

Contribution of English Oral Vocabulary Knowledge to Reading Development  
in Grade 1 French Immersion Students

by

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We acknowledge and respect the Lək̓ʷəŋən (Songhees and X̱wsep̓səm/ Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

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### **Abstract**

Understanding the role of oral language skills both within and across languages in supporting reading comprehension is critical. However, few studies have assessed the generalizability of the Simple View of Reading to early French Immersion using a complex measure of French listening comprehension. Additionally, most research on the cross-linguistic influence of English vocabulary knowledge on French reading development has focused on word-reading skills. The present study sought to examine how French listening comprehension, as an integral measure of oral language skills, contributes to reading development in Grade 1 French immersion students. It also examines the role of English oral vocabulary knowledge in supporting reading at both the word- and text-levels, and the mechanisms underlying cross-linguistic transfer.

A sample of 61 Grade 1 French immersion students completed a battery of standardized French measures assessing listening comprehension, word reading, pseudoword decoding, reading comprehension, as well as English receptive vocabulary. Hierarchical multiple regression was conducted to analyze the contribution of French listening comprehension and English vocabulary along with word reading and pseudoword decoding to French reading comprehension.

The analyses revealed that French listening comprehension did not make a statistically significant contribution to reading comprehension, though, both word reading and pseudoword decoding were significant predictors. While English vocabulary was a significant predictor of French reading comprehension when it was alone in the model, its contribution lost statistical significance, when French word reading or pseudoword decoding were added to the models.

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### **Dedication**

I dedicate this thesis to my family for their continuous support of my dreams and career aspirations. To my mother, Zilara Gabdrakhimova, who came from Russia and stayed in Canada for three years to support me and feed my family while I was working days and studying nights. To my husband, David Coppard, who took care of all household chores and all children's medical appointments. To my children, Alexei and Sophia, who waited patiently until their mother finished her studies. I would not have completed this program without you.

## **Contribution of English Oral Vocabulary Knowledge to Reading Development in Grade 1 French Immersion and English Students**

In the context of the French immersion program, children acquire both a new language and literacy skills simultaneously, and by the end of Grade 3 their French vocabulary knowledge and reading skills are comparable to those of native French speakers (Au-Yeung et al., 2015; Harrison et Boulet, 2024). Research indicates that children rely on similar mechanisms during both first and additional language and literacy acquisition (Cummins, 2000), and, according to the influential Simple View of Reading, reading comprehension in French immersion students, like in monolingual learners, relies on two key processes: decoding and linguistic comprehension (Huo et al., 2021). Findings from studies conducted in Grade 1 immersion classrooms support that French reading comprehension is predicted by within-language decoding and linguistic comprehension skills (Huo et al., 2021; Lee & Chen, 2019; Erdos et al., 2011). While several studies measure linguistic comprehension through French receptive vocabulary (Huo et al., 2021; Lee & Chen, 2019), Erdos et al. (2011) used listening comprehension, a construct the present study uses to assess linguistic comprehension skills of Grade 1 students. Compared to the participants in Erdos et al.'s study who attended elementary schools outside of Montreal and were exposed to some French in their everyday life, the participants in the proposed study reside in British Columbia and their exposure to the French language is limited to the school environment. It remains unclear if French listening comprehension can be used to measure linguistic comprehension skills in Grade 1 French immersion students who receive language and literacy instruction in the additional language exclusively at school.

Research shows that literacy development in an additional language draws on general cognitive and first-language linguistic resources through the process of cross-linguistic transfer

where skills developed in one language support the development of skills in another (Cummins, 2000). A wide range of knowledge and skills that may facilitate cross-linguistic transfer have been studied, including phonetic awareness (Comeau et al., 1999), semantic awareness (Proctor et al., 2012), morphological awareness (Deacon et al., 2007), syntactic awareness (Burchell et al., 2023), and orthographic processing (Deacon et al., 2009). There has been a debate in existing literature regarding the role of first language oral vocabulary knowledge in supporting the development of literacy skills in an additional language. Specifically, researchers have questioned whether vocabulary reflects language-specific knowledge or whether it represents a more general cognitive ability to acquire new words which can transfer across languages to support the development of second-language vocabulary and reading skills (Jared et al., 2011). Previous studies have shown inconsistent results with some reporting small but significant contribution from first-language vocabulary to second-language reading development (Erdos et al., 2011; Lervåg & Aukrust, 2010; Proctor et al., 2006) and some studies not finding such an effect (Deacon et al., 2007; Jared et al., 2011).

Furthermore, there has been limited research exploring the impact of English oral vocabulary skills on the development of French early literacy skills at both the word- and text-levels in Grade 1 immersion students. Prior studies have primarily focused on word-level reading skills, reporting correlational analyses in this population (Deacon et al., 2007) or examined text-level comprehension in older children (Berube et al., 2022). Therefore, there exists a gap in the literature describing how English oral vocabulary knowledge may support reading development at both word- and text-levels in Grade 1 French immersion students and the mechanisms underlying cross-linguistic transfer.

The present study seeks to contribute to existing research by examining two interrelated questions. First, it tests the applicability of the Simple View of Reading to explain the development of reading comprehension in Grade 1 French immersion students. Specifically, it investigates whether French listening comprehension directly contributes to reading comprehension as early as Grade 1 in a context where language acquisition is limited to the school environment. Second, the study explores a potential role of English oral vocabulary knowledge in supporting French reading development at the word- and text-levels in Grade 1 French immersion students.

This thesis has the following structure. The first section discusses two models of reading: the Simple View of Reading model (SVR) and its extension, the Direct and Indirect Effects Model of Reading (DIER). These models describe the contribution of proximal and distal components to reading comprehension, with the DIER specifically outlining the role of vocabulary in relation to other components of reading. The next section reviews existing research on how oral language vocabulary knowledge contributes to word- and text-level reading development through phonological, semantic and inferential processing. The literature review gives theoretical support for the present study to investigate a potential contribution of English oral vocabulary knowledge to word reading and text reading comprehension in French Immersion students. Next, the process of cross-linguistic transfer is described as an important aspect of the Linguistic Interdependence Hypothesis which explains how language and literacy-related knowledge and skills transfer across languages. Additionally, the section discusses existing research on how English oral vocabulary knowledge relates to French word- and text-reading in early elementary immersion context. Literature on statistical learning and its role in literacy development will also be presented as a potential mechanism facilitating cross-linguistic

transfer across orthographic, phonological, and semantic components. The next section includes the purpose and methodology of the proposed study. The final section describes the statistical analyses used to address the research questions, followed by a discussion of the results, study limitations, and future implications.

## **Models of Reading Comprehension**

### **Simple View of Reading**

Reading comprehension is a complex process influenced by various interrelated factors. One of the most widely used theoretical models, the Simple View of Reading, proposed by Philip B. Gough and William E. Tunmer as a conceptual framework that describes the process of learning to read in alphabetical writing systems, is frequently applied in research involving elementary school children (Hoover & Tunmer, 2018; Tunmer & Hoover, 2019). The model conceptualizes the process of reading as the product of two broad cognitive constructs, word recognition and oral language comprehension (Tunmer & Hoover, 2019). These two constructs can be broken down into their component processes for further analysis (Tunmer & Champan, 2012).

The word recognition process in alphabetical writing systems refers to the ability to accurately and efficiently recognize printed words by applying the alphabetic principle and mapping letters and letter combinations to phonological structures stored in the mental lexicon (Hoover & Tunmer, 2018; Tunmer & Chapman, 2012). The alphabetic principle refers to the understanding that letters represent phonemes. It depends on two essential areas: letter knowledge, the ability to recognize and manipulate letters, and phonemic awareness, the ability to recognize and manipulate phonemes (Tunmer & Hoover, 2019). The process of mapping letter sequences to corresponding phonological forms allows to establish orthographic representations in lexical memory which in turn supports the acquisition of word-specific knowledge (Tunmer & Hoover, 2019). The word recognition process reaches automaticity when the orthographic representation is fully integrated with the phonological and semantic representations of the word in lexical memory, allowing for fluent word reading (Tunmer & Chapman, 2012; Perfetti, 2007).

The second cognitive construct, language comprehension, broadly refers to the ability to understand spoken language by integrating information from two cognitive domains: linguistic knowledge and background knowledge, including inferencing skills. The linguistic domain includes the ability to comprehend the language's phonetic system, the ability to extract and construct literal meaning from vocabulary units used in different morphosyntactic structures and to form structural representations of sentences (Tunmer & Chapman, 2012). Background knowledge, on the other hand, draws on individual's cultural background, knowledge of the world, as well as previous information in the text and the situational context. Therefore, oral language comprehension involves the process of making inferences while integrating background knowledge and literal meaning derived from linguistic knowledge (Tunmer & Hoover, 2019).

### **The Direct and Indirect Effects Model of Reading**

The SVR describes the word recognition and language comprehension cognitive capacities as direct or proximal processes underlying reading comprehension; however, the model does not focus on the analysis of the component skills which support reading comprehension indirectly. The Direct and Indirect Effects Model of Reading, developed by Young-Suk Grace Kim, extends the SVR by exploring the nature of the component processes and skills involved in word recognition (referred to as word reading in the DIER) and language comprehension (referred to as listening comprehension in the DIER) (Kim, 2017, 2020a, 2020b). It examines whether these components influence reading comprehension directly or indirectly and how they are structurally interconnected.

The DIER conceptualizes component skills as being in hierarchical, interactive, and dynamic relations (Kim, 2020b). This model views multiple layers of hierarchical organization

of component skills and processes in the following way. The following broad cognitive constructs: word reading, listening comprehension, and text reading fluency are conceptualized as proximal skills which influence reading comprehension directly. These proximal skills are supported by distal skills such as metalinguistic awareness and knowledge, higher-order cognitions and regulation, foundational oral language skills, and executive function. The distal component skills influence reading comprehension indirectly through their effect on proximal skills (Kim, 2020b).

Text-reading fluency relies on both word reading and listening comprehension and mediates the relations of these skills to reading comprehension (Kim, 2020b). Word reading is a lexical-level reading skill that relies on orthographic, phonological, and semantic processing (Kim, 2020a; 2020b). The development of a skilled word recognition system involves mappings between orthographic and phonological representations which interact with knowledge of word meanings (Nation & Snowling, 1998). In this process vocabulary knowledge plays an important role by indirectly supporting word reading through gradual refinement and expansion of phonological and semantic representations in the mental lexicon (Nation & Snowling, 2004; Ouellette, 2006).

Listening comprehension is a discourse-level oral language process that is supported by interaction between foundational oral language skills and a complex set of higher-order cognitions and regulation (Kim, 2020b; Kim et al., 2024). Foundational oral language skills including vocabulary and grammatical knowledge draw on semantic, morphological and syntactic processing (Proctor et al., 2012). Higher-order cognitions and regulations, which include inference, reasoning, perspective taking, monitoring, background knowledge, are supported by these foundational oral language skills to facilitate the comprehension (Kim,

2020b; Kim et al., 2024). As research demonstrates, a growing vocabulary plays a crucial role in this process by developing and strengthening a system of lexical-semantic concepts which is essential for making inferences, understanding implicit information, drawing conclusions (Cain & Oakhill, 2014; Ouellette & Shaw, 2014). Lastly, both word reading and listening comprehension constructs and their component skills rely on foundational domain-general cognitions or executive function such as working memory, shifting, inhibitory and attentional control which support reading comprehension through all component skills (Kim, 2020b).

The SVR proposes that while both word reading and language comprehension skills are equally important for reading comprehension, their relative contributions vary depending on the child's developmental level. Word reading skills have stronger contribution on reading comprehension in younger children, such as the children involved in the proposed research, who are still developing their decoding skills and cannot fully utilize their linguistic knowledge. When word reading becomes automatized, later on in development, reading comprehension increasingly relies more on linguistic comprehension process (Hoover & Tunmer, 2018). The DIER goes beyond the idea that the relative importance of proximal component skills changes with a reader's development level. It proposes that the relationship between proximal and distal component skills contributing to reading comprehension is dynamic and may vary depending on text-related features such as choice of words and expressions, syntactic structures, cognitive demands and other factors (Kim, 2020b). Specific to vocabulary, its contribution to reading comprehension may increase when texts include more sophisticated language, such as idiomatic or metaphoric expressions, formal academic words or unfamiliar words as is the case with children in the proposed study who are learning a new language. If the text comprehension requires extensive inference-making or perspective taking or knowledge of cultural references

then higher-order and cognitions components play a greater role (Kim, 2020b). Additionally, various activity tasks such as reading strategies and goals, assessment methods impact the dynamic relationship between proximal and distal components of reading. For example, research demonstrated that some reading comprehension assessment techniques draw more on decoding skills while others draw more on listening comprehension skills (Keenan et al., 2008).

Within a multi-layered hierarchical system component skills interact with each other and develop reciprocally through reading experience and exposure. Specifically, vocabulary being a component of foundational oral language skills, interacts with phonological, semantic and inferential processing (Cain & Oakhill, 2014; Kim, 2020a; Nation & Snowling, 2004; Ouellette & Shaw, 2014). Individuals' vocabulary knowledge develops when they enhance and add phonological representations to their mental lexicon and expand their knowledge of word meanings and their conceptual connections (Ouellette, 2006; Proctor et al., 2012).

Additionally, component skills interact with individual's environment, socioeconomic status, various ecological systems and factors such as the language of instruction and linguistic context of bilingual or immersion programs. Consequently, when children begin learning an additional language in the French Immersion program such as children in the present research, the proximal and distal processes and skills that support their literacy development will resemble those of monolingual learners. However, the contribution of component skills such as first language vocabulary knowledge interacting with the immersion environment may dynamically change in relation to reading development.

### **Section Summary**

The proposed study utilizes two models to explain reading comprehension in Grade 1 French Immersion students, namely the Simple View of Reading and the Direct and Indirect

Effects Model of Reading. While SVR identifies two key processes involved in reading the DIER offers a more detailed analysis of components underlying reading comprehension and explains their structural, dynamic and interactive relationships. Specifically, it demonstrates the role of vocabulary as a distal component skill that supports reading comprehension indirectly through both language comprehension and word recognition constructs. The DIER model can be applied cross-linguistically as it offers explanation how its components can interact with external factors such as French Immersion context. Therefore, the DIER model allows to investigate interactive relationship between first-language vocabulary and reading development in the French Immersion context which is relevant to the proposed research.

### **Vocabulary Contribution to Word- and Text-Level Reading**

The DIER model conceptualizes oral vocabulary knowledge as a distal component skill which influences reading comprehension indirectly through two proximal skills: word reading, a lexical-level reading skill, and oral language comprehension, a discourse-level oral comprehension skill (Kim, 2020b; Kim et al., 2024). In studies devoted to reading development oral vocabulary knowledge is defined as a multidimensional construct which includes interconnected dimensions such as number of lexical entries, semantic representation (knowledge of core and peripheral semantic features), lexical-semantic organization (awareness of the semantic relations between the words), understanding the relations between word use and the background knowledge including inference skills (Cain & Oakhill, 2014; Ouellette & Shaw, 2014). Vocabulary is hypothesized to interact with linguistic domains which include phonology and semantics (Ouellette, 2006; Proctor et al., 2012), and with higher-order cognitions and regulations which include background knowledge and inference in both word reading and oral language comprehension constructs (Currie & Cain, 2015; Kim et al., 2024).

According to the DIER, word reading relies on phonological, semantic, and orthographic processing (Kim, 2020b). A word's semantic information interacts with associated phonological and orthographic representation which facilitates the development of rapid and accurate word recognition (Ouellette, 2006). Oral vocabulary knowledge is believed to influence the development of word recognition system through both phonological and semantic pathways (Nation & Snowling, 2004). As vocabulary grows, new items accumulate and refine phonological representations of sublexical and lexical forms in mental lexicon and gradually improve children's decoding ability (Ouellette, 2006; Ouellette & Beers, 2009). Additionally, oral vocabulary knowledge influences the development of semantic representations which are

thought to work together with phonological factors to facilitate automatic word recognition (Nation & Snowling, 2004; Ouellette, 2006). Strong semantic representations are especially important for identifying irregularly spelled words which cannot be fully decoded by letter-sound correspondences (Nation & Snowling, 1998; Ouellette & Beers, 2009). This aligns with the findings from a study by Tunmer and Chapman (2012) who demonstrated that oral vocabulary knowledge, while being an essential component of oral language comprehension, indirectly supports the development of both phonological decoding and word recognition skills. These findings are relevant to the proposed study as they outline pathways through which oral vocabulary of beginning readers contribute to the development of word recognition.

Oral vocabulary knowledge supports text comprehension through expanding lexical-semantic organization of words in mental lexicon and through interaction with higher-order cognitions and regulations such as background knowledge and inference skill (Cain & Oakhill, 2014; Tunmer & Hoover, 2019). A larger oral vocabulary supports the development and growth of lexical-semantic system where words are interconnected through semantic relations, categorization, and associations, including synonyms and antonyms (Cain & Oakhill, 2014; Ouellette & Shaw, 2014). A well-developed and interconnected vocabulary system supports text comprehension by rapidly activating semantic knowledge and constructing a structural representation of a sentence that conveys its literal meaning (Ouellette & Shaw, 2014; Tunmer & Hoover, 2019).

The reader applies inferential and pragmatic rules to integrate the meaning derived from structural representations with their background knowledge, the preceding text, and the situational context and generates inferences about the intended meaning of the text (Tunmer & Hoover, 2019). Research investigating the relations between vocabulary and text comprehension

processing confirms that good vocabulary knowledge supports higher-order processes such as inference making (Cain & Oakhill, 2014; Ouellette & Shaw, 2014). The ability to generate inferences relies on lexical-semantic organization or knowledge about interrelations between words (Cain & Oakhill, 2014). A reader draws on vocabulary and general background knowledge to understand information that is not directly stated by linking semantically related concepts and drawing inferences.

### **Section Summary**

Research has demonstrated that oral vocabulary knowledge supports reading development through both word recognition and language comprehension cognitive processes. A better oral vocabulary knowledge facilitates word recognition through its impact on the development of phonological and semantic representations and development of a lexical-semantic system in the mental lexicon. Oral vocabulary knowledge also interacts with integrative and inferential processing allowing the reader to go beyond the literal meaning and make full sense of the intended meaning of the text. These findings are relevant to the proposed study which examines how oral vocabulary supports the development of word-level and text-level skills in beginning readers.

### **Cross-Linguistic Research on Vocabulary Contribution to Word- and Text-Level Reading**

Research demonstrates that language and literacy acquisition is supported explicitly through multiple factors such as the language of instruction (Proctor et al., 2006), formal instructional methods, and the volume and nature of literacy exposure (Arciuli & Simpson, 2012). Additionally, research shows that literacy development in an additional language is supported implicitly through skills and knowledge developed in the context of two languages and is influenced by the process of cross-linguistic transfer (Kim et al., 2024). The next two portions will discuss the process of cross-linguistic transfer and statistical learning mechanism, which is a form of implicit learning, which may support the transfer.

### **Linguistic Interdependence**

#### ***Hypothesis***

Children learning to read in an additional language often face a more challenging situation because they do not have or have very limited knowledge of the new language's linguistic system. It was proposed that during the literacy development students draw on resources and skills developed in their first language, both linguistic and cultural (Genesee et al., 2007). Jim Cummins' Linguistic Interdependence Hypothesis (Cummins, 1979, 1981, 2000) proposes that literacy-related knowledge and skills transfer across languages. The hypothesis distinguishes between two domains of language: Basic Interpersonal Communicative Skills (BICS) and Cognitive Academic Language Proficiency (CALP). BICS represent surface-level language skills specific to each language used in everyday communication, while CALP involves deeper cognitive and linguistic processes which allow to manipulate and reflect on surface features of the language outside of specific context (Cummins, 1981). CALP refers to the aspects

of language proficiency that are closely connected to academic and literacy skills and are transferrable across languages (Cummins, 1981).

According to Cummins, three key processes facilitate the transfer of literacy-related skills: 1) the application of the same cognitive and linguistic ability and skills across languages, 2) reliance on general concepts and knowledge from the reader's first-language experience, and 3) structural similarities between linguistic forms and features in both languages (Cummins, 2000). When compared to the DIER model, the processes facilitating cross-linguistic transfer of literacy-related knowledge and skills can be understood through the dynamic interaction of several cognitive constructs. Cognitive abilities such as memory, auditory discrimination, and abstract reasoning, represent foundational domain-general cognitive processes. Along with metalinguistic awareness, a language related ability, these cognitive-linguistic abilities underlie both word recognition and oral language comprehension processes (Cummins, 2000; Kim, 2020a). Conceptual knowledge including general concepts, background knowledge, literacy-related operational knowledge, and knowledge of how to approach the text, monitor comprehension, and interpret the meaning, involve higher-order cognitions and regulations which support language comprehension (Cummins, 2000; Kim, 2020b). Finally, linguistic knowledge refers to those aspects of foundational oral language skills which enable individuals to analyze their language use and manipulate surface language features (Cummins, 2000; Kim, 2020b).

### ***The Role of Oral Vocabulary Knowledge in Cross-Linguistic Transfer***

To better understand the role of oral vocabulary knowledge in cross-linguistic transfer across languages, it is important to define the broad construct of linguistic knowledge more precisely. Based on the description of the construct in Cummins' works, linguistic knowledge

can be understood as verbal cognitive abilities which include vocabulary and concept knowledge, metalinguistic awareness, deductive verbal reasoning skills (Cummins, 2000). Linguistic knowledge, on one hand, can be operationalized as procedural knowledge which relies on broad metalinguistic knowledge and skills, such as understanding and reflecting on structural features of language, semantic features of words and their lexical-semantic conceptual organization (Chung et al., 2019; Genessee et al., 2007). On the other hand, linguistic knowledge refers to academic language that children acquire through instruction at school and supports higher-order cognitive strategies such as integration of the meanings in the text, comprehension monitoring and inference making (Chung et al., 2019). The key aspect of cognitive academic language is its reliance on the knowledge of language to interpret the meaning with minimal support from the context (Cummins, 2000).

Research on monolingual reading development suggests that oral vocabulary knowledge supports reading comprehension through phonological, semantic, and inferential processing. Studies examining cross-linguistic association of oral vocabulary knowledge in the first language to reading development in an additional language suggest that the same cognitive-linguistic processing may be involved. For example, Ordóñez et al. (2002) found that understanding semantic hierarchy and identifying superordinate terms in a category in Spanish facilitates the same skill in English among Grade 4 and 5 students. Hipfner-Boucher et al. (2016) found that recognizing cognate relationships between French and English, languages that are historically and culturally connected, contributes to reading comprehension as early as Grade 1. According to Cummins (1979), even if children may initially have limited oral comprehension skills in an additional language, many concepts they encounter in early reading and writing are already familiar to them because they have most likely formed in their first language. Children acquire a

new label for an already existing concept during additional language and reading acquisition (Cummins, 1979).

### **Cross-Linguistic Research**

Studies show conflicting results regarding possible cross-linguistic association between English oral vocabulary knowledge and French word reading. Deacon et al. (2007) reported weak but significant correlation of .26 between English vocabulary knowledge, assessed with the PPVT-3, and French word reading in Grade 1 immersion students. This study, however, did not find significant longitudinal correlation between English vocabulary and French word reading assessed in Grade 2 or 3. Similarly, Hipfner-Boucher et al. (2016) reported weak but significant correlation of .28 between Grade 1 English vocabulary knowledge, assessed with the PPVT-4, and concurrent French word reading. However, no significant correlations emerged between Grade 1 English vocabulary knowledge and Grade 2 French word reading or between Grade 2 English vocabulary knowledge and concurrent French word reading. These findings are particularly relevant to the present study as they provide correlational analyses specific to Grade 1 French immersion students.

Conversely, Erdos et al. (2011) found that English vocabulary, assessed with the PPVT-3 in the fall of kindergarten, showed no significant correlation with Grade 1 French word identification. Similarly, Jared et al. (2011) reported that English vocabulary, assessed with the PPVT-3 in kindergarten, did not emerge as a significant predictor of French word recognition ability in Grade 3. Notably, the results from these two studies focus on longitudinal relationships between kindergarten oral vocabulary knowledge and word-level reading skills in later grades whereas the proposed study examines concurrent associations between oral vocabulary knowledge and word-level reading in Grade 1 students.

Cross-linguistic associations of English oral vocabulary knowledge and French text reading comprehension show more consistent results. In Hipfner-Boucher et al. (2016), English receptive vocabulary, assessed with the PPVT-4 in both Grade 1 and 2, demonstrated a weak but significant correlation with Grade 2 French reading comprehension. In Grade 1 English receptive vocabulary correlation coefficient was .28 and in Grade 2 English receptive vocabulary correlation coefficient was .39. Although, English vocabulary did not emerge as a significant unique predictor of French passage reading comprehension in the hierarchical linear regression. Harrison & Boulet (2024) reported significant cross-linguistic association ( $r = .63$ ) between English vocabulary, assessed with the PPVT-4, and French text reading comprehension in Grade 3 children. Erdos et al. (2011) found that Grade 1 French reading comprehension was predicted by the following kindergarten measures such as French receptive vocabulary, English blending, a measure of phonological awareness, Rapid Automatized Naming of numbers (RAN-N), and English receptive vocabulary. Notably, English vocabulary, assessed with the PPVT-3, accounted for a small but significant individual variance both in fall kindergarten (beta = .353,  $p = .001$ ) and in spring kindergarten (beta = .211,  $p = .003$ ). However, when RAN of objects was used instead of RAN of numbers, English receptive vocabulary did not contribute significantly to the model. The longitudinal study conducted by Jared et al. (2011) found that English receptive vocabulary, assessed with the PPVT-3 in kindergarten, was a significant predictor of Grade 3 French text reading comprehension when it was used alone in the model accounting for 3% of variance.

In contrast to these studies, the proposed research, using a cross-sectional research design, examines the concurrent relationship between English oral vocabulary knowledge and both French word reading and text reading comprehension measured in Grade 1 students. By

using the Peabody Picture Vocabulary Test, fourth Edition (PPVT-4; Dunn & Dunn, 2007), a well-established measure for assessing receptive English vocabulary knowledge, this study aligns with the methods used in previous research, and it addresses the gap in existing literature by exploring the potential relationship between English oral vocabulary knowledge and French reading comprehension in Grade 1 French immersion students.

### **Section Summary**

The Linguistic Interdependence hypothesis provides a framework which explains how language and literacy-related knowledge and skills transfer across languages and support reading comprehension. In accordance with the DIER model, the transfer is facilitated by domain-general cognition processes, higher-order cognitions and regulation, and foundational oral language skills. The research shows inconsistent results of English vocabulary knowledge association with French word reading; however, studies show that English vocabulary knowledge significantly correlates with French text reading comprehension.

### **Statistical Learning**

Research demonstrates that during reading development a novice reader relies both on explicit learning instruction and implicit learning when a reader detects statistical probabilities of associated items in linguistic and orthographic input (Arciuli, 2018; Arciuli & Simpson, 2012). Statistical learning is a form of implicit learning where a person unconsciously encodes regularities or statistical patterns in linguistic and non-linguistic stimuli through repeated exposure (Arciuli & Simpson, 2012; Elleman et al., 2019; Seidenberg & MacDonald, 2018). Language displays statistical patterns at each level including phonology, vocabulary, syntax, including orthography and pragmatic use of language in various social contexts. These patterns are probabilistic which means they could lead to various possible combinations which differ in the likelihood of occurring and combining in a sequence (Seidenberg & MacDonald, 2018). Additionally, statistical regularities correlate between the levels of linguistic structure and constrain patterns that can occur at another level (Seidenberg & MacDonald, 2018).

Statistical learning supports reading development directly and indirectly. During the word reading process, statistical learning supports forming orthographic representations when a reader detects probabilistic patterns in mapping graphemes to phonemes, which gradually results in the mapping of orthographic representations to phonological and semantic representations of words in lexical memory (Arciuli & Simpson, 2012; Frost et al., 2013). Statistical learning indirectly supports reading development by influencing the foundational oral language components of listening comprehension skills such as facilitating vocabulary growth (Arciuli & Simpson, 2012; Evans et al., 2009). At the sentence and text levels readers implicitly use statistical knowledge to generate expectations about most probable word that will likely follow and combine probabilistic cues to interpret the meaning of sentences (Seidenberg & MacDonald, 2018). Increased exposure

to written language in different contexts increases individuals' sensitivity to probabilistic cues for relations between word meanings without having to explicitly teach them through formal instruction (Arciuli & Simpson, 2012).

Research demonstrates that literacy development in an additional language relies on the same statistical learning mechanisms as the first language when individuals learn a new language and orthographic mapping by acquiring a new set of statistical patterns in the linguistic and orthographic stimuli (Frost et al., 2013). Moreover, a recent study by Ren & Wang (2024) showed that statistical learning may facilitate cross-linguistic transfer where the ability to track probabilities in auditory or visual input in one language influences reading in another language. Sensitivity to distributional probabilities in linguistic and orthographic input helps readers integrate information across previously encountered items stored in lexical memory by detecting common features and organizing them into categories (Thiessen & Erickson, 2013). Therefore, sensitivity to distributional information may support a mechanism for cross-linguistic transfer proposed in the Linguistic Interdependence Hypothesis. Statistical learning may support discovery of cognate relationships between words by detecting similarities in meaning and orthographic and phonological forms in historically and culturally related languages and facilitate the transfer between literacy development across languages. Additionally, sensitivity to distributional information may support the transfer of background knowledge and general concepts from a first language to the acquisition of additional languages. When a concept is acquired in one language, it activates the process of integrating information across exemplars from two languages and facilitates vocabulary growth in an additional language. This, in turn, indirectly supports reading development in that language.

**Section Summary**

Statistical learning presents a potential mechanism for cross-linguistic transfer at the orthographic, phonological, and semantic levels. By detecting distributional probabilities between words that share semantic, phonological or orthographic features, statistical learning can facilitate vocabulary growth and listening comprehension in an additional language and support reading development in students in French Immersion program. This is directly relevant to the proposed research because the role of listening comprehension is crucial in reading development as shown in the Simple View of Reading model. Additionally, sensitivity to distributional patterns, such as common features between cognates or conceptual knowledge, may explain how first-language oral vocabulary knowledge may contribute to reading comprehension at both the word- and text-levels in an additional language. This is pertinent to the present research because it may explain how English oral vocabulary knowledge can facilitate French reading development in Grade 1 immersion students, particularly in terms of word recognition and text comprehension.

## Methods

The present study is part of a longitudinal project investigating literacy and executive function development in French Immersion (FI) and English program (ENG) students from Grades 1 to 5 in the Sooke and Greater Victoria school districts in British Columbia. The larger project started in the 2022–2023 school year and set to conclude in the 2026–2027 school year. Reading and writing measures alternate each year to capture students' literacy development over time, while executive function skills are assessed annually. This research focuses on reading and oral language measures assessed during the first year of the project.

The purpose of this study is twofold. First, it aims to test the applicability of the SVR model to reading development in Grade 1 FI students by analyzing the contribution of within-language word reading and listening comprehension skills. Second, it examines the contribution of English oral vocabulary knowledge to reading development at both the word- and text-levels in Grade 1 FI students. Data collection occurred in the spring of Grade 1. Following the SVR model, children in the FI program were assessed on within-language measures of word reading, pseudoword decoding, listening comprehension, reading comprehension, and English receptive vocabulary.

Drawing on previous research, it is hypothesized that the Simple View of Reading can be applied to explain French reading development in immersion students. Similar to monolingual students, their reading comprehension is expected to rely on two key components: within-language decoding and listening comprehension. It is further anticipated that French listening comprehension will significantly contribute to French reading comprehension as early as Grade 1. Moreover, based on existing studies, it is predicted that English receptive vocabulary, as assessed by PPVT-4, will correlate with French reading measures at the word- and text-levels.

The cross-linguistic association is expected to be weak but significant. Finally, drawing on existing studies, it is anticipated that English receptive vocabulary will make a significant independent contribution to French text reading comprehension.

### **Participants**

A total of 61 Grade 1 FI students (19 boys and 42 girls) with an average age of 6.83 years from three schools across two school districts participated in the study. Prior to the project's start, ethics approval was obtained from the University of Victoria's Human Research Ethics Board. Parents provided consent for their child's participation in the study. Though no formal demographic data were collected, the children were primarily from middle-class neighborhoods. The sample included students of various abilities and heritage backgrounds, reflecting the diversity of the general population. Previous studies have shown that monolingual and multilingual students exhibit similarities in their language and reading development in French Immersion programs (Au-Yeung et al., 2015; Berube et al., 2022; Lee & Chen, 2019); therefore, no information was collected on language status of multilingual students. In British Columbia, the early French Immersion program begins in kindergarten, where French is the sole language of instruction through Grade 2 (Government of British Columbia, 2022).

Each child was assessed individually during a 45–60-minute session during school hours. Examiners read a short description explaining the study's purpose, and children gave verbal consent based on the information provided. Instructions for French reading and listening comprehension tasks were delivered in French; however, English was used when a student was not able to understand the task. English receptive vocabulary assessment was conducted in English.

## Measures

A battery of measures administered to FI students included French word reading and pseudoword decoding, French listening comprehension, French reading comprehension, and English receptive vocabulary.

**French Word Reading.** The Lecture de Mots subtest from the Wechsler Individual Achievement Test – Second Edition (WIAT-II; The Psychological Corporation, 2002) was used to assess French word reading skills. WIAT-II was normed on the French-Canadian population. The subtest assesses basic reading skills such as letter knowledge, phonological awareness, and word recognition skills. Children began with item 1 which was the starting point for Grade 1. They named the letters of the alphabet, identified riming words, words that started or ended with the same sound, combined sounds into a word, and read words aloud from a list of individual words of increasing difficulty. The assessment stopped after 7 consecutive errors. The total score was the number of items read correctly. Internal consistency estimates based on coefficient alpha are reported between .98 and .99 for 6- to 7-year-olds.

**French Pseudoword Decoding.** The Décodage de Pseudo-mots subtest from the Wechsler Individual Achievement Test – Second Edition (WIAT-II; The Psychological Corporation, 2002) was used to assess non-word reading. The subtest assesses the ability to apply French spelling-sound patterns. Children began with item 1, which is the starting point for Grade 1, and read aloud individual words from a list of words of increasing difficulty. The total score was the number of pseudowords read correctly. The task was discontinued after 7 consecutive errors. Internal consistency estimates based on coefficient alpha are reported at .97 for 6- to 7-year-olds.

**French Listening Comprehension.** The Compréhension Orale subtest from the Wechsler Individual Achievement Test – Second Edition (CDN-F; WIAT-II; The Psychological Corporation, 2005) was used to assess linguistic comprehension. Compréhension Orale subtest includes Vocabulaire Réceptif, Compréhension de Phrases, and Vocabulaire Expressif. The child identified a picture among four pictures which best represented a word or a phrase said by the examiner, and during the Vocabulaire Expressif component the child said a word that was shown in the picture. Internal consistency estimates based on coefficient alpha are reported between .72 and .73 for 6- to 7-year-olds.

**French Reading Comprehension.** The Compréhension de Lecture subtest from the Wechsler Individual Achievement Test – Second Edition (WIAT-II; The Psychological Corporation, 2002) was used to assess text-level reading comprehension. The child read individual sentences and stories and answered several questions that tested literal and inferential understanding. Internal consistency estimates based on coefficient alpha are reported between .85 and .84 for 6- to 7-year-olds.

**English Receptive Vocabulary.** The Peabody Picture Vocabulary Test, fourth Edition (PPVT-4; Dunn & Dunn, 2007) was administered to assess FI students' English receptive vocabulary knowledge. The test was administered according to the standardized procedures. The basal was established based on the child's age. The examiner read a word, and the child pointed to one of four pictures which corresponded to the word. The test stopped if a child made eight mistakes in one set. Internal consistency estimates based on coefficient alpha are reported at .97 for 6- to 7-year-olds.

## Results

Descriptive statistics are presented first, followed by the results of the correlational analysis. To address the study's two research questions the hierarchical multiple regression method was selected because the order of variable entry is determined by theoretical frameworks and developmental considerations (Harrison et al., 2021). First, the analyses examined the contribution of within-language listening comprehension, word reading, and pseudoword decoding to Grade 1 French reading comprehension. Two hierarchical multiple regression models were tested: one assessing the contribution of listening comprehension and word reading, and the other evaluating listening comprehension and pseudoword decoding. These analyses assess the applicability of the SVR to French reading development in this group of students. They also examine whether a listening comprehension measure adequately captures French oral language comprehension construct at such an early stage and whether the students rely more on their growing word reading or decoding ability in French.

Second, drawing on the theoretical framework outlined in the DIER and the Linguistic Interdependence hypothesis, the present study investigates the cross-linguistic influence of English vocabulary knowledge on French reading development in this group of students. Two hierarchical multiple regression models were built: one assessing the potential contribution of oral English vocabulary knowledge beyond French word reading, and the other examining its influence beyond French pseudoword decoding.

### Descriptive Statistics

The distribution of the data was examined using histograms and Q-Q plots to assess normality and screen for missing data, outliers, and linearity of relations among variables to ensure suitability for a regression-based analysis. A visual inspection of the predictor and

outcome variables suggested possible outliers in English receptive vocabulary, French word reading, and French reading comprehension. One student with exceptionally high English vocabulary score also performed well across all French reading and oral language measures. Two students who scored particularly low on French word reading similarly performed low on French pseudoword decoding and reading comprehension; however, their oral language skills in both English and French were close to the mean. Additionally, three students who scored high on French reading comprehension demonstrated stronger performance in English and French oral language measures, as well as in French reading tasks. The presence of outliers likely reflects the variability in skills levels among beginner readers. Therefore, the outliers were retained to preserve the diversity of oral language and reading skills that exist in a typical classroom.

The distribution of the variables approximated normality; however French reading comprehension appeared to be positively skewed. Given that the sample size for the FI group is 61 students, the Shapiro-Wilk test was used to further evaluate the normality of data distribution. The Shapiro-Wilk test revealed that data were approximately normally distributed ( $p > .05$ ) for the English receptive vocabulary, French word reading, French pseudoword decoding, and French listening comprehension. However, the Shapiro-Wilk test for French reading comprehension was significant ( $p = .04$ ) indicating that the data were skewed. The skewness likely arose because the French reading and oral language measures were normed on a French-Canadian population. Text reading comprehension, a more challenging task, may be particularly difficult for FI students who are learning a new language and developing reading skills simultaneously. To achieve distributional normality a natural log transformation was applied to the French reading comprehension variable. However, even after transformation was applied, two high outliers remained. Correlational and hierarchical multiple regression analyses were run

using both the transformed and non-transformed scores yielding similar results. Given that the Shapiro-Wilk test’s significance was only marginal for French reading comprehension, and that the results remained consistent across transformations, the non-transformed data were used for statistical analyses aligning with a similar approach adopted in previous studies (e.g., Erdos et al., 2011; Hipfner-Boucher et al., 2016; Lee & Chen, 2019).

**Table 1**

*Means, Standard Deviations, and Shapiro-Wilk Test of All Variables Included in the Analyses*

Variable	M	SD	Min.	Max.	Skew	Kurtosis	Shapiro-Wilk	
							Statistic	Sig.
EV	113.418	10.569	90.0	141.0	-.128	.017	.984	.657
FWR	79.327	16.479	40.00	114.00	-.554	.210	.969	.166
FPD	85.055	10.918	63.0	109.0	.146	-.469	.979	.453
FLC	74.036	17.558	40.00	105.00	-.335	-.588	.963	.092
FRC	54.927	9.979	40.0	85.0	.750	.589	.955	.040

*Note.* EV = English receptive vocabulary, FWR = French word reading, FPD = French pseudoword decoding, FLC = French listening comprehension, FRC = French reading comprehension. Standard scores M = 100; SD = 15.

Table 1 summarizes the standard score descriptive statistics for FI students on English receptive vocabulary, French reading and oral language measures. Consistent with previous research (Au-Yeung et al., 2015; Harrison et Boulet, 2024), FI students show higher than average performance on English receptive vocabulary knowledge. French pseudoword decoding is within the average range, word reading is reaching the average range; however, listening comprehension is below average and reading comprehension is low. This low performance on the reading comprehension task is likely due to floor effects which occurred because the task was

too difficult for the present group compared to the normative group which is comprised of Francophone Canadian children.

**Correlational Analysis**

Correlational analyses examining the associations between English vocabulary knowledge, French reading measures and French listening comprehension are shown in Table 2.

**Table 2**

*Bivariate Pearson Correlation Coefficients of Variables Included in Regression Analyses*

Measure	1	2	3	4	5
1. PPVT	1				
2. FWR	.327*	1			
3. FPD	.354**	.699**	1		
4. FLC	.176	.152	.204	1	
5. FRC	.303*	.733**	.745**	.178	1

*Note.* EV = English receptive vocabulary, FWR = French word reading, FPD = French pseudoword decoding, FLC = French listening comprehension, FRC = French reading comprehension.

\*  $p < .05$ , \*\*  $p < 0.01$  (two-tailed).

Children’s English vocabulary knowledge, assessed by the PPVT-4, showed significant correlations with all French reading measures: French word reading ( $r = .327, p < .05$ ), French pseudoword decoding ( $r = .354, p < .01$ ), and French reading comprehension ( $r = .303, p < .05$ ). Additionally, the French reading measures were strongly correlated with each other: French word reading and pseudoword decoding ( $r = .699, p < .01$ ), French word reading and reading comprehension ( $r = .733, p < .01$ ), and French pseudoword decoding and reading comprehension ( $r = .745, p < .01$ ). While the bivariate correlation coefficients for the French reading measures

were quite large, none exceeded the .90 threshold indicating that there was no strong indication of multicollinearity between the variables (Tabachnick & Fidell, 2013). In contrast, French listening comprehension did not correlate with either English vocabulary knowledge or any of the French reading measures. Although no significant correlation was found with French reading comprehension, listening comprehension was still included in the hierarchical multiple regression models to assess the generalizability of the SVR in this sample, based on the theoretical framework of this model of reading (Hoover & Tunmer, 2018; Tunmer & Champan, 2012).

**Hierarchical Multiple Regression**

Two hierarchical regression analyses were conducted to examine the contribution of word reading and pseudoword decoding to French reading comprehension above and beyond the influence of French listening comprehension. In both models French listening comprehension as a measure of oral language comprehension was entered at Step 1 as supported by theoretical and developmental considerations (Erdos et al., 2011). The first model included French word reading entered at Step 2 (see Table 3), and the second model included French pseudoword decoding entered at Step 2 (see Table 4).

**Table 3**

*Hierarchical Multiple Regression Examining the Simple View of Reading: Predicting French Reading Comprehension from Listening Comprehension and Word Reading*

Step	Variables	$R^2$	Adj. $R^2$	$R^2$ change	$\beta$	$p$
1	FLC	.032	.015	.032	.178	.169
2	FLC				.069	.448
	FWR	.542	.526	.510	.723	<.001

As Table 3 shows, French listening comprehension explained 3.2% of the variance (adj.  $R^2 = .015$ ) which was not significant [ $F(1,59) = 1.94, p = .169$ ]. When French word reading was added to the model, it accounted for an additional 51% ( $R^2$  change = .510) of the variance in French reading comprehension, and this contribution was significant [ $F(1,58) = 64.66, p < .001$ ]. The whole model explained 54% of the variance in French reading comprehension (adj.  $R^2 = .526$ ) and was significant [ $F(2,58) = 34.35, p < .001$ ].

**Table 4**

*Hierarchical Multiple Regression Examining the Simple View of Reading: Predicting French Reading Comprehension from Listening Comprehension and Pseudoword Decoding*

Step	Variables	$R^2$	Adj. $R^2$	$R^2$ change	$\beta$	$p$
1	FLC	.032	.015	.032	.178	.169
2	FLC				.027	.760
	FPD	.555	.540	.523	.739	<.001

Then the analyses were conducted using pseudoword decoding instead of word reading, and the results are shown in Table 4. French pseudoword decoding explained 52% in French reading comprehension ( $R^2$  change = .523), and the contribution was significant [ $F(1,58) = 68.187, p < .001$ ]. The whole model explained 56% of the variance in French reading comprehension (adj.  $R^2 = .540$ ) and was significant [ $F(2,58) = 36.17, p < .001$ ].

The contribution of English vocabulary knowledge as a measure of cross-linguistic oral language comprehension to French reading comprehension was examined next. Two hierarchical regression analyses were conducted with English vocabulary was entered at Step 1. The first model included French word reading entered at Step 2 (see Table 5), and the second model included French pseudoword decoding entered at Step 2 (see Table 6).

**Table 5**

*Hierarchical Multiple Regression Predicting French Reading Comprehension from English Vocabulary and Word Reading*

Step	Variables	$R^2$	Adj. $R^2$	$R^2$ change	$\beta$	$p$
1	PPVT	.092	.076	.092	.303	.018
2	PPVT				.071	.453
	FWR	.542	.526	.450	.710	< .001

As shown in Table 5, English vocabulary explained 9% of the variance (adj.  $R^2 = .076$ ) and was significant when it was in the model alone [ $F(1,59) = 5.97, p = .018$ ]. When French word reading was added in Step 2 of the model, it accounted for an additional 45% ( $R^2$  change = .450) of the variance in French reading comprehension, and the contribution was significant [ $F(1,58) = 57.04, p < .001$ ]. Notably, the contribution of English vocabulary in the second model lost its significance ( $\beta = .071, p = .453$ ). The whole model explained 54% of the variance in French reading comprehension (adj.  $R^2 = .526$ ) and was significant [ $F(2,58) = 34.34, p < .001$ ].

**Table 6**

*Hierarchical Multiple Regression Predicting French Reading Comprehension from English Vocabulary and Pseudoword Decoding*

Step	Variables	$R^2$	Adj. $R^2$	$R^2$ change	$\beta$	$p$
1	PPVT	.092	.076	.092	.303	.018
2	PPVT				.045	.630
	FPD	.556	.541	.464	.728	< .001

Table 6 shows the results of the analyses when pseudoword decoding was used instead of word reading. In model 1 English vocabulary explained 9% of the variance (adj.  $R^2 = .076$ ) and was significant when it was alone in the model [ $F(1,59) = 5.97, p = .018$ ]. When French

pseudoword decoding was added to the model two, it accounted for an additional 46% ( $R^2$  change = .464) of the variance in French reading comprehension, and the contribution was significant [ $F(1,58) = 60.65, p < .001$ ]. In the model with pseudoword decoding the contribution of English vocabulary lost its significance ( $\beta = .045, p = .630$ ). The whole model explained 56% of the variance in French reading comprehension (adj.  $R^2 = .541$ ) and was significant [ $F(2,58) = 36.33, p < .001$ ].

## Discussion

The first goal of this study was to explore how within-language listening comprehension, word reading, and pseudoword decoding explain French reading comprehension in Grade 1 students in the given sample. The second goal of this study was to investigate the cross-linguistic contribution of English oral vocabulary knowledge to reading comprehension at both the word- and text-levels in French.

The results indicated that the FI students in the sample demonstrated strong English oral language skills. This result may be influenced by the language and literacy-rich environments in families who have a higher socioeconomic status and educational level. According to existing research they are more likely to enroll their children in French immersion programs (Au-Yeung et al., 2015). The students' average performance on pseudoword decoding and near average performance on word reading indicate a strong grasp of the alphabetic principle which supports the development of decoding skills and the formation of orthographic representations in lexical memory. Moreover, the shared alphabet and multiple similar letter-sound connections between English and French facilitate cross-linguistic transfer of orthographic knowledge, allowing students to apply their reading strategies across English and French (Deacon et al., 2009). However, the low performance on French reading comprehension task is likely due to floor effects and may also be linked to less developed French listening comprehension skills. According to the SVR (Tunmer & Hoover, 2019), reading comprehension relies on both word reading and oral language comprehension. As the analyses show, while Grade 1 readers demonstrated near average word reading skills, their listening comprehension was below average; therefore, students may not yet have sufficient French oral language skills to support the comprehension of written texts.

The bivariate Pearson correlation analyses revealed cross-linguistic associations between children's English vocabulary skills and both French word reading ( $r = .327, p < .05$ ) and French pseudoword decoding ( $r = .354, p < .01$ ), which may explain the stronger mean performance on word recognition and decoding tasks. These results align with previous studies demonstrating significant associations between English vocabulary and French word reading skills (Deacon et al., 2007; Hipfner-Boucher et al., 2016). It is likely that English oral vocabulary knowledge contributes to the development of French word level reading skills through the process of cross-linguistic transfer. Additionally, English vocabulary is significantly associated with French reading comprehension ( $r = .303, p < .05$ ) providing further evidence for cross-linguistic support at the text level. This finding is consistent with previous studies (Erdos et al., 2011; Harrison & Boulet, 2024; Hipfner-Boucher et al., 2016). However, the correlation analyses show that French listening comprehension is not significantly associated with French reading measures or English vocabulary knowledge. This suggests that the listening comprehension task, which assessed both receptive and expressive vocabulary as well as receptive grammar, may have been too difficult for Grade 1 students. Prior research suggests that a simpler measure, such as French receptive vocabulary, may be more appropriate for assessing French oral language comprehension in younger learners (Hipfner-Boucher et al., 2016; Huo et al., 2021; Lee & Chen, 2019).

The hierarchical multiple regressions assessed the generalizability of the SVR to this group of FI students. The model including French listening comprehension explained 3.2% of the variance in French reading comprehension; however, this contribution was not significant. When French word reading and pseudoword decoding were added to the model, both were found to be significant predictors of Grade 1 French reading comprehension. This finding aligns with the SVR framework, which posits that beginner readers rely more on word reading and decoding

skills than oral language skills (Hoover & Tunmer, 2018). Notably, the model with pseudoword decoding explained more variance in this sample's French reading comprehension than the model with word reading. This contrasts with findings from Erdos et al. (2011) who reported that French word reading was a stronger predictor of French reading comprehension than pseudoword decoding. One possible explanation is the relatively small size in the present study whose exposure to French was limited to the school environment, whereas Erdos et al. (2011) analyzed a larger sample from a French speaking province which would support students' greater word knowledge. Interestingly, in the present study French pseudoword decoding showed the strongest correlation with English receptive vocabulary compared to other French reading measures ( $r = .354, p < .001$ ). This finding suggests that students may rely on cross-linguistic support from English in building their decoding skills in French.

The present study found that English vocabulary knowledge was a significant cross-linguistic predictor of Grade 1 French reading comprehension when it was alone in the model and explained 9% of variance. This finding aligns with Jared et al. (2011) who also reported that English vocabulary was a significant predictor of French passage comprehension when it was the only predictor in the model. This cross-linguistic contribution of the English vocabulary to French reading comprehension partially supports Cummin's Linguistic Interdependence Hypothesis (1979, 1981, 1991, 2000) which posits that cognitive and linguistic abilities transfer across languages. However, English vocabulary knowledge lost its significance when French word reading or pseudoword decoding were added to the model aligning with the DIER framework (Kim, 2017, 2020a, 2020b). The results from the present study suggest that English vocabulary is necessary but not sufficient to support reading comprehension in French. The DIER suggests that word reading skills directly contribute to reading comprehension whereas

vocabulary exerts an indirect effect through word reading and listening comprehension. This could explain the reason why word reading and decoding absorbed the indirect contribution of English vocabulary knowledge.

The results show that English vocabulary accounted for a greater proportion of variance (9%) in French reading comprehension compared to French listening comprehension (3%). This finding reflects the gradual development of French language oral language skills in FI students, where French listening comprehension is gradually developing through exposure to distributional probabilities between words within language and cross-linguistically, thus supporting statistical learning mechanism. Although this study did not find significant associations between English and French oral language measures, it is likely that because French listening comprehension is still in its early stage of development in the present group of children, such associations may be difficult to detect.

### **Summary**

Overall, the findings of this study support the generalizability of the SVR model in French reading development to this group of Grade 1 FI students. Additionally, the study found that English oral vocabulary knowledge had cross-linguistic effects supporting reading at the word and text levels. However, when word reading and decoding skills, which directly support reading comprehension development, were included in the model, the influence of English vocabulary, as an indirect component, was no longer significant. The findings suggest that these Grade 1 students rely more on their English oral language skills rather than on French listening comprehension abilities at this early stage. However, the fact that French listening comprehension contributed to French reading comprehension, although not significantly within the models, may demonstrate that it follows statistical learning developmental pattern. Students

may gradually be building skills in listening comprehension while subconsciously accumulating knowledge of probabilistic patterns through repeated exposure to spoken and written French as well as detecting similarities in meaning and orthographic and phonological forms across English and French.

### **Limitations and Future Implications**

The present study has several limitations. First, the small size may not have offered enough power to detect possible contribution of oral language skills to French reading comprehension either within language or cross-linguistically. The second limitation concerns the French measures that were chosen for the current study. This study used the Wechsler Individual Achievement Test – Second Edition (WIAT-II; The Psychological Corporation, 2002) which was normed on a native French-Canadian population. As a result, the Grade 1 students demonstrated floor effects in French reading comprehension, likely because the task was too difficult for them and their performance was being compared to Francophone Canadian children. In contrast, previous studies on early elementary FI students often used experimental measures designed to assess their developing French language and reading skills (Au-Yeung et al., 2015; Hipfner-Boucher et al., 2016; Lee & Chen, 2019). Using an experimental measure may have been more appropriate in this context and could have helped avoid floor effects. Third, the study assessed English oral language comprehension using a receptive vocabulary measure. However, oral vocabulary knowledge is a multidimensional construct. Measures that capture students' semantic representations and the organization of lexical-semantic knowledge would have provided a more comprehensive assessment of oral language comprehension construct. Additionally, assessing morphological and syntactic processing in English would have been valuable as previous studies suggested that English grammatical knowledge contributes significantly to French reading

comprehension in early elementary FI students (Burchell et al., 2023; Deacon et al., 2007; Jared et al., 2011).

Another limitation of this study is its reliance on data from only one year of the longitudinal study. Because the larger study alternated reading and writing measures each year, the present study was constrained to using data from the first year and adopting a concurrent research design. While this design allowed for analysis of the generalizability of the SVR to FI students' reading comprehension and detecting cross-linguistic associations between English vocabulary knowledge and French reading measures, a longitudinal design would have provided greater explanatory power and a deeper understanding of developmental trends over time.

The study's findings on the cross-linguistic indirect association between English oral language comprehension and French reading have important implications for future research and educational practice. They highlight the importance of developing the first-language semantic awareness in young students, including cognate awareness, and strengthening lexical-semantic organization. A well-developed semantic network in students' first language may support key language and reading skills in their additional language, such as building a stronger vocabulary knowledge, recognizing cognate relationships, developing conceptual understanding, making inferences, processing implicit information, and drawing conclusions. Consequently, strengthening French oral language skills will likely enhance reading comprehension skills.

Teachers could design age-appropriate activities that support both surface-level language skills specific to French and broader language proficiency aspects closely connected to academic and literacy skills, referred to as Cognitive Academic Language Proficiency in Linguistic Interdependence Hypothesis (Cummins, 1981). These activities could integrate learning content information with language exercises and develop skills in three major areas, such as

metalinguistic awareness, semantic processing and inference processing. Thus, teachers could encourage students to analyze surface features of French and English comparing similarities and differences in vocabulary, grammatical structures, phonetic forms, prosody, and orthographic forms found in the content they are studying. For vocabulary development, teachers could use semantic maps to help students categorize new words, identify superordinate terms, and recognize synonyms or antonyms. Furthermore, using grade appropriate French texts which employ students' existing background knowledge, teachers may encourage students to generate inferences and understand implicit information when comprehending the text.

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