisqu'elles prétendent être des chroniques historiques et basées sur des faits, l'auditeur doit pouvoir les associer avec un personnage illustre, un point d'intérêt géographique ou un événement réel. Même dans leurs formes les plus élaborées, imaginatives ou satiriques, on présente les légendes comme des récits crédibles, et de façon conventionnelle, le narrateur cite l'autorité de l'histoire soi-disant de bonne réputation. D'un autre côté, le conte ne tente jamais de faire mine d'être vrai; toutefois solennel, il reste toujours dans le domaine de la tromperie.

Histoire 5

Le bruit des sabots dans les broussailles a interrompu la veille solitaire de la garde forestière. À travers la faible luminosité matinale elle pouvait distinguer le contour fluide des bêtes majestueuses qui se réunissaient à la source artésienne. En se faufilant de plus en plus près vers leur côté sous le vent, elle a pu obtenir le compte approximatif requis pour être conforme aux règlements de la dernière note du gouvernement, mais à quel effet? On n'avait pas besoin des évaluations officielles des rapports ennuyeux du gouvernement fédéral pour comprendre la terrible situation désespérée des chevaux. Les chiffres décourageants témoigneraient la tragédie d'une population décroissante, mais ils n'auraient aucun effet sur la prévention. Elle regardait une des bandes décroissantes de chevaux sauvages qui occupaient les endroits les plus lointains et les plus rigoureux de cette étendue aride. Comptant une fois dans les millions, les mustangs étaient les aristocrates d'un vaste domaine. Mais, on leur a rendu hommage seulement en forme de verbiage et non en mesures pratiques comme les lois de protection. Vaincus par l'indifférence, les derniers de cette race noble étaient devenus les nomades dépossédés du désert.

APPENDIX F

French Nelson-Denny Reading Test

Texte 1.

En 1795, la veille de Noël, les chevaux mangeaient leur avoine et frottaient leur museau sur leurs mangeoires dans une écurie de Québec, « La Belle Époque ». Dans la pièce au-dessus, à la lumière de la lampe, une mère tenait le petit Jean Côté dans ses bras, son premier-né, et appelait le père du jeune garçon pour lui montrer son adorable sourire (il souriait déjà à sept mois !). Toutefois, le petit Jean Côté avait un fort caractère et est rapidement devenu un enfant irrépressible et obstiné. Sa mère l'adorait et le gâtait peut-être un peu trop, car elle trouvait qu'il lui ressemblait beaucoup. Jean a hérité de son caractère passionné, gai et animé, mais à un moindre niveau.

Thomas Côté, le père de Jean, était un garçon d'écurie à « La Belle Époque ». Son ambition, son raisonnement logique et ses compétences étaient si remarquables que M. Gauthier, son beau-père, lui a laissé son entreprise. Le nouveau propriétaire a prospéré. Jean a été envoyé dans une école de Ste-Anne-de-Beaupré, une ville au nord-est de Québec.

Un jour, après être tombé de son cheval, la vie de Thomas Côté a pris fin à cause d'une fracture du crâne. Mme Côté s'est donc retrouvée sans ressource. En moins d'un an, elle a épousé un certain M. Beaulieu, mais le mariage était malheureux. Mme Beaulieu a donc quitté son mari et l'écurie, et elle a amené avec elle ses quatre enfants (George, Tom et Fanny sont nés dans cette période).

À l'école, Jean était un élève médiocre, mais ses poings répandaient la terreur autour de lui. Ses camarades de classe ont déclaré que « combattre, c'était, pour lui, comme boire et manger » et qu'il avait « la détermination d'un terrier ». Il semblait déjà destiné à devenir nul autre qu'un poète. Il captivait et étonnait les garçons avec des histoires extraordinaires sur son héro, soit l'oncle de sa mère qui était soldat. Il pourrait aussi raconter que les oreilles de son frère ont déjà été déformées par un huissier. Les soupçons non fondées de ses compagnons au sujet de ses impressionnantes dispositions affectives et morbides troublaient beaucoup Jean. Ses camarades ont déclaré qu'il était « toujours extrémiste », tantôt violent, tantôt généreux, « exprimant des torrents de larmes ou des fous rires outrageux ». Malgré cela, ils aimaient ce garçon et admiraient son fervent courage.

Sa mère l'idolâtrait, tout comme il l'idolâtrait aussi. Quand il retournait à la maison pour les vacances, elle tombait sous le charme de ses humeurs de dépression poétique qui alternaient avec ses rires machiavéliques. Un jour, on a entendu dire que Mme Côté est tombée malade et que Jean, pour ordonner le silence, a trouvé une vieille épée, montait la garde devant sa porte et empêchait quiconque de passer.

Imaginez comment un garçon de quinze ans étant aussi passionné par tout, aussi susceptible de souffrir et aussi affligé « d'un tempérament horriblement morbide »… imaginez comment un tel garçon a pu se révolter face à la mort. On peut comprendre ce qui est arrivé à Jean quand sa mère est décédée en 1810. Si son humeur est devenue plus changeante que jamais, s'il boudait constamment, s'il était inconsolable, s'il se cachait sous le bureau de son professeur et s'il repoussait le réconfort de son professeur et de ses amis, on peut comprendre. Étant passionné depuis deux ans par la littérature, on peut aussi comprendre pourquoi il a noyé son désespoir dans la gloire et l'oubli que les livres pouvaient lui apporter. Il s'est mis à lire aussi intensément qu'il se battait et protestait autrefois. Il a traduit Virgil l'Aeneid. Il s'est plongé dans les œuvres de Shakespeare. Mais, le plus important, il a découvert les mythes grecs à travers certaines anthologies de la bibliothèque de son école. Les dieux, les nymphes et les héros ont pris feu en lui ! Si quelqu'un était destiné à devenir poète, c'était bien Jean Côté.

Questions sur le texte 1.

1. Quel âge avait Côté lorsque sa mère est décédée ?
   A) douze
   B) treize
   C) quatorze
   D) quinze
   E) seize

2. À l'école, Côté était perçu comme :
   F) un élève moyen
   G) un bon élève
   H) un rêveur
   I) le dernier de sa classe
   J) un élève médiocre

3. Compléter : « Côté avait _____ d'un terrier » :
   A) l'entêtement
   B) la détermination
   C) la résistance
   D) la dureté
   E) le courage

4. Dans son enfance, Jean Côté traduisait :
   F) Virgil
   G) Homer
   H) Aristote
   I) Platon
   J) Horace

5. Les lectures les plus influentes de Côté étaient apparemment :
   A) la littérature latine
   B) la littérature anglaise
   C) la littérature grecque
   D) la fiction
   E) la poésie

6. Quel mot décrit le mieux le caractère de Côté?
   F) intense
   G) sérieux
   H) joyeux
   I) dépressif
   J) boudeur

7. Comment les éléments de ce texte sont-ils ordonnés?
   A) du général au spécifique
   B) du plus important au moins important
   C) de cause à effet
   D) dans un ordre séquentiel
   E) de l'ordinaire à l'inusité

8. Après la mort de sa mère, Côté a beaucoup lu pour :
   F) avoir des conseils
   G) avoir de l'inspiration
   H) avoir de l'information
   I) s'évader
   J) obtenir de l'aide pratique

Texte 2.

Simon Momada est né en Outaouais, au sud-ouest du Québec. Son père était un amérindien appartenant à la tribu Algonquienne et sa mère était l'arrière-petite-fille d'une Montagnaise. Ses parents enseignaient dans des réserves amérindiennes. Il a passé son enfance dans plusieurs réserves du sud-ouest où il a acquis des connaissances poussées sur la culture et l'histoire amérindiennes. En 1958, il a été diplômé de l'Université du Québec en Outaouais et il a ensuite obtenu un doctorat en anglais de l'Université de Montréal en 1963. Il est ensuite devenu professeur d'anglais à Montréal.

Le premier livre de Momada, *La maison de l'aube* (1968), traite d'un jeune amérindien qui tente de réconcilier les valeurs d'un ancien mode de vie avec celles du monde moderne. Ce livre a été récompensé du prix Nobel de littérature pour la meilleure oeuvre de fiction. Momada a écrit une étude historique sur la tribu Algonquienne et il a ensuite développé son œuvre en y ajoutant ses impressions sur l'histoire contemporaine et la culture de son peuple. Cette version allongée de son livre, publiée sous le titre *Le chemin de la montagne de pluie*, constitue l'un des récits les plus éloquents et les plus pénétrants de la vie et de la culture amérindiennes à ce jour. Momada, qui se considère comme étant essentiellement un poète, est l'auteur de deux recueils de poèmes. Ces recueils reflètent son intérêt pour la doctrine amérindien, mais ils contiennent aussi des poèmes sur une veine plus philosophique et mélancolique. En 1976, il a publié *Les noms*, un mémoire sur la vie de ses parents et sur son enfance dans diverses réserves.

9. Momada a reçu son doctorat en:
   A) 1958
   B) 1960
   C) 1963
   D) 1968
   E) 1976

10. Momada se considère essentiellement comme:
   F) un professeur
   G) un historien
   H) un anthropologue
   I) un poète
   J) un philosophe

11. On peut déduire que Momada :
   A) est un expert sur l'histoire de l'Outaouais
   B) valorise les connaissances
   C) sous-estime les études supérieures
   D) ignore son héritage
   E) fonctionne mieux dans une famille élargie

12. On peut déduire que *Le chemin de la montagne de pluie* est :
   F) un recueil de poèmes
   G) un drame
   H) un récit anthropologique
   I) une collection de courtes histoires
   J) une histoire du peuple Iroquois

Texte 3.

George Caron voulait aider les fermiers du Québec. En 1896, après avoir obtenu une maîtrise en agriculture, Caron a été à la tête de la Faculté des sciences de l'agriculture de l'Université Laval.

Caron a aménagé un laboratoire et des terrains expérimentaux pour développer la recherche en agriculture. Il a engagé des étudiants pour l'aider à réaliser des expériences sur différentes cultures et sur les produits qui étaient fabriqués à partir de ces cultures. Caron était particulièrement intéressé par les arachides et les patates douces, des cultures qui abritent des bactéries sur leurs racines qui ajoutent des nutriments au sol. Caron a découvert environ 300 produits qui pourraient être fabriqués à partir des arachides et plus de 100 produits qui pourraient être fabriqués à partir des patates douces. Ces produits incluent la farine, le fromage, le lait, les cosmétiques, les teintures, le caoutchouc et le beurre d'arachide.

Cette liste impressionnante de produits a montré l'importance des arachides et des patates douces. Les fermiers du Québec ont commencé à exploiter ces cultures qui étaient particulièrement adaptées aux températures humides et au sol fertile.

Caron a continué ses recherches en agriculture. Il a publié des articles sur des considérations pratiques comme l'amélioration des techniques agricoles et la préservation des aliments. Ses travaux ont été particulièrement appréciés durant la Grande Dépression des années '20 quand les gens n'avaient plus d'emploi et avaient peu d'argent pour acheter de la nourriture. Caron était aussi un professeur influant et il a inspiré beaucoup de jeunes à trouver des moyens pour que la science améliore la vie des gens.

13. Les résultats des expériences de Caron ont apporté des effets :
   A) durant les années 1890
   B) durant les années 1930
   C) seulement auprès d'autres chercheurs
   D) seulement auprès des fermiers
   E) seulement auprès des étudiants

14. Après que Caron ait établi l'importance des arachides et des patates douces, il :
   F) a étudié pour obtenir un diplôme de maîtrise
   G) a rejoint la faculté de l'Université Laval
   H) est parti vers le nord
   I) a continué ses recherches
   J) a fermé son laboratoire

15. Caron a inspiré beaucoup de jeunes :
   A) à devenir fermiers
   B) à commercialiser les produits qu'il a découverts
   C) à manger des arachides et des patates douces
   D) à survivre à la Grande Dépression
   E) à améliorer la vie des gens grâce aux connaissances scientifiques

16. Les contributions de Caron à la science ont permis aux fermiers d'utiliser :
   F) leurs terres d'une manière plus productive
   G) moins d'insecticide
   H) moins de machinerie
   I) moins de fertilisant
   J) plus de nutriments dans le sol

17. L'auteur suggère que Caron:
   A) a consacré la plupart de son temps à enseigner
   B) a abandonné l'enseignement pour faire de la recherche
   C) a utilisé un équipement à la fine pointe de la technologie
   D) a été un pionnier dans son domaine
   E) a dirigé toutes ses propres recherches

Texte 4.

Les gens ont divers degrés d'engagement personnel dans leurs activités quotidiennes. Ils peuvent être profondément impliqués dans une activité (une élection politique, par exemple), mais sans être engagé personnellement. Cela signifie que leur autoévaluation (leur estime de soi) est insensible aux résultats positifs ou négatifs de l'activité. Les tâches diffèrent selon de degré d'engagement personnel; les examens académiques demandent davantage d'engagement personnel qu'une activité physique. Les différences individuelles jouent aussi un rôle important dans le niveau d'engagement personnel dans une tâche particulière. Certaines personnes pourraient être déçues en apprenant un mauvais résultat à un examen, mais garder leur estime de soi. D'autres personnes, au contraire, se sentiraient non seulement mal, mail aussi dévalorisées à la suite de leur performance.

L'engagement personnel dans une tâche fait souvent entrer en jeu des moyens de défense, comme la répression et la rationalisation, pour éviter de ressentir les sentiments douloureux causés par une faible estime de soi. De plus, cette préoccupation d'être centré sur soi-meme interfère avec une résolution de problème appropriée pour une tâche donnée et est particulièrement apparente chez les individus très anxieux.

18.Quelle activité est explicitement mentionnée?

F) les Séries Mondiales
G) une collecte de fonds
H) un concours populaire
I) le Super Bowl
J) une élection politique

19. Selon cet extrait, la préoccupation d'être centré sur soi-même est particulièrement apparente chez :

A) les parents
B) les adolescents
C) les individus très anxieux
D) les cas de problème d'identité
E) les jeunes enfants

20. La rationalisation était spécifiquement classée comme :

F) un moyen de défense
G) un ajustement personnel
H) une réactance
I) du narcissisme
J) un comportement d'anxiété

21. Selon vous, ce texte provient :

A) d'un livre avancé d'anthropologie
B) d'un livre de biologie du secondaire
C) d'un avis d'un journal
D) d'un éditorial d'un journal
E) d'un livre de psychologie du CÉGEP

22. Ce texte a été écrit essentiellement pour :

F) donner des conseils
G) informer
H) mieux vivre
I) prévenir des problèmes
J) persuader

Texte 5.

L'acide hydrochlorique, un acide minéral puissant connu commercialement sous le nom d'acide muriatique, est utilisé pour nettoyer les métaux qui doivent être enduits ou plaqués (ce nettoyage est connu sous le nom de décapage). L'acide hydrochlorique est aussi utilisé pour nettoyer la brique et le ciment.

L'acide nitrique, un autre acide minéral, est très réactif. Lorsqu'une personne ayant une peau claire en renverse un peu sur sa peau, celle-ci devient jaune. C'est dû à une réaction entre l'acide nitrique et une protéine dans la peau. L'acide nitrique est principalement utilisé dans la production de fertilisant, mais est aussi utilisé pour fabriquer des teintures, des plastiques et des explosifs.

L'acide sulfurique, qui est aussi un acide minéral très fort, est un autre acide qui est utilisé dans des fertilisants. De plus, on l'utilise pour fabriquer de la poudre sans fumée (un type d'explosif) et de la nitroglycérine. Les batteries d'automobile contiennent une forme diluée d'acide sulfurique. Ces batteries fonctionnent parce qu'il y a une réaction entre l'armature et l'acide, ce qui crée un mouvement d'électrons et, par conséquent, un courrant lectrique. Les Russes manufacturent l'acide sulfurique provenant des oxydes de sulfure qui sont produits lorsqu'on brûle des combustibles fossiles pour créer de l'électricité. En d'autres mots, les acides sulfuriques peuvent être fabriqués par un sous-produit de l'énergie électrique des plantes.

23. Les batteries d'automobile contiennent une forme diluée:
    A) d'acide hydrochlorique
    B) d'acide nitrique
    C) d'acide sulfurique
    D) d'acide phosphorique
    E) d'acide acétique

24. Quelle sorte d'acide est un sous-produit de l'énergie électrique des plantes?
    F) l'acide hydrochlorique
    G) l'acide sulfurique
    H) l'acide nitrique
    I) l'acide phosphorique
    J) l'acide acétique

25. Le jaunissement de la peau résulte d'une réaction entre l'acide et :
    A) les glucides dans la peau
    B) les follicules des poils
    C) les tissus sous-cutanés
    D) l'huile naturelle dans la peau
    E) une protéine dans la peau

26. Le meilleur titre pour ce texte serait :
    F) l'utilisation moderne des acides
    G) les acides communs et leurs utilisations
    H) les acides puissants versus réactifs
    I) le rôle des acides dans l'indistrie
    J) les acides et le mode de vie

27. L'explication sur les batteries visait à démontrer :
    A) pourquoi elles fonctionnent
    B) comment générer de l'électricité
    C) comment les batteries sont fabriquée
    D) une utilisation importante des acides
    E) pourquoi un acide doit être dilué

Texte 6.

Les informations sur l'écoulement de l'eau dans nos rivières et nos ruisseaux proviennent de mesures qui sont prises par des hydrographes. Les hydrographes mesurent les précipitations et l'écoulement de l'eau à des endroits fixes. Ils mesurent la profondeur de l'eau et le débit. Ils prennent aussi des échantillons de l'eau pour les analyser. Plus tard, les hydrographes rassemblent toutes les données et préparent des graphiques et des tableaux qui montrent le réseau hydraulique.

Les hydrographes travaillent souvent dans des barrages ou des canaux où des informations précises sur l'écoulement de l'eau sont essentielles. Ils peuvent prendre des échantillons de vase provenant de l'eau à analyser et à mesurer. Les hydrographes prennent fréquemment des mesures sur la quantité de vase et le débit de l'écoulement de l'eau dans un bassin dévasé. Le bassin dévasé est un lac ou un bassin qui a été créé pour éviter qu'un canal soit rempli de vase.

La formation requise pour travailler comme hydrographe consiste généralement à deux ans d'études après les etudes secondaires. La formation sur le terrain remplace un peu l'éducation formelle. Un hydrographe doit aimer travailler dehors, avoir une bonne vision et être capable de faire un travail vigoureux. Des habiletés en mathématiques sont très utiles pour préparer les tableaux, les graphiques et les rapports requis.

28. Selon le texte, qu'est-ce qui fournit des données statistiques sur l'écoulement de l'eau?
    F) des images
    G) des tableaux
    H) des résumés
    I) des récits
    J) des portfolios

29. Parmi les éléments suivants, lequel est le plus important pour un hydrographe?
    A) la précision
    B) l'intuition
    C) la diplomatie
    D) la rapidité
    E) la loyauté

30. Pour préparer les tableaux requis, les hydrographes ont besoin :
    F) de bonnes notions reliées à l'histoire
    G) d'un bon vocabulaire
    H) de bonnes habiletés dans les arts
    I) d'habiletés de synthèse
    J) d'habiletés en calcul

31. On peut conclure que les bassins dévasés :
    A) renforcent les barrages
    B) altèrent l'écoulement des rivières
    C) protègent les canaux
    D) protègent les petits lacs
    E) protègent les réservoirs

32. Pour les hydrographes, une faible vision serait :
    F) un handicap
    G) typique
    H) un atout
    I) sans conséquence
    J) inévitable

Texte 7.

Les sociétés complexes considèrent l'école comme étant une partie intégrante de leur système d'éducation. Pour que la culture subsiste il y a une vaste gamme de connaissances specialisées et d'habiletés à maîtriser. Ainsi, l'école représente un effort majeur des sociétés complexes qui vise à préserver ces connaissances approfondies. On ne cherche pas à nier, qu'il y a d'autres structures qui enseignent aux enfants (par exemple, la famille, les pairs, les médias, etc.) a l'intérieur des sociétés complexes. C'est simplement une explication pour dire pourquoi il y a des écoles dans les sociétés complexes.

Mélissa Morin fournit une autre explication. Dans les sociétés plus complexes, elle souligne que l'emphase est mise susr l'*enseignement* par opposition à l'*apprentissage*. Elle remarque que les enfants des sociétés relativement simple apprennent ce qu'ils doivent savoir pour survivre. Ils sont motivés à aller chercher les connaissances auprès des personnes qui les possèdent. Dans les sociétés plus complexes, cependant, les détenteurs des connaissances cherchent à les transmettre aux enfants qui ne voient pas souvent leur importance immédiate. C'est possible que les enfants américains, par exemple, ne voient pas l'importance d'apprendre l'histoire, mais ils apprennent l'histoire quand même. Donc, l'emphase est mise sur l'enseignement plutot que sur l'apprentissage.

33. Une mention spécifique a été faite sur :
    A) la télévision
    B) les médias
    C) la musique rock
    D) la radio
    E) les conventions

34. Dans les sociétés simples, les enfants apprennent ce qu'ils ont besoin pour :
    F) réussir
    G) rencontrer les demandes culturelles
    H) devenir mature
    I) survivre
    J) être accepté

35. L'idée principale du premier paragraphe répondait à la question :
    A) pourquoi
    B) quand
    C) où
    D) qui
    E) comment

36. La principale intention de ce texte est :
    F) de persuader
    G) de décrire
    H) d'expliquer
    I) de résumer
    J) de soulever des questions

37. L'idée principale du deuxième paragraphe était développée essentiellement par :
    A) des détails spécifiques
    B) des illustrations
    C) des contrastes
    D) des répétitions
    E) des données expérimentales

APPENDIX G

Oral Script for Initial Telephone Call to School Boards

ORAL SCRIPT FOR THE INITIAL TELEPHONE CALL TO THE SCHOOL BOARDS AND SCHOOLS TO EXTEND AN INVITATION TO PARTICIPATE IN MY DISSERTATION RESEARCH

I am a doctoral student at McGill University, in the School Psychology program, and I am currently searching for schools who might be interested in participating in my dissertation research project.

For schools only: I have contacted (Mr./Mrs._____) at the Educational Services Department and have discussed my research with them; I have been given approval by Mr./Mrs._____ to contact schools directly to extend to them an invitation to participate in my research.

I am being supervised by Dr. Ron Stringer, who is Associate Professor in the Department of Educational and Counselling Psychology in the Faculty of Education.

The topic of my study is reading comprehension among bilingual adolescents. I am looking for students in Secondary 4 who are native speakers of English, and who speak French as their second language. My study is looking at the factors that contribute to good reading comprehension ability in French as a second language.

My study consists of administering a series of language tests, reading comprehension tests, and demographic/background questionnaires in English and French. I will be overseeing all administration of tests. Some of the specific tests include, for example, vocabulary and listening comprehension tests, in both English and French, and a reading comprehension test in both languages. The goal of my study is to see which of these factors contributes the most to successful comprehension when reading in French.

Most of the tests can be group-administered, however one individual session is required of each student with me. The total amount of time needed to complete the test battery is approximately 3½ hours of group administration, which I intend to divide into 3 group sessions, and one 20-minute individual session. I will be offering a compensation of $20.00 to each volunteer participant.

The times that I can visit schools are quite versatile, so I will arrange it with the schools to visit them at the most convenient times.

You can reach me at (514) 603-5861 or by email at gail.mccoubrey@mail.mcgill.ca

Thank you for your consideration!

APPENDIX H

Student Recruitment Letter

Dear Student,

I am a graduate student at McGill University in Montreal, where I am completing my doctorate in School Psychology. To fulfill the requirements for my degree, I am presently conducting a research study about reading comprehension in adolescents who speak French as their second language. I am hoping to acquire a better understanding of the skills that high school students need in order to read well in their second language.

I will be at your school the week of (*date to be determined with school*) to conduct my research with students in grade 10. Participation in this research will take place during regular school hours, and is on a voluntary basis. If you would like to participate, you will be asked to complete language and reading tests, in English and French. You will also be asked to fill out some questionnaires about what you do when you are trying to understand what you are reading, as well as a questionnaire to gather some information about your background, such as where you have lived, the types of schools you have attended, and the leisure activities in which you participate.

Participation in this research will take place at your school, during regular school hours, and will require approximately 4 hours of your class time. Participation in this research will be divided into 3 group sessions of about 50 – 70 minutes, and one shorter, individual session with me, for approximately 20 minutes.

All participants will receive $20.00 for participating in my research. If you are interested in being a part of this study, please complete the section at the bottom of this page and return it to your teacher. You will also need to have your parent or guardian complete the attached consent form, and return it to school. I will be happy to answer any questions you may have upon my arrival at your school.

I look forward to meeting you!

Regards,

Gail McCoubrey, M.A., Ph.D (c)
Doctoral Candidate, School Psychology Program
Faculty of Education
McGill University
3700 McTavish Street
Montreal, Quebec H3A 1Y2 gail.mccoubrey@mail.mcgill.ca

I would like to participate in this research project.

Name (please print): _____

APPENDIX I

Parent Consent Form

Dear Parents/Guardians,

I am a graduate student at McGill University in Montreal, where I am completing my doctorate in School Psychology. This year, I am conducting a study to fulfill the research requirements for my degree. The topic of my research is reading comprehension among Anglophone adolescents who speak French as their second language. I am hoping to acquire a better understanding of the skills that students need to read well in their second language. This project is supervised by my thesis advisor, Dr. Ron Stringer, Associate Professor in the Faculty of Education at McGill University.

An introductory letter explaining the purpose of my research and what it involves was distributed in your child's class, and he/she has expressed interest in participating in my research study. Participants will complete language tests of their vocabulary, listening comprehension and grammar, and reading comprehension tests, in English and French. They will also complete questionnaires about what they do when they try to understand a text, and another questionnaire to gather information about the languages they speak, places they have lived, schools attended, and leisure activities. This will take place over the course of regular school hours, and will consist of 3, 50 – 70 minute group sessions and one 20-minute individual session.

The results of this research will be discussed in my dissertation. Participation in my research is on a voluntary basis, and will not count towards your child's grades at school. For those who agree to participate, a compensation of $20.00 will be offered. Furthermore, even if your child decides to participate, he/she can change his/her mind later and withdraw from the study at any time without any negative consequences, and will still be rewarded the full monetary compensation. The results will be kept completely confidential, which means that your child will be given a number code, and only this code will be used for identification; your child's name will not appear in the discussion of results. Participants' data will be aggregated, and only group averages will be discussed.

If you would like your child to participate in my study, please sign the attached permission form and have your child return it to school. If you would like any additional information about this project, please contact me at (514) 603-5861, or Dr. Stringer at (514) 398-3428. If you have any questions or concerns about your child's rights as a participant in this research study, please contact the McGill Ethics Officer at (514) 398-6831.

Kind regards,

Gail McCoubrey, M.A., Ph.D (c)
Doctoral Candidate
School Psychology Program
Faculty of Education
McGill University

Conditions of Participation:

- I understand the purpose of this study and have been informed about the risks and benefits that this research project entails.
- I understand that my child is free to withdraw from this study at any time, without any penalty.
- I understand how confidentiality will be maintained during this research project.
- I understand the anticipated uses of data, especially with respect to publication and how data will be reported.

I have carefully studied the above and understand the extent of my child's participation in this project. I freely consent and voluntarily agree to let my child participate in this study.

Child's name:_____

Parent/Guardian's name:_____

Parent/Guardian's signature:_____

Researcher's signature:_____

Date:_____

APPENDIX J

Student Consent Form

INFORMED CONSENT FORM TO PARTICIPATE IN RESEARCH

This is to state that I agree to participate in the research project conducted by Gail McCoubrey (Ph.D candidate), graduate student in the School Psychology Program at McGill University.

This project is supervised by Dr. Ron Stringer, Associate Professor, Department of Educational & Counselling Psychology, McGill University.

Purpose
The goal of this research project is to examine the reading and oral language factors that contribute to reading comprehension ability in high school students who read English as their mother tongue and French as their second language.

Procedures
You will be administered a series of reading tasks in English and French, which include vocabulary, listening comprehension, and grammar tests, two reading comprehension tests (one in each language), questionnaires about what you do to understand while you read in English and French, and a questionnaire designed to gather your background data (i.e., birth date, languages spoken at home, leisure activities). These activities will be administered over the period of 3, 50 – 70 minute group sessions, and one individual test session that will last approximately 20 minutes. All sessions will take place during regular class time.

The researcher who is conducting this project will administer all the tasks mentioned above. Your answers will be written down for some of the activities, whereas others will require you to provide oral responses. All the information and data that you provide on the language and reading tests, as well as the questionnaires, will be kept confidential and will not be divulged. Only the primary investigator of this project and her thesis supervisor will have access to participant data. To ensure anonymity and confidentiality, the data and information you provide will be number-coded for the statistical analysis, so that only your participant number can be used to locate specific information in the data bank. The results of this study will be discussed within the context of my dissertation, and only group averages will be used for discussion – no individual test scores will be revealed. The data will be kept in a locked filing cabinet in the Reading Lab in the Faculty of Education for a period of 5 years following completion of this thesis project, after which it will be destroyed.

Participation in this study is on a voluntary basis. Therefore, you do not have to participate in this study if you do not want to. You are free to stop participating at any time, and there are no consequences for doing so. You may refuse to answer any question(s). Furthermore, there are no known potential risks or benefits to participating in this study. Your decision about whether to participate in this project will not affect your academic standing.

You will be given $20.00 as compensation for the time required to participate in this research project, either in part or in its entirety.

You can contact Dr. Stringer or Gail McCoubrey at the Reading Lab at the Department of Educational and Counseling Psychology, McGill University, at (514) 398-3428 for further inquiries.

Conditions of Participation:

- I understand the purpose of this study and have been informed about the risks and benefits that this research project entails.
- I understand that I am free to withdraw from this study at any time, without any penalty.
- I understand how confidentiality will be maintained during this research project.
- I understand the anticipated uses of data, especially with respect to publication and how data will be reported.

I have carefully studied the above and understand the extent of my participation in this project. I freely consent and voluntarily agree to participate in this study.

Participant's name:_____

Participant's signature:_____

Researcher's signature:_____

Date:_____

CERTIFICATE OF ETHICAL APPROVAL