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The Use of Reading Strategies in Second Language Adult Learners

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Education

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Abstract

The current study examined the use of reading strategies in connection to reading comprehension success. 38 graduate students, who did not consider English their first language participated in this study. The participants' vocabulary knowledge, word reading fluency, decoding, and working memory were measured. Think-alouds captured strategy use and reading comprehension was assessed through questions about the text. Results indicate that vocabulary knowledge was correlated to reading comprehension success but word reading fluency, decoding, and working memory were not. A factor analysis on strategy use revealed that three factors emerged to account for unique variance in reading comprehension performance. These factors were text analysis and integration (text structure, vocabulary, connecting and predicting), meaning extraction (summarizing and inferencing), and extrapolating beyond the text II (visualizing and elaborative inferencing). Therefore, reading strategy use predicted reading comprehension success beyond vocabulary knowledge and working memory.

Keywords

Reading Strategies, Second Language Learners, Adult, Reading Comprehension

Summary for Lay Audience

Students that are learning English as a second language fall behind their academic studies resulting in them potentially having fewer job opportunities. Reading comprehension is connected to an individual's academic success and job-related success (Green & Ridell, 2007). Individuals can use the knowledge and strategies that they use with their first language towards learning their second language. Reading strategies have been found to be correlated with reading comprehension. Thus, this study examined which reading strategies were helpful in improving post-secondary students' understanding of the stories that they read. Reading strategy use was measured in this study through having participants read stories and state out loud what they were thinking while they were reading the stories.

Other factors' relationship with reading comprehension was also measured. These factors included vocabulary knowledge, working memory, decoding, and word reading fluency. Working memory is the ability to focus on the information that is relevant to an activity, in this case it was information relevant to the understanding of the stories. Decoding involves the correct pronunciation of words and understanding letter-sounds relationships. Word reading fluency is the accuracy and speed of reading. In this study, vocabulary knowledge was correlated with reading comprehension. The reading strategies that correlated with reading comprehension included summarizing, making inferences while reading, connecting different parts of the text and referring to the structure of the text. Reading strategies were also grouped together. Certain reading strategies were more helpful to the student when used together compared to when they were used individually.

Therefore, by knowing which reading strategies were helpful to individuals while reading can then help improve students' reading comprehension. Professors can then use this information to teach students which strategies are useful to help them understand the texts that they may be reading. Professors can encourage students to use specific reading strategies while also monitoring their use of those strategies. Thus, by improving their reading comprehension, students can also then positively impact other areas of their life and potentially tackle barriers such as accessing counselling services.

Acknowledgments

I would like to express my deepest gratitude to my supervisor, Dr. Deanna Friesen, who has always gone above and beyond to help with my thesis process. Thank you so much for your patience, guidance, and unwavering support. I also sincerely appreciate the mentorship and direction that Katherine Schmidt has provided me with. Thank you to Kayla Edwards for your help with the transcription of the data.

I would like to thank our professors for creating a collaborative and supportive environment for us to learn and work in. I would like to acknowledge my wonderful peers and friends, you have been an inspiration to me throughout this process.

I am indebted to my parents, grandparents, and siblings for their ongoing help and encouragement. You have all made this process so much easier for me.

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Chapter 1

1 Introduction

Reading is a fundamental skill that can be acquired; it is critical for an individual's academic success leading to their financial, job-related, and social success in the future (Green & Ridell, 2007). However, reading comprehension studies done with second language learners (SLLs) regularly demonstrate that compared to their monolingual peers, SLLs are less skilled in reading comprehension (De Jong, 2004). On average, SLLs compared to monolinguals are less familiar with their second language vocabulary and grammar which can result in weaker reading comprehension skills (Trapman, Gelderen, Steensel, Schooten, & Hulstijn, 2014). Therefore, it is important that SLLs get appropriate instruction to develop their reading skills in their second language.

Previous research has shown that there are several skills that underlie reading comprehension success such as language knowledge (e.g., vocabulary), executive control ability (e.g., working memory), and use of reading strategies (see Friesen & Haigh, 2018 for a review). SLLs can improve their second language reading comprehension through improving language knowledge and by using effective reading strategies (Friesen & Haigh, 2018). The present study will examine the use of reading strategies in adults learning English as a second language in order to understand the effect that reading strategy use may have on reading comprehension performance beyond language knowledge and working memory.

1.1 Reading Models

Different reading models explain the processes underlying effective reading comprehension. They enable us to consider how various factors such as oral language ability, word reading ability, and vocabulary knowledge contribute to successful reading comprehension (Van Staden, 2016). The Simple View of Reading Model (SVR) places stress on two important components as they relate to reading comprehension. These skills are language comprehension and word-level reading skills such as word recognition and

decoding skills (Gough & Tunmer, 1986; Van Staden, 2016). This model also emphasizes that learners can decipher written words into spoken language while also comprehending the meaning of these written words. SVR highlights that being able to decode will result in increased reading comprehension ability (Gough & Tunmer, 1986; Van Staden, 2016). However, this model does not account for how individual readers use decoding and listening comprehension skills during reading comprehension itself.

The second reading model discussed here is the Construction-Integration (CI) model and it provides insight on how reading comprehension unfolds. Here, the reader generates mental representations of text from what is written and from what they know about the topic. Through reading the text, the individual is able to identify the main ideas in the text, represent, and consolidate them in their memory (Kintsch, 1988; Nirchi, 2014). This theory proposes that three different levels of representation are formed when the individual reads the text. The first level is the surface level, which is the word by word form of the text (e.g., the vocabulary and syntax). The second level is the textbase where the reader focuses on the meaning units of the text and can recognize the links between those elements. Lastly, the situation model involves combining their prior knowledge to their understanding of the text (Kintsch, 1988; Nirchi, 2014). Without the development of a situation model, the surface form, and textbase levels are independent of the context. Whereas, the situation model looks past the content of the text by incorporating general knowledge and inferences (Kintsch, 1988; Raney, 2003). An established situation model connects surface form and textbase levels resulting in context-dependent representation of the text. When individuals are using the situation model, they are able to free up more resources for reading comprehension because they are no longer focusing their attention on trying to understand the vocabulary and syntax of the text. Thus, allowing them to engage in reading behaviours such as the use of reading strategies, which will be examined in the current study.

As discussed above, according to the SVR model, reading comprehension success is reliant on both word reading ability and language comprehension ability (Gough & Tunmer, 1986). Vocabulary knowledge, word decoding, and reading fluency are significant predictors of reading comprehension success (Klauda & Guthrie, 2008;

Meschyan, & Hernandez, 2002; Pasquarella et al., 2012). For monolinguals and SLLs, problems in either word reading ability or language comprehension ability can result in weaker reading comprehension (Friesen & Haigh, 2018). Less experience and knowledge of L2 vocabulary and L2 language structures for SLLs can also weaken their reading ability (Friesen & Haigh, 2018).

For children and adults, word knowledge is related to reading comprehension ability (Carroll, 1993 as cited in Oakhill, Cain, & Bryant, 2003). Frid and Friesen (2019) did a study that involved sixty-six French immersion elementary students and found that vocabulary scores strongly correlated to reading comprehension in both English and French. Thus, knowledge of word meaning is connected to an individual's capability to comprehend text. If the reader does not know a lot of words, then it is more likely that they will not be able to understand the main message of the text (Oakhill et al., 2003).

Word decoding has also been shown to be a consistent predictor of reading comprehension ability (Meschyan, & Hernandez, 2002). Decoding involves the awareness of letters (orthographic skills), understanding of speech sounds of a language, and the ability to identify the relationship between letter sounds and written letters. The reader then combines these sounds into a precise phonological representation of printed words or non-words. It is also possible that a large vocabulary can improve decoding skills due to a higher number of close guesses of unfamiliar words and non-words in memory (Meschyan, & Hernandez, 2002).

Pasquarella et al., (2012) investigated the factors correlated with English reading comprehension in adolescents in Grade 9 and 10. L1 and L2 speakers were given measures of decoding, vocabulary knowledge, and reading comprehension in English. They found that adolescent SLLs were one and two standard deviations lower than their L1 peers on decoding, vocabulary knowledge, and reading comprehension. For the SLLs, the individual measures of decoding and vocabulary were correlated to reading comprehension. The interaction between decoding and vocabulary was also correlated to reading comprehension. Whereas, for L1 students, only the measure of vocabulary was correlated to reading comprehension (Pasquarella et al., 2012). In the Friesen and Frid

adult study (2020), English-French bilingual adults read texts in their first and second language. Word fluency was not significantly correlated with reading comprehension performance for either language. Research has found that the relationship between decoding and successful reading comprehension is significant in children; however, in adults, decoding is not consistently found to be a significant predictor of successful reading comprehension (Landi, 2010).

In accordance with the CI model, if individuals are able to automatically recognize and understand the words, then they can spend less time on surface and text level. This leaves cognitive resources to employ reading strategies and other methods of making connections beyond the text (Bourassa, et al., 1998; Long, Oppy, & Seely, 1997; Raney, 2003). The faster the word recognition, the more automatic it will become which then allows for less focus on word decoding, so the reader can focus their attention on comprehension (Klauda & Guthrie, 2008). Reading fluency has been found to be separate from decoding fluency for successful reading comprehension. However, reading fluency may be less important for reading comprehension in adults (Landi, 2010). Nonetheless, for second language adult learners, word and decoding fluency may be sufficiently variable to be correlated with reading comprehension performance.

1.2 Executive Function

Executive control is the name used for these cognitive processes that are essential in goal driven behaviour (Denckla, 1989, as cited in Sesma, Mahone, Levine, Eason, & Cutting, 2009). In fact, all readers possess these functions but may differ in how proficient they are in using each function. For example, working memory is required for a variety of cognitive skills, as it is a temporary storage where information can be manipulated and processed (Baddeley, 2003). Lower working memory capacity has been found in both poor decoders and students who were good decoders but weak in reading comprehension (Christopher et al., 2012; Cutting, Materek, Cole, Levine, & Mahone, 2009; Swanson, Howard, & Saez, 2006).

Response inhibition, sustained attention, and cognitive inhibition are possible independent functions of attentional control that are also connected to working memory

(Arrington, Kulesz, Francis, Fletcher & Barnes, 2014). Response inhibition is the purposeful controlled suppression of dominant and automatic responses to external stimuli (Logan, & Cowan, 1984). Students with poor reading skills show a lower response inhibition and working memory. Cognitive inhibition is related to the intentional control of mental processes that keep task-irrelevant information out of the working memory as well as inhibit irrelevant thoughts and context-inappropriate meanings (Arrington et al., 2014; Nigg, 2000). Individuals struggling with reading comprehension have shown difficulties with blocking out information that is not relevant to their reading comprehension (Arrington et al., 2014; Pimperton, & Nation, 2010). It was found that cognitive inhibition and sustained attention were related to reading comprehension but response inhibition was not (Arrington et al., 2014). Therefore, in addition to language factors, how individuals direct their attention and their working memory capacity may also influence their reading comprehension success.

1.3 The Use of Reading Strategies

Early research has focused on lower levels skills such as decoding and word recognition in reading comprehension. However, recently research has begun to focus more on higher-level skills such as the usage of reading strategies and their connection to reading comprehension (Landi, 2010). Research shows that the types of strategies learners are using as well as how often they use strategies, differentiates successful and less successful readers (Kolić-Vehovec & Bajšanski, 2007).

Several definitions of reading strategies exist, and several suggestions have been made to classify reading strategies (Yang, 2006). Block (1986) used two different categories to organize reading strategies, which were general strategies and local strategies. In general reading strategies, the attention is on high-level reading comprehension which include inference and monitoring. For local strategies, the focus is on basic linguistic knowledge such as the sentence structure and word meaning (Block, 1986; Yang, 2006). Block (1986) found general strategies include “predicting content, recognizing text structure, integrating information, posing questions, interpreting the text, utilizing general knowledge, and associations, reflecting on behaviour or process, monitoring comprehension, self-correcting, and reacting to the text. In the category of local strategies

are paraphrasing, rereading, questioning the meaning of a clause or a sentence, questioning the meaning of vocabulary, and solving the vocabulary problem” (as cited in Yang, 2006, p. 316).

Janzen and Stoller (1998) categorized reading strategies into ten different types. The ten strategies involve recognizing “a purpose for reading, previewing, predicting, asking questions, checking prediction or finding an answer to the questions, connecting the text to the prior knowledge, summarizing, connecting one part of the text to another, and recognizing text structure” (as cited in Yang, 2006, p. 316). These strategies may be helpful for all readers, but may be particularly helpful for SLLs to perform well on reading a variety of academic texts.

Mokhtari and Reichard (2002) also suggested three ways of organizing text reading strategies. The three suggested ways of organizing reading strategies are global strategies, problem-solving strategies, and support strategies. Global strategies involve previewing and predicting in order to deliberately monitor reading (Mokhtari and Reichard, 2004). Problem-solving strategies help individuals to better understand challenging text and involve using context clues and visualizing the text in order to understand the word meaning (Huang, Chern, and Lin, 2009). Lastly, support strategies help the reader in improving their understanding of the text such as looking up words in the dictionary or asking someone (Mokhtari and Reichard, 2004).

The higher-order processes of reading comprehension involve understanding large sections of the text, such as noticing global text characteristics and making inferences about the reading passages (Trapman et al., 2014). Individuals who are good at reading comprehension will utilize clues in the text to predict information or make comparisons between new content in the text and the text that they had already read (Olson et al., 1984, as cited in Block, 1986).

In their review article, Friesen and Haigh (2018) highlighted several reading strategies important for reading comprehension. The reading strategies mentioned included necessary inferencing, elaborative inferencing, reference to text structure, summarizing, connecting parts of the text, reference to vocabulary, questioning, making predictions,

and visualization. According to Cain (2010) through inferencing the reader can form conclusions. Necessary inferences must be made to understand the text when the reader recognizes that details that are important for comprehending the text are absent. This information is not usually found in the text but through inferencing the reader can form interpretations of the text. When the reader engages in elaborative inferencing, they may connect what they are reading to their background knowledge. In this case, the inference is not essential for the reader to understand the text. Cain (2010) mentions that another important strategy is identifying text structure which involves recognizing different types of text such as the contrast between narrative and expository texts. Thus, being able to recognize the text structure, allows the reader to arrange the forthcoming content of the story, in line with how a story may take place; consequently, this knowledge allows the reader to make predictions about what might happen in the story (Friesen & Haigh, 2018).

Several studies have used think-alouds to measure the use of reading strategies. For example, Block (1986), examined reading strategy use through think-aloud use in 9 college-level students, 6 participants were enrolled in ESL classes and 3 participants were in college reading classes for native speakers. In this study, participants described what they were doing when they were engaging in a specific strategy. When a reader was summarizing, they may have paraphrased the text. The reader then may have used different words that have similar meanings to state the text. This strategy was used to help with understanding and solidifying ideas in the text. The reader may have also reread the text out loud. Block (1986) suggested that this may mean that the individual did not understand the text or that they needed more time to process the meaning of the text.

Block (1986) discussed several other strategies. For example, a reader may have made a prediction about what will occur in the next part of the text when they are expecting certain things to occur in the text. The reader may have also engaged in questioning and during questioning they may “question the meaning of a clause or sentence” or question the information in the text. The readers referred to the vocabulary by enquiring about the

meaning of a certain word. For example, they said “I don’t understand this word”. The readers also used background knowledge, which is bringing in their “knowledge and experience to explain, extend and clarify content”. Thus, individuals may engage in numerous strategies in order to solidify their understanding of the text.

Comprehension monitoring is necessary in order for readers to select effective strategies. Comprehension monitoring is the activity of constantly checking one’s understanding of comprehension while reading (Kolić-Vehovec & Bajšanski, 2007). According to Baker and Brown (1984), individuals who are good readers know about their cognitive abilities and can also control those abilities (as cited in Kolić-Vehovec & Bajšanski, 2007). The reader can decide if comprehension is occurring by constantly checking in on their own activities. Individuals may ask themselves questions to understand if they are understanding the text. Lastly, if the readers notices that there are errors in comprehension, they will correct themselves (Yang, 2006).

The use of strategies can result in good reading comprehension; however, readers should know how to choose these effective strategies for a specific text. Thus, readers should carefully consider which strategies would be effective in a given text. Metacognition notably allows for the reader to choose strategies that will strengthen reading comprehension, presumably because comprehension monitoring has detected a comprehension failure. A reader’s attentiveness to their own reading strategy use, as well the usefulness of each reading strategy can be determining factors in the usage of strategies (Baker and Brown, 1984; as cited in Kolić-Vehovec & Bajšanski, 2007). Thus, comprehension monitoring is the engine that drives strategy selection.

Effective readers give meaning to text through tasks such as “backward and forward text inspection, identifying main ideas, integrating information across text, connecting textual information with previous knowledge, and inference generation” (Kolić-Vehovec & Bajšanski, 2007, p. 199). Individuals who are more skilled at reading comprehension engage in strategies to consolidate their understanding after the reading by summarizing the information, asking questions, and looking for further resources (Friesen & Haigh, 2018). However, awareness of reading strategies does not mean that a reader will engage

in them, but rather they need to feel encouraged to use the strategies (Kolić-Vehovec & Bajšanski, 2007).

Studies that have examined reading strategy use in SLLs have often used surveys to learn about the participants' perceived use of reading strategies. For example, in their study, Mokhtari and Reichard (2002) used the metacognitive awareness of reading strategies inventory (MARSII) that they designed to measure adult students' awareness and use of reading strategies when they read academic texts. Hong-Nam and Larkin Page (2014) used the Survey of Reading Strategies (SORS; Mokhtari & Sheorey, 2002) as the only measure to assess reading strategy use in Korean university students. SLLs at Korean universities were using more reading strategies and also used them often. These students also showed a great amount of metacognitive understanding of their use of strategies (Hong-Nam and Larkin Page, 2014). However, with surveys, there is an awareness of strategies but there is no evidence that readers are actually using them while they read. Whereas, think-alouds can capture the actual use of reading strategies.

Studies such as the one done by Jiménez, García, and Pearson (1996) have also examined the use of reading strategies with bilingual participants by having them engage in think-alouds during the reading comprehension tasks. When the think-aloud procedure is done, then thought processes can be articulated. Jiménez et al. investigated the use strategies of bilingual Latina/o children in the upper elementary grades who were successful English readers. In this study, there were eleven Latino sixth and seventh grade students with 8 Latina/o students who were successful at reading English and 3 Latina/o students who were not as successful at reading English. The successful Latina/o readers engaged in comprehension monitoring and were able to notice comprehension difficulties that they may have encountered. They linked their existing knowledge with the text during both Spanish and English reading. The Latino/a readers who did not perform as well were trying to finish reading the text instead of comprehending it. When these readers found words that they did not know, they did not use strategies to help with their understanding. This study examined reading strategy use with elementary aged children, which is different from the adult population, examined in the current study.

Schmidt (2019) looked at differences in reading comprehension, such as the use of reading strategies, in monolinguals (EL1s) and SLLs in grade 4 and 5. It was found that the use of reading strategies such as necessary and elaborating inferencing, background knowledge, and predicting were connected to reading comprehension success in SLLs. Strategies that uniquely predicted reading comprehension success for SLLs were elaborative and necessary inferencing, sentence structure and not partaking in summarizing. In the Frid and Friesen (2019) study with children, when participants were reading in French, which was their second language, they did not engage in more elaborative strategies like predicting, elaborative inferencing, and reference to background knowledge. The students were also discussing unknown words in French more often than while reading in English. When students were reading in French, text analysis strategies such as text structure and connecting to the text in addition to inferencing behaviours were predictors of reading comprehension success. Therefore, the use of certain strategies in SLLs such as inferencing and reference to text structure may result in better reading comprehension.

Friesen and Frid (2020), found that when adults were reading in English, which is their first language and French which was their second language, the strategy use in both languages was similar. Summarizing was the most utilized strategy when participants were reading in French and after that it was inferencing behaviours. When participants were reading in English, they utilized necessary inferencing more than summarizing. This may imply that participants are better able to pull out underlying meaning of the text, engage in elaborative inferences, and connect the text to their background knowledge in their first language. In both languages, readers were successful in understanding the text when they focused on text analysis, meaning extraction, and created cohesion/integration. Although this study had also used bilingual adult participants, the participants had started learning their second language at a young age. The current study will differ because the adult participants started learning their second language, which is English, later on in their life and are currently learning it in an immersive setting.

1.4 Current Study

The current study looked at strategy use and reading comprehension success in adult SLLs, who were currently learning English as a second language. Whether reading strategy use is related to better reading comprehension outside of an individual's knowledge of vocabulary and their working memory was examined. The reading strategies that were coded for were summarizing, necessary inferencing, elaborative inferencing, visualizing, connecting, background knowledge, reference to text structure, reference to vocabulary, questioning, and predicting. The definitions and examples of these reading strategies are included in Appendix A.

Graduate students who were learning English as a second language, were assessed on their reported strategy use during a think-aloud reading comprehension task. The think aloud method involved participants stating what they were thinking while they were reading a text. Subsequently, their use of strategies was coded. Participants were given tasks that measured their reading comprehension & strategy use, decoding skills, verbal fluency, and working memory capacity. To my knowledge, no studies address strategy use in a second language while accounting for both language knowledge and working memory. Thus, this study is unique as it examines the relationship between strategy use and reading comprehension while considering language proficiency and working memory.

Research Question (s). What reading comprehension strategies are being used by second language learners in a post-secondary program? Does reading strategy use predict reading comprehension success beyond vocabulary knowledge and working memory capacity?

Hypotheses. 1) Adult second language learners will use a combination of surface form strategies (i.e. referring to vocabulary and text structure), textbase strategies (i.e. summarizing and necessary inferencing), and situation model strategies (i.e. elaborative inferencing, predicting, questioning, visualizing, connecting, and background knowledge) when reading in English. 2) Reading comprehension strategies will account for unique variance in reading comprehension scores beyond language knowledge and working memory.

According to Mokhtari and Reichard (2004), studies like the current study, which assess SLLs' cognitive activities such as the individual's strategic processes and metacognitive knowledge, are rarely being done. This study will address the gaps in the literature by focusing on the reading strategies being used by adult SLLs. Investigating older students is important because as students get older, the types of knowledge or skills that are important for reading comprehension may change (Trapman et al., 2014).

Additionally, the process of an individual learning a second language as an adult versus a child may also differ. Cummin's (1978, 1979) Developmental Interdependence hypothesis assumes a relationship between the first and second languages. So, an individual's capability in their second language is then related to their competences and skills in their first language. Individuals are then able to allocate the skills from their first language to their second language learning (Lasagabaster, 2010). In cases where an individual's first language is advanced, such as in the case of the adults in this study then their acquired skills from their first language may have a positive impact on their learning of their second language.

The population in this current study comprises of sequential bilinguals. Sequential bilinguals learn their native language first and then after they learn their second language. They may learn their second language as young children or once they are adults. Whereas, individuals that are simultaneous bilinguals have been learning two languages from birth (Byers-Heinlein & Lew-Williams, 2013). Compared to sequential bilinguals, individuals that are simultaneous bilinguals tend have "better accents, more diversified vocabulary, higher grammatical proficiency, and greater skill in real-time language processing" (Byers-Heinlein & Lew-Williams, 2013, p.7; see also Lew-Williams & Fernald, 2010). Older children and adults who are learning a second language have a very different experience compared to bilinguals who had learned both of their languages in their early years of life. For example, older adults and children may have much less time to spend on learning a language. They may also not have exposure to environments that are immersed in the languages that they are learning and where they may be the sole recipient of attention from their caregivers or other native speakers. The environment in which older children and adults are learning their second language are vastly different as

most of the time their learning is restricted to a classroom setting. In the classroom, students would receive less attention (Byers-Heinlein & Lew-Williams, 2013; Lew-Williams & Fernald, 2010). With the difference in environments, sequential bilinguals are not able to practice the language to the extent that simultaneous bilinguals are able to. Thus, this is another barrier that adult sequential bilinguals face when learning their second language.

While there is a shortage of research examining comprehension difficulties in older readers, particularly critical is the shortage of research in the increasing population of SLLs who are challenged with the task of understanding text in their second language and having to work in environments where they must speak and read in their second language (Lesaux, Crosson, Kieffer, & Pierce, 2010). Therefore, this current research study will try to fill some of the gaps in the literature by focusing on the use of reading strategies in adults who are learning English as a second language. Awareness of the skills useful in improving reading comprehension in adult second-language learners can then lead to targeting these necessary skills, in order to improve their reading comprehension. Thus, SLLs who are doing poorly at reading comprehension and are not aware of their own cognitive activities should be supported in obtaining and using successful reading strategies (Mokhtari & Reichard, 2004).

Chapter 2

2 Method

2.1 Participants

Thirty - eight adults (36 females; Mean Age = 25.16, SD = 3.74) participated in the study. The participants were all born outside of Canada and English was their second language. On average, the participants have been in Canada for 9.66 months (SD = 3.74). Thirty-five participants were born in China, two participants were born in Iran, and one participant was born in Japan. All participants were graduate students in the Faculty of Education at Western University. Thirty-five participants were completing the Teaching English to Speakers of Other Languages (TESOL) program, two participants were completing a Masters of Curriculum studies and one participant was completing their PhD in Educational Studies. Mandarin was the first language of thirty-four of the participants, Farsi was the first language of two participants, Malay and Chengoluchongqing dialect were the first languages of the remaining two participants. Reported age of acquisition in each language, English and native language proficiency ratings and current language use ratings are found in Table 1 (end of chapter).

2.2 Materials

The Language Experience Questionnaire asked participants to report the age at which they began to understand each language (English and native language), which language they know best, the amount of time they use each language, and in what contexts (see Appendix B). This questionnaire was adapted for use in the current study and has been used in previous research by Friesen and colleagues (e.g., Friesen & Jared, 2007).

To measure vocabulary knowledge, the Peabody Picture Vocabulary Test-III (PPVT; Dunn & Dunn, 1997) was used. This standardized test measured receptive vocabulary by asking participants to choose the picture that best matches the word that they have heard from four alternatives (see Appendix C for an example). The sets of items increased in difficulty until the stop rule is applied. Since the goal was to use vocabulary knowledge

as a predictor of reading comprehension, raw scores were calculated and used in the analyses.

The Test of Word Reading Efficiency (TOWRE; Torgesen, Wagner, & Rashotte, 1999) measured word reading fluency (see Appendix D for an example). Participants read aloud as many items as possible in 45 seconds. The TOWRE includes two lists. One is a list of 104 real English words and the second list is comprised of 63 non-words. Non-words can be read using English's spelling-sound correspondence without any semantic meaning. Participants were required to read the lists aloud as quickly and as accurately as possible and were audio-recorded for coding purposes. Raw scores were computed by adding the number of items read correctly in the allotted time for each measure.

Reading comprehension and strategy use were measured using stories from the Gray Oral Reading Test (GORT; Wiederholt & Bryant, 2001). Five texts were presented one at a time on a computer screen. The first story was a sample story, where pre-recorded think-alouds were heard by the participants. The think-aloud examples for this story are listed in Appendix E. The participants then read the remaining 4 stories and engaged in 4 think-alouds per story. For each story, participants read 2 sentences at a time. Once they were finished, they hit the space bar which resulted in a beep sound. The beep cued the participants to say out loud what they had been thinking when they were reading the story. Participants then hit the spacebar again to reveal the next two sentences. The previous text remained on the screen. A sheet with prompts for the think-alouds was provided to each participant. The participants were encouraged to use the prompt sheet if they needed some direction during a think aloud. The think aloud method enables implicit cognitive processes to be explicitly stated (Jiménez et al., 1996).

The grade level of the stories was calculated online through an online readability calculator (Adamovic, 2006). The calculator showed the United States grade level that was needed to understand the text. Grade levels were calculated by the ARI (Automated Readability Index), Flesch Kincaid Grade level, and Coleman Liau Index. These readability formulas have been validated (Coleman, 1975; Kincaid et al., 1975; Senter, & Smith, 1967). The first story, which was a sample think-aloud story, was about a

grandmother and grandson going fishing. This story had 101 words and was 8 sentences long. The grade level had ranged from 3.44 to 5. The second story about a turtle and eagle had 103 words and was 8 sentences in total. The grade reading level of the story was between 3.96 to 5.51. The third story about hardships faced by farmers was 97 words and 7 sentences long. The grade level needed to understand the text ranged from 8.35 to 10.55. The fourth story about the life of Harriet Tubman, a similar made up story is included in Appendix E. The story had 125 words and was 9 sentences long. The grade reading level of the story was between 7.03 to 8.89. Lastly, the fifth story was about a brother and sister caught in a storm. The story had 8 sentences and 153 words. The reading grade level of the story ranged from 10.89 to 11.02.

Following each text, participants responded out loud to the three reading comprehension questions that were shown one at a time on the computer screen. For each text, three comprehension questions were asked including one literal question, one necessary inference question and one elaborative inference question. The text contained the answers to the literal questions. For the necessary inference questions, readers identified information not found directly in the text but was important to understand the text. To answer the elaborative inference questions, participants had to make connections beyond the text. Examples of questions for the comparable story that resemble the questions found in the GORT can be found in Appendix F

The verbal fluency test from the Delis–Kaplan Executive Function (D-KEF) System (D-KEFS; Delis, Kaplan, & Kramer, 2001) was used to measure expressive vocabulary. The test measured participants' category fluency and letter fluency (see Appendix G). For category fluency, two categories were used: animals and fruits/vegetables. Participants listed as many category members as they could retrieve in a minute for each of the two categories. For letter fluency, the letters "F" and "A" were used, and participants named as many words as possible that began with these letters in two separate trials. Additionally, for letter fluency, participants were restricted from using names of people and places. They were also only permitted to list one word from each word family (e.g., if they said farm, they could not say farms or farmer). The number of words said in each

category during the one minute were added up to get a single score for both the letter and category fluency tasks.

The Backwards Digit Span test was used to measure working memory. This test is part of the Wechsler memory scales (WISC-V; Wechsler, 2014; See Appendix G). The participants heard some digits and were asked to repeat the numbers backwards (e. g., If I say ‘1, 3,’ you say 3,1’). The participants needed to hold and manipulate (reverse) a series of numbers in their minds. The memory demand increased by requiring them to repeat larger sets of numbers to determine their working memory span. The task started with two digits and increased to a possible eight digits. Each new level added a digit to remember and had 2 trials each. Participants had to correctly repeat the digits backwards in at least one trial to move onto the next level. The digit span was the number of digits remembered at the last level completed correctly.

2.3 Procedure

Once the University Non-Medical Ethics Board approved the study, recruitment was done at Western University’s Faculty of Education building through posters and in-class visits to the TESOL program. Testing took place in a quiet room and the session lasted for approximately 1 hour and 30 minutes. The tasks were administered in the same order: PPVT, TOWRE, reading comprehension task, strategy survey, verbal fluency task, and backwards digit span task¹. The PPVT and reading comprehension task were done on a laptop or a desktop computer using E-prime2 software. Once participants were done the tasks, they were given the debriefing sheet and compensated fifteen dollars for their time.

Table 1. Language Background of Second Language Learners

	L1		English (L2)	
	Mean (SD)	Range	Mean (SD)	Range
Current Use (%)				
Skills				
Speaking	48.32 (21.49)	0-80	51.68 (21.49)	20-100
Listening	34.74(16.60)	0-70	65.26 (16.60)	30-100
Reading	26.32 (17.46)	0 - 80	73.68 (17.46)	20-100
Writing	26.97 (24.34)	0 -80	73.03 (24.34)	20-100
Context				
Family	96.47 (7.33)	60 - 100	3.53 (7.33)	0-40
Friends	64.21 (26.50)	0-100	35.79 (26.50)	0-100
Classmates	43.32 (27.99)	0 -95	56.68 (27.99)	5-100
Co-workers	21.42 (29.20)	0-100	78.58 (29.20)	0-100
Age of Acquisition				
Understanding	1.94 (1.21)	0-6	8.79 (2.65)	4-15
Speaking	1.74 (1.31)	1-6	10.16 (3.91)	4-19
Reading	4.19 (1.82)	1-8	9.74 (2.46)	6-17
Writing	5.52 (1.79)	1-9	10.82 (2.57)	6-16
Current Ability Rating				
Understanding	8.87 (2.59)	0-10	6.55 (2.39)	1-9
Speaking	9.13 (2.17)	2-10	6.00 (1.85)	1-8
Reading	9.13 (2.19)	1-10	7.00 (1.76)	1-9
Writing	8.75 (2.23)	1-10	5.76 (1.94)	1-8

Chapter 3

3 Results

3.1 Background Measures

The means, standard deviations, and ranges of the objective language measures are reported in Table 2 (tables are found at the end of the chapter). Standard scores were not computed for the language measures, since the goal was to examine how absolute knowledge or skill in language measures were related to reading comprehension performance. Yet it is worth noting that the range of scores was quite large in the objective measures. This finding was particularly evident with the PPVT, which has a range of 79 – 171.

3.2 Strategy Use

Table 3 reports the mean and range values of the strategies used by the participants when doing the reading comprehension task. According to the Shapiro-Wilk test, eight out of ten strategies violated the assumptions of normality. The exceptions were the necessary inferencing and elaborative inferencing distributions. Consequently, non-parametric tests were used to analyze strategy use. There was a main effect of frequency of strategy use, $\chi^2(9) = 217.16, p < .001$. A Bonferroni-corrected Wilcoxon Signed-Ranks Tests was used to adjust for multiple comparisons (alpha less than .05).

Table 4 depicts whether strategies were used significantly more or less than each other. It provides the average rank order of each strategy. If ranks are listed in the same box, it means that there was no significant difference between the usage of that strategy and the other strategies in that box. For example, summarizing did not differ significantly from elaborative inferencing, predicting, connecting, background knowledge, questioning, and text structure. However, it was used significantly less than necessary inferencing but was used significantly more than questioning, text structure, visualizing and vocabulary. As seen in Table 4, necessary inferencing was used significantly more than all of the strategies with the exception of elaborative inferencing. The least used strategies were reference to vocabulary and visualizing.

3.3 Variables Correlated with Reading Comprehension

The correlations of reading comprehension with both the language measures and the use of reading strategies are shown in Table 5. Reading comprehension scores had moderate positive correlations with vocabulary and category fluency. Participants who had higher scores in vocabulary knowledge also did better on reading comprehension questions. Likewise, as category fluency scores increased so did reading comprehension scores. Whereas, word fluency, non-word fluency, letter fluency, and digit spans scores did not correlate significantly with reading comprehension scores. The reading strategy of connecting had a strong correlation with reading comprehension indicating that participants who utilized this strategy had higher reading comprehensions scores. Three other reading strategies also had significant moderate correlations with reading comprehension; these strategies were necessary inferencing, followed by text structure, and summarizing. The remaining reading strategies had low correlations with reading comprehension scores that did not reach significance.

Table 6 shows the correlations among different strategies. As seen in table 6, if participants used more necessary inferencing, they also used more summarizing. Connecting was a variable that seemed to relate to several other variables such as necessary inferencing, vocabulary, and text structure. The use of the connecting and text structure strongly correlated with each other. Text structure also correlated with referencing vocabulary and predicting.

3.4 Reading Strategies Factor Analysis

An exploratory principal component factor analysis was done on the ten strategies. This analysis grouped related variables together to create factors to predict reading comprehension performance. An orthogonal solution was found by use of a varimax rotation. Based on the resulting factors, regression scores were calculated to be utilized in a subsequent regression analysis. Eigenvalues above 1 demonstrated that four factors were extracted and accounted for 24.78%, 18.96%, 13.09% and 12.55% of the variance respectively for a total of 69.38% of the variance accounted for. Extracted communalities

were all about .7 except for elaborative inferencing, which had a lower commonality. Factor loadings and commonalities can be found in Table 7.

The first identified factor was named Text Analysis and Integration. This factor included reference to text structure, reference to vocabulary, connecting, and predicting. It was called text analysis because participants were pointing out the surface form of the text and commenting on the text structure (e.g., text genre). Integration was occurring because readers were anticipating subsequent parts of the text by predicting and also making connecting statements to earlier parts of the text. Meaning Extraction was the second factor and it included summarizing and necessary inferencing. Here the readers identified the main messages, concepts, and underlying themes in the text. The third factor included questioning and background knowledge and was called Extrapolating beyond the Text I. This factor involved participants using information that was outside the text to understand it. However, of note, individuals who used background information were not more likely to engage in questioning (i.e., no correlation between the two). Lastly, the fourth factor was called Extrapolating Beyond the Text II, and it included the strategies of visualizing and elaborative inferencing. These strategies also required the participants to use ideas and information that was not directly stated in the text. That is, elaborative inferencing is not necessary to understand the text, but it allows for a richer representation for the text.

3.5 Predictors of Reading Comprehension

Subsequently, a multiple regression analysis was conducted on reading comprehension performance with vocabulary knowledge (i.e., PPVT score) as the language measure. Word reading fluency measures were not entered in the models as they did not considerably correlate with reading comprehension scores. In the analysis, the PPVT vocabulary measure was entered in the first step followed by all four of the strategy factors in the second step using the stepwise method. Results of the comprehension analysis produced a significant regression model, $R = .79$, $F(4, 33) = 13.23$, $p < .001$, that accounted for 62% of the variance. Text Analysis & Integration, Meaning Extraction, and Extrapolating the text II, each accounted for meaningful unique variance and had positive regression weights, indicating that higher scores on these factors were associated with better overall reading comprehension scores. The only factor that was not included in the

model was Extrapolating Beyond the Text I, which included questioning and background knowledge.

Figure 1 shows the line of best fit between the predicted reading comprehension scores from the regression analysis and the actual reading comprehension scores. With the exception of a few outliers, majority of the points were plotted close to the line of best fit.

Figure 1. Predicted Vs. Actual Reading Comprehension

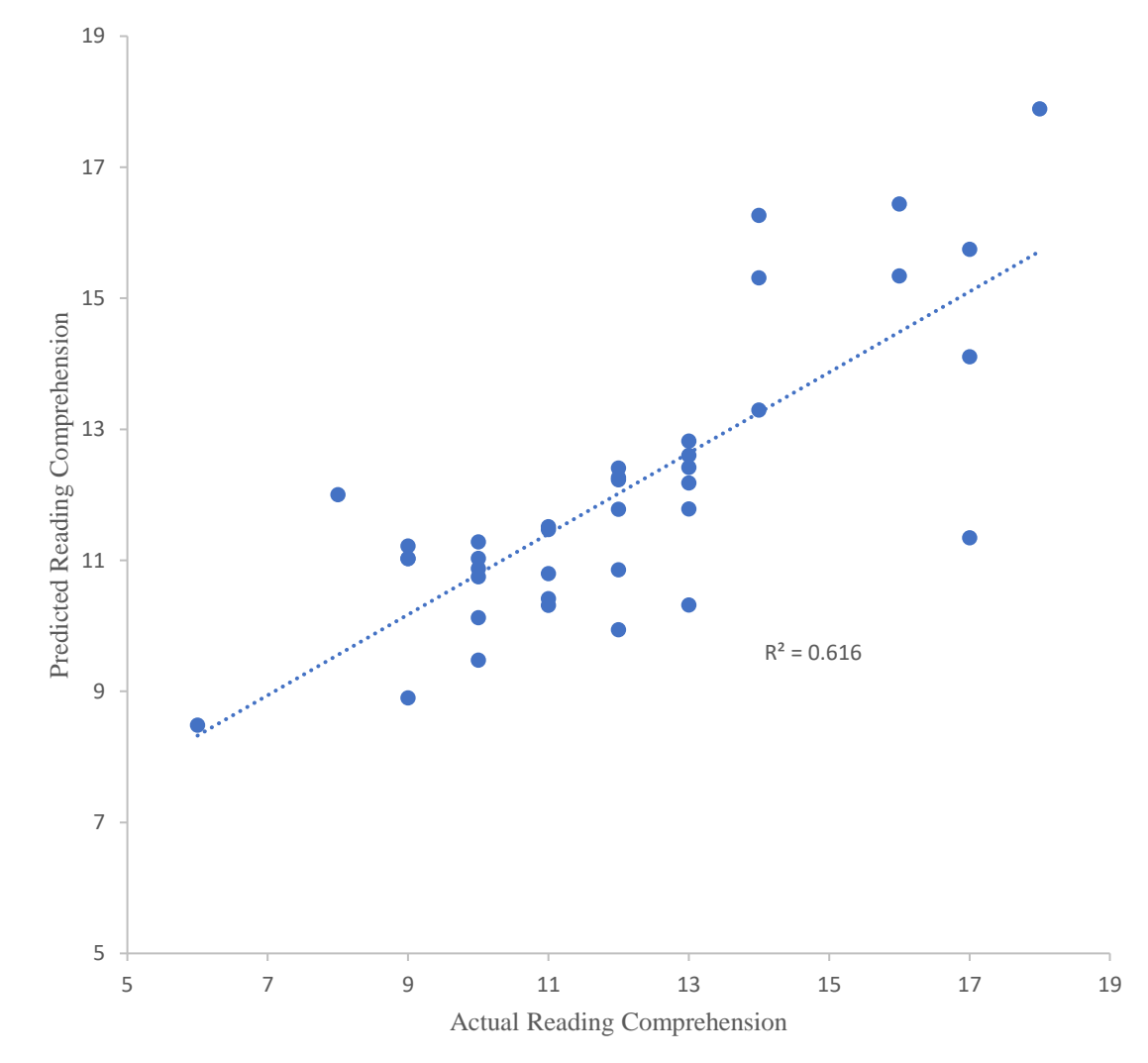


Table 2. Language and Working Memory Measures

	Mean (SD)	Range
Language Measures		
Reading Comprehension (max. 24)	12.05 (2.74)	6 – 18
PPVT (raw scores, max 204)	119.05 (21.03)	79 – 171
TOWRE Words (max. 104)	67.89 (13.49)	37 – 91
TOWRE Non-Words (max. 63)	35.37 (9.85)	15 – 56
Category Fluency	29.79 (6.70)	16 – 43
Letter Fluency	23.65 (6.31)	13 – 37
Working Memory Measure		
Backwards Digit Span	4.71 (1.21)	3 - 8

Table 3. Strategy Use Sums Means and Standard Deviations of Strategy Use

Strategies	Frequency	
	Mean (SD)	Range
Vocabulary	0.29 (0.52)	0 - 2
Text Structure	1.92 (1.95)	0 - 7
Summarizing	5.71 (4.50)	0 - 22
Necessary Inferencing	14.26 (6.00)	3 - 32
Connecting	2.26 (2.19)	0 - 8
Elaborative Inferencing	10.50 (4.58)	3 - 20
Questioning	2.08 (2.59)	0 - 12
Visualizing	0.79 (1.60)	0 - 7
Background Knowledge	2.26 (1.69)	0 - 8
Prediction	3.97 (3.18)	0 - 12

Table 4. Mean Rank of Strategy Use

Strategies	1	2	3	4	5	6
Necessary Inferencing	9.47					
Elaborative Inferencing	8.88	8.88				
Summarizing		6.86	6.86			
Predicting			6.00	6.00		
Connecting			4.99	4.99	4.99	
Background Knowledge			4.95	4.95	4.95	
Questioning				4.38	4.38	
Text Structure				4.36	4.36	4.36
Visualizing					2.95	2.95
Vocabulary						2.22

Note. Strategies that are grouped together do not differ significantly from each other (Bonferonni corrected)

Table 5. Correlations of Background Measures and Strategy Use with Reading Comprehension Score

Variable	
Language Measures	
Vocabulary	.479
Word Fluency	.159
Non-word Fluency	.021
Category Fluency	.447
Letter Fluency	.245
Digit Span	.013
Strategies	
Vocabulary	.276
Text Structure	.431
Summarizing	.378
Necessary Inferencing	.497
Connecting	.517
Elaborative Inferencing	.183
Questioning	-.150
Visualizing	.151
Background Knowledge	.119
Prediction	.291

Note. Bolded values denote significant correlations

Table 6. Pearson Correlations between Strategy Types

	2	3	4	5	6	7	8	9	10
1. Summarizing	.52**	.07	-.17	-.07	-.08	-.18	.30	.07	.11
2. Necessary Inferencing	--	.28	.04	-.23	.09	-.16	.39*	.21	.11
3. Elaborative Inferencing	--	--	-.05	-.02	.10	-.21	-.03	-.21	.11
4. Predicting	--	--	--	.15	.16	.08	.40*	.25	.42**
5. Questioning	--	--	--	--	.20	.37*	.12	.08	.01
6. Visualizing	--	--	--	--	--	.01	.04	.15	.10
7. Background Knowledge	--	--	--	--	--	--	.14	.24	.15
8. Connecting	--	--	--	--	--	--	--	.35*	.61**
9. Vocabulary	--	--	--	--	--	--	--	--	.45**
10. Text Structure	--	--	--	--	--	--	--	--	--

Note. + $p < .10$, * $p < .05$, ** $p < .01$

Table 7. Rotated Factor Loadings and Communalities for each Strategy Used in English Think-Alouds

Strategies					
	Text Analysis & Integration	Meaning Extraction	Extrapolating beyond the Text I	Extrapolating beyond the Text II	Communalities
Text Structure	.82	.08	.11	-.14	.72
Connecting	.77	.35	-.14	.07	.73
Predicting	.73	-.33	-.26	.25	.78
Vocabulary	.63	.16	.32	-.32	.63
Summarizing	.04	.85	-.04	-.10	.73
Necessary Inferencing	.02	.79	-.16	-.20	.74
Questioning	-.09	-.04	.81	.23	.73
Background Knowledge	-.08	-.16	.78	-.16	.67
Visualizing	.06	-.09	.18	.84	.75
Elaborative Inferencing	-.20	.33	-.20	.53	.50

Table 8. Coefficient Table of English Variables that Predict Successful English Reading

Predictors	B	SE	β	<i>t</i>	Sig.
Overall					
Constant	5.43	1.8		3.01	<.01
PPVT	0.06	0.02	0.43	3.73	<.01
Text Analysis & Integration ¹	1.18	0.30	0.43	3.96	<.001
Meaning Extraction ²	0.97	0.30	0.35	3.22	<.01
Extrapolating the text II	0.76	0.31	0.28	2.5	<.05

1. *Note.* Text analysis and integration here consists of both reference to text structure, connecting, predicting and vocabulary
2. *Note.* Meaning Extraction here consists primarily of summarizing and necessary inferencing
3. *Note.* Extrapolating beyond the text II consists of visualizing and elaborative inferencing

Chapter 4

4 Discussion

The current study investigated the use of reading strategies by second language learners (SLLs) in a post-secondary program. Specifically, this study looked at whether reading strategy use predicts reading comprehension success beyond vocabulary knowledge and working memory ability. The language measures that predicted reading comprehension success included vocabulary knowledge and category fluency. The reading strategies most used by SLLs were necessary inferencing, elaborative inferencing, summarizing, and predicting. The strategies that were correlated to reading comprehension included connecting, necessary inferencing, reference to text structure and summarizing. The reading strategies loaded differently into underlying factors. In this study, four factors had emerged; however, only three factors accounted for unique variance in reading comprehension performance. These three factors included text analysis & integration, meaning extraction, and extrapolating beyond the text II. Extrapolating beyond the text I did not account for unique variance.

4.1 Language Predictors of Reading Comprehension

4.1.1 Vocabulary

Vocabulary knowledge and category fluency were significant predictors of reading comprehension for the SLLs in this study. Higher scores on the English vocabulary measure was associated with higher scores on the reading comprehension task. The same was true for category fluency. For readers who know fewer words, it was possible that they missed the main message of the text resulting in them doing poorly in the reading comprehension tasks (Oakhill et al., 2003). This finding is consistent with one component of the SVR model. The SVR model suggests reading comprehension success is dependent on both word reading ability and language comprehension ability (Gough & Tunmer, 1986). Here we see that word knowledge is related to reading comprehension ability for SLLs adults.

The current study is consistent with findings from research with both children and adult readers. Previous research has shown that vocabulary knowledge is correlated to reading comprehension success in children (Klauda & Guthrie, 2008; Meschyan, & Hernandez, 2002; Pasquarella et al., 2012). According to Landi, vocabulary is a key predictor of reading comprehension success, having the greatest correlation with reading comprehension ability (2010). Schmidt (2019) found that vocabulary was also associated with successful reading comprehension ability in both L1 and L2 elementary students. Frid and Friesen (2019) also found that the PPVT vocabulary scores were significantly correlated to reading comprehension in both English and French for French Immersion students. In the Friesen and Frid study (2020), which closely related to the current study, PPVT was also significantly correlated with reading comprehension in both languages for adults. Therefore, vocabulary knowledge is a crucial predictor of reading comprehension success in both children and adults.

4.1.2 Decoding and Word Reading Fluency

Word reading fluency and decoding fluency were not related to successful reading comprehension for adults in this study. Word reading fluency was measured by using the TOWRE word list and decoding was measured by using the non-word TOWRE. This finding is not consistent with the SVR model. Previous studies with children have also shown that word decoding and reading fluency are significant predictors of reading comprehension success (Klauda & Guthrie, 2008; Meschyan, & Hernandez, 2002; Pasquarella et al., 2012). Frid and Friesen (2019) found that French word reading fluency and non-word reading fluency were significantly correlated with French reading comprehension but not with English reading comprehension in French immersion elementary students. Schmidt (2019) also found that vocabulary, word reading fluency, and decoding were all correlated to successful reading comprehension ability in both L1 and L2 elementary students.

In the Friesen and Frid (2020) adult study, in which English-French bilingual adults read texts in their first and second language, word fluency was not significantly correlated with reading comprehension performance in either language. The reading comprehension and word fluency measures, were the same measures used in the current study. Thus,

decoding mastery can happen for both monolinguals and bilinguals with additional practice such that readers reach a point where it is automatic. Therefore, there are fewer individual differences in decoding performance and thus fluency does not impact reading comprehension performance. Schmidt (2019) had also found that SLLs did not differ from monolinguals in their decoding abilities, which was also determined by the non-word TOWRE task. Schmidt then suggested that growth in L2 decoding ability may not be substantially impacted by language background in the home.

For adults, fluency is not a significant predictor of reading comprehension success because adults engage in more automatic decoding processes; however, for children fluency is a significant predictor. Thus, in this study word reading fluency and word decoding were not related to reading comprehension. Droop and Verhoeven (2003) propose that word-decoding is a skill that can be grasped fast so it is not a factor that results in group differences for reading comprehension. Landi (2010) has also found that in adults, decoding skill was not as important for successful reading comprehension. Reading fluency has also been found to be separate from decoding ability for successful reading comprehension (Jackson, 2005). In the current study, given that the participants had learned English primarily as a subject in school, it was hypothesized that word fluency would still be an important factor in reading comprehension. However, results suggest that participants had sufficient word automaticity such that it did not distinguish individuals good at comprehension from individuals that were poorer at comprehension.

4.1.3 Working Memory

Working memory in adults did not correlate with reading comprehension in this study. Working memory is required for a variety of cognitive skills, as it is a temporary storage where information can be manipulated and processed (Baddeley, 2003). Lower working memory capacity has been found in students weak at reading comprehension (Christopher et al., 2012). Unlike what was expected, in this study, working memory did not correlate with reading comprehension use. It is possible that in this study, the relationship between working memory and reading comprehension is weak because of the sample size used. Consequently, a larger sample size may have been needed to observe a correlation. Friesen and Haigh (2018) noted that the studies that typically report

a relationship between executive control ability (including working memory) and reading comprehension success have employed a large number of participants. However, the studies discussed with Friesen and Haigh (2018) were with children. A second possibility is that for adults working memory is less important and to my knowledge no study has measured working memory in relation to reading comprehension success in L2 adults.

4.2 Strategy Use

There was great variability in the nature of SLL strategy use. The reading strategies primarily used by SLLs were necessary inferencing, elaborative inferencing, summarizing, and predicting. The result in the current study are similar to the Friesen and Frid (2020) study with adults, the top three most commonly used strategies in participants' second language were the same as the present study. Overall the strategy use of SLLs in both studies was very similar. These participants used more summarizing since they would not be as strong in their second language. Thus, they would engage in more summarizing as it is a surface level reading strategy that helps individuals to understand the text.

According to the CI model, which has three different levels of representation, individuals who are utilizing more reading strategies may be operating at the textbase or situation model level. They may be less focused on understanding the vocabulary and syntax (surface level) which can then give them more resources to engage in summarizing. As was seen in the current study, these students may be more interested in the meaning units of the text and noticing connection between those parts (textbase) through inferencing behaviours. While using their previous knowledge to understand the text (Kintsch, 1988; Nirchi, 2014) such as through elaborative inferencing. Thus, engaging in meaning-based behaviours enabled readers to form a deeper understanding of the text.

The least used reading strategies were referring to text structure, visualizing, and referring to vocabulary. Although text structure was related to reading comprehension success, it was found to be one of the least used strategies by SLLs. It is possible that it may have been under-reported as this strategy may not have been consciously available to the students. Surprisingly, visualizing was not commonly used even though studies

have shown that it is related to reading comprehension success (e.g. Friesen & Frid, 2020). It is possible that participants may have been engaged in visualizing but it may not have been on the forefront of their mind to say out-loud during the think-aloud.

The least used reading strategy was reference to vocabulary knowledge; yet vocabulary knowledge itself (i.e., PPVT scores) predicted reading comprehension scores. Participants did not refer to vocabulary often. However, it was not that the participants did not need to refer to the vocabulary as the stories were not easy, it is likely that participants were not familiar with all of the vocabulary words. There was variability in reading comprehension that was related to vocabulary knowledge, thus, that does suggest that some readers understood some of the words in the story better than other readers. The other readers that were less familiar with the vocabulary did not refer to the words as expected. In the Friesen and Frid (2020) study, reference to vocabulary was the fourth most used strategy when individuals were reading in French. In the Schmidt (2019) study, SLLs were referring to vocabulary more than the monolingual group of elementary students. The less use of the reading strategy, vocabulary knowledge, was also surprising considering that SLLs would need to dedicate more resources to unknown vocabulary than first language learners (Jiménez et al., 1996).

4.3 Factors that Predict Reading Comprehension

The correlation between all ten strategies were examined with reading comprehension. The strategies that emerged as related to reading comprehension were connection, necessary inferencing, text structure, and summarizing. A factor analysis was performed to create super variables to see how the reading strategies grouped together. Four Factors had emerged in the factor analysis and three factors accounted for unique variance in predicting reading comprehension success. The four factors that emerged were text analysis and integration (text structure, vocabulary, connecting and predicting), meaning extraction (summarizing and necessary inferencing), extrapolating beyond the text I (questioning and background knowledge) and extrapolating beyond the text II (visualizing and elaborative inferencing). All of these factors accounted for unique variance in reading comprehension, beyond vocabulary knowledge, except for extrapolating beyond the text I.

The factor, Text Analysis and Integration included reference to text structure, reference to vocabulary, connecting, and predicting. In the Friesen and Frid (2020) study with adults, text analysis included the same four variables for the participants' second language. These strategies help to link different parts of the text so that the reader can understand the bigger picture and the overall meaning of the text. These strategies can be used to analyze the text. For example, when someone knows it is a narrative and can understand the text structure, the individual then creates a scaffold on which to insert new information (Cain, 2010). However, as noted above, text structure was rarely used but was more of a marker of successful reading comprehension. Thus, individuals were not commenting on it consistently. Readers who are aware of the structure can then organize the information in a similar way as the author while creating their own mental representation of the text. A clear mental representation of text ideas that involves the understanding the relationship between texts ideas is an important part of reading comprehension (Meyer, Brandt, & Bluth, 1980; Ray & Meyer, 2011).

Connecting and predicting also formed part of this factor and may enable readers to insert information into their text representation. Connecting on its own was also found to be correlated with reading comprehension. Block (1986) describes that connecting occurs when readers connect new information in the text with the information already stated in the text. Good reading comprehension is related to effective text connecting inferences (Oakhill & Cain, 2000). Individuals that are poor at reading comprehension are not able to combine information in the text in order to develop connection between different sentences (Oakhill, 1982, as cited in Kolić-Vehovec & Bajšanski, 2007). Effective readers give meaning to text through tasks such as “backward and forward text inspection and integrating information across text” (Kolić-Vehovec & Bajšanski, 2007, p. 199). Thus, as seen in the literature, it is not unexpected that the use of the reading strategy connecting is related to successful reading comprehension.

There was a moderate correlation between predicting and making connections. However, predicting on its own was not a significant predictor of reading comprehension success. This finding was surprising as individuals who are good at reading comprehension utilize clues in the text to predict information or make comparisons with the new information

with the information already provided (Block, 1986). In this case, predicting may not have been related to reading comprehension success due to the nature of the predicting. For example, if there was a prediction then there may not have been a connection to follow it. This was found in the Frid and Friesen's (2019) study with elementary school children, where the readers were predicting but were not confirming their predictions. Thus, predicting on its own was not a positive predictor of reading comprehension success. Other research has shown that predicting should be accompanied by an assessment of the prediction (i.e., making a connection) for it to result in successful reading comprehension (Duke & Pearson, 2009). Thus, in this study, the participants' use of the predicting strategy did not have much pay off if it occurred in isolation.

Meaning Extraction was the second factor and it included summarizing and necessary inferencing. Here the readers used the textbase strategies to identify the main messages and themes in the stories. At times, the readers engaged in the summarizing through paraphrasing and repeating the text. This may have occurred as a way to prolong their processing time (Coté, Goldman, & Saul, 1998). Whereas, inferencing would take more time to complete (Keenan, Baillet and Brown, 1984). Thus, paraphrasing and repeating text may take place instead of inferencing behaviors. In this study, these combined behaviours constituted extracting meaning from the print and resulted in more effective reading comprehension.

Nordin, Rashid, Zubir, and Sadjirin (2013) found that individuals who are higher achieving SLLs will spend more time on behaviours such as summarizing the text. Jiménez et al., (1996) found that successful Latina/o readers were creating a number of inferences while reading in both Spanish and English. Friesen and Frid (2020) also found that for English, the meaning extraction factor included summarizing and necessary inferencing. Whereas, in French, which was the participants' second language, both necessary inferencing and elaborative inferencing loaded onto this factor but not summarizing. It was unexpected that participants' reading behaviours was more similar to the participants when they were reading in their first language and not their second language. This may have occurred because in the Friesen and Frid (2020) study, participants were able to conduct their think-alouds of French texts in English. Thus, in

French, the summarizing behaviour constituted a lot of translating and some individuals relied exclusively on this strategy, while others indicated what the text meant by engaging in inferencing.

The third factor, Extrapolating Beyond the Text I, had participants using information that was not directly present in the text in an attempt to better understand it. The two variables that loaded on this factor were background knowledge and questioning. This factor did not account for significant unique variance in reading comprehension performance. This may have occurred because when individuals accessed background information, they may not have considered whether their background information was relevant to the text. For example, Block (1986) found that SLL adults who were non-integrators were relating information in the text to themselves. They tried to form connection with information from their own lives with the information presented in the text. However, these connections were only one sided since the individuals failed to connect the information from their own lives to the information in the text. So, these connections were not helpful in extending and explaining the text. In the current study, participants often discussed how the second story about pesticides reminded them of family members who worked on farms back home in China. However, the participants did not further expand or question the fit of this background information with the text.

Questioning on its own was not found to be connected to reading comprehension in this study. However, Frid and Friesen (2019) had found that questioning was strongly related to reading comprehension in the participants' second language. Duke and Pearson (2009) also suggest that individuals that are strong readers will question the meaning of the text that they are reading. When individuals learn to come up with questions for a text, largely their reading comprehension also strengthens (Yopp, 1988, as cited in Duke and Pearson, 2009). Thus, it is possible that questioning was not related to reading comprehension success because of the type of questioning that participants were engaging in. Hence, the quality of the questioning may not have assisted the students in better understanding the stories.

Lastly, the fourth factor was called Extrapolating Beyond the Text II, and it included the strategies of visualizing and elaborative inferencing. These strategies also required the participants to use ideas and information that were not directly stated in the text. That is, elaborative inferencing is not necessary to understand the text, but it allows for a richer representation of the text. Surprisingly, elaborative inferencing did not correlate with reading comprehension scores on its own. Inferencing behaviour is important for going beyond the text and making connections (Kintsch, 1988; Raney, 2003). According to the CI model, elaborative inferencing would also be important for reading comprehension, since according to this model reading is considered to be creating a mental representation of the text through inferencing behaviours (Kintsch & van Dijk, 1978).

Previous research has shown that elaborative inferencing is related to successful reading comprehension. In Schmidt's study (2019) with EL1 and ELL elementary students, elaborative inferencing was related to reading comprehension success for both groups. In the Friesen and Frid study (2020) with adults, elaborative inferencing was correlated to better reading comprehension in both English and French. It is possible that the quality of the elaborative inferencing used may not have been helpful to the participants. The participants may have been elaborating too far beyond the text which was not helpful or using background knowledge that was not applicable. It is possible that poor readers engaged in elaborative inferencing in ways that made the strategy ineffective. Future research could examine differences in the quality of the elaborative inferences and whether quality impacts the relationship between reading comprehension success and elaborative inferencing. Nonetheless, elaborative inferencing did predict a small and unique portion of the variance once combined with visualization, once other factors were accounted for. Visualization encompasses the creation of mental images of what was read in the text (Friesen & Frid, 2020). Visualization was also related to individuals' reading comprehension in their second language (Friesen & Frid, 2020).

4.4 Limitations

One possible limitation in this study is that participants did their think-alouds in their less dominant language. Considering that these students had not been learning English for very long, it is possible that the full picture of the reading strategies that they are using

was not captured when they had been stating their thought process in English. The reading strategies found may have been different if the participants had been doing the think aloud in their native language. However, participants were given the opportunity to do the think-aloud in which ever language that they had preferred and only one participant chose to use their native language. Likewise, in second language classrooms, students are often expected to respond in their second language, making the task more authentic.

The type of measures used in this study may have also impacted the nature of the results. Cutting and Scarborough (2006) found that the type of reading comprehension measure will also influence the skills that are found to be important for reading comprehension. So, specific skills can then impact the outcomes of the different reading comprehension measures. However, there is no one gold standard for reading comprehension measures, making picking reading comprehension tasks a challenge. An additional concern was that the reading comprehension questions were developed in our lab and thus, had not been standardized. Therefore, the validity and reliability of these measures has not yet been established. However, in reading research there is no real consensus on the best reading comprehension measures. For example, Keenan and Betjemann (2006) found that children who did not read the texts in the GORT, still did better than expected on the multiple-choice questions. Thus, it is possible that the questions can be answered based on an individual's background knowledge. Therefore, had the GORT multiple choice comprehension questions been used, we may not have been given a full picture of reading comprehension.

The sample was also not very diverse as majority of the students were female students from China. This may make generalizing the results more difficult. However, it is possible that this population may have similar reading comprehension behaviours as other second language populations. As, Friesen and Frid (2020) had similar findings and the population in that study consisted of English-French Bilingual adults. Additionally, different results may have been found with more male participants. Hong-Nam and Park (2014) had found that female students were using more strategies than male students. Of

note however, in that study, there were no major differences found in the types of strategies being used by the male and female students.

4.5 Implications

Immigration trends in Canada have given rise to new immigrants; these immigrants have advanced educational attainment and literacy skills in their first language (Organization for Economic Co-operation and Development, 2005, as cited in Pasqueralla et al., 2012). These individuals often do not have the same proficiency level in their second language; thus, they have to get jobs that match their skillset (Geva, Gottardo, Farnia, & Byrd Clarke, 2009). Specifically, international students face more difficulties than domestic students as they adapt to the mainstream culture of the new country. Language and academic struggles can further exacerbate the stress faced by the international students (Mori, 2000). Language is often considered to be the greatest difficulty and barrier that is faced by international students. Obtaining language skills in the second language for adults can be a particularly long and difficult process (Takahashi, 1989, as cited in Mori, 2000).

Next this thesis focuses on the implications of reading in relation to seeking out counselling services given that I am in the Counselling Psychology program and the findings have direct relevance to future practice. Importantly, recent immigrants or individuals with low English language skills are more likely to encounter difficulties with their health as a result of weak health literacy skills (Rootman & Gordon-El-Bihbety, 2008). Health literacy has been defined as “the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course” (Rootman & Gordon-El-Bihbety, 2008, p. 11). Mental health literacy has been defined as “knowledge and beliefs about mental disorders which aid their recognition, management or prevention” (Jorm et al., 1997, p. 182). Clough, Nazerath, Day, and Casey (2019) found that international students had lower levels of mental health literacy compared to the domestic students. Hyun, Quinn, Madon, and Lusting (2007) asked graduate students about their awareness of services on campus. 61% of international students responded that they were aware of counselling services available on campus. Whereas, this number was 79% for domestic students. Hyun et al.,

(2007) suggested that this difference could be a result of the delivery of information to international students. However, it is possible in these situations that reading comprehension of the materials may have played a role in the international students' decreased awareness of counselling services. Thus, education is important to supporting the development of L2 reading comprehension.

Friesen and Haigh (2018) have identified, through a literature review, ways that teachers can make strategy use clearer in the classroom. These recommendations can also be applicable to professors at post-secondary institutions with international students. They mentioned that students can be asked which comprehension strategies they are using by getting them to comment on their thinking while reading or listening to a text. Professors may want to present successful reading strategies to their students that they can use before reading, during reading as well as post-reading to consolidate their understanding of the text. Professors may also want to simply discuss how strategies can be helpful with understanding text. Lastly, it should be recommended to students that they monitor their strategy use, so that they can evaluate whether a certain strategy is helpful or not. Consequently, if a strategy is not helpful then they may utilize a different reading strategy.

4.6 Future Research

Participants' use of strategies was measured in this study. However, strategies reported during a reading task may not capture the full repertoire of a reader's knowledge of strategies. Their awareness of the strategies that they chose to engage in was not examined, such as through the use of a survey. Previous research has shown that the types of reading strategies that are being used by students is important but so is participants' awareness of their use of reading strategies (e.g. Baker and Brown, 1984, as cited in Kolić-Vehovec & Bajšanski, 2007). An important factor in an individual utilizing a useful reading strategy is them noticing and paying attention to their use of reading strategies. (Kolić-Vehovec & Bajšanski, 2007). So, that they can actively choose and engage in those reading strategies. Thus, studies that examine the use of reading strategies as well as the participants' awareness of the reading strategies can be helpful in then having teachers encourage reading strategy use.

Secondly, a study examining how a reader's motivation impacts strategy selection would be important. Many studies have found that a student's motivation influences their education beyond the influence of their intelligence and background knowledge (Schiefele, Schaffner, Möller, & Wigfield, 2012). Reading is really important to learning, as students are often given lots of written materials. So, their motivation to read would be essential to their learning success. For example, in the current study participants had engaged in narrative texts and were not looking to learn new information. The texts used in this study did not have relevance to the people reading them. The type of reading strategies that are used by participants might be different if they are not seeking out knowledge. Thus, the goals of the readers will change. When individuals are accessing information that may be important to their wellbeing (e.g. reading consent forms in counselling), the importance of reading may then change. Therefore, motivation should also be examined alongside reading strategies in future studies.

This study had focused on a quantitative analysis of the types of reading strategies being used by participants. However, the quality of these reading strategies was not measured. Even though participants had been utilizing similar strategies, what they said while engaging in the strategy may have highly differed. For example, elaborative inferencing was not shown to be correlated to reading comprehension despite what has been seen in previous studies (e.g. Schmidt, 2019) So, it was speculated that the quality of the reading strategies being utilized by the participants may have then impacted the correlation of reading strategy use to reading comprehension. Therefore, it would be helpful for future studies to also examine what participants are doing when they are engaging in certain strategies and not just the reading strategies that are being used.

4.7 Conclusion

Thus, the current study had found that the reading comprehension strategies most being used by second language learners in a post-secondary program were necessary inferencing, elaborative inferencing, summarizing, and predicting. It was found that reading strategy use did predict reading comprehension success beyond vocabulary knowledge and working memory capacity. Particularly, the reading strategies that were correlated to reading comprehension included connecting, necessary inferencing, text

structure, and summarizing. While reading strategies had also grouped onto different factors, three factors had accounted for unique variance including Text Analysis and Integration, Meaning Extraction, and Extrapolating Beyond the Text II. Therefore, professors at post-secondary institutions should then keep the importance of reading strategies in mind while helping their students learn and comprehend reading material. Professors may want to educate their students on the types of strategies that are connected to reading comprehension success, while encouraging and reminding them to utilize the successful reading strategies. They may engage in more active monitoring of their students' use of reading strategies through questionnaires, so students are also made aware of their strategy use. Thus, allowing international students to learn to improve their reading comprehension while simultaneously improving other aspects of their life such as increasing their work and educational prospects here in Canada. All the while addressing a potential barrier in international students accessing services such as counselling.

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Footnotes

1. For some participants, there were technical difficulties with the computer and the order of tasks was changed to address the issue (i.e., the TOWRE was administered before the PPVT).
2. The survey of reading strategies created by Mokhtari and Sheorey (2002) which looks at participant's perceived use of strategies was originally used but we did not see a relationship between what people were saying and doing. So, it was not included in the analysis.

Appendices

Appendix A: Reading Strategies Descriptions and Examples

Strategies	Definition	Example (taken from Participants' think alouds)
Vocabulary	<p>Referring to a vocabulary word because it was difficult to understand. Mentioning that they did not understand many words in the text.</p> <p>The reader may also refer to the vocabulary word to point out the significance of the word.</p>	<p>There are some unfamiliar words so I may have some troubles understanding that (the text). There are some words like robot.</p>
Text Structure	<p>Referring to the layout of the text (e.g. noticing that the text is a story). Mentioning the intent of the author or commenting on how an idea is expressed that implies the structure of the text.</p>	<p>It seems like a story about how Winnie saved herself and her brother from a storm.</p> <p>I think it is a happy ending because when she was exhausted there was some food that emerged from the darkness.</p>
Summarizing	<p>Paraphrasing the text or identifying the main ideas of the text by re-stating them.</p>	<p>This means the farmers all over the world are facing many problems like the crops are attacked by insects and some disease.</p>

<p>Necessary Inferencing</p>	<p>Identifying information that is needed to understand the text. This information is not usually found in text so it is like reading between the lines.</p>	<p>So, if there is a little rain this year then the plants will not grow very well.</p> <p>I think this means that the north place is a good place or is a free place for the slaves.</p> <p>The sister thinks someone might rescue them if they face any problems on the way.</p>
<p>Elaborative Inferencing</p>	<p>Going beyond the text and identifying new information that is not necessary to understand the text. (e.g. commenting on the personality traits of a character)</p>	<p>I think the turtle may be really lonely.</p> <p>I can see the turtle must enjoy this travel a lot since you will feel very safe and it is a very new aspect for the turtle to see this world.</p> <p>I think that what Harriet did was something that not many people could do, what she did was really brave and very dangerous for her and she decided to do it.</p>
<p>Predicting</p>	<p>Making guesses on what might occur next in the text.</p>	<p>I predict that this turtle wants to make friends with this eagle and want to chat with her.</p> <p>Through this atmosphere, I predict that all the farmers will very disappointed and maybe they will give up to being a farmer or want to change their job.</p>

Connecting	Referring to an earlier part of the text. Referring to a previous think-aloud which may have included a prediction.	<p>After reading the whole passage, I think maybe they are caught in the ocean.</p> <p>My guess is right, the turtle fell straight into the ocean because she opened her mouth. But I didn't guess how she dropped.</p>
Visualizing	A mental image of the text or information not in the text that helps the reader understand the text.	<p>I imagine that there is a little turtle. I am picturing the turtle on the eagle's back.</p> <p>I am picturing the wanted wall. (for Harriet)</p>
Questioning	Asking questions about the text. Questions about the information in the text or questioning the meaning of a statement. Such as questions about who, what, where, when and how.	<p>I wonder how she could run away to the north? How many difficulties she has experienced? Wont she be afraid of being caught by her owner?</p> <p>I wonder who Harriet is, is she someone like political or someone who want to set up a revolution?</p>

<p>Background Knowledge</p>	<p>Referring to information that is beyond the text. Such as information that the participant has learned or information that is related to their life and life experiences in order to better understand the text.</p>	<p>This makes me think of my father, my father also has a farm. He plants many potatoes and other plants. But one thing he worries about is.... he is afraid of being attacked by insects</p> <p>The turtle reminds me of my grandmother because she is so... she likes talk very much and I don't like it and she does have many friends and I don't know why.</p> <p>I think this maybe come from a book talking about slaves or a movie talking about how to free slaves.</p>
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Appendix B: Language Experience Questionnaire

Participant #: _____ Program: _____

Age: _____ Gender: M F

Country of birth: _____

If not Canada, how many years have you lived in Canada:

Have you ever had a vision problem? Yes No

If so, do your glasses/contacts correct your vision to normal? Yes No

	List languages in the order in which they were learned	List languages from best known to least well-known
For Yourself		
For your Mother		
For your Father		

What percentage of the time are you *currently* exposed to each of your languages (total = 100%)?

	English	Other Language	Total
Speaking			= 100
Listening			= 100
Reading			= 100
Writing			= 100

What percentage of the time do you *currently* use each of your languages with the following groups of people?

	English	Other Language	Total
Family			= 100
Friends			= 100
Classmates			= 100
Co-Workers			= 100

How often do you mix words or sentences from English and other language in your speech?

Never Rarely Occasionally Sometimes Frequently Very Frequently Always

1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____

For each of the English and other language skills of understanding, speaking, reading, and writing, please indicate the age at which you first started to acquire the skill, the place in which you learned the skill (e.g. home, school), and rate the ability with which you can currently perform the skill. (circle one number per skill).

English Language Skills

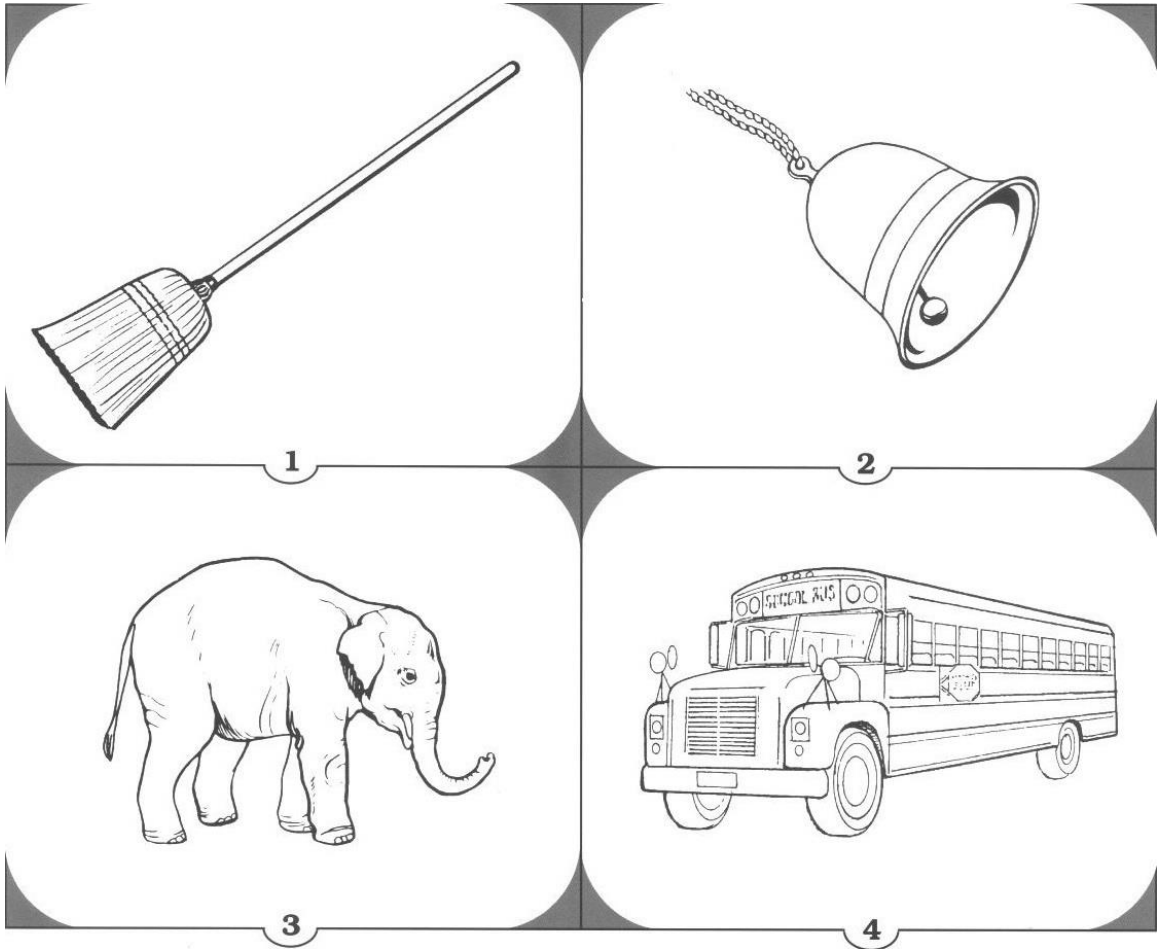
	Starting age	Place (home, school)	Ability									
			very poor									native-like
Understanding			1	2	3	4	5	6	7	8	9	10
Speaking			1	2	3	4	5	6	7	8	9	10
Reading			1	2	3	4	5	6	7	8	9	10
Writing			1	2	3	4	5	6	7	8	9	10

Other Language Skills

	Starting age	Place (home, school)	Ability									
			very poor									native-like
Understanding			1	2	3	4	5	6	7	8	9	10
Speaking			1	2	3	4	5	6	7	8	9	10
Reading			1	2	3	4	5	6	7	8	9	10
Writing			1	2	3	4	5	6	7	8	9	10

Appendix C: Peabody Picture Vocabulary Test-III

Participant hears “broom” and must identify which picture is being referred to.



Appendix D: The Test of Word Reading Efficiency (TOWRE)

Subtest 1: English Sight Word Efficiency

Instructions “I want you to read some lists of English words as fast as you can. Let’s start with this practice list. Begin at the top, and read down the list as fast as you can. If you come to a word you cannot read, just skip it and go to the next word. Use your finger to help you keep your place if you want to. Remember to say the words in English.”

Practice Words: on, my, bee, old, warm, bone, most, spell

Test Items : 104 words and 45 seconds to read as many items as possible.

Subtest 2: Phonemic Decoding Efficiency

Practice: “Now I want you to read some words that are not real English words. Just tell me how they sound in English. I want you to read them as fast as you can. Let’s start with this practice list. Begin at the top, and read down the list as fast as you can. If you come to a made-up word you cannot read, just skip it and go to the next word. Use your finger to keep your place if you want to. Remember to say them in English.”

Practice words: ba, um, fos, gan, rup, nasp, luddy, dord

Test Items : 63 non-words and 45 seconds to read as many items as possible.

Appendix E: Think Aloud Exemplar from Sample Story

Think aloud 1: I am picturing a young boy and his grandmother walking excitedly hand in hand to a small pond to go fishing. It must be warm outside if they are choosing to fish on this particular day.

Think aloud 2: They must have waited in anticipation for a fish to bite and I am sure the boy was happy once the fish took hold of the bait. I wonder how long they waited for.

Think aloud 3: The boy must feel disappointed that he didn't catch a fish and now has no pole. I predict that he will leave the pond very unhappy and grandma will buy him a treat for being such a good sport.

Think aloud 4: I was wrong the boy and his grandmother thought the accident was funny and made light of the situation.

Appendix F: Comparable Story Example

Laura Secord was born in the state of Massachusetts, but she made her home in Upper Canada. During the War of 1812, her house was taken over by American soldiers who had her cook and clean for them. One night, she overheard plans for a surprise attack on troops at Beaver Dams. Her husband James had been wounded at the first battle of the war and could not make the long hike to raise a warning. Instead, Laura left very early in the morning to sneak the message past the soldiers. She walked 32 km, braving the weather and the terrain to warn Lieutenant FitzGibbons. Today, Laura Secord is considered a Canadian hero. Her daring actions saved many lives and she even had a chocolate company named after her.

Questions

1. When did Laura leave her home? (Lit).
2. What message did Laura give to Lieutenant FitzGibbons? (NI)
3. How do you think Laura felt when she arrived? (EI)

Appendix G: Verbal Fluency

Category Fluency Instructions

This should be done at the start of the first testing session, i.e. before the subject has seen any of the naming cards etc... since these may prime the fluencies.

Say: "I'm going to give you a category and ask you to name all the different examples that you can think of from that category in one minute. For instance, if I said flowers, you might say rose, daisy, etc. Do you understand?"

"Now go ahead and tell me all the different ANIMALS you can think of."

"Thank you. Are you ready for the next one?"

"Now tell me all the different FRUITS and VEGETABLES you can think of"

Letter Fluency Instructions

"This time I'm going to give you a letter of the alphabet and ask you to name as many different words as you can think of that start with that letter. I don't want you to include the names of people or places. You'll have one minute to think of as many different words as you can. Try not to give the same words with different endings, e.g. run, runner and running."

"Now go ahead and tell me all the different words that you can think of that start with the letter **F**."

"Thank you. Are you ready for the next one?"

"Now go ahead and tell me all the different words that you can think of that start with the letter **A**."

Appendix H: Backwards Digit Span (based on WISC-V)

Students are told they are going to play a number game. They will hear some numbers and they will be asked to repeat the numbers backwards (e. g., If I say ‘1, 3,’ you say 3,1’). The students need to hold and manipulate (reverse) a series of numbers in their minds. The memory demands increase by requiring them to repeat larger sets of numbers. (note the actual digits are not included to maintain the integrity of the test).

Start with practice trials:

Practice 1

Trial	Response	Score
4,6		
7,3		

Practice 2

Trial	Response	Score
2, 6, 4		
5, 8, 3		

Test Items:

Give both trials of each item, even if trial 1 is answered correctly. Only stop after child answers both trials incorrectly.

Trial 1	Response	Score	Trial 2	Response	Score
2 digits			2 digits		
3					
4					
5					
6					
7					
8 digits			8 digits		

Appendix I: Ethics Approval



Date: 18 December 2018

To: Dr. Deanna Friesen

Project ID: 113076

Study Title: Reading Comprehension and Strategy use in Adult English Language Learners

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: January 11 2019

Date Approval Issued: 18/Dec/2018

REB Approval Expiry Date: 18/Dec/2019

Dear Dr. Deanna Friesen

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Debriefing letter_FINAL (12_12_18)	Debriefing document	12/Dec/2018	2
Digit Span (07_11_18)	Other Data Collection Instruments	07/Nov/2018	1
English-TOWRE-(07_11_18)	Other Data Collection Instruments	07/Nov/2018	1
Language Experience Questionnaire (12_12_18)	Paper Survey	12/Dec/2018	2
LOI-Reading Strategies_(12_12_18)	Written Consent/Assent	12/Dec/2018	2
Peabody Picture Vocabulary Test sample	Other Data Collection Instruments	07/Nov/2018	1
Poster (12_12_18)	Recruitment Materials	12/Dec/2018	2
Reading Comprehension Stories-(07_11_18)	Other Data Collection Instruments	07/Nov/2018	1
Recruitment Script_(12_12_18)	Oral Script	12/Dec/2018	2
Survey of Reading Strategies	Other Data Collection Instruments	07/Nov/2018	1
Verbal Fluency(07_11_18)	Other Data Collection Instruments	07/Nov/2018	1

Documents Acknowledged:

Document Name	Document Type	Document Date	Document Version
Running Sheet (07_11_18)	Supplementary Tables/Figures	07/Nov/2018	1

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Page 1 of 2

Sincerely,

Kelly Patterson, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Curriculum Vitae

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Post-secondary Education and Degrees: Bachelor of Arts (Honours) in Psychology
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