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EARLY READING SKILLS IN LOW SOCIOECONOMIC STATUS AT RISK ENGLISH LANGUAGE LEARNERS: EFFECTS OF MULTISENSORY STRUCTURED LANGUAGE INTERVENTION

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Esta Tese foi julgada adequada para obtenção do Título de "Doutor em Estudos da Linguagem" e aprovada em sua forma final pelo Programa de Pós-Graduação em Inglês.

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To my Parents,
with all my gratitude

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ABSTRACT

Research on literacy development has been predominantly carried out with monolingual native English speaking learners and has largely disregarded English language learners (ELLs). Studies have shown that ELLs and monolinguals perform at a similar level of accuracy for word-level reading and spelling skills, and they share similar difficulties in these skills. However, ELLs lag behind their monolingual peers with regards to reading comprehension in English as a second language (L2), factor that places this population at risk of school failure. There have also been a number of studies that investigate the efficiency of multisensory structured language instruction (MSL) in helping reading instruction, but very few have focused on the implementation of either computer-assisted instruction (CAI), or teacher-mediated (paper-and-pencil) instruction, to suit ELLs' specific needs. Keeping these considerations in mind, this small scale exploratory study examined early reading skills, namely word and pseudoword recognition, listening comprehension, and reading comprehension, in low socioeconomic at risk ELLs. More specifically, the present dissertation also investigated the effects of MSL in computer-assisted and teacher-mediated intervention. Data was collected during this researcher's internship at the Massachusetts General Hospital – the Institute of Health Professions (MGH-IHP) in Boston (MA, USA). Participants were in the 1st and 2nd grades of elementary school, 22 ELLs and 21 monolinguals. ELLs' first language background was diverse, such as Cantonese, Spanish, Mandarin, and Haitian. Intervention lasted for about eight weeks and it consisted of systematic, structured, and student-guided multisensory instruction, with emphasis on visual, auditory, and kinesthetic-tactile strategies. Pre- and Post-tests were administered before intervention started and after intervention was finished. Data was analyzed, quantitatively and qualitatively and, as a whole, findings corroborate previous research that ELLs did not differ from non-ELLs in measures of decoding real words and phonemic decoding, listening comprehension, and reading comprehension in early stages of reading development. Additionally, sight word and phonemic decoding skills seemed to largely contribute to reading comprehension. Listening comprehension skills did not have the same impact as word recognition skills did, which could be explained due to the characteristics of the population of this study, i.e., low-income at risk English limited proficient learners. Moreover, findings from this study provide evidence

that early reading skills stand out as fundamental competencies in low socioeconomic status (SES) at risk learners.

Keywords: Reading comprehension. Word recognition. Listening comprehension. English language learners. Multisensory structured language intervention.
Number of pages: 179
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RESUMO

A pesquisa em alfabetização tem sido predominantemente conduzida com estudantes nativos monolíngues de língua inglesa e tem desconsiderado amplamente os aprendizes de inglês como segunda língua, neste caso, aprendizes de Inglês (ELLs). Os estudos têm demonstrado que os aprendizes de Inglês e os alunos monolíngues têm um desempenho de acurácia semelhante no reconhecimento de palavras e em testes de soletramento. No entanto, os aprendizes de Inglês têm um desempenho inferior ao dos monolíngues em tarefas de compreensão leitora em Inglês como segunda língua (L2), fator este que os coloca em risco de fracasso escolar. Há também alguns estudos que investigaram a eficácia do método multissensorial (MSL) no auxílio da leitura, mas muito poucos com foco na implementação da instrução assistida por computador (CAI), ou mediada pelo professor, com papel e lápis, os quais atentassem para as necessidades específicas dos aprendizes de Inglês. Tendo em mente tais colocações, este estudo exploratório de pequena escala examinou as habilidades de leitura de nível básico, como o reconhecimento de palavras e de pseudopalavras, a compreensão auditiva e a compreensão leitora em aprendizes de Inglês, os quais estão em potencial risco de fracasso escolar e pertencem a uma classe socioeconômica mais pobre. Mais especificadamente, esta dissertação também investigou os efeitos do método multissensorial na instrução assistida por computador (CAI), e na mediada pelo professor, com papel e lápis. Os dados do estudo foram coletados durante o período do doutorado-sanduíche no *Massachusetts General Hospital – the Institute of Health Professions* (MGH-IHP), em Boston (MA, EUA). Os participantes cursavam os 1º e 2º anos do ensino fundamental, sendo 22 aprendizes de Inglês e 21 monolíngues. Entre os exemplos de línguas maternas dos aprendizes de Inglês podemos citar o Cantonês, o Espanhol, o Mandarim e o Haitiano. A intervenção durou aproximadamente oito semanas e consistiu em instrução multissensorial, sistemática e estruturada, desenvolvida de acordo com as necessidades de cada aluno, com ênfase em estratégias visuais, auditivas, cinestéticas e tácteis. Pré- e Pós-testes foram aplicados antes da intervenção começar e depois que a intervenção havia sido finalizada. Os dados foram analisados, quantitativa e qualitativamente e, de uma maneira geral, as conclusões corroboram os resultados de pesquisas anteriores de que o desempenho dos aprendizes de Inglês é semelhante em medidas de reconhecimento de palavras e decodificação fonêmica, compreensão auditiva e compreensão leitora em estágios iniciais de desenvolvimento

da habilidade leitora. Além disso, as habilidades de reconhecimento de palavras familiares e decodificação fonêmica parecem contribuir amplamente para a compreensão leitora. A compreensão auditiva não produziu os mesmos resultados, e não parece ter influenciado a compreensão leitora tal como a habilidade de reconhecimento de palavras, o que pode ser explicado pelas características da população deste estudo, isto é, alunos com proficiência limitada do Inglês, em potencial risco de fracasso escolar e provenientes de uma baixa classe socioeconômica. No mais, os resultados deste estudo fornecem evidência de que as habilidades de leitura de níveis mais básicos destacam-se como fundamentais para alunos com proficiência limitada do Inglês, em potencial risco de fracasso escolar e de origem socioeconômica deficitária.

Palavras-chave: Compreensão leitora. Reconhecimento de palavras. Compreensão auditiva. Aprendizes de língua inglesa. Intervenção multissensorial.
Número de páginas: 179
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LIST OF ACRONYMS

ACT: Adaptive Character of Thought
ACCESS: Assessing Comprehension and Communication in English State-to-State for English Language Learners
APA: American Psychological Association
ANA: *Avaliação Nacional da Alfabetização*
ANRESC: *Avaliação Nacional do Rendimento Escolar*
CAI: Computer-assisted Instruction
CK: Conditional Knowledge
CAH: Contrastive Analysis Hypothesis
CELF: Clinical Evaluation of Language Fundamentals
DIBELS: Dynamic Indicators of Basic Early Literacy Skills
ELLs: English Language Learners
EFA: Exploratory factor analysis
ESL: English as a Second Language
FUNDEB: *Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação*
IBGE: *Instituto Brasileiro de Geografia e Estatística*
IH: Interdependence Hypothesis
INSE: *Indicador de Nível Socioeconômico das Escolas de Educação Básica*
ISEI: International Socio-Economic Index of Occupational Status
SES: Socioeconomic Status
L1: First language
L2: Second language
MGH-IHP: Massachusetts General Hospital – the Institute of Health Professions
MSL: Multisensory Structured Language (teaching approach/ intervention/ instruction)
NCLB: No Child Left Behind Act (2001)
non-ELLs: Monolingual Native English Speaking Learners
PDSE: *Programa de Doutorado Sanduíche no Exterior*
PISA: Programme for International Student Assessment
PK: Procedural Knowledge
RIT: Response to Intervention
SAEB: *Sistema de Avaliação da Educação Básica*
SEI: Sheltered English Immersion
SVR: Simple View of Reading
TH: Threshold Hypothesis
ODH: Orthographic Depth Hypothesis

TOWRE: Test of Word Reading Efficiency
WRMT: Woodcock Reading Mastery Test

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CHAPTER 1
INTRODUCTION

1.1 PREFACE

Research has demonstrated that among students[1] considered at risk, English Language Learners (ELLs) are an increasing at risk demographic group in the US educational scenario (the reader is referred to August & Shanahan, 2006, for a comprehensive review on the topic). According to the American federal law, the No Child Left Behind Act (NCLB, 2001)[2], ELLs are defined as students whose first language (L1) is not English, and/or students who struggle to complete ordinary classroom work in English. The NCLB guarantees appropriate instruction to enable ELLs to reach the expected competency in English language, and to receive instruction in other content areas as their monolingual peers do. Besides, a substantial amount of ELLs come from a low socioeconomic status (SES) and from families whose primary language is not English and do not share an English cultural background, factors that may greatly aggravate the risk of reading failure. In line with the most informed literature in the field, the term SES is used in this study to refer to an individual's social standing or class often measured as a combination of education, income and occupation (APA[3]; PISA[4] - Programme for International Student Assessment - ISEI - International Socio-Economic Index of Occupational Status; INSE - *Indicador de Nível Socioeconômico das Escolas de Educação Básica*[5])

August and Shanahan (2006) observe that when ELLs start school, they need to learn "oral language and literacy in a second language and they have to learn with efficiency if they are to catch up with their monolingual English classmates" (p. 53). Indeed, additionally

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[1] In this dissertation, the terms 'he' and 'she', and their compounds are used at random when referring to students.

[2] The No Child Left Behind Act of 2001 is fully available in the web link: http://www2.ed.gov/policy/elsec/leg/esea02/index.html.

[3] The definition of the term SES may be found at the web link: http://www.apa.org/definition.

[4] The document is fully available in the web link: http://portal.inep.gov.br/pisa-programa-internacional-de-avaliacao-de-alunos.

[5] A thorough review of the concept SES is fully available in the web link: http://download.inep.gov.br/educacao_basica/saeb/ana/resultados/2014/nota_tecnica_inse.pdf.

to the individual differences that all learners carry, ELLs present linguistic and cultural differences in relation to monolingual learners, and these distinctions influence ELLs' language and literacy development when children learn to read and write in English as a second language[6] (L2) (August & Shanahan, 2006; Geva, 2006; Mancilla-Martinez & Lesaux, 2011; Lesaux, Koda, Siegel, & Shanahan, 2006; Paradis, Genesee, & Crago, 2011). Additionally, research has demonstrated that learners go through acquisition stages in the three first years of reading development in English. This means that young learners evolve from a prereading stage in kindergarden, to initial reading or decoding phase in grades 1-2, to confirmation, fluency and ungluing from print in grade 3 (Chall, 1983; as cited in Moats, 2010; Frith, 1985; Seymour, Aro, & Erskine, 2003). Research also shows that learners have more difficulties to go through those stages of reading development in alphabetic languages with a deep orthography, that is, languages in which the grapheme-phoneme correspondence is less consistent, such as English, as opposed to shallow orthography, for example Italian and Finish, languages in which the grapheme-phoneme correspondence is more regular (Frost, Katz, & Betin, 1987; Katz & Frost, 1992; Seymour et al. 2003; Share, 2008). Therefore, it is paramount to readily identify struggling ELLs and to determine their learning difficulties. As a result, effective multisensory intervention (Birsh, 2011) can be prescribed and promptly implemented to suit individual learner's needs.

According to the US Department of Education (2007), 70% of ELLs in 4th and 8th grades perform below basic levels of proficiency in reading when compared to 30% and 24% of monolingual English speaking peers. In the greater Boston area, where this study was conducted, 46.3% of students do not speak English as first language (L1), and 29.9% are considered ELLs, which correspond to students immersed in an English language program. Moreover, 77.7% of students come from low income families and the same percentage is eligible for free or reduced lunch. More striking is that 85.2% from all learners in

[6] Following Ellis, R. (1986), when the term 'second language acquisition' is used, it is not my intention to contrast it with 'foreign language learning', although I acknowledge the ongoing debate in the Second Language Acquisition (SLA) field regarding the aspects that define and characterize each one of the constructs.

the Massachusetts state are considered high needs[7]. Table 1 demonstrates those percentages.

Table 1. Selected populations in Public Schools in Massachusetts

Population	% of District	% of State
First Language not English	46.3	17.8
English Language Learner	29.9	7.9
Low-income	77.7	38.3
Students With Disabilities	19.5	17
Free Lunch	74.6	33.6
Reduced Lunch	3.1	4.7
High Needs	85.2	48.8

Bearing in mind those peculiarities about the American educational scenario that impair reading acquisition for early graders, it is the general objective of this study to examine reading predictors in early literacy development in low socioeconomically at risk ELLs as compared to low socioeconomically at risk native speakers of English, while both groups are engaged in initial phases of learning to read.

1.2 CONTEXT OF INVESTIGATION

In a meta-analytic review, August and Shanahan (2006) observe that language and literacy acquisition comprise complex developmental processes that start with the acquisition of oral language skills much before a child receives formal instruction at school. Lesaux et al. (2006) observe that along with the predominantly low socioeconomic background of ELLs' families, deficient (English) oral language proficiency also contributes to the differences in reading achievement between ELLs and monolingual learners in the US. For instance,

[7] Data provided by the Massachusetts Department of Elementary and Secondary Education available at http://profiles.doe.mass.edu/profiles/student.aspx?orgcode=00350000&orgtypecode=5&leftNavId=305&fycode=2014.

vocabulary acquisition and phonological awareness, experience with print, and basic world knowledge acquisition are acquired early before a child starts attending school, regardless of the ELL or native speaking status (Geva, 2006).

Research findings on the relation between oral language proficiency and English word-level skills in ELLs demonstrate that measures of oral language proficiency in English positively correlate with word and pseudoword (decoding) reading in English, but they do not predict future reading level, whereas evidence from measures of phonological awareness, rapid letter naming, and phonological memory is more robust in predicting reading skills in English (August & Shanahan, 2006; Geva, 2006; Haynes, Ayre, Haynes, & Mahfoudhi, 2009; Hook & Haynes, 2009; Mancilla-Martinez & Lesaux, 2011; Lesaux et al., 2006; Seymour et al., 2003). As for the relationship between English oral competence and English text-level skills, research results sustain that well-developed oral English language proficiency in ELLS, that is, large repertoire of high frequent words and academic relevant vocabulary, is associated with well-developed reading comprehension skills in English (August & Shanahan, 2006; Geva, 2006; Haynes et al., 2009; Hook & Haynes, 2009; Mancilla-Martinez & Lesaux, 2011; Lesaux et al., 2006; Seymour et al., 2003). Geva (2006) concludes that among the oral language skills in English that impact reading comprehension are English vocabulary knowledge, listening comprehension, syntactic skills, and the ability to handle metalinguistic aspects of the language. In contrast, low or limited vocabulary knowledge is associated with low-level of reading comprehension in English.

Another important relationship between reading and oral language proficiency is that skills and strategies (Almeida, 2010) employed by a learner to make sense of oral language are also employed to make sense of written language. Thus, it is important to teach students these tools until they become automatized and students are more aware (Almeida, 2010) of their literacy development. In early stages of literacy acquisition, in which children learn low-level skills, such as decoding and literal comprehension (Gagné, Yekovich, & Yekovich, 1993), it is meaningful to explicitly provide them with the connections between oral and written language, mainly when learners are already identified as being at risk as it is the case of English Language Learners in this study.

One may postulate that explicit instruction of low-level reading skills, such as decoding (Gagné et al., 1993), would be irrelevant given the limited demands of comprehension in early grade reading texts;

nonetheless, as noted, reading acquisition starts long before actual reading of written language takes place. Ideally, reading comprehension begins with accurate and automatic listening comprehension of oral language. Then, it progresses to accurate and automatic low-level reading skills, such as conceptual knowledge (or declarative knowledge) of letters, phonemes, morphemes, and decoding. Finally, reading reaches higher-level processes, such as inferential comprehension and comprehension monitoring (Almeida, 2010; Gagné et al., 1993). In proficient reading, these skills occur simultaneously and in parallel; however, for struggling learners the path may not be so smooth when learning early reading skills (Gagné et al., 1993, Kintsch & van Dijk, 1978; Tomitch, 2009).

In this study, I draw attention to the low-level reading skill of decoding performed by early grade ELLs. Decoding refers to the ability to match a letter, or combination of letters (graphemes), to their sounds (phonemes) rapidly and effortlessly. Decoding also refers to the ability to recognize the patterns that form syllables and words (for a comprehensive review, see Adams, 1990). Fast and accurate decoding enables learners to build a sight vocabulary of frequent words, and helps them decipher unfamiliar and complex words. Moreover, decoding causes a 'domino effect' because automatic recognition of individual words leads to fluent reading of sets of words, which, in turn, leads to comprehension. Stanovich (1986) notes that prompt attainment of early skills, such as decoding, is a strong predictor of later reading comprehension. The author cites strong and persuasive evidence that children who start slow in learning to read present enduring difficulties. As Stanovich (1986) observes in the Matthew Effect concept (*the richer get richer, the poor get poorer*), when a child learns to decode early in her literacy development, she develops better reading habits, such as growth in vocabulary, world knowledge and textual knowledge. As a whole, learners who are capable of listening carefully and strategically to oral language are also able to read carefully and strategically; conversely, learners who struggle to understand oral language are more likely not to keep up the pace of learning to read and rarely become proficient readers.

In this small scale exploratory study I follow Gough and Tunmer's (1986) theory of the Simple View of Reading (SVR) according to which reading comprehension is the *product* of decoding

and oral language[8] comprehension (R = D x C). The authors explain that decoding refers to the ability to read individual words quickly, accurately, and silently so that the learner applies rules of letter-sound correspondence. Oral language comprehension encompasses the processes via which words, sentences, and discourses are interpreted. Gough and Tunmer (1986) acknowledge that decoding skills *per se* may not be enough for comprehension to occur, but in a deep orthographic system, such as English, decoding is an essential reading skill because it helps the learner recognize irregular and ambiguous words and decipher complex and unfamiliar words (Frost, Katz, & Bentin, 1987; Katz & Frost, 1992; Seymour et al., 2003). In addition, early attainment of decoding skills has been proven to be a prime requirement for later reading comprehension (Adams, 1990; August & Shanahan, 2006; Moats, 2010)

Although most children may learn to match print to speech on their own, almost all learners benefit from explicit and systematic decoding instruction, particularly children that struggle with learning to read and write – the poorer readers. Studies have shown that ELLs and non-ELLs perform at a similar level of accuracy for word-level and pseudoword reading and spelling skills, and when they experience difficulties, ELLs and non-ELLs share similar problems in these competencies (August & Shanahan, 2006; Mancilla-Martinez & Lesaux, 2011; Lesaux et al. 2006; Lesaux & Siegel, 2003; Mahfoudhi & Haynes, 2009). The literature explains this similarity in ELLs' and non-ELLs' performance on the basis that if decoding instruction is systematic and structured, both groups of learners are able to follow it and benefit from it. Thus, when learners show deficits in decoding, it does not matter if they are an English limited proficient learner or a native speaking student. This similarity in performance between ELLs and non-ELLs is limited to decoding skills. Research shows that ELLs lag behind their monolingual peers with regards to reading comprehension in English as a second language (August & Shanahan, 2006; Mancilla-Martinez &

[8] There seems not to be a consensus on the terms *language* or *linguistic* comprehension as authors vary on their wording. Gough and Tunmer, in the seminal paper of 1986, use only the term comprehension, and further the authors mention the need for a measure of *listening* comprehension (p. 7). Hoover and Gough (1990) use the term *linguistic comprehension*, while Catts, Adlof, & Weismer (2006) prefer *language comprehension*. For the purpose of this study, both terms are used randomly to refer to the oral language comprehension.

Lesaux, 2011; Lesaux et al. 2006; Mahfoudhi & Haynes, 2009). In their meta-analysis, August and Shanahan ascribe that ELLs fall below their monolingual peers in measures of reading comprehension due to the unfavorable combination of circumstances that ELLs encounter. These factors include, but are not limited to, deficient competence in oral language, lack of background knowledge, family SES and low parent literacy levels.

Thus, it is crucial to promptly diagnose the reading difficulties that learners exhibit to recommend proper intervention. Birsh (2011) stresses that effective intervention calls for multisensory structured language teaching approach (MSL), in the sense that instruction should be systematic, structured, sequential, and explicit to help learners, principally struggling ones. Birsh underpins that the notion of multisensory encompasses the fact that senses (auditory, kinesthetic, tactile, and visual), and modalities (reading, writing, listening, and speaking) ought to be involved in intervention (see also Beck, McKeown, & Kucan, 2013; Henry, 2010; Moats, 2010).

The multisensory structured language teaching approach is seen as the central core method for promoting effective response to intervention (RTI). Birsh (2011) supports that intervention programs and school curricula should be developed and implemented grounded on scientific-based teaching principles and strategies that underlie a multisensory structured language intervention approach. Several response to intervention (RTI) programs have been developed and a teacher-mediated (paper-and-pencil lessons) approach with computer-assisted instruction (CAI) are among the most common and effective MSL intervention methods used to assist struggling readers (D'Ely & Tavares, 2014). Research results show that, in the long run and with the appropriate supplemental instruction, English language learners are capable of overcoming the first obstacles in learning to read in English and, in some cases, surpassing their monolingual peers (August & Shanahan, 2006; Goldenberg & Coleman, 2010; Hart & Risley, 1995; Paradis et al., 2011; Seymour et al, 2003).

1.3 STATEMENT OF THE PROBLEM

Although considerable emphasis has been given to the investigation of early reading skills, namely decoding, and multisensory structured language intervention, research has been predominantly carried out with monolingual native English speaking learners ('non-ELLs') and has largely disregarded low SES at risk English language

learners (ELLs) (August & Shanahan, 2006; Bialystok, 2001; Bigelow & Tarone, 2004; Haynes et al., 2009; Hook & Haynes, 2009; Mancilla-Martinez & Lesaux, 2011; Seymour et al., 2003; Share, 2008). Findings are still not conclusive concerning the underlying causes of reading comprehension difficulties in ELLs, and which specific skills may have the greatest impact on reading comprehension. As previously mentioned, research has demonstrated that oral language aspects and socio-cultural variables, such as home language use, SES, reading instruction characteristics, quality and language of instruction as a whole, seem to play a role in reading readiness of ELLs, but research still needs replication as well as elaboration (Lesaux, 2001; Mahfoudhi & Haynes, 2009; Mancilla-Martinez & Lesaux, 2011; Seymour, Aro, Erskine, 2003; Share, 2008).

Similarly, despite the fact that a number of studies have investigated the efficiency of computer-assisted instruction and teacher-mediated approach (paper-and-pencil lessons) as methods of response to intervention in reading instruction, very few have focused on the implementation of such methods to suit low SES at risk ELLs' specific needs (Macaruso, Hook, & McCabe, 2006; Macaruso & Rodman, 2011a; Macaruso & Rodman, 2011b; Macaruso & Hook, 2007; Macaruso & Wider, 2008).

The present dissertation is embedded in the context described above and the objectives are presented in the section that follows.

1.4 OBJECTIVES

Based on the considerations mentioned above, in this study early reading skills are examined, namely decoding skills, which account for word recognition and phonemic decoding, and oral language comprehension, in early literacy development, in low socioeconomically at risk ELLs. More specifically, it is also the objective to investigate the effects of multisensory structured language intervention, which encompasses teacher-mediated approach (paper-and-pencil lessons) and computer-assisted intervention (CAI), in ELLs' early reading skills development. Having in mind the theoretical background and research results briefly discussed, the following research questions were formulated and respective hypotheses were proposed.

1.5 RESEARCH QUESTIONS AND HYPOTHESES

RQ1: Will low SES at risk ELLs' performance improve on decoding skills of sight word reading after multisensory structured language intervention is carried out?

H1. Low SES at risk ELLs' performance will improve on decoding skills of sight word reading after multisensory structured language intervention (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

RQ2: Will low SES at risk ELLs' performance improve on phonemic decoding skills after multisensory structured language intervention is implemented?

H2. Low SES at risk ELLs' performance will improve on phonemic decoding skills after multisensory structured language intervention is implemented (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

RQ3: Will low SES at risk ELLs' listening comprehension performance improve after multisensory structured language intervention is administered?

H3: Low SES at risk ELLs' listening comprehension performance will improve after multisensory structured language intervention is administered (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

RQ4: Will low SES at risk ELLs' reading comprehension skills improve after multisensory structured language intervention is administered?

H4: Low SES at risk ELLs' reading comprehension skills will improve after multisensory structured language intervention is administered (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

RQ5: Will multisensory structured language intervention equally benefit ELLs and non-ELLs? In case MSL intervention did not equally benefit ELLs and non-ELLs, which group of learners benefited the most from intervention?

H5: Multisensory structured language intervention will equally benefit ELLs and their monolingual peers (Birsh, 2011; Hook & Haynes, 2009; Macaruso & Hook, 2007; Macaruso & Rodman, 2011a; 2011b).

RQ6: Which early reading skills, that is, decoding of real words, phonemic decoding, and listening comprehension, significantly correlate with reading comprehension for at risk low SES ELLs?

H6: Decoding of real words and phonemic decoding will more strongly correlate with reading comprehension than listening comprehension based on the fact that learners have limited English proficiency and come from low-income households (August & Shanahan, 2006; Adams, 1990; Gough & Tunmer, 1986).

1.6 SIGNIFICANCE OF THE RESEARCH

The overall paucity of research that focuses on English literacy development of English language learners urgently calls for more studies considering the population's individual differences and their characteristics as compared to monolingual native English speaking learners. Similarly, the efficiency of multisensory structured language intervention to cater for ELLs' specific needs has received scant research attention. Hence, it is my belief that investigating ELLs' early reading predictors and the effects of teacher-mediated and computer-assisted instruction on ELLs reading acquisition, even at a small scale exploratory instance, may increase our understanding of the key processes involved. In addition to that, findings from this study may strengthen the literature that advocates for the importance of examining reading difficulties from early stages of reading, which is in line with the motto "catch them before they fall" (Torgensen, 1998).

Additionally, potential benefits to participants in this study include personalized after-school instruction in foundational reading skills, including multisensory structured instruction in essential language and literacy skills, such as phonological awareness, phonics, structural analysis, vocabulary, fluency and automaticity, and comprehension. Potential benefits to the school include online continuous progress reports for the student participants, as well as overall risk assessment for reading failure, and percentage chance of reaching end-of-year literacy benchmarks.

To a certain extent, findings from this study may also inform the literature on second language acquisition, on the grounds that strategies applied in this context may be adapted and therefore employed in English as a foreign language course, not only for children, but also for adults.

In sum, I sustain that findings from this small scale exploratory study may provide some understanding on the ongoing debate and research regarding early reading predictors in low SES at risk English language learners. Additionally, results may be relevant for the fields of Second Language Acquisition, Education, Applied Linguistics, and Psycholinguistics.

1.7 ORGANIZATION OF THE STUDY

This study is organized in five chapters. In Chapter 1, the context of investigation is presented in which the problems that stated its examination are described, followed by the research questions and hypotheses that motivated this analysis. Then, readers are provided with the significance of this research to the field, along with a description of the organization of the chapters. In Chapter 2, an overview of the theoretical rationale used is offered, including definitions on the most relevant concepts involved, and a review on some previous studies in the area. In Chapter 3, a detailed description of the method used to collect and analyze data is provided, including participants, instruments, procedures for data collection per phase, and a framework for data analysis. In Chapter 4, the results of the study are presented and discussed having in mind each phase of data collection. In Chapter 5, final remarks are posed in line with the research questions and hypotheses that oriented this study. The limitations of the study are acknowledged and suggestions concerning pedagogical implications as regards the Brazilian educational scenario are put forward. Lastly, some suggestions for further research are pointed out.

CHAPTER 2
REVIEW OF THE LITERATURE

This chapter aims to present the theoretical background and the studies reviewed that underlie this exploratory study. In the first section, the key components of reading are presented. Next, the construct of the Simple View of Reading is discussed. In the third section, the Stages of reading development are considered. In the fourth section a distinction between skills and strategies is proposed in light of the metacognitive awareness of reading process. Oral and written components involved in reading are discussed next. In the sixth section, the construct of phonological awareness is considered. In the seventh section, aspects involved in the reading development in low SES at risk English language learners are taken into account. Following, some basic premises of the multisensory structured language teaching approach are pondered, followed by the orthographic considerations. Finally, the tenth section accounts for the Brazilian educational scenario.

2.1 KEY ELEMENTS OF READING AS A LITERACY SKILL

The term *literacy* started being used only in the 19th century to refer to the abilities to read and write. Only then was the expression *literate person* defined, as it is today, as "one knowledgeable or educated one in particular field or fields" (Cambridge, 2008; Oxford, 2005; UNESCO, 2006). Apart from the dictionary definition, scholars have not yet come to an agreement on the premises to describe the concept of *literacy*. To make matters more intricate, the wide-range of disciplines that investigate it, such as Education, Psychology, Speech Pathology, and Applied linguistics, tend to study *literacy* from independent theoretical perspectives, with distinct practical implications. Having considered this ongoing debate, and for the purposes of this study, I understand literacy as a set of cognitive skills in the learning process, which encompasses the ability to read and write, and oral language skills (Adams, 1990; August & Shanahan, 2006; Moats, 2010; UNESCO, 2006).

As a literacy skill, reading is among the most efficient competencies through which one may access information and acquire knowledge. However, reading begins much before a child goes to school and starts reading written language. It is critical that children develop strong early literacy and learning skills through oral language and exposure to print because these skills will provide the foundation to

learn all the other school subjects (Adams, 1990; Hook & Haynes, 2009). Moreover, when children start school, they will be prepared to learn to read and write whereas capable of transferring their oral language skills to learn written language.

Academics in the field of literacy development continue to disagree on which would be the best way to acquire and develop literacy skills: while some theoreticians strongly assert the benefits of the 'phonetic' approach (Adams, 1990; Blachman, 2000; Goswami, 2000; Gough, 1984; Johnson & Baumann, 1984; Share, 2008), others argue in favor of 'reading for meaning' approach. Research has demonstrated the advantages of the 'phonetic' approach, as for limited proficient learners of English for struggling readers (Ayre, Haynes, Hook, & Macaruso, 2010; Bigelow & Tarone, 2005; Geva, 2006; Lesaux, 2012; Scliar-Cabral, 2010). As learners progress in their reading abilities, they are able to interactively build meaningful and coherent mental representations of the texts they read while accessing their schema and employing appropriate strategies (Aebersold & Field, 1997; Almeida, 2010; Kintsch & van Dijk, 1978; Souza & Rodrigues, 2008; van Dijk & Kintsch, 1983).

Thus, reading reflects a complex cognitive process that relies on skills and strategies that occur simultaneously and in parallel (Almeida, 2010; Gagné et al., 1993; Kinstch & van Dijk, 1978; Tomitch, 2009). But this is an ideal reading situation portraying a proficient reading process, not always shared by all learners. Although the skilled learner reads a text automatically and without effort, the underlying processes that support reading should be unveiled, that is, explicitly explained and practiced, mainly for students who strive to learn to read (August & Shanahan, 2006; Hook & Haynes, 2009). Professionals working with children and adults that experience difficulties in learning to read ought to understand the cognitive processes underlying effective reading comprehension. In this sense, learners' individual differences can be observed and learners' needs can be fulfilled (Birsh, 2011; Henry, 2010; Moats, 2010; Tomitch, 2009). Moreover, compelling literature supports the view that reading begins well before a child starts formal instruction at school, and it emphasizes the importance of oral language proficiency, mainly for ELLs (Adams, 1990; Moats, 2010; Paradis et al., 2011).

As aforementioned in the Introduction, this study is aligned with the Simple View of Reading (SVR) (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000), a theory that understands reading comprehension as the outcome of decoding and oral language

comprehension. The SVR is discussed in the next section. But briefly, some academics and researchers neglect the approach put forward by the SVR, principally to examine the underlying processes during the first phases of learning to read and the learning difficulties that learners are fraught with in this reading phase. Hoffman (2009) reasons that theoreticians, textbooks, and national reports describe reading comprehension as a complex process considering a sociocontrustivist perspective of the concept and disregarding the SVR merits.

2.2 THE SIMPLE VIEW OF READING

The Simple View of Reading proposes that reading is the product of decoding and comprehension as represented in the formula $R = D \times C$, in which R stands for reading comprehension, D represents decoding, and C stands for linguistic (or language) comprehension. In this regard, reading comprehension is explained as the interaction between two skills, automaticity in decoding and oral language comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000). On the one hand, decoding encompasses an automatized skill as it refers to the ability to read individual words fast and effortlessly, so that the learner efficiently applies rules of letter-sound correspondence. In this sense, decoding is more than sounding out words based on phonic rules that enable fast and accurate reading. On the other hand, listening comprehension refers to the processes involved in interpreting spoken words, sentences, and discourses, and includes receptive vocabulary, grammatical understanding, and discourse comprehension. Therefore, according to the SVR, the linguistic processes involved in oral language comprehension are claimed to significantly constrain reading comprehension (Catts, Adlof, & Weismer, 2006; Gough & Tunmer, 1986; Hoffman, 2009; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000; Verhoeven & Leewe, 2011; 2012).

When proposing the Simple View of Reading, Gough and Tunmer (1986) acknowledge that decoding may not be sufficient for comprehension to occur, but they emphasize that decoding is a crucial skill in learning to read because the child may rely on decoding strategies to match a letter, or a combination of letters (graphemes), to their sounds (phonemes) principally when she faces irregular, unfamiliar or ambiguous words, much more when a child is learning to read in more opaque languages as English and Portuguese (Frost, Katz, & Bentin, 1987; Katz & Frost, 1992; Seymour et al., 2003). According to

the SVR, an increase in the automaticity in decoding yields general growth in language competence, because once decoding is automatized, the difference between listening comprehension and reading comprehension is almost inexistent. Therefore, automatic word identification is an essential skill for struggling readers. Indeed, if decoding and listening comprehension skills improve, reading comprehension also improves. Conversely, if a learner struggles to decode, he is likely not to understand what he reads, irrespectively of his listening skill level. Similarly, if a learner struggles to comprehend what he listens to, even with efficient decoding skills, he is likely not to understand what he reads (Catts, Adlof, & Weismer, 2006; Gough & Tunmer, 1986; Hoffman, 2009; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000).

In line with the SVR theory, reading comprehension difficulties may be caused by deficits in decoding skills, or in oral language comprehension, or in a combination of these two variables. Hoover and Gough (2000) propose three basic types of reading disorder, listed from the least to the most common types of reading deficiency. The first one refers to *Hyperlexia*, characterized by the ability to rapidly and easily decode a text, but not able to understand what is being read, which implicates robust decoding skills but without reading comprehension. According to the authors, *Hyperlexia* occurs rarely. The second reading disorder refers to *True dyslexia*, characterized by the leaner's ability to understand spoken language, despite not being able to decode the written text. In other others, the learner's listening processing takes place, but he cannot match symbols to sounds (graphemes to phonemes) to access underlying spoken language and its meaning. Hoover and Gough point that *True dyslexia* is less rare to occur than *Hyperlexia*. A relatively common reading disorder in Hoover and Gough's opinion is the *Garden-variety reading disorder*, characterized by a concomitant difficulty in decoding written text and in understanding spoken language, meaning that the learner comprehends neither written language, nor oral language.

Tunmer and Hoover (1993) examine the components that encompass the SVR theory and distinguish oral language comprehension as "the ability to take lexical information (i.e. semantical information at the word level) and derive sentence and discourse interpretations Reading comprehension involves the same ability, but one that relies on printed information arriving through the eye" (Tunmer & Hoover, 1993, p.8). Moreover, the authors assert which measures should be applied to investigate both skills:

> a measure of linguistic comprehension must assess one's ability to understand language (e.g. assessing the ability to answer questions about contents of a narrative passage presented orally). Similarly, a measure of reading comprehension must assess the same ability, but one where the comprehension process begins with print (e.g. assessing the ability to answer questions about the contents of a read narrative) (Tunmer & Hoover, 1993, p.8).

Following Gough and Tunmer (1986) and their advocates (Catts, Adlof, & Weismer, 2006; Gough & Tunmer, 1986; Hoffman, 2009; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000), I acknowledge that many processes are involved in reading on the grounds that comprehension is a complex process. I also agree that struggling readers may show deficits related to other reading components, such as to processing components, for instance auditory processing, phonological processing, or language processing, and even difficulties that stems from attention and memory deficits (Adams, 1990; August & Shanahan, 2006; Ayre et al., 2010; Flore, Hübner, & Gabriel, 2013; Henry, 2010; Hook & Haynes, 2009). At the risk of repetition, I would like to remind the reader of the general objective of this small scale exploratory study, i.e., to examine reading predictors in English early literacy development in low socioeconomically at risk ELLs and non-ELLs. Thus, with respect to the SVR model, I investigate ELLs' decoding real words and pseudowords and their listening comprehension for orally presented language.

2.3 STAGES OF READING DEVELOPMENT

Along with the Simple View of Reading (Gough & Tunmer, 1986; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000), the seminal work developed by Chall concerning stages of reading development (1983; as cited in Adams, 1990 and in Moats, 2010) will be discussed as her theory provides a reliable developmental framework to be used as a reference when analyzing learners' progress, and difficulties, in learning to read. Chall proposes that there are six stages of reading developments that begin at birth and continue beyond college, but she acknowledges that stages may overlap in accordance with the reading situations (Almeida, 2010; Gagné et al, 1993; Kintsch & van Dijk, 1978). Additional to the stages, the quality and quantity of

interactions that learners experience with the (learning) environment when growing up seems to play a role in their development (Fromkin, Rodman, & Hyams, 2014; Owens, 2012).

According to Chall, (1983; as cited in Adams, 1990 and in Moats, 2010) Stage 0 refers to *Prereading* stage. It reflects the reading development of a child from her birth to age 6, so it also corresponds to the learner's progress from Preschool to Kindergarten. The focus of Stage 0 is on oral language development because during this time the child goes through a pre-reading or a pre-school period. When the child starts attending school, her oral language skills will help her development in learning to read. In this sense, it is important that a child learns the letters and becomes aware of speech sounds and words, all of which may begin with exposure to print. Some children are able to write their names in Stage 0. Chall added Stage 0 lastly, that is, after she had already developed the first 5 phases.

The author (Chall, 1983; as cited in Adams, 1990 and in Moats, 2010) explains that children are still in preschool in Stage 1, but the focus changes from oral language development to written language growth. Stage 1 refers to *Initial Reading*. The cornerstone in Stage 1 is that children learn that letters represent sounds and that there is a correspondence between sound-and-spelling. The seeds planted some years before with exposure to print, for example, reading books at bed-time, will now help children develop a sense of the alphabetic principle and sound-spelling relationships.

Chall (1983; as cited in Adams, 1990 and in Moats, 2010) delineates that Stage 2 comprises *Confirmation* and *Fluency* phases. Stage 2 corresponds to grades 2 and 3 in Elementary School and that is the phase when children learn to develop decoding skills, fluency and additional strategies to help them derive meaning from texts. In Stage 3, *Reading for Learning the New*, students are in grades 4 to 8, and advance into Middle School broadening their knowledge from learning to read to learn. In Stage 3 learners come upon a wide variety of texts and contexts, which increase the reading demands and result in a two-way reading path: on the one hand, learners need to extend their vocabulary if they are to understand the text meaning; on the other hand, text variety expands learners' background knowledge and their strategic behavior as readers.

In Stages 4 and 5, the *Multiple Viewpoints* and *Construction and Reconstruction* phases, learners progress from High School to College. Chall (1983; as cited in Adams, 1990 and in Moats, 2010) mentions that students are supposed to interpret text with higher linguistic and

cognitive demands, to analyze texts critically, and to understand different points of view on the same topic. Finally, when the learner reaches Stage 5, learners are able to construct his own meaning of the material read as a result of analyses and syntheses of their stored information. In line with the most coherent literature on reading development, the learner draws on his schema and actively interacts with the text to construct a meaningful representation of it, while deleting what is irrelevant, suppressing unnecessary information, making inferences, elaborating to fill gaps and, finally, monitoring for comprehension (Almeida, 2010; Gagné et al, 1993; Gernsbacher, 1997; Kintsch & van Dijk, 1978; van den Broek, Young, Tzeng, & Linderholm, 1999).

Needless to say, this description depicts an ideal reading development, which research shows it is not the case for a great majority of students, irrespective of the educational context or type of instruction they are exposed to. In the case of low-income at risk ELLs, research shows that they consistently fare badly in following the same pattern of development as their monolingual peers from more privileged backgrounds (August & Shanahan, 2006). The literature and study results point towards the advantages of explicit and formal instruction of learning strategies and the substantial benefits derived from being aware of tools available to aid achieve comprehension (Almeida, 2010; Carrell, 1998; Gagné et al., 1993; Paris, Lipson & Wixson, 1983; Paris, Wasik, & Turner, 1991; Tomitch, 2002). We shall discuss the topic next.

2.4 METACOGNITIVE AWARENESS OF READING PROCESS: A DISTINCTION BETWEEN SKILLS AND STRATEGIES

Another key element encompassed in reading development is metacognitive awareness. Metacognition is usually defined as *thinking about thinking* (Almeida, 2010; Anderson, 2010; Baker & Brown, 1984; Carrell, 1998; Tomitch, 2002) as it refers to the awareness that a learner possesses of what is being learned. This means that the reader consciously perceives the learning situation and chooses how to proceed with it. In this regard, it is up to the teacher to raise and develop students' awareness of their reading processes or, more broadly, their learning process, while explicitly instruct students how to approach a learning context (Almeida, 2010; Flores et al., 2013; Tomitch, 2002). Metacognitive awareness is a paramount skill that learners should master in order to grow more independent and critical learners. However, it is important to clarify that metacognition, as any other skill,

may transit within a continuum that varies in its nature as totally internalized and proceduralized, as a skill, or more declarative, conscious and controlled, as a strategy. The literature sustains a dichotomy between skills and strategies, although a flexible one, and I followed this distinction in this study (Almeida, 2010; Carrell, 1998; Gagné et al., 1993; Paris, Lipson & Wixson, 1983; Paris, Wasik, & Turner, 1991; Silveira, Zimmer, & Alves, 2006; Tomitch, 2002).

For the purposes of the present investigation, I follow Flavell's (1978; as cited in Carrell, 1998; Baker & Beall, 2009) and Anderson's understanding on metacognitive ability. According to the Flavell, there are two dimensions of metacognitive ability: knowledge of cognition and regulation of cognition. The first dimension, knowledge of cognition refers to what readers know about their cognitive resources, including three instances of knowledge: declarative knowledge (DK), procedural knowledge (PK), and conditional knowledge (CK) (Paris et *al.,* 1983), concepts discussed next. The second dimension, regulation of cognition, refers to how learners use their cognitive resources as they select strategies, apply them and monitor for comprehension.

Anderson (2010) proposes the Adaptive Character of Thought (ACT), considering the information processing approach, which I apply in the context of language learning and reading development. As language learning is a complex process, Anderson (2010) adduces that the ACT accounts for both the acquisition and strengthening of memory traces through practice. According to the author, learners may have knowledge of what they may not be aware of, and they may use such knowledge to perform tasks. However, to perform more complex behaviors, learners apply new strategies to overcome the difficulties so these strategies become more automatized. In turn, this means that less cognitive resources are required in the learning process. For Anderson, the learning process comprises a three-stage development continuum and they are explicative, rather than distinct from one another: the cognitive stage, the associative stage, and the autonomous stage.

In the cognitive stage, learners receive instructions or are provided with an example of how to perform the task. The information is represented declaratively and it should be interpreted to accomplish the set goals. In the associative stage, skills make a transition from a declarative representation to a more procedural one. The transition from one step to the next within the task happens more quickly because it is not necessary to verbalize every move. Besides, the learner does not need to rehearse and interpret the information as in the cognitive stage. In the autonomous stage, skills are automatized and unconscious, and it

may happen that the learner is not able to verbalize or describe his/her move because the information is already part of the implicit memory. The development of skills from a more declarative to a more proceduralized nature is likely to influence the learning process, and, more specifically, the reading process, on the grounds that skills become more automatized and require less cognitive resources, which can be applied in other processes. In line with Anderson' ACT, the literature understands that there are three types of knowledge involved in the learning process: declarative knowledge (DK); procedural knowledge (PK); conditional knowledge (CK) (Paris, Lipson & Wixson, 1983; Paris, Wasik, & Turner, 1991)

Declarative knowledge refers to knowledge that the learner has about facts and things and has conscious access to it. Additionally, the learner is able to verbalize the declarative knowledge (Almeida, 2010; Anderson, 2010; Blackwell Dictionary of Cognitive Psychology, 2002; Matlin, 2003). Procedural knowledge ascribes knowledge about the way the learner executes a task and to which he does not have conscious access to. Consequently, the learner is not able to verbalize the knowledge; rather, he demonstrates the knowledge through actions. (Almeida, 2010; Anderson, 2010; Blackwell Dictionary of Cognitive Psychology, 2002; Matlin, 2003). Declarative knowledge is frequently described as *knowing what*, while procedural knowledge is referred to as *knowing how*.

Gagné and her colleagues (1993) understand that DK and PK are elements that sustain their reading framework as declarative knowledge accounts for conceptual understanding and procedural knowledge encompasses automated basic skills, and strategies. The authors sustain that declarative knowledge includes knowledge of topics, that is, knowledge about letters, phonemes, morphemes, words, ideas, schemata, and topics. Besides, procedural knowledge consists of knowledge of skills and strategies, including four components, decoding, literal comprehension, inferential comprehension, and comprehension monitoring.

Although the literature mentioned propose a dichotomy between declarative knowledge and procedural knowledge, it is important to observe that scholars agree that they are not opposing points in the learning process. Rather, DK and PK depict stages in the learning process since students evolve from a more conscious level of awareness to a less conscious one, on the grounds that the operationalizations become more automatized and less cognitive resources need to be allocated to carry out the task.

The concept of conditional knowledge (CK) was put forward by Paris and collaborators (1983). CK refers to the learner's intentionality and self-control when approaching a learning situation. This means that conditional knowledge accounts for the knowledge that the learner has to know when and why to adopt one learning behavior instead of another.

Along with the first dimension, knowledge of cognition (Flavell, 1977; as cited in Carrell, 1998), the second dimension refers to the regulation of cognition, which refers to the use of learning strategies, while monitoring and evaluating whether comprehension takes place. If we apply both dimensions to the situation of struggling students learning to read in a second language, it is likely that lower levels reading processes are to occur in a more declarative type of knowledge. This happens because learners have not internalized the processes yet and need explicit assistance. Carrell (1998) underscores that less skilled readers are less strategic and do not know how to operationalize their learning process. To sum up, underachieving readers are more unaware of the processes involved in learning and how to implement them, and, consequently, decoding processes, are more controlled less automatic.

2.5 ORAL AND WRITTEN COMPONENTS INVOLVED IN READING

Hook and Haynes (2009) draw attention to the fact that two thirds of children that have oral language difficulties present difficulties in reading and writing too (Lyon, 1995; Stackhouse & Wells, 1997; Tallal, 1988; Torgesen, Rashotte, & Alexander, 2011; all cited in Hook & Haynes, 2009). The authors adduce that although oral and written language components are distinct, they interact in acquisition processes, processes that may be code-related or content-related in nature. As Hook and Haynes explain, code-related components mainly affect word identification, while content-related components mainly affect comprehension and written language. Figure 1 below reproduces Hook and Haynes (2009)'s chart.

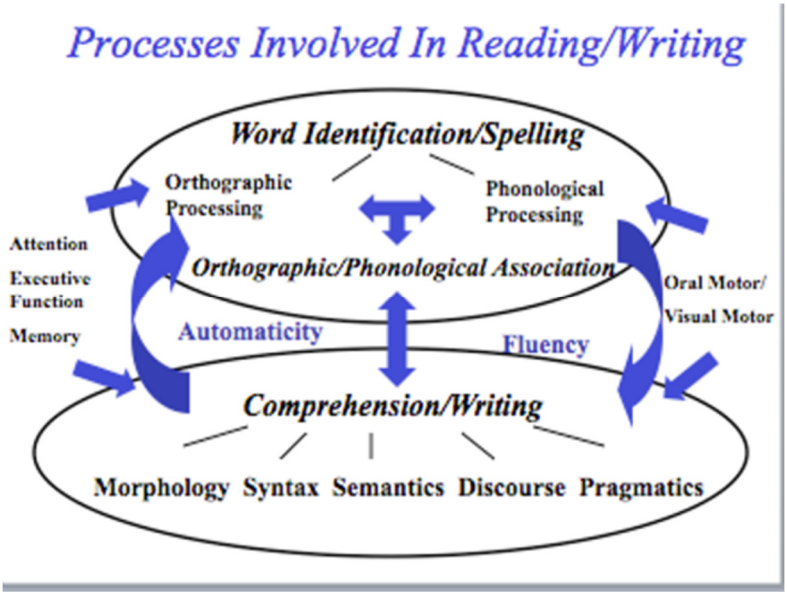

Figure 1: Processes involved in reading and writing
(Hook & Haynes, 2009; reproduced with the authors' authorization)

You can see at the top of the chart the word identification and spelling components that comprise three subcomponents: orthographic processing, phonological processing, and orthographic-phonological association. According to Hook & Haynes (2009) orthographic processing corresponds to the ability to process letter shapes individually or in groups; and phonological processing consists of the ability to access the sound structure of a letter or a word. Thus, orthographic-phonological associations refer to the capacity to associate letter shapes with their respective sounds, or the grapheme-phoneme correspondence.

As the authors suggest, the components placed in the bottom of the chart are more directly implicated in comprehension and writing, namely, morphology, syntax, semantics, discourse, and pragmatics. For Hook and Haynes (2009, morphology implies the awareness of rules that define word formation, such as roots and affixes. Syntax refers to the rules that prescribe word order in sentences. Semantics consists of the depth and the breadth of meanings in a language, which may be expressed by vocabulary and concepts. Discourse corresponds to the knowledge of text structure, be it oral or written. Pragmatics describes the social use of a language.

Automaticity and fluency seem to fluctuate between the two parts of the chart in a way that these skills directly link the components involved in word recognition and spelling and comprehension and writing. The authors support that automaticity ascribes word-level reading efficiency whereas fluency refers to text-level reading efficiency. Automaticity and fluency impact reading comprehension outcomes, while concomitantly underlying language skills (bottom of the chart) impact speed and accuracy at word-reading and text-reading levels.

Attention, executive function and memory displayed on the left side of the chart also affect reading comprehension and writing. Difficulties in focusing attention, planning and monitoring the execution of the task, and deficits in memory are likely to impair comprehension. The same is true for deficiencies in oral motor or visual motor skills, components listed on the right side of the chart. A student with difficulties in any of these components is probable not able to fulfill comprehension in reading and, in turn, unable to express himself/herself through writing.

Hook and Haynes (2009) list the context of school instruction, home language, and literacy environment among the extrinsic factors that also affect language and literacy development. The authors underscore the relevance that not only linguistic features, but also socioeconomic ones, have on the acquisition of literacy for bilinguals. In line with the most updated literature on the theme, they draw attention to the impact that home language use and exposure have on word recognition and reading comprehension, as well as proper literacy instruction at school that meets ELLs' individual needs (August & Shanahan, 2006; Ayre at al., 2010; Mancilla-Martinez & Lesaux, 2006; 2010; 2011; Lesaux, 2012; Seymour at al., 2003).

Following the same line of thought, August and Shanahan (2006) support that many factors should be taken into account in the literacy developmental process. First, the child should learn the phoneme-grapheme correspondences in the given language, in this case, English, to understand how speech is represented through writing. Again, decoding is a paramount skill in early reading acquisition. This means that the child should be capable of analyzing spoken language into smaller units of sounds and perceive that these sounds are represented in symbols. The authors explain that as decoding and encoding processes become internalized, the next stage of literacy development is on fluency and accuracy skills so that the learner is able to attain meaning from the text. As noted before, the developmental process departs from

lower-level components of reading to more advanced ones as the learner reaches automaticity of such skills. At the risk of repetition, it is worth mentioning that low and high-level reading component processes occur concomitantly for a typical achieving learner.

August and Shanahan (2006) stress that reading instruction should foster integration of skills in reading instruction, that is, integrating the phases learning the code with learning the meaning, which may be an additional burden for learners with limited English proficiency in L2. The authors propose that learning the code encompasses spelling rules, accuracy and fluency, phonological awareness; and learning the meaning accounts for world knowledge, vocabulary, discourse structure and comprehension strategies.

In line with the premises set in the Simple View of Reading (Gough & Tunmer, 1986; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000) not only decoding, but also oral language comprehension are necessary for reading comprehension to occur. Reading comprehension is seen as the outcome of decoding and oral language comprehension. As Lesaux and Geva (2006) state, oral language proficiency is an essential skill that learners must acquire, mainly ELLs, because it comprises receptive and expressive basic abilities and certain features of language, such as phonology, vocabulary, and morphology, that greatly influence reading ability as a whole. More specifically, Lesaux and Geva point that phonological processing is a great precursor of word reading ability.

Lesaux and Geva (2006) define phonology as the ability to recognize and produce the sounds and the sound sequences that constitute a language. The authors assert that phonological processing refers to the ability to use sounds of language to process oral and written language, which, in turn, affect the whole process of reading acquisition and comprehension. Phonological processing entails phonological awareness, phonological recoding and phonological memory. We shall examine each one of these features.

According to Lesaux and Geva (2006), phonological awareness (PA) constitutes the ability to perceive the sounds of language as distinct from their meanings, which is critical in early reading development, such as in decoding. PA is an umbrella term and it should be understood as a broad concept that entails other aspects of language, such as phonemic awareness. Phonemic awareness accounts for the ability to perceive that spoken words can be conceived as a sequence of phonemes, a skill that is fundamental for the young child to understand the alphabetic principle and, therefore, learn phonics and spelling. The

authors explain that phonological recoding refers to the ability to convert nonphonological stimulus, for instance written words, pictures, letters, digits, in a phonological output. In addition, it is frequently measured by RAN (rapid automatized naming) tests. Finally, phonological memory corresponds to the information coded phonologically for temporary storage in working memory (WM) and short-term memory (STM). Shah and Miyake (1999) appreciate that in cognitive psychology the term working memory has been used to "refer to the system or mechanism underlying the maintenance of task-relevant information during the performance of a cognitive task" (p.1). In line with the authors, Bailer, Tomitch and D'Ely (2013) agree that the theoretical construct of WM "has been used in cognitive psychology to refer to the integrated system that temporarily stores and manipulates information during the performance of a cognitive task" (p.139).

2.6 PHONOLOGICAL AWARENESS

Adams (1990) asserts from conducting and reviewing research on early reading that letter knowledge and the ability to discriminate phonemes auditorily are strong predictors of reading achievement in the first year at school (Chall, 1967; as cited in Adams, 1990 and in Moats, 2010). However, a broader perspective discussed by the author explains that it may not be only the ability to accurately name letters that give children an advantage in learning to read. It may be the fluency with which children recognize and name letters that places them in a favorable position relative to their reading, which, in turn, strongly correlates with their early reading achievement. This finding from Adams corroborates the automaticity in decoding as proposed by the SVR. In this sense, findings from research conducted with prereaders, as well as studies that examine skilled readers' performance, may shed some light on what should be taught for less-skilled and struggling learners (see Adams (1990) for a comprehensive review of the topic). Hence, phonological awareness, as an umbrella term that encompasses other phonological related skills and accuracy and fluency, has been shown to play a major role in predicting reading achievement.

Among the other skills covered by phonological awareness, there is phonemic awareness. As noted, while PA refers to the ability to reflect on sound units of language, and that sounds of language are distinct from their meanings (Lesaux & Geva, 2006), phonemic awareness entails the specific ability to analyze the phonemes in spoken words. A phoneme is the smallest phonetic unit in a language that

conveys a distinct meaning from another phoneme. For instance, consider the word “bat”. It is made up of three phonemes: /b/ /æ/ /t/. Each phoneme has a distinct sound and meaning. Replace /b/ sound for /m/ and you have an entirely different word. Phonemic awareness also enables a child to understand the alphabetic principle and, as a consequence, to learn phonics and spelling. The term phonics refers to the rule system for associating sounds and symbols.

Concerning oral language development, the literature advises that learners go through stages in phonological awareness development in English (Adams, 1990; Chall, 1983; as cited in Adams, 1990 and in Moats, 2010; Fromkin et al., 2014; Henry, 2010; Moats, 2010; Owens, 2012). When children are preschoolers, they take part in rhyming games and nonsense or made-up words plays. At the beginning of Kindergarten, when children are around five years old, they develop awareness that a word corresponds to a distinct unit, as well as that a syllable conveys a unit. Next, when children are already in kindergarten, they learn how to identify rhymes, to match initial consonant sounds, to segment two phonemes, such as the combinations: consonant-vowel, vowel-consonant, or vowel-vowel + consonant, using onset and rime, and to blend two phonemes, specially to practice vowel-consonant, which is easier than consonant-vowel combination. When children are six years old and are in the beginning of grade 1, they learn to match final sounds and to segment simple spoken words, such as the combination consonant + vowel – consonant. Between the end of the 1st grade and in the beginning the 2nd grade, children learn how to blend three phonemes, such as the combinations consonant-vowel-consonant and consonant + consonant-vowel- consonant, and they learn how to complete phoneme segmentation through tasks that employ strategies as saying, tapping, and counting phonemes. Finally, when children are eight years old, they learn to segment more elaborated phonemes and to manipulate phonemes in tasks that require multiple phonological awareness skills, such as use of segmentation and deletion of phoneme(s), reversal, substitution, and blending. It is important to emphasize that these stages refer to English language development, and some caution should be applied when applying them to other languages.

In line with the theories discussed so far, Gough (1984) acknowledges that there is much more involved in the reading processes than just word recognition, but the author posits that this is the foundation of reading. Gough sustains that accuracy and speed impacts word recognition, mainly for less skilled readers. Similarly, Goswami (2000) signals to a settlement in the literature sustaining that a child’s

awareness of her language phonology is believed to be one of the most important elements to influence her progress in learning to read. Additionally, lexical development and phonological development seem to be closely linked, in the sense that phonological awareness depends on the quality of words in the mental lexicon, which appear to be critical for reading development. The author clarifies that phonological awareness is measured using tasks that require the child to reflect on the sound of the word, rather than on its meaning. More important, the stages in phonological awareness development of learners strengthen the premise proposed by the Simple View of Reading, and discussed before, that oral language comprehension also contributes to reading comprehension.

So far, it is possible to sum up the oral and written components involved in reading development from two perspectives: one that tackles word recognition skills and another that comprises text-level skills. As for word-level skills, Lesaux and Geva (2006) maintain that learners progress through several stages in a typical literacy developmental process, as discussed before. Considering a phonic approach of instruction (Souza, 2009), readers are firstly taught how to decode print, that is, they are taught letter-sound correspondences, enabling them to verbally express the coding that print conveys (declarative knowledge). Next, learners build a sight vocabulary, that is, they can recognize familiar words that are repeatedly encountered, mostly Tier 1 words, that is, common words in spoken language that do not require explicit instruction (Beck, McKeown, Kucan, 2013), in a combination of phonological and orthographic skills. When sight words are internalized and stored in long-term memory, learners evolve to a more fluent and accurate type of reading. This enables students to move from 'learning to read' to 'read to learn', advancing from decoding to reading for meaning, a more skilled reading process.

Concerning text-level skills, Lesaux and Geva (2006) affirm that in order to achieve a reading comprehension level it is necessary that learners first have consolidated several skills of language acquisition because reading comprehension on their being efficiently implemented. For instance, lexical knowledge (vocabulary), semantic knowledge (meaning), syntactic knowledge (language structure), and background knowledge of the topic and textual knowledge – if the learner has not fully internalized one of these skills, it is probable that reading comprehension is impaired.

I would like to remind the reader about the considerations presented in the section above as regards the population of this study:

English limited proficient students, who are in the 1st and 2nd grades, learning to read in English. More importantly, these English language learners are doubly at risk: firstly, because they fare badly to reach end-of-the-year benchmarks; and secondly, because of their predominantly low socioeconomic status. We shall examine next the aspects that distinguish this population.

2.7 READING DEVELOPMENT IN LOW SES AT RISK ENGLISH LANGUAGE LEARNERS

This next section is subdivided into four parts. The first subsection describes the profile of ELLs. The next subsection provides some information on types of instruction programs offered to this group. After that, some aspects involved in reading development of low SES at risk ELLs are discussed. The fourth subsection presents the Threshold Hypothesis and the Common Underlying Language Proficiency theories.

2.7.1 Profile of English language learners

In order to understand the specificities of reading development in English language learners, one must first consider the characteristics that define this group of students. According to the US Census from 2010[9], there has been a considerable demographical change in the country towards a more multicultural population. Amongst foreign born residents living in the USA, 27% came from Asia, 14% emigrated from Europe, 6% were born in other regions, and the majority of 52% came from countries in Latin America. This means that a considerable amount of citizens, including children, speak dozens of other languages at home and in their communities, languages that are different from English. Moreover, those numbers also represent a demographic change in the profile of students at American schools and stress the need for accommodations in language and literacy instruction to suit the individual differences of these learners.

The American federal law, the No Child Left Behind Act (NCLB, 2001) defines who the limited English proficient learners are and determines the criteria to assess their English language knowledge. It also provides guidelines on the necessary educational adaptations and

[9] A full version of documents is available at https://www.census.gov/prod/2012pubs/acs-19.pdf and at https://www.census.gov/prod/2011pubs/12statab/pop.pdf.

adjustments to be implemented for ELLs. The NCLB refers to limited English proficient learners as *English Language Learners (ELLs)*, or as *English as a Second Language Learners (ESL)*. As noted, in this study, they are referred to as English language learners (ELLs), while native English speaking learners are referred to as non-ELLs. The federal law defines ELLs as the individual that (1) is between 3 and 21 years old; (2) is enrolled in the Elementary or Secondary school; (3) was not born in the United States; has a mother tongue different from English; that is Native American (from Indigenous heritage) or born in Alaska; came from a place where English is not the main language; immigrated or came from a non-American place; (4) does not have language proficiency in English that allows the individual to reach minimal scores in standard tests, and to follow mainstream English classes, as well as to take part in community activities. The NCLB ensures not only appropriate instruction to enable English limited proficient learners to reach the expected competency in English language, but also instruction in other content areas at the same quantity and quality as their English native speaking peers receive.

In accordance with the NCLB, Massachusetts State, where the present study took place, observes the criteria that defines English language learners and applies specific tests to determine ELLs' level of language proficiency to prescribe the type of instruction that would be most suitable for them[10]. This study was conducted at an Elementary School (Kindergarten l to Grade 5) in the Boston District, where 46.3% of students do not speak English as first language (L1)[11], and 29.9% are considered English limited proficient learners. In addition to that, 77.7% of learners in the District come from low-income families. Table 1 in the Introduction displays these numbers.

Along with the benchmarks proposed by the laws, another criterion to be considered regarding ELLs is their socioeconomic status (SES). Additionally to their limited English language competence, their predominantly low SES[12] inevitably increases their risk of reading failure. The literature acknowledges that the persistent underachieving reading performance in ELLs may be explained by several facets, such

[10] More information available at http://www.doe.mass.edu/ell/Guidance.pdf.
[11] More information available at http://www.bostonpublicschools.org/Page/4693.
[12] As discussed, the term SES is used in this study to refer to an individual's social standing or class often measured as a combination of education, income and occupation (APA; PISA - ISEI; INSE; Snow, Burns, & Griffin, 1998).

as lack of oral language exposure in English compared to mainstream learners, paucity of background knowledge, and dearth of motivation to cite some (August & Shanahan, 2006; Bigelow & Tarone, 2005; Haynes et al., 2009; Hook & Haynes, 2009; Lesaux, 2006; Mancilla-Martinez & Lesaux, 2006; 2010; 2011). Furthermore, the predominantly low socioeconomic status of ELLs' families in the US reflects parents' income and educational level that are usually lower than mainstream families. As discussed before, according to Chall's stages of reading development (1983; as cited in Adams, 1990 and in Moats, 2010), learners' literacy is supposed to develop as learners grow and interact with their learning environment. ELLs' experiences are poorer in comparison to non-ELLs on the grounds that that they are not likely to be exposed to the same amount of oral (English) language within family and community, as well as they may lack background cultural experience.

According to Johane Paradis and her research fellows (Paradis, Genesee, & Crago, 2011), one important aspect to be considered when examining the profiles of English language learners (dual language learners, as referred to by the authors) accounts for whether learners belong to either the majority ethnolinguistic community or the minority ethnolinguistic community. The majority ethnolinguistic community consists of most individuals speaking the same language and/or they are part of the same ethnic or cultural group in the group. The majority ethnolinguistic community may be represented as a country, a state, a province or even a smaller geographical and political unit. Besides, the majority language may be recognized as the official language used in documents, newspapers, and political aspects within the community. Regarding the minority ethnolinguistic community, Paradis et al. (2011) postulate that it represents individuals that belong to a minority status because of their low social, economic and political position in relation to the majority ethnolinguistic group. Examples of the minority ethnolinguistic community are Hispanics in the US, Inuktitut speakers in Canada, and Turkish speakers in The Netherlands. The authors stress that rather than being a dichotomy, the majority-minority categorization should be understood as end-points in a continuum, which is essential when analyzing learners' performances and predicting their outcomes. Moreover, if a learner belongs to either a majority or minority ethnolinguistic group, it may influence the type of formal instruction he needs to receive. The types of instruction that English language learners may be provided with is discussed next.

2.7.2 Types of instruction programs provided for ELLs

The type of formal instruction that a limited English language learner receives may depend on his level of competence in English and the programs available in the School District (Goldenberg, 2012; Goldenberg & Coleman, 2010; Paradis et al. 2011). The Massachusetts State law determines that instruction in public schools should be delivered in English with the exceptions of instruction for limited English proficient learners, who may start attending classes in one of Sheltered English Immersion (SEI) programs. Most SEI programs consist of bilingual instruction in both content areas and in English as a Second Language (ESL) instruction. Once limited English proficient learners reach the level of proficiency in English language, they are transferred to a mainstream English group and are monitored for a period of two years[13]. However, it is important to mention that parents/guardians are the one who report the child's L1 by the time of school enrollment. In this sense, parents/guardians may ask for a waiver and choose to have their child attending classes on a mainstream English class, rather than on a SEI class. Some of the programs available for limited English proficient learners are:

- **Sheltered English Immersion (SEI) Programs:** the literature supports that sheltered English instruction programs may be very effective for very limited English learners (Goldenberg, 2012; Goldenberg & Coleman, 2010; Paradis et al. 2011). The main goal of SEI programs is to assist ELLs to learn academic content and skills according to ELLs' grade level. Besides, learners study English as a second language. This means that teachers are trained to work with language and content development with a group of students who have specific needs in language learning.

- **Transitional Bilingual Education Programs**: In transitional bilingual education programs, ELLs receive bilingual instruction from qualified teachers in academic subjects and in English. Some programs may last for the first primary grades. Once the learner is capable of following a mainstream class, he is transferred to a group in which the instruction is delivered only in English. Paradis et al. (2011) note that the aim in immersion

[13] More information available at http://www.doe.mass.edu/ell/TransitionalGuidance.pdf .

programs is to fully enable the students to follow a class in English-only instruction, and to teach respective academic standards according to the learner's grade.

• **Dual Language Programs**: Dual language programs are also known as two-way bilingual immersion programs. In a dual language program group, half of the students are from the minority language group and the other half are from the majority language group. For example, Spanish speaking learners and English speaking learners that study in the same group. In two-way bilingual programs, instruction for all academic contents is delivered both in English, the mainstream language, and in the minority language. This type of instruction can be implemented in Elementary grades and continue in High School.

• **Native Language Literacy Programs**: In the Massachusetts Educational department, for example, native language programs cater for the need of grade 3 students and for students that have had interruptions in their education. These learners receive intensive instruction in native literacy and in English as a second language. Since these students did not follow a regular sequence of formal education, they need more years to graduate.

• **English-only Programs**: as the term defines it, all the instruction in class is provided only in English, even for limited English proficient learners. It is possible that ELLs also receive English classes as a second language delivered by a trained teacher in addition to the regular classes in the mainstream group.

In addition to the programs described, it seems significant to consider the environment in which the child is inserted because it may also affect her language development. I follow Paradis and colleagues' (2011) notion that environment encompasses family, community and school setting. Lambert (1977; as cited in Paradis et al., 2011) coined the terms additive bilingual environment and subtractive bilingual environment to refer to language learning environments. According to Lambert (1977; as cited in Paradis et al., 2011), additive bilingual environment provides support for children to maintain their mother tongue at the same time that they acquire an additional language. Paradis et al. (2011) clarify that additive environments usually sustain dual

cultures because they are most common in the majority ethnolinguistic community, in which children learn two languages and live two cultures. As Paradis and colleagues note, most children from majority ethnolinguistic community and, consequently, from an additive bilingual environment tend to be highly proficient bilinguals.

Contrary, in subtractive bilingual environments, the acquisition of the majority language or second language, takes place at the expense of losing the first language. As Paradis et al. (2011) observe, subtractive bilingual environment may also indicate stagnation or deterioration of first language knowledge and a lack of identification with one culture. Subtractive bilingual environments are frequently associated with minority ethnolinguistic communities in which the majority group language is acquired at the cost of the learner's mother tongue. Unlike learners in an additive bilingual environment, students in a subtractive bilingual environment become proficient in one language, the majority ethnolinguistic language.

Haynes and Halvorson-Bourgeois (2012; Haynes, personal communication, 2013) observe that children may be considered bilingual, but the language exposure, use and competence may vary. Balanced bilingualism accounts for the situation in which the child is exposed to the same amount of language in each language and has equal opportunities to use both languages. Conversely, unbalanced bilingualism indicates the circumstance in which a child comes across more exposure in one language than in the other, and has more opportunities to speak in one language than in the other. Additionally, the input received in one language is poorer in quality compared to the other language. The authors conclude that the child's competence in one language is likely to be stronger than in the other and they advert that the majority of low SES bilinguals exhibit unequal language competences in L1 and L2. Thus, they are the example of unbalanced bilingualism. In this sense, the subtractive bilingual environment, as opposed to additive bilingual environment charges the acquisition of the majority language at the cost of less proficiency in the minority language.

Paradis and colleagues (2011) posit that learning to read and write in two or more languages greatly impacts learners' literacy development and individual differences, regardless of the learning two languages concomitantly from childhood, or learning a second language after the first one was acquired. The authors note that different groups of learners face different challenges when learning to read and write and these circumstances should be observed mainly when examining reading

development in limited English proficient learners. Paradis and colleagues explain that simultaneous acquisition reflects the process when a child concomitantly learns two or more languages, between birth and approximately age three, while sequential acquisition occurs when a second language (L2) is learned after the age of three, and when first language acquisition has taken place. Sequential acquisition may also be referred to as successive acquisition, since one language is learned successively the other. Paradis et al. (2011) use the term English Language Learner to designate learners who are sequential bilinguals and who are learning English as a second or an additional language. The authors point out that language competence may vary greatly depending on whether learners' language acquisition was either simultaneous or sequential. In order to understand how ELLs acquire language and develop reading skills, one must appreciate the issues that directly impact the process. Furthermore, identifying factors that affect ELLs' performance and that result in the gap between ELLs and mainstream students may help gain insight into the academic performance of ELLs and other subgroups of students with similar characteristics.

2.7.3 Aspects involved in reading development in low SES at risk ELLs

In the beginning of the Review of the Literature, I present my understanding of reading as a literacy skill, along with written and oral language, and describe reading as complex cognitive process based on skills and strategies that happen simultaneously and in parallel (Almeida, 2010; Gagné et al., 1993; Gernsbacher, 1997; Kinstch & van Dijk, 1978; Tomitch, 2009; van den Broek et al., 1999). I also draw attention to the fact that this description of reading depicts a proficient reading process, disregarding the fact that many learners confront severe difficulties in learning to read. In the case of limited English proficient learners, specific features must be considered when investigating ELLs' reading acquisition.

Despite the fact that learning two (or more languages) may be considered an advantage in the long run of learning development (Bialystok, 2001; Pearl & Lambert, 1962; as cited in Paradis et al., 2011; Seymour et al., 2003), research indicates that this is not the predominant outcome for low SES ELLs (August & Shanahan, 2006; Ayre at al., 2010; Geva, 2000; Haynes et al., 2009; Lesaux, 2012; Mancilla-Martinez & Lesaux, 2006; 2010; 2011). The literature in the field illustrates that, given their low socioeconomic status, most ELLs'

families lack the background knowledge in either language and do not have a routine with their children to support the acquisition of basic language and literacy skills. In addition to that, not all schools are prepared to implement a bilingual language and literacy program and professionals in the educational setting may have not received appropriate training to work with this group of students (August & Shanahan, 2006; Ayre at al., 2010; Geva, 2000; Haynes et al., 2009; Lesaux, 2012; Mancilla-Martinez & Lesaux, 2006; 2010; 2011). In sum, ELLs' deficit of oral English exposure, their families' low-income condition, and sometimes, the paucity of properly qualified professionals of education to work with bilinguals, may help explain why ELLs tend to fall short standard benchmarks and lag behind their monolingual peers

August and Shanahan (2006) remind us that ELLs have a double objective when starting school because they must learn the English language and the academic content to catch up and keep up with their monolingual peers. August and Shanahan (2006), and their group of researchers, conducted a groundbreaking meta-analytic review of studies that investigated the development of literacy in English language learners. The group emphasizes the cornerstone aspects in ELLs' reading acquisition, such as oral language proficiency, word-level and text-level skills, and knowledge transfer.

August and Shanahan summarize research results on similarities and differences between ELLs and non-ELLs as regards the development of reading related skills. The authors explain that for word-level reading and spelling skills, ELLS and non-ELLs perform at the same level of accuracy, considering children from Elementary school grades to 8th grade. Moreover, when ELLs face difficulties in acquiring word-level reading skills, these difficulties are the same that non-ELLs encounter. Their deficits in word-level skills refer to phonological awareness and to working memory skills.

Concerning text-level reading skills, ELLs fall behind non-ELLs, which seems to happen because preliminary skills that lay the foundation for proper reading comprehension are underdeveloped given the distinguishing characteristics of ELLs. Furthermore, as ELLs progress through school years, the gap increases proportionally in terms of background knowledge, oral language proficiency, motivation and aptitude (August & Shanahan, 2006).

The meta-analytic review carried out by August and Shanahan and colleagues (2006) also reports research findings on the relationship between oral proficiency and English word-level skills. Results

demonstrate that measures of oral language proficiency in English positively correlate with word and pseudoword reading in English, but they do not predict future reading level. Evidence from measures of phonological awareness, rapid letter naming, and phonological memory were more robust in predicting reading skills in English. In the same vein, oral language proficiency does not correlate with English spelling skills.

Findings from research on the relationship between English oral proficiency and English text-level skills sustain that well-developed English oral language proficiency, that is, large repertoire of high frequent words and academic relevant vocabulary is associated with well-developed reading comprehension skills in English for ELLs. Oral language skills in English that impact reading comprehension encompass English vocabulary knowledge, listening comprehension, syntactic skills, the ability to handle metalinguistic aspects of the language. In contrast, low or limited vocabulary knowledge is associated with low-level of reading comprehension in English.

Mancilla-Martinez & Lesaux (2010) conducted a longitudinal study to examine English reading comprehension with 173 Spanish-speaking learners considered low achieving and from low-income households. The researchers followed the students from 4.5 to 11 years old and examined growth rates in vocabulary skills and word reading skills in reading comprehension outcomes. In a meticulous statistical investigation, measures of accuracy in word reading and productive vocabulary were annually applied, in both Spanish and in English, whereas English reading comprehension measures were administered when learners were 11 years old, that is, at the end of the study. In a nutshell, findings show that English skills contribute variance in English comprehension results. However, there were no significant changes in word reading and vocabulary skills throughout the study, aspect that Mancilla-Martinez and Lesaux understand as a consequence of the low-level of reading comprehension competency of learners. As results, the authors stress the importance of explicitly teach vocabulary, regardless of their age, so to enable low-achieving learners to decode words and improve their abilities to make sense of the text on their own. Moreover, Mancilla-Martinez and Lesaux (2011) recommend, "...learners must be provided with opportunities to read independently with appropriate and manageable text to amass the word and world knowledge necessary to comprehends increasingly sophisticated text" (Mancilla-Martinez & Lesaux, 2010, p. 11).

Mancilla-Martinez and Lesaux carried out another longitudinal

study in 2011 in which they investigated the growth rate between word reading and word knowledge of low-income 173 Spanish-speaking students (from 4.5 to 11 years old), and underscore the relevance of examining language and literacy development of ELLs. The study applied measures of word reading, expressive vocabulary, and verbal short-term language memory, in Spanish and in English. In short, results indicate two gaps. The first gap refers to students' weakness in Spanish relative to national norms and to their English skills. The second gap corresponds to the impressive discrepancy between students' ability to read words and their word knowledge in English. Mancilla-Martinez and Lesaux (2011) explain the first finding reasoning that although participants were recruited because they reported speaking Spanish at home, most children already spoke English by the age of 4.5 and received all formal instruction at school entirely in English, which characterizes a subtractive environment to Spanish language. (results) in my study, and unlike Mancilla-Martinez and Lesaux (2011)'s study, participants were already identified as at-risk of failure. (cont. review) The second gap is in line with most recent findings that ELLs develop word reading skills at similar rates to native English speakers. The authors observe that although word reading skills are crucial for reading comprehension, they are not enough to develop literacy proficiency. Mancilla-Martinez and Lesaux posit, reading comprehension encompasses more than automatic and accurate word reading skills, and highlight the importance of oral language for understanding literacy development, mainly for children with difficulties.

Adams (1990) asserts that educators should keep in mind the sophistication of vocabulary, concepts, and knowledge that children are expected to master. Most of the times, proficient readers do not apply their knowledge of the grapheme-phoneme mappings to consciously recognize words when reading a text; instead, this process takes place automatically. If a proficient reader comes across a word that it is not familiar to him, or that possesses an irregular orthography, which is fairly common in English, he is able to deliberate and intentionally apply the necessary strategies to "break the code" and figure out the new/irregular word. Geva (2000) reasons that in the case of at risk low SES ELLs, language proficiency and reading development tend to develop in an alternative way because for ELLs, language proficiency in English does not precede reading development as it does for monolingual learners.

In sum, among the conclusions that we may draw at this point from research conducted August and Shanahan and their group draw is

that research on reading development of ELLs is still incipient and the literature does not know which factors impact reading acquisition the most. More important, the findings are still not conclusive concerning the underlying causes of reading comprehension difficulties in ELLs, and which specific skills may have the greatest impact on reading comprehension. The authors support that it is likely that academic variables, such as linguistic and literacy aspects, and also social and cultural variables, such as home language use, SES, reading instruction characteristics, quality and language of instruction as a whole, seem to play a role in the reading acquisition of limited English proficient learners. In order to deeper examine ELLs' reading development, I concisely discuss some other aspects involved in reading skill acquisition in light of some studies carried out and theoretical aspects that informed these investigations.

2.7.4 The Threshold Hypothesis and the Common Underlying Language Proficiency

Among many aspects to be considered regarding ELLs' reading development, one refers to cross-linguistic transfer. Although in this study it was not possible to examine ELLs' L1 competence, the issue is briefly presented here to introduce the theoretical discussion that follows. Aligning myself with Genesse, Geva, Dressler, Kamil (2006), I understand that transfer may be found not only in linguistic structures, but also in skills that encompass cognitive and language abilities. Gass and Selinker (2008) clarify that the term transfer was primarily used to refer to two distinct underlying cognitive processes, a positive transfer and a negative transfer and, consequently, most research on transfer tends to analyze language output, based on error analysis, rather than the process of transfer.

Most studies that investigate cross-linguistic relationships consider transfer through two main theories: the Contrastive Analysis Hypothesis (CAH) (Ellis, R., 1986; Lado, 1964; as cited in Gass & Selinker, 2008; and as cited in Genesse et al., 2006), and the Interdependence Hypothesis (Cummins, 1978; 1979; as cited in Gass & Selinker, 2008; and as cited in Genesse et al., 2006; Ellis, R., 1986). Genesse et al. (2006) succinctly explain that CAH "involves analyzing a learner's first and second languages to identify structural (i.e., grammatical) similarities and differences" (p.154). The authors add that " second-language errors will be made (interference) when learners encounter structures in the second language that differ from or are

unfamiliar to them in their first language" (p. 155). The Interdependence Hypothesis (IH) (Cummins, 1981; 2000; as cited in Genesse et al., 2006; Ellis, R., 1986; Gass & Selinker, 2008; Goldenberg & Coleman, 2010; Haynes & Halvorson-Bourgeois, 2012; Paradis et al., 2011) sustains that L1 and L2 acquisition occur interdependently, meaning that L1 acquisition may influence and even facilitate L2 acquisition, but, not all aspects of the L1 can facilitate L2 acquisition.

The question posed next is the level of proficiency required in both languages to facilitate cross-linguistic transfer. Cummings proposes the Threshold Hypothesis (TH) and its related common underlying language proficiency to answer it (Cummins, 1981; 2000; as cited in Genesse et al., 2006; Ellis, R., 1986; Gass & Selinker, 2008; Goldenberg & Coleman, 2010; Haynes & Halvorson-Bourgeois, 2012; Paradis et al., 2011). According to the TH, transfer occurs when the learner reaches a certain level of proficiency in both languages. This means that once the learner acquires enough knowledge, he is able to transfer knowledge from one language to the other. Although Cummings does not make explicit what common underlying language proficiency means, Genesee et al. (2006) understand that it refers to the procedural knowledge that underlies language use for academic or higher order cognitive purposes that entails skills involved in defining words or verbally elaborate ideas. In this sense, there is a level of underlying proficiency that is common and shared by both languages.

As Paradis and her research fellows clarify that

> children who acquire relatively high levels of competence in two languages are likely to exhibit higher than average levels of general cognitive and language ability, whereas children who acquire relatively low-levels of ability in their two languages are likely to experience lower than average levels of general cognitive and language ability (p. 273).

The explanation provided by Paradis et al. is in line with Bialystok's findings (2001) mentioned before. In a similar vein, studies conducted by Sparks (1995; 2006), Ganschow and their research team (1993; 1995; 1998; 2000a, 2000b) report similar results, although the majority of their studies has been conducted with adults.

Thus, in consonance with TH, and with the most up-to-date reading theories, knowledge is neither detached nor a single unit, and it can be shared between languages (1981; 2000; as cited in Goldenberg &

Coleman, 2010; Gernsbacher, 1997; Haynes & Haynes and Halvorson-Bourgeois, 2012; Haynes, personal communication, 2013; Paradis et al., 2011; van den Broek et al., 1999). The Threshold Hypothesis holds that for knowledge to be transferred, the learner must have a sufficient level of competence in both languages. As a consequence, the learner must also have some metacognitive ability to recognize the usefulness of the knowledge and apply it from one language to the other, even in a more implicit and unconscious reading behavior.

A more recent viewpoint on common underlying language proficiency is proposed by Bransford and Schwartz (1998; as cited in Genesse et al., 2006). The authors state that all types of learning influence readiness for future learning, which, in turn, impact our learning susceptibility. Yet, teachers should not assume that knowledge is automatically transferred from one language to the other. Learners may not realize that what they know in one area may be related or used in another area, or from one language to the other. Ideally, teachers should facilitate this metacognitive process for students, eliciting from learners what they already know, showing them the content, and teaching them how to apply knowledge from one learning situation to another. More important, in the circumstances of struggling ELLs, metacognitive processes should be explicitly explained, modeled and trained until learners are able to perform them on their own.

2.8 MULTISENSORY STRUCTURED LANGUAGE INSTRUCTION (MSL)

The idea of teaching while involving experiencing through the senses, that is, visual, auditory, kinesthetic and tactile sensory modality simultaneously involved in instruction has been widely used as both a remedial and preventive method to children that experience difficulties in learning and children with learning disabilities (Birsh, 2011). Farrell and Sherman (2011) observe that the term multisensory is often used to "describe strategies that involve learners in activities that include the use of two or more sensory modalities simultaneously to take in or express information" (p.25). Among the first multisensory structured language approach methods, there are the *Montessori*, dated from 1912, the *Strauss and Lehtinen*, reported from 1947, and the *Fernald and Keller,* referred back to 1921. More recently, most MSL programs follow the *Orton-Gilligham approach* that accounts for teaching language related academic skills, as well as emphasizes the systematic, cumulative, explicit, and sequential teaching of sounds, syllables, words, sentences,

and written discourse (the reader is referred to Birsh, 2011, for a comprehensive review on the topic).

In alphabetic languages, and mainly in deep orthographies, as it is the case of the English language, teaching reading begins with direct instruction on symbol-to-sound correspondences. Research has shown that systematic phonics instruction for early grade learners and struggling readers, in conjunction with text reading and comprehension skills instruction, are necessary components to later successful readers (Adams, 1990; Fuchs, L., Fuchs, D., Hamlet, Powell, Capizzi, & Seethaler, 2006; Linan-Thompson, Vaughn, Prater, & Cirino, 2006; Moats, 2010). Farrell and Sherman (2011) explain why phonics instruction is effective and state that

> skilled reading requires accurate processing of the internal details of words – their phonological, morphological, and orthographic features. Beginning readers must be aware or must learn that words are made up of individual sounds (phonemes). They must be able to represent in their mind the linguistic structure of words they are learning to read, primarily at the phoneme level, and at other levels of language structure as well, especially morphology or the meaningful parts of words (p. 32).

Intervention in this study is provided in two forms: one, computer-based and another, teacher-mediated with paper-and-pencil lessons, but both are supervised by the teacher. The main difference consists of the fact that the learner works individually and independently with the computer program, while paper-and-pencil lessons are delivered by the teacher. In line with the MSL guidelines, intervention in this study is based on systematized and structured tasks, that explicitly teaches and practices the content in six core skills of reading instruction: phonological awareness, phonics, structural analysis, automaticity and fluency, vocabulary and comprehension areas. Content varies from pre-kindergarten through grade 5. More discussion and examples are provided in Chapter 3, in the section on CORE5® and multisensory structured language.

2.9 ORTHOGRAPHIC CONSIDERATIONS

In a critical article, Share (2008) sustains the extreme ambiguity of English spelling-sound correspondence, fact that should limit the scientific and theoretical findings to only English rather than contributing to a science of reading applied to all languages. The author adduces that among the disadvantages of English research is that it focuses mainly on oral reading accuracy, in detriment of silent reading, meaning access, and fluency. Share acknowledges that despite the peculiarities of English orthography (spelling-sound correspondence), English research and theory have informed a large science of reading in other languages. However, the author appreciates English as a "sufficient regular alphabet" that allows the novice readers to decipher its meaning, which is not the common agreement among psychologists and linguists who see English spelling-sound correspondence as the most complex among alphabetical orthographies.

Teachers should observe the orthographic particularities, mainly when working with ELLs. The concepts of *granularity* and *transparency* (Haynes & Halvorson-Bourgeois, 2012; Ferrari-Neto, 2012) should be considered. *Granularity* accounts for the size of the linguistic units represented by the symbols of a given writing system, and they vary along a continuum. In alphabetic writing systems, such as in English, the *granules*, or graphemes, represent the phonemes. As discussed earlier in the Phonological Awareness section in this chapter, phonemes correspond to the smallest units of language that convey meaning. More in the middle of the granularity continuum, there are characters, such as the Japanese kana that is represented in syllables. Finally, at the other extreme of the granularity continuum, there are ideographic writing systems, such as Chinese and Japanese kanji.

The other reference of comparison of orthographies refers to the degree of transparency (Frost, Katz, & Bentin, 1987; Katz & Frost, 1992). Orthographies in which the relationships between symbols and sound units are consistent are considered highly transparent, also called shallow orthographies. Haynes and Halvorson-Bourgeois (2012) note that the alphabetic system of Spanish is highly *transparent*: there are 24 phonemes represented by 26 individual graphemes and three digraphs (ch, ll, rr), with very few exceptions. Contrary, orthographies in which the relationships sound-to-symbol are inconsistent are considered highly *opaque*, such as English. There are 44 phonemes in English and more than 100 graphemes (letters or combinations of letters) to produce the 44 sounds in English.

In the same vein, Frost, Katz, and Bentin (1987) explain that

> in a shallow orthography, the phonemic and the orthographic codes are isomorphic. The phonemes of a spoken word are represented by the graphemes in a direct and unequivocal manner. In contrast, in a deep orthography, the relation of spelling to sound is more opaque. The same letter may represent different phonemes in different contexts; moreover, the same letter may represent the same phoneme (p.104).

Frost and colleagues (1987) coined the term grapheme-to-phoneme translation having in mind that the process encompasses larger units than single letters in its correspondence. In their review, the authors note that in shallow orthographies the use of grapheme-to-phoneme translation for word recognition provides the articulatory codes necessary to pronounce a word. Consequently, in a shallow orthography, the reader does not need to rely on the lexicon to pronounce printed words. Conversely, if grapheme-to-phoneme translation is complex, the process is likely to be time consuming and the lexicon may be used as a strategy to help name written words.

In order to verify the orthographical depth and its influence on visual word recognition, Frost, Katz, and Bentin (1987) conducted a study in which they examined naming performance in Hebrew, English, and Serbo-Croatian. Hebrew is considered to have the deepest orthographic system among the three languages, followed by English, and Serbo-Croatian as the shallowest of the three orthographies. In the first experiment, results showed that lexical status of stimuli, that is, high-frequency words, low-frequency words, and nonwords, significantly affected word naming in Hebrew, moderately affected in English and non-significant in Serbo-Croatian. Experiment 2 focused on semantic priming effects and results showed that the influence was higher in Hebrew than in English, and absent in Serbo-Croatian. Experiment 3 showed that nonwords affected naming words in Hebrew and in English, but not in Serbo-Croatian. Frost, Katz, and Bentin understand that the results could be interpreted as a strong support for the orthographic depth hypothesis on the grounds that they suggest that in shallow orthographies phonology derives from print and in deep orthography phonology derives from lexicon.

In a later article, Katz and Frost (1992) retake the theme of the orthographic depth hypothesis (ODH) by examining the reading and writing processes in different orthographies. According to the authors, in

alphabetic orthographies "there are varying degrees of dependence on the strict alphabetic principle: the range of correspondence between grapheme and phoneme varies both in consistency and completeness" (p.147). Bearing in mind that, to a certain extent, all alphabetic orthographies rely on phonology for word recognition, Katz and Frost sustain that a combination of prelexical and visual-orthographic information account for word recognition, which, in turn, corresponds to one form of the orthographic depth hypothesis. Moreover, the researchers put forward the notion that an efficient theory would account for the relationships between orthography and phonology, orthography and morphology, and phonology and morphology, as well as these representations and the lexicon. In this sense, the ODH encompasses such relationships since be the orthographies shallow or deep.

In this study, the aspects of orthography, phonology, and morphology are considered on the grounds that participants receive systematic and structured instruction on each and every ability.

In this chapter, key elements of reading were discussed bearing in mind the premises proposed by the Simple View of Reading Theory (Gough & Tunmer, 1986; Hogan & Thomson, 2010; Hoover & Gough, 1990; Hoover & Gough, 2000), and the stages of reading development (Chall, 1983; as cited in Adams, 1990 and in Moats, 2010). In addition to that, learners' metacognitive awareness of the reading process, oral and written components involved in reading, and phonological awareness were also considered. More specifically, reading development in low SES at risk ELLs was reviewed, as well as multisensory structured language instruction not only to ELLs, but also no non-ELLs. Last, orthographic considerations of learning to read and write in English, being a deeper orthographic system was examined. To conclude, this brief review of the literature on provides support to the analysis of reading skills in ELLs who are in impoverished conditions and at risk of school failure. The next chapter provides information on the method used to collect data in order to answer the research questions proposed in this study.

CHAPTER 3
METHOD

In this chapter, the methodological procedures followed in this small scale exploratory study are described in detail. First, the participants of the study are presented, followed by a description of the study design. Then, norm-referenced and criterion-referenced tests administered in this investigation are delineated. Next, attention is drawn to the instruments used in the intervention.

As mentioned before, data for this study was collected during my internship program in Boston, Massachusetts, at the Massachusetts General Hospital – the Institute of Health Professions (MGH-IHP). Thus, I followed the ethical procedures for conducting research that involves human beings established for that program. Hereupon, a research proposal was submitted and approved by the Institutional Review Board (IRB) of the Spaulding Rehabilitation Hospital - IRB approval Protocol 2014P000095/SRH, a committee which the MGH-IHP is a member of.

There were many people involved in this research, and I hope to have included them all in the "Acknowledgments/Thank you" section. First, I would like to accentuate the active and engaged participation of the 15 Master students from the Speech Pathology Department at the MGH – IHP, who voluntarily took part in all phases of the research and generously contributed to it. The Master students are informed by the MGH-IHP of the rules and regulations for conducting research and for treating patients/students when they first start school. In this study, we (myself included in the group) are referred to as "teachers" and I sometimes use the pronoun "she" when referring to us because we were a group of female teachers only. Next, I draw attention to the participation of young learners, who eagerly and regularly attended testing and intervention sessions. I may refer to them as "he" or "she" since there were boys and girls in the groups. I would also like to stress the pivotal roles played by the School Principal and the School Speech Pathologist, truly committed professionals that made this research possible. They were also informed on the rules and regulations for conducting research, in accordance with the Institutional Review Board (IRB) of the Spaulding Rehabilitation Hospital Committee. Last, but not least, I would like to emphasize, and to thank, the dedication and seriousness with which Dr. Charles Haynes advised me in my scholarship sandwich at the MGH-IHP. He was the one who opened all the doors so that this study could be conducted.

Although I recognize the importance of conducting a pilot study before data is collected (Bailer, Tomitch, & D'Ely, 2011), it was not possible to carry out one in this study due to time constraints. While conducting a research on an internship program was a unique opportunity, it was also a challenge to find a school whose doors were held open to receive a research team. Districts have highly bureaucratic procedures when it comes to conduct experimental research that involves students, which is understandable; however, all the requirements also complicate and delay the process of conducting a study. Fortunately, there are educators involved in this process that attend for the substantial benefits that learners are likely to gain from an engaged investigation and welcome researchers.

Additionally, the research team involved in this study took all the necessary measures to ensure that the scientific standards when conducting this research were followed. More details about the procedures followed are discussed below. Briefly speaking, the research proposal was primarily approved by the IRB, parents/caretakers when contacted and a parental consent was signed so that their children could take part in the study. Participants were also invited personally and through an assent. Besides, instruments were selected based on the fact that they all had been previously used and applied while rigorously following the manuals procedures prescribed in the manuals. These are only a few aspects that are discussed in-depth as follows.

3.1 PARTICIPANTS

Students in the 1st and 2nd grades from an urban elementary school in the greater Boston area (MA, USA) were invited to take part in this study as an after-school enrichment program. These participants had been formerly evaluated by the school as being at risk of school failure and were considered low socioeconomic status (SES) in agreement with standard parameters. Such crucial criteria were previously discussed in the Review of the Literature, and I retake them further in this section to characterize learners in this study.

There were initially 46 participants from the 1st and 2nd grades, but 3 participants dropped out of the research. Thus, 43 learners completed the study. One participant dropped out of the investigation because he was sick and missed almost 3 weeks of intervention. Hence, it would not be possible to retake intervention sessions for that learner due to the limited amount of time of the research. Another student started taking the school bus and could not stay after school regular

hours. His mother began working and could not pick him up from school any longer. The last student was withdrawn from the after-school enrichment program by the School Principal and the School Speech Pathologist, in agreement with the study's teachers, due to behavioral problems.

Following the IRB requirements, parents/caretaker signed the Parent Consent Form (see Appendix A for the document). Following the school's procedures, I used interpreters (school teachers and staff) to communicate with parents/caretaker that were not proficient in English and were not able to fully understand the Parent Consent Form. Since eligible participants were very young learners, I monitored for learners' assent throughout the study, and reminded them that they might drop out of the after-school enrichment program at any time they wished, without any consequences to their school activities. In addition, teachers (Master students from the Speech Pathology Department at the MGH – IHP), who assisted in the study, were also instructed to observe participants' assent throughout the program.

3.1.1 ELLs and non-ELLs

Participants in this study were divided in two groups: one group composed of English language learners (ELLs), and another group, of native speakers of English, or non-ELLs. Both groups included learners from the 1st and 2nd grades. According to the American federal law, the No Child Left Behind Act (NCLB, 2001), students whose first language is not English, and/or students who struggle to complete ordinary classroom work in English, should receive appropriate instruction to enable learners to reach the expected competency in English language. The NCLB (2001) also guarantees that learners with limited English proficiency (LEP) have their English language proficiency properly and annually assessed. In this regard, the federal law assures that these language learners receive equal access to content area instruction and academic achievement alongside their peers, who are native English speakers.

Both groups of ELLs and non-ELLs matched the criteria of low SES and they were also considered at risk of school failure. Tables 2 and Table 3 describe the group profile. There were 22 ELLs and 21 non-ELLs. If we consider the number of ELLs and non-ELLs per grade, there were 11 ELLs and 6 non-ELLs in the 1st grade; and 11 ELLs and 15 non-ELLs in the 2nd grade. As a group, there were 27 females and 16 males.

Table 2: Participants' profile

ELLs and non-ELLs Participants	
ELLs	2
Non-ELLs	1
Males	6
Females	7
1st grade	7
2nd grade	6
ELLs' chronological mean age	.54
Non-ELLs'chronological mean age	.83

Table 3: Number of participants per grade

Group	1st Grade	2nd Grade
EELs	11	11
Non-ELLs	6	15

In agreement with the federal law guarantees from the NCLB (2001), the Massachusetts state law[14] assures that most districts provide limited English proficient learners[15] with sheltered English Immersion (SEI) instruction until they are language proficient enough to join a mainstream English class. This means that SEI instruction consists of both academic content area instruction and English as a Second Language (ESL) instruction. Needless to say, the two-folded instruction

[14] Document available at http://www.doe.mass.edu/ell/TransitionalGuidance.pdf.
[15] More information available at http://www.bostonpublicschools.org/Page/4693.

aim of SEI greatly capacitates learners to match their peers in all areas of instruction, not only in English language. Even after limited English proficient learners have joined a mainstream English class, their development is closely followed and monitored for a period of two years. It is relevant to inform that learners' L1 is reported by parents/caretaker by the time of school enrollment and learners are almost never evaluated in their L1 knowledge. Moreover, it is the parents/caretaker' choice to decide whether their child will attend classes in an English mainstream class or in the SEI program. This means that although a child may not have the appropriate level of English language, if her parents/caretaker decides that he/she should join a mainstream group, the school must respect and follow their decision.

For the purposes of this study, and following the criteria described in Chapter 2, participants were considered English language learners (ELLs) if they were previously identified by the school as language learners and spoke a language different from English as their first language. They may or may have not attended classes in a SEI program. In the same vein, participants were considered non-ELLs if they were native English speaking learners, as well previously identified by the school. Among the most common participants' first languages in the greater Boston area are Cantonese, Spanish, Mandarin, Haitian, Cape Verdean, Chinese and Vietnamese[16]**.** At the risk of repetition, all participants, ELLs and non-ELLs matched the criteria of low SES and they were also considered at risk of school failure.

3.1.2 Chronological Age

One of the variables listed in Table 1 refers to participants' chronological mean age. For the purposes of this study, and in line with the norm-referenced and criterion-referenced assessments, chronological age refers to the learner's age measured from birth to the date when the tests were applied. Farrall (2012) appraises the useful distinction between age norms and grade norms when administering age-normed and grade-normed score-based tests. Add to that the fact that participants are low SES and at risk of not reaching end-of-the-year school benchmarks; thus, it seems perfectly reasonable to use *age* norms as the main reference to evaluate learners' performance. Moreover,

[16] More information available at available at http://www.bostonpublicschools.org/Page/826**.**

participants belong to a group of learners with language learning difficulties that perform below standard levels for their respective grades.

Participants' chronological age was calculated two times during the implementation of this investigation: first, in the beginning of the study, before intervention phase started, and in the end of the study, when intervention phase was completed. To calculate participant's chronological age, I subtracted the birth date from the date on which participant is tested. Table 4 exemplifies the chronological age subtraction for Mike, a fictitious student. It is worth mentioning that this is a simple subtraction operation in which the numbers refer to years, months and days. For instance, Mike was born on July 7, 2004, and was tested on November 16, 2011. Simple subtraction finds that Mike was 7 years 4 months and 8 days old on the testing day.

Table 4: Example 1 of learner's chronological age calculation

Mike's chronological age			
	Year	**Month**	**Day**
Date tested	2011	11	16
Date of birth	2004	7	8
Chronological age	**7**	**4**	**8**

It may happen that we need to "borrow" 1 year/12 months, or 1 month/30 days to subtract the dates. Table 5 illustrates such subtraction using Samantha's chronological age calculation, another fictitious student. Samantha was born on November 17, 2002 and she was tested on November 16, 2011. Following the same criteria of a subtraction operation, 17 cannot be subtracted from 16, then, one must borrow 30 days (1 month) from the adjacent (month) column and add 30 days to the 16 days. Again, because 11 months cannot be subtracted from 10 months, one needs to borrow 12 months (1 year) from the adjacent (year) column.

Table 5: Example 2 of learner's chronological age calculation

Samantha's chronological age			
	Year	**Month**	**Day**
Date tested	2010	10	46
Date of birth	2002	11	17

Chronological age	**8**	**11**	**29**

More important, calculating chronological age is a *sine quo non* condition when working with criterion- and norm-referenced tests, and, it is highly recommended in the literature when investigating learners who experience difficulties in the learning process (Brown-Chidsey, & Steege, 2010; Calderón, 2012; Farrall, 2011; Paul, & Norbury, 2012; Swanson, Harris, & Graham, 2013). For those reasons, participants' ages were not rounded up when evaluating test results.

3.2 AT RISK PARTICIPANTS

Learners that took part in this study were considered doubly at risk. Firstly, because they were at risk of school failure, that is, English language students and monolingual students were likely not to achieve end-of-the-year benchmarks. The school regularly applies standard measures to assess all learners' development. In line with the motto, "catch them before they fall", the school's main objective is to identify learners who may be experiencing learning difficulties, as well as to determine the level and source of such deficits to cater for pertinent instruction. We also administered independent measures to assess reading comprehension, listening comprehension, and word recognition skills. Tests are thoroughly explained in the instrument subpart in the study design section below and results are discussed in the next chapter.

Secondly, and equally important, participants belong to a low socioeconomic status. The literature on language and literacy development and research findings assert that low SES profoundly impacts learners' development, principally in the case of ELLs' development (August & Shanahan, 2006; Lesaux, 2011; Hart & Risley, 1995). Participants' impoverished condition is among the factors that make them eligible for free or reduced lunch and after-school snack when attending an after-school program. Table 1 in Chapter 1 shows selected population of students in the greater Boston area in which we can spot the high percentage of low-income ELLs, as well as students eligible for free or reduced lunch.

According to the Massachusetts Department of Elementary and Secondary Education, 95% of students in the school where this study was conducted were on free lunch[17]. Lastly, another relevant point to be

[17] More information on selected population for the school year of 2013/2014 available at

raised is the fact that about 70% students in this school attending from 1st to 6th grades were enrolled in after-school programs, which indicates an attempt from the school's part to overcome learning difficulties also caused by students' poorer socioeconomic circumstances.

Exclusionary criteria for this study were not based on race, ethnicity, or gender, and participants' hearing and visual acuity fell within normal limits based on school reports. This study was particularly equitable because it targeted ELLs, an underserved and at risk population in the American schools.

3.3 STUDY DESIGN

All participants were enrolled in an after-school enrichment program designed to provide learners with intervention on English language and literacy and on Mathematics. The study consisted of three phases, two of which data was collected:

Phase 1: Pre-testing;

Phase 2: Computer-based and Teacher-mediated (paper-and-pencil lessons) Intervention; and

Phase 3: Post-testing.

The enrichment program occurred 3 times a week, on Tuesdays, Wednesdays, and Thursdays, from 3.45pm to 5.15pm, adding 90 minutes daily, an average of 270 minutes per week, including 2 weekly sessions of English language and 1 weekly session of Math intervention. The program lasted for 8 weeks adding up to an average of 36 hours of intervention per child. All three phases of the program were carried out as an after-school program on the same days and times. More details are described in the Intervention subheading below.

3.3.1 School tests

In agreement with federal and state laws mentioned in the introductory chapter and in the review of the literature, learners that attend classes in schools from the Boston Public School system between 2013-2014 were regularly evaluated by the school using mCLASS[18]

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http://profiles.doe.mass.edu/state_report/selectedpopulations.aspx?mode=district&year=2014&Continue.x=6&Continue.y=8.

[18] More information about mCLASS can be found at http://bpsearlychildhood.weebly.com/progress--assessment.html.

Tests (between 2013-2014 school year). More specifically, learners from grade 1 and grade 2 were assessed with DIBLES (Dynamic Indicators of Basic Early Literacy Skills)[19], and English language learners were evaluated with ACCESS (Assessing Comprehension and Communication in English State-to-State for English Language Learners)[20].

DIBELS works as a prompt indicator when assessing the development of early literacy and early reading skills and it can be regularly applied to non-ELLs and ELLs. The Massachusetts Department of Elementary and Secondary Education determines DIBELS to be administered three times a year for 1st and 2nd graders: firstly, between September and October; secondly, in February; and lastly between May and June. DIBELS measures five essential skill areas of early literacy that a learner must master in order to become a proficient reader:

1) Phonemic Awareness: ability to hear and use sounds in spoken words;
2) Alphabetic Principle and Phonics: ability to recognize the sounds of the letters and to sound out written words;
3) Accurate and Fluent Reading: ability to read stories and other materials easily and quickly with few mistakes;
4) Vocabulary: ability to understand and use a certain variety of words; and
5) Comprehension: ability to understand what is spoken or read.

Following the Boston Public School system, ACCESS is used by schools to annually assess English language learners' proficiency in reading, writing, listening, and speaking English. It is also used to assess learners' development in learning the English language. Among the features of the ACCESS test, it may indicate English language development while using items that encompass Social and Instructional language, Language Arts, Mathematics, Science, and Social Studies. ACCESS is administered once during school year, in January-February. Test forms in ACCESS are divided into five grade-level groups, which are: kindergarten, grades 1-2, grades 3-5, grades 6-8, grades 9-12. Except for the kindergarten group, ACCESS for ELLs comprises three

[19] More information about DIBELS can be found at http://bpsearlychildhood.weebly.com/assessment-tools--resources.html#dibels.
[20] More information about mCLASS can be found at http://www.doe.mass.edu/mcas/access/.

forms, that is, Tier A – beginning level, Tier B – intermediate level, and Tier C – advanced level. The main purpose in having the test organized in tiers is to keep the assessment time as brief as possible, and also to more effectively reach each learner's language skills. Additionally, the tier cluster follows the standards designed for response to intervention tier-based instruction.

As previously discussed, it was my intention in this study to work with students who were experiencing learning difficulties when compared to their peers. Based on standard measures of assessment, the school had already identified 1st and 2nd grade ELLs and monolingual learners that were struggling to keep up with their classmates. Besides, leaners' low socioeconomic status and the risk of not reaching end-of-the-year school benchmarks placed them in a vulnerable position when compared to typically-achieving students. Therefore, I decided to accept the school's choice regarding the potential participants for my study and the invitation to take part in the after-school enrichment program was sent to the students' parents previously identified by the school.

3.3.2 Pre- and Post-testing

Although test results administered by the school provided insights into learners' language and literacy development, it was not possible to determine whether learners experienced difficulties in learning the language itself (English, in this case), or if learners exhibited a general deficit in learning. In order to give more support to the school's findings, and also to have independent measures, we assessed participants using standardized tests, which are thoroughly described in the next section:

1) Test of Word Reading Efficiency 2 (TOWRE-2)
    - Phonemic Decoding Efficiency Test (and)
    - Sight Word Efficiency Test
2) Clinical Evaluation of Language Fundamentals 4 (CELF-4)
    - Understanding Spoken Paragraphs Test
3) Woodcock Reading Mastery Test III (WRMT-III)
    - Passage Comprehension Test
    -

Participants were evaluated in the beginning of the program, before intervention phase, and at the end of the program, when intervention phase was concluded. Pre- and Post-tests lasted for about 1 week each and testing time was not added in the 8-week intervention phase. Tests were individually administered in a silent classroom. Tests

were applied by teachers, i.e., the 15 Master students from the Speech Pathology Department at the MGH – IHP, and I. MA students are invited to administer those tests since they are trained clinicians and teachers at the Speech, Language and Literacy Center at the MGH – IHP. As a one-year visiting researcher, I had the opportunity to attend full courses at the Institute and follow the practice at the Center. Figure 2 illustrates the phases in the study design.

An informal/experimental data collection was gathered through CORE5® Auto placement test, which included word recognition and reading comprehension measures before intervention began (CORE5® is discussed in section 3.5.2). Also, throughout the use of CORE5® during the 8 weeks of intervention, data comprised phonological awareness, phonics/word attack, structural analysis, vocabulary, and comprehension skills.

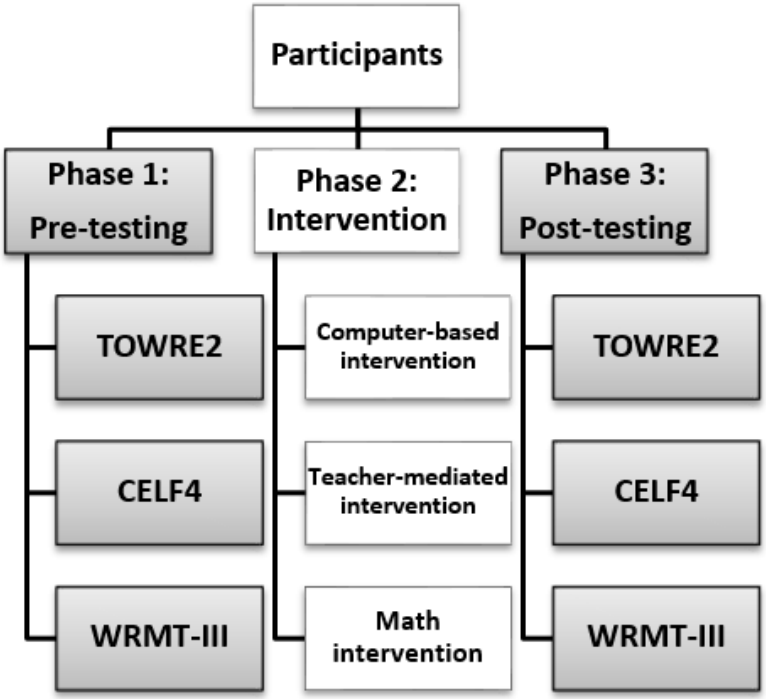


Figure 2: The Study Design

Procedures on each test are described next. It may be a little repetitive, but since neither are the tests part of our standard assessment, nor do we English teachers receive training on them, I believe it is important to detail tests' objectives and procedures. I want to stress how careful we were in following the tests' guidelines provided on the User's Manual for each test. Additionally, I would like to thank the Speech, Language and Literacy Center at the MGH-IHP and its supervisors for letting me use the material with my participants.

3.4 TESTS

3.4.1 Test of Word Reading Efficiency 2 (TOWRE 2)

TOWRE 2 (Wagner, Torgesen, & Rashotte, 2011) provides an efficient measure of fluency and accuracy of reading strategies through two tests: (A) Sight Word Efficiency (SWE) and (B) Phonetic Decoding Efficiency (PDE). TOWRE 2 assesses the learner's ability to pronounce printed words and pseudowords accurately and fluently. Additionally, TOWRE 2 is a useful tool to promptly identify students that are struggling to learn fundamental reading skills. Although sight word reading and phonemic decoding are two components under the many skills necessary to proficient reading, research shows that difficulties in accurate and fluency reading is highly correlated to later deficits in reading comprehension (for a comprehensive review, the reader is referred to August & Shanahan, 2006).

There were some particular reasons that lead this researcher, under the guidance of my external advisor, to choose to administer TOWRE tests for measures of word reading efficiency. First and foremost, both tests provide an accurate insight into two crucial word reading skills that are considered fundamental in the development of reading ability, namely sight word reading and phonemic decoding. In line with the most up-to-date literature, I acknowledge that the learner's ability to orally pronounce real words and made-up words may not be enough to measure one's reading ability or comprehension, but research has shown that these competencies precisely identify early reading difficulties. What is more, research has also demonstrated that learners adopt several strategies to identify words when reading a text, strategies that are closely related to phonological and phonemic knowledge and letter knowledge, such as blending phonemes, phonemic decoding, grapheme-phoneme decoding, sounding out, to mention a few. These strategies may be applied by the learners when taking TOWRE tests,

since participants in this study are 1st and 2nd grade students that had already been taught work attack strategies and were tested by the school in pre-school and kindergarten grades. Thus, due to a restriction of time and resources, I opt to administer a test that would comprise such knowledge and that was adequate for the age and grade of participants.

There are 4 versions of TOWRE 2: forms A, B, C and D. Form A was used for Pre-test while form B was administered for Post-test. There are also Examiner Record Booklet Forms to record answers and scores.

A. Sight Word Efficiency Test (SWE)

Administration

We carefully followed the Manual's instructions on how to administer the abovementioned test. The Sight Word Efficiency Test evaluates the examinee's ability to accurately recognize familiar words as whole units or sight words.

There is a Practice list and a Test list for SWE test. The examinee has a time limit of 45 seconds to read the list of words, in the Practice list and in the Test list, unless the examinee finishes reading it before 45 seconds. According to the TOWRE 2 Manual, in case the examinee stops at a word and he/she cannot read it for more than 3 seconds, we said, "*Go on"*. Feedback to the examinee may be given only during the Practice session.

For the Practice list, and following the Manual's instruction, we said to the examinee, *"I want you to read some lists of 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 that you cannot read, just skip it and go to the next word. Use your finger to help you keep your pace if you want to*". Then, we showed the Practice list card and the examinee read the list of words.

For the Test list, and again following the Manual's guidelines, we said to the examinee, *"OK, now you will read some longer lists of words. The words start out pretty easy, but they get harder as you go along. Read as many words as you can until I tell you to stop. Begin here (*we showed the Test list card and pointed to the upper left corner of the list) *and read down the list* (we drew our finger down the list) *before you start on the next list* (we pointed to the top of the second column). *Read the words in order, but if you come to one you can't read, skip it and go to the next word and point to the word you are reading next"*. We stopped here for a moment, turned the card down, and asked the

examinee, *"Do you understand? It is ok if you want me to repeat the instructions. You will begin as soon as I turn over the card"*.

Next, we turned over the Test list card so that the word list was exposed and started timing as soon as the examinee said the first word. We recorded the answers in the Examiner Record Booklet Form. If the examinee hesitated for more than 3 seconds on a word, we considered it incorrect and said, "*Go on"*. After 45 seconds we told the examinee to stop and drew a line after the last word he/she read. If the examinee stopped reading the words before time was up and indicated that he/she could not read more words, we asked him/her to look over the whole list to see if there were any more words that he/she could read. If the examinee then indicated that he/she could not read any more words, we stopped the test and drew a line after the last word he/she read.

Scoring

The examinee's score was the total number of words read correctly within 45 seconds. If the examinee skipped a word, it was counted as an error. If the examinee hesitated for more than 3 seconds on a word, he was instructed to proceed to the next word, and we marked the hesitated word as an error. Some word items have more than one correct pronunciation for the vowel sound and we considered the item correct if the examinee gave any of the correct pronunciation forms. TOWRE 2 Manual provides some of the most common, or most regular, pronunciations for consonant-vowel sequences. For example: *bave* rhymes with *save* and *pave*, rather than *have*.

Discontinue Rule

Sight Word Efficiency test was discontinued and no score was recorded if the examinee could not correctly respond to at least one practice word in the Practice list test.

Recording and Scoring

We recorded the answers in the Examiner Record Booklet Form. For each correct word, a score of 1 was given. For each incorrect word, a score of 0 was given.

B. Phonemic Decoding Efficiency Test

Administration

The Phonemic Decoding Efficiency Test (PDE) evaluates the examinee's ability to sound out pseudowords quickly and accurately.

Pseudowords are formed by a string of letters that resembles a real word in terms of its orthographic and phonological structures, but since pseudowords do not exist, the examinee does not *know* the word and the assessment of grapheme-phoneme correspondence may be more precise.

There is a Practice list and a Test list for PDE test. The examinee has a time limit of 45 seconds to read the list of words, in the Practice list and in the Test list, unless he/she finishes reading it before 45 seconds. Following the guidelines in the TOWRE 2 Manual, in case the examinee stops at a word and he/she cannot read it for more than 3 seconds, we said, "*Go on"*. Feedback to the examinee may be given only during the Practice session.

For the Practice list, and following the Manual's instruction, we said to the examinee, *"I want you to read some made-up words that are not real words. Just tell me how they sound. 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 that you cannot read, just skip it and go to the next word. Use your finger to help you keep your pace if you want to*". Then, we showed the Practice list card and the examinee read the list of pseudowords.

If the examinee tried to substitute pseudowords for real words, according to the guidelines in the Manual, we reminded the examinee that those were made-up words, and the goal was to try to say how they sound. In case the examinee skipped around the pseudoword list, we asked him/her to read the made-up words from the top to bottom, without jumping around. Finally, if the examinee simply pronounced each letter sound separately instead of reading the made-up words, we said, "*You are giving me the sounds each letter makes. Try to blend the sounds together to make a made-up word"*.

For the Test list, and again following the Manual's guidelines, we said to the examinee, *"OK, now you will read some longer lists of made-up words. The made-up words start out pretty easy, but they get harder as you go along. Read as many words as you can until I tell you to stop. Begin here (*we showed the Test list card and pointed to the upper left corner of the list) *and read down the list* (we drew our finger down the list) *before you start on the next list* (we pointed to the top of the second column). *Read the made-up words in order, but if you come to one you can't read, skip it and go to the next word and point to the word you are reading next"*. We stopped here for a moment, turned the card down, and asked the examinee, *"Do you understand? It is ok if you want me to repeat the instructions. You will begin as soon as I turn over the card"*.

Next, we turned over the Test list card so that the word list is exposed and started timing as soon as the examinee said the first pseudoword. We recorded the answers in the Examiner Record Booklet Form. If the examinee hesitated for more than 3 seconds on a word, we considered it as incorrected and said, "*Go on"*. After 45 seconds we told the examinee to stop and drew a line after the last word he/she read. If the examinee stopped reading the words before time was up and indicated that he/she could not read more words, we asked him/her to look over the whole list to see if there were any more words that he/she could read. If the examinee then indicated that he/she could not read any more words, we stopped the test and drew a line after the last word he/she read.

Scoring

The examinee's score was the total number of pseudowords pronounced correctly within 45 seconds. If the examinee skipped a word, it was counted as an error. If the examinee hesitated for more than 3 seconds on a word and was instructed to proceed to the next word, we marked the hesitated word as an error as well. Some pseudoword items have more than one correct pronunciation for the vowel sound and we considered the item correct if the examinee gave any of the correct pronunciation forms. TOWRE 2 Manual provides some of the most common, or most regular, pronunciations for consonant-vowel sequences. For example: *bave* rhymes with *save* and *pave*, rather than *have*.

Discontinue Rule

Phonemic Decoding Efficiency Test was discontinued and no score was recorded if the examinee could not correctly respond to at least one practice pseudoword in the Practice list test.

Recording and Scoring

We recorded the answers in the Examiner Record Booklet Form. For each correct word, a score of 1 was given. For each incorrect word, a score of 0 was given.

3.4.2 Clinical Evaluation of Language Fundamentals 4 (CELF4)

Understanding Spoken Paragraphs

CELF4 – Understanding Spoken Paragraphs test (Semel, Wiig, & Secord, 2003) evaluates the examinee's ability (1) to sustain attention

while listening to spoken paragraphs of increasing length and complexity; (2) to understand oral narrative and text, that is, if the examinee has critical thinking for text comprehension; and (3) to think critically to arrive at logical answers. After listening, examinees were confronted with probe questions to test their understanding of the main idea of the paragraph; understanding of and memory for details; sequence of events; and the ability to make inferences (I) and predictions (P) from information presented in the paragraphs.

Administration and Start Points

For CELF 4 - Understanding Spoken Paragraphs test, there is a trial test and specific test paragraphs that are appropriate for the student's age. The age ranges vary from 5 to 6, from 7 to 8, from 9 to 10, from 11 to 12, from 13 to 14, and from 15 to 21 years old. Test paragraphs and test trials are presented in forms, for instance, age 5-6 is Record Form 1; age 7-8 is Record Form 2, and so on. There is one test trial and five questions for each age-level. There are 3 test paragraphs and 5 questions for each paragraph, totaling 15 questions. We followed participant's chronological age at the time of test administration for pre- and post-tests. Although the average age of participants is 7.54 years old, some participants from 1st grade could be younger than that. Thus, we used the proper form of test in consonance with participants' chronological ages. Moreover, because participants were considered at risk learners, they might start at a lower aged-based start point, as CELF 4 Manual anticipates.

Administration of Trial Paragraph

We first administered the trial paragraph to familiarize the examinee with the task and the responses required. We also applied the trial paragraph according to the examinee's chronological age. One repetition for each question is permitted for the trial paragraph, but repetitions for the test paragraph are not allowed.

We introduced the trial paragraph using the instructions from the CELF 4 Manual that guides to say, "*Listen carefully to what I am going to read to you. Afterwards, I will ask you some questions about what I read*". Then, we read the paragraph to the examinee at a conversational level and rate and asked the associated questions. We could read the trial paragraph and the questions a second time if the examinee did not respond within 10 seconds, or if the examinee requested a repetition. If the examinee's answer was vague or incomplete, we could prompt him/her for answers to the trial questions by providing clues to the

answers. Repetitions were only allowed for the trial paragraph and questions since the objective at this point was not to test participants, but, rather, to make the task clear to participants so that they could perform at their best at the test paragraphs and questions.

Administration of Test Paragraph

After presenting the trial paragraph, we moved to the test paragraph. Strictly following the CELF 4 Manual instructions, we introduced the test paragraph by saying, *"Now listen carefully to what I read next. Remember, I will ask you questions about it"*. Next, we read the paragraph to the examinee at a conversational level and rate and asked the associated questions. We could read the test paragraph only once; however, we were allowed to reread the questions a second time if the examinee asked for a repetition or did not respond within 10 seconds.

As mentioned, each test paragraph contains five questions of two types: inferential or predictive questions; or story details and event sequence questions. An example of predictive question is, *"What do you think Derek will name his kitten?"*, and any logical answer that fits the context of the question and the examinee's experience may be considered as correct. Contrary, if the question focuses on story detail or event sequence, such as, "*What did Derek hear from the basket? A meow/cat/kitten"*, answers are more restrictive and may not be credited as correct if they do not precisely correspond to the fact. The question type is noted in parentheses for each item targeting inference and predictive information. Acceptable answers to each question are provided in the Record Form. If the examinee's answer is ambiguous and could be correct, the CELF 4 Manual advise us to provide the examinee with some probe, for example, "*Can you tell me more?"*. If the answer was still ambiguous, it was scored incorrect.

If the examinee did not obtain a perfect score on the two first items administered according to his/her age, the CELF 4 Manual directed to regress one level and administer the test paragraph of the lower-level. In this case, we introduced the lower-level test paragraph by saying again, "*Now listen carefully to what I read next. Remember, I will ask you questions about it"* and we followed the same procedure for each test paragraph. Conversely, if the examinee completed all test paragraphs and questions for his/her level, we presented the next level repeating the same instructions. We could read the test paragraph only once; however, we were allowed to reread the questions a second time if

the examinee asked for a repetition or did not respond within 10 seconds.

Scoring

If the response was correct, a score 1 was given. If the answer was incorrect, a score 0 was given.

Discontinue Rule

According to the CELF 4 Manual, there is not a discontinuing rule. The Manual instructs to administer all three test paragraphs and fifteen questions for each age. Since we administered the test in agreement with the examinee's chronological age, the start point was age-based. If the examinee obtained a perfect score on the two first items out of three, we proceed to the next age range level. In contrast, if the examinee did not obtain a perfect score on the two first items administered at the age-based start point, we retroceded one age-based level and re-started the test.

3.4.3 Woodcock Reading Mastery Test III (WRMT III)

Passage Comprehension Test

According to WRMT III Manual (Woodcock, 2011), the Passage Comprehension test measures the examinee's ability to study a sentence or a short passage and to exercise a variety of comprehension and vocabulary skills in identifying a missing word. The task is a modified cloze procedure that uses a blank line to represent the missing word. The most common responses for each item are listed in the examiners' side of the booklet.

The items are selected so that the examinee will not be likely to provide an acceptable response by reading a few words on either side of the blank. Instead, to complete the item the examinee must understand not only the sentence containing the blank, but the other sentence(s) in the passage as well. Thus, a correct response demonstrates that the learner has comprehended the entire passage.

Approximately 40% of the items are one-sentence long and contain a part related to the text. The pictures in these items do not simply illustrate the text but are a source of information required by the examinee to determine an appropriate word to complete the sentence. Picture-text items allow the measurement of passage comprehension skills at a much lower grade or age level than would be possible with text-only items.

There are 2 versions of WRMT III, form A and form B. Form B was used for Pre-test while form A was administered for Post-test. There are also Record Forms for each test type.

Scoring

The Passage Comprehension test has a dichotomous scoring: correct responses are scored 1, and incorrect responses are scored 0. For this test, examiners record scores by circling a score of 1 or 0 for each item. If the examinee self-corrects an initial incorrect response, the examiner should give credit for the final correct response.

Administration

Following the Manual's instructions on how to administer the test, we told the examinee to read the passages silently. Some examinees, particularly the young ones as it is the case of participants, started to read the sentences aloud. If this happened, we asked them to read silently. If the examinee persisted in reading aloud, we did not insist on silent reading.

We accepted only one-word responses. If the examinee responded with more than one word, we asked for a one-word answer. If the examinee did not respond to an item within 5 seconds, approximately, not exactly, we said "*What word belongs in the blank space*?" If the examinee still did not respond, we moved on to the next item.

Discontinue Rule

We stopped the test if the examinee had four consecutive scores of 0.

Recording and Scoring

All administered tests were attributed a score of 1 or 0. To calculate the raw score, I added the number of items answered correctly to the number of not administered items below the examinees' baseline. I recorded that value in the space labeled Passage Comprehension Raw Score, located at the lower-right corner of the test page.

3.5 INTERVENTION

Intervention took place as an after-school enrichment program focused on English language and literacy, and on Mathematics. Intervention occurred 3 times a week, on Tuesdays, Wednesdays, and Thursdays, from 3.45pm to 5.15pm, totaling 90 minutes daily. The

intervention phase lasted for about 8 weeks, from February/2014 to May/2014. Testing phases were administered 1 week before and 1 week after the intervention and thus not computed in the 8-week-intervention time. English language and literacy intervention was implemented with computer-based and teacher-mediated (paper-and-pencil) instruction, both of each was supervised by the group of 15 teachers. Math intervention was paper-and-pencil based and it was developed and supervised by the Math teacher and the School Speech Pathologist. I next provide detailed information on the English intervention.

3.5.1 English language and literacy intervention

The main objective of this study was to investigate early reading predictors in English in ELLs who were low SES and at risk of school failure, in comparison to low SES at risk non-ELLs. Additionally, it was the objective to examine the effects of multisensory intervention in both groups of learners. In order to do so, I needed a ~~effective~~ **research-proven** intervention program to work with the children. So, my external advisor mediated several meetings with LEXIA® board of directors and research development in which we presented our study design and chronogram. LEXIA® kindly authorized our use of their technology-based reading program, CORE5®, as the intervention instrument for this study, and provided full support to implement the program as an after school enrichment program at an urban elementary school in the greater Boston area.

LEXIA® is seriously committed to investigate the effects and benefits of multisensory, computer-assisted and teacher-mediated types of intervention. Their research has been predominately conducted with monolingual learners, but they initiated research considering ELLs population (Macaruso & Hook, 2007; Macaruso & Rodman, 2011a; Macaruso & Rodman, 2011b). I emphasize that none of the researchers involved in this study have any financial interest in CORE5® or in any other product designed by LEXIA®.

3.5.2 CORE5® and MSL intervention

CORE5® reading program consists of two types of intervention, one that is computer-based and another that is teacher-mediated with paper-and-pencil lessons. In fact, both types of intervention are mediated and supervised by the teacher, but while the learner individually and independently works with the CORE5® computer

program, paper-and-pencil lessons are directly implemented by the teacher. Having studied and used the program in this investigation, I support that among its distinct advantages are the facts that CORE5® caters for systematized and structured activities, and motivates learners while providing them with positive feedback. Instruction in CORE5® is explicit and leveled as learners receive instruction and practice six crucial areas of reading instruction: phonological awareness, phonics, structural analysis, automaticity and fluency, vocabulary and comprehension, areas that cover content standards in pre-kindergarten through grade 5.

Figure 3 on the next page depicts the scope and sequence of the six areas of reading skills comprised in CORE5® according to grade level. It is worth mentioning that each reading skill is represented with a different color and there are also visual aids to help learners fast identify such skills. Additionally, these multisensory aids are consistent throughout CORE5®.

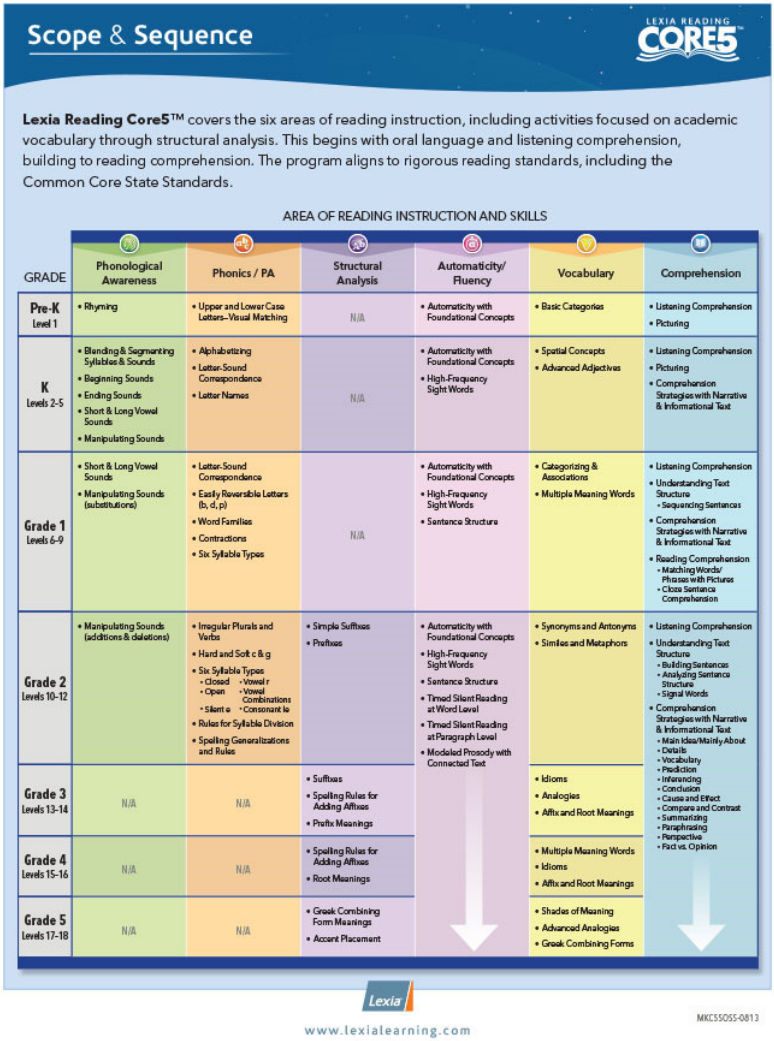


Figure 3: CORE5® reading skills according to grade level

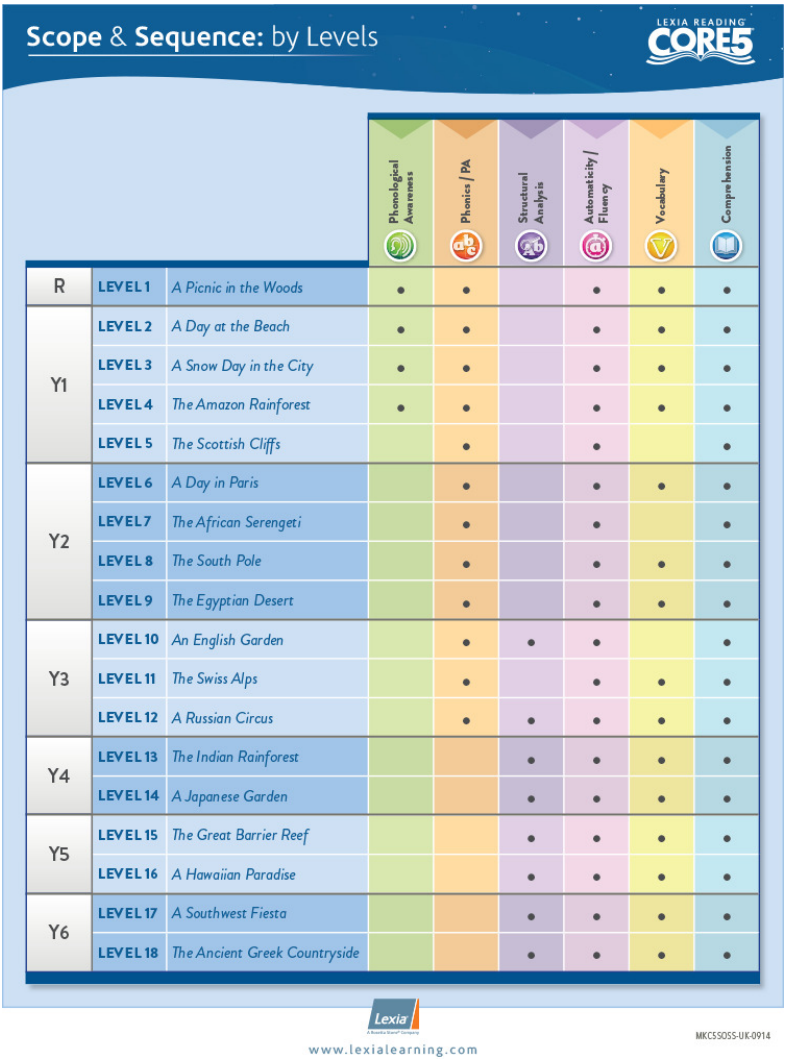


Figure 4: CORE5®: Scope and Sequence

As it could be seen in Figures 3 and 4, each level corresponds to a visual theme in which the activities are presented. The next figures contain three examples of level themes. Figure 5 depicts *A Japanese Garden*, level 14 from grade 3. Figure 6 illustrates level 12 from grade 2, *A Russian Circus*. And Figure 7 portrays *A Day on the Beach*, level 2 from kindergarten.

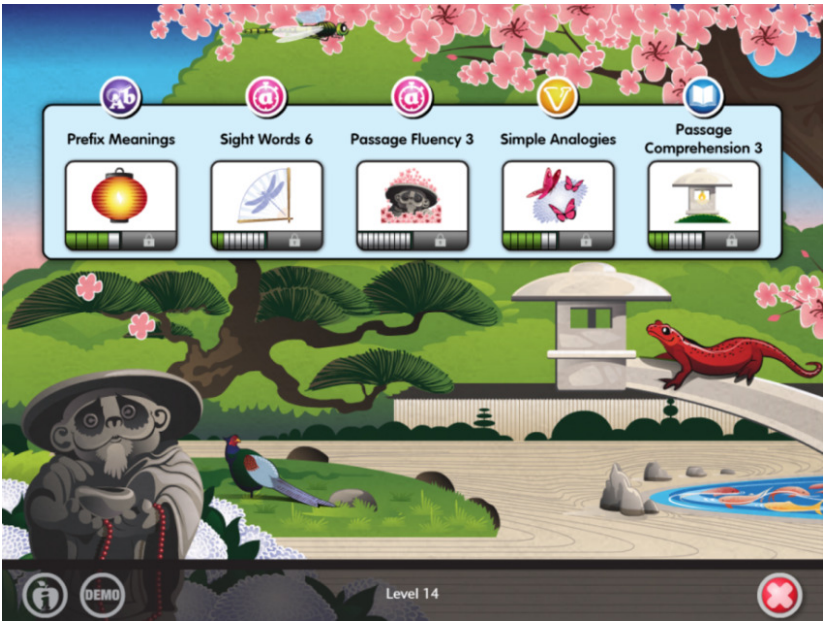


Figure 5: CORE5® A Japanese Garden

Figure 6: CORE5® A Russian Circus

Figure 7: CORE5® A Day on the Beach

In these figures, I would like to draw the reader's attention to the fact that each one of the 5 activities corresponds to a skill with a drawing that characterizes it. Drawings from Figure 8 are selected and highlighted. The **green ear** refers to exercises on phonological awareness; the **orange *a, b, c*** encompasses phonic exercises; the **purple *A, b*** with a hand glass comprises structural analysis activities; the **pink *A*** in a ***clock*** includes automaticity and fluency practice; the **yellow *V*** contains exercises on vocabulary; and the **blue open book** provides comprehension activities.

Figure 8: Identification of CORE5® skills through colors and drawings

At the risk of repetition, it is worth mentioning again that for a learner that is struggling to learn how to read and write, multisensory stimuli such as colors, drawings, sounds, and interaction, all of which CORE5® provides, may make all the difference in the intervention process. Research and the literature on the theme have shown that multisensory instruction is proven to be more effective than regular types of intervention. For instance, in Figure 7, *A Day on the Beach*, the first activity is *Blending and Segmenting 1* signaled with green color and with an ear, as well as the second activity, *Beginning Sounds*, because they both refer to phonological awareness skill. The third exercise is *Letter Names* is colored in orange with the letters *a, b, c* because it ascribes phonics skill. The fourth exercise, *Spatial Concepts*, is colored in yellow and it has a *v*, since it refers to vocabulary. *Picturing Stories* is the last exercise, and it encompasses comprehension skill, as it is identified by the color blue and there is an open book on it.

In what follows, I briefly retake the reading skills covered in CORE5®: phonological awareness, phonics, structural analysis, automaticity and fluency, vocabulary and different levels of comprehension, and describe the type of exercises comprised in CORE 5 computer-based intervention.

Phonological awareness (PA) refers to the ability to analyze and manipulate the sound structure of language (Adams, 1990; Hook & Haynes, 2009; Lesaux & Geva, 2006; Moats, 2010). CORE5® phonological awareness activities include identifying, segmenting, blending and manipulating syllables and sounds in words. Phonemic awareness is within the umbrella notion of phonological awareness and it corresponds to teaching word identification strategies based on the relationship between letters and sounds. CORE5® activities on

phonemic awareness focus on the ability to apply knowledge of letter-sound correspondence to reading and spelling words, pattern recognition of syllable types, rules for syllable division and simple spelling generalizations that are based on letter-sound correspondence. The reader is referred to the link http://lexialearning.com/product/scope-sequence/phonological-awareness for a demonstration on a PA activity and the link http://lexialearning.com/product/scope-sequence/phonics for a phonics one.

Structural analysis makes it possible for the learner to recognize compound words, contractions, suffixes and prefixes, as well as Greek and Latin roots, while attributing meaning to them (Hook & Haynes, 2009; Jennings & Haynes, 2002; Moats, 2010). In other words, structural analysis enhances the ability to analyze the meaningful morphological structure of words, that is, morphemes, and how to combine them to form new words. CORE5® structural analysis skill includes working on recognizing meaningful parts of multisyllabic words mostly derived from Latin and Greek. The reader is referred to the link http://lexialearning.com/product/scope-sequence/structural-analysis for a structural analysis exercise demonstration.

Although the terms automaticity and fluency are often used interchangeably, they are not the same skill (Adams, 1990; Hook & Haynes, 2009; Jennings & Haynes, 2002). Automaticity involves the ability to identify letters, letter patterns and isolated words accurately and quickly. In addition, it is often the result of lots of reading practice. Very young learners may read accurately, that is, they may automatically recognize words, but they may not be fluent readers. Automaticity refers to accurate, speedy, and effortless word recognition. Therefore, automaticity is an inherent ability within fluency. Fluency integrates automatic word identification with appropriate intonation, rhythm or prosody, and phrasing at the text level. Automaticity in CORE5® is systematically developed through a series of warm-ups and activities focused on processing speed, whereas fluency is addressed through activities that involve analysis of sentence structure, and at more advanced levels, the timed silent reading of passages. A demonstration of CORE5® activity may be found at http://lexialearning.com/product/scope-sequence/automaticity-fluency.

In CORE5®, vocabulary skill addresses the knowledge of word meanings and the relationships among words in a language system. Vocabulary knowledge refers not only to understanding the word meanings, but also how to use them (Adams, 1990; Beck, McKeown, & Kucan, 2013; Hook & Haynes, 2009). Vocabulary activities in

CORE5® teach word-learning strategies, and expose learners to a wide and rich variety of vocabulary and their associations. The reader is referred to the link http://lexialearning.com/product/scope-sequence/vocabulary for a demonstration on vocabulary exercise.

Finally, comprehension should be understood as an active process that happens while the learner understands spoken and written language, and the relationship among words within sentences and paragraphs (Adams, 1990; Beck, McKeown, & Kucan, 2013; Hook & Haynes, 2009; Jennings & Haynes, 2002). In CORE5®, comprehension activities include concrete and abstract levels of understanding with increasingly complex narrative and informational texts. For a demonstration on a comprehension exercise, the reader is referred to the link http://lexialearning.com/product/scope-sequence/comprehension.

When a school starts using CORE5®, an account is created in the *myLexia* database and learners' performance is individually recorded. *myLexia* reports provide information on students' progress toward reaching grade-level benchmarks. Reports may be accessed by authorized people only, such as the school principal and teachers, in order to respect ethical procedures in data collection and to protect learners' privacy and confidentiality. Reports may be displayed at district, school, grade, class, and student level. Figure 9 below depicts one sample report on student's level, in which students' names are fictitious. The report displays the academic development of 2nd grade students and it signals which students need more attention in which content. I draw the reader's attention to the 3 flags signaling red, for high priority, yellow, for medium priority, and green, for low priority in teacher-led instruction.

Plan Instruction

13 students need instruction in **6** skills.

PR Level 3 (1st)

Silent-e Word Recognition

- Maria Estrella Montanez
- Marco Rowley
- Tayler Satterfield

Silent-e Word Construction

- Michael Everhart

PR Level 4 (2nd)

Lesson

Cloze Sentence/Paragraph Comprehension

- Madison Delatorre
- Patrick High
- Elias Keating
- Elvis Scales

Lexia Core 5

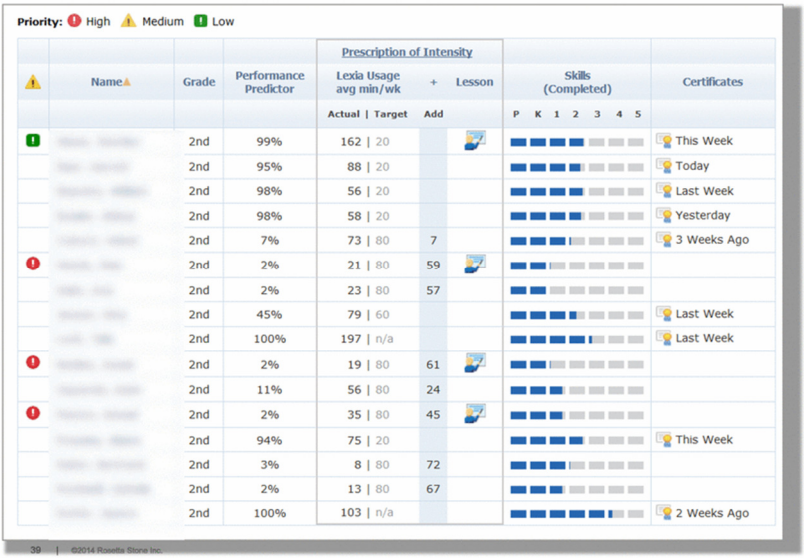


Figure 9: CORE5® Student Report and Plan Instruction

For example, the first listed student has a green flag that indicates there is a high percentage (99%) chance that this learner will meet end-of-the-year benchmarks. Furthermore, this child completed a level this week and is supposed to receive a certificate (see Figure 10 for a Certificate sample with a fictitious name on it). However, this learner needs further teacher-mediated instruction with a paper-and-pencil lesson. The other students are red flagged, which indicates that high priority attention should be devoted to them because they are likely not to reach grade-level benchmarks with the average usage of CORE 5 per week. Please note the indications in the report. The first red-flagged learner uses CORE 5 an average of 21 minutes per week, whereas he should be using it for 80 minutes per week. Thus, the report warns an increase of 59 minutes in his usage. For the second red-flagged student, the average usage is 19 minutes per week, whereas he should also be using it for 80 minutes, a difference of 61 minutes per week. Lastly, the third learner with a red flag has a difference in weekly usage of 45 minutes, from 35 to 80 minutes per week. The report also signalizes when a child needs further practice on certain content with teacher-led instruction – that is the Lesson column with a teacher on the board. Further report examples may be accessed at

http://lexialearning.com/product/assessment-without-testing/. As well, a LEXIA® CORE5® Lesson sample is provided in Appendix B.

Having in mind those brief considerations on CORE5®, the procedures involved in the implementation of CORE5® for the purposes of this study are described next.

Figure 10: CORE5® Certificate of Achievement

3.5.3 Procedures for English language and literacy intervention with CORE5®

The first procedure followed to implement CORE5® was the training. Teachers involved in this study (MGH-IHP MA students and I) received some training on CORE5® provided by LEXIA®, and I personally participated in the implementation, training, and research proposals of CORE5® in other schools before starting my study. The training was also available for the School Principal, the School Speech Pathologist, and School teachers. Then, the school was registered in LEXIA® system so that we were authorized to use the online program. Next, I recorded each participant's information into LEXIA® database

regarding their age, grade, and group (ELLs or non-ELLs). Each participant received a username and a password. Finally, I set the school´s laptops with CORE5® link to start the intervention phase.

The first intervention session started with all participants distributed in three classrooms with individual laptop computers set with CORE5® link and were supervised by us, teachers. Since that was their first time using the program, we explained to them how to log into the program. Each student had a username (student's first and last names) and a password. Figure 11 displays the log in page. One may argue that students may have experienced some trouble using the computers, since they are low SES and probably do not have computer access at home, and this may affect their development during intervention. However, participants have computer classes at school and are used to developing other projects with several subjects using the computers. We only had to help learners in the first time they logged in CORE 5. The next intervention sessions with computers they were able to log in by themselves.

Figure 11: CORE5® log in page

All participants started with online CORE5® because the program begins with the Auto Placement, as noted a test administered to place participants in the appropriate level of proficiency in the computer-based program.

The 43 participants were weekly distributed into three groups according to the activity the child was supposed to do that week.

- Group 1: CORE5® computer-based intervention;
- Group 2: Paper-and-pencil teacher-mediated intervention;
- Group 3: Math intervention.

The activity participants were supposed to engage on depended upon students' response to intervention, both computer-based and teacher-mediated. At the risk of being repetitive, it is worth mentioning that CORE5® provides data reports into the academic growth on the student level, as well as on the class or grade levels. So, it is possible to daily follow participants' performance and determine the type of intervention and on which content a specific learner needs help. While using the computer-based program, if a learner has difficulty in a task, CORE5® provides a level of scaffolding by removing some of the answer choices and stimuli on the computer screen. When the learner is able to successfully perform the activity in the scaffolded level, the program automatically gives the learner the chance to try the initial activity again. If the student cannot do the task and continues struggling, CORE5® gives explicit instruction followed by another opportunity to practice on the scaffolded level and then on the regular level of the activities. In case the learner is not capable of doing the exercise, despite the scaffolded instructions and attempts, CORE5® records the data concerning the learner's performance and changes the practice to another skill. As mentioned, CORE5® reports will display the learner's difficulty and prescribe the appropriate intervention.

For example, if Mike (our fictitious student) was online doing CORE5®, phonological awareness, segmenting, Level 2 and could not progress, his report will indicate that Mike had difficulty doing the activity phonological awareness, segmenting, Level 2. Furthermore, CORE5® report already provides teachers with the link to the respective paper-and-pencil lessons. In this sense, on Tuesday, Mike was on the computer-based intervention group, but because he was struggling with the task, he was directed on Wednesday to the teacher-mediated intervention with paper-and-pencil material. On Thursday, he was on Math intervention.

I daily accessed the reports and prepared the materials for the teachers with one week in advance so that teachers could prepare their classes. They received an email with the name of the student(s) they were supposed to work with, the day, and the content. CORE5® printable materials were made available in advance for the teachers as I left them on envelopes on the mailbox in my office door at the MGH-IHP.

This chapter presented the methodological procedures followed in this study, including a detailed description of participants, the designed applied in this study, the tests administered for data collection, as well as the intervention proceedings implemented. The next chapter reports and discusses the results obtained from data collection.

CHAPTER 4
RESULTS AND DISCUSSION

This chapter reports and discusses the results of the descriptive and statistical analyses conducted in light of the theoretical background presented and the empirical studies reviewed in Chapter 2 - Review of the Literature. Chapter 4 begins with this brief introduction in which some aspects of the data analyses are firstly presented to the reader. Next, some discussion follows in section 4.1 on the effects of multisensory structured language instruction (MSL) on ELLs' and non-ELLs' performance. Pre- and Post-tests' results concerning the four fundamental early reading skills tackled in this investigation, namely, decoding skills of real word, phonemic decoding of pseudoword, listening comprehension, and reading comprehension, are described and discussed considering the first four Research Questions proposed and the Hypotheses posed. Section 4.2 also examines the effects of MSL, while comparing ELLs' and non-ELLs' achievement. In order to do so, another set of Parametric tests (*t*-tests) were run to compare participants' scaled scores on Pre- and Post-tests. In an attempt to verify whether there was a correlation among early reading skills, and, more specifically, which skill(s) correlates with reading comprehension outcome, Pearson's correlations were run and results are presented and considered in section 4.3. The discussion in all sections also accounts for some qualitative data to the extent that further explanation is needed.

Data set was tested for normal distribution using Kolmogorov-Smirnov and Lilliefors tests for normality (Larson-Hall, 2010), and all results accounted as normal. The Kolmogorov-Smirnov and Lilliefors tests for normality were chosen because it was the purpose to compare two sets of quantitative data in terms of their mean values. Cochran C tests (Larson-Hall, 2010) were also run to verify the homogeneity of variance and data presented homogenous variances and test variances presented homoscedasticity.

Data from non-ELLs was also examined in order to avoid potential bias in the study, considering that monolinguals are frequently the reference point in research to which English language learners are compared with. For that reason, parametric *t*-tests were run so data from the Pre-test could confirm, or refute, the condition of at risk of school failure for non-ELLs, as previously identified by the school. Findings displayed on Tables 10, 11, 12 and 13 indicate that there was no statistically significant difference in achievement between the two groups of learners in the Pre-testing phase. *T*-test results confirm that

English language learners and monolinguals did start taking part in the study at the same level of proficiency concerning decoding ability of real word and pseudoword reading, listening comprehension, and reading comprehension skills.

The fact that ELLs and non-ELLs start at the same level of proficiency in English language is a valuable piece of information. When considering students that are English language limited proficient compared to monolingual leaners, it is possible to assume that ELLs would present lower English oral language proficiency and lower reading achievement in English when compared to their monolingual peers. As discussed in the review of the literature, the better one's (English) oral language skills are, the better one`s (English) reading proficiency is. The rationale behind this premise is that oral language proficiency helps promote and develop reading competence, on the grounds that the better one speaks and understand a certain oral language, the better one is expected to read it and understand what is read. Consequently, the opposite is also true: limited expertise of a language leads to lack of ability to read and understand it (August & Shanahan, 2006).

Along with English oral language proficiency and reading achievement, another important aspect that is likely to increase the risk of reading failure is learners' low socioeconomic status. As presented in chapter 3, in which ELLs' characteristics are described, the predominantly low SES of ELLs' families in the US reflects parents' income and educational level, which are often lower than mainstream families. However, not only ELLs, but also non-ELLs come from impoverished conditions, factor that places the two groups of participants doubly at risk of school failure. In sum, ELLs' and non-ELLs' ability in English as regards word recognition skills, listening comprehension, and reading comprehension were at the same level of proficiency when this study began, which confirm the school's identification of students in both groups as being at risk of not reaching end-of-the-year benchmarks.

Additionally to having similar levels of proficiency in those skills, it is paramount to remind the reader that participants in this study were considered at risk of school failure. This means that although ELLs and non-ELLs present a compatible command of English, they have a poorer level of performance when compared to peers of the same age and grade. As discussed in the review of the literature, poor readers suffer from underdeveloped vocabulary, lack of background knowledge, inability to use higher-level language skills, among other aspects. This

troublesome problem places learners in a relatively deprived condition that tends to worsen as they progress through school years – the Matthew Effect (Stanovich, 1986). This is also critical information because it may not be feasible to consider basal and ceiling level of standardized measures when assessing the participants in this study, since they might not be valid points of comparison (Farrall, 2012). As a necessary consequence, and for the purposes of this study, it seems reasonably fair that participants *compete in favor of themselves*, and not against, when trying to benefit from intervention and improve their performance. At the risk of repetition, it is important to emphasize that ELLs and non-ELLs received the same quantity and quality of instruction during the after-school enrichment program.

Results are presented and discussed according to the research questions formulated and the hypotheses raised, bearing in mind the effects of multisensory structured language intervention on ELLs' and non-ELLs' performance.

4.1 EFFECTS OF MULTISENSORY STRUCTURED LANGUAGE INTERVENTION ON ELLS' AND NON-ELLS' PERFORMANCE

The first four Research Questions proposed in this study aimed at investigating whether multisensory structured language intervention provided significant gains in ELLs' performance for word recognition skills, which included real word reading and pseudoword reading, listening comprehension, and reading comprehension. In order to do so, Pre- and Post-tests were administered before and after intervention was implemented. Data from Pre- and Post-tests was collected using three standard and independent measures, which were presented to the reader in the Method chapter of this work: TOWRE-2 (Test of Word Reading Efficiency, 2nd edition), including two tests, Sight Word Efficiency Test and Phonemic Decoding Efficiency Test; Understanding Spoken Paragraphs Test, from CELF-4 (Clinical Evaluation of Language Fundamentals, 4th edition); and Passage Comprehension Test, from WRMT-III (Woodcock Reading Mastery Test, 3rd edition). As mentioned, tests were applied two times during this study: the first time before intervention started, which accounts for Pre-tests, and the second time after intervention was concluded, which encompasses Post-test results.

4.1.1 Research Question 1

TOWRE tests were applied to measure participants' decoding skills of reading familiar words and pseudowords in an attempt to answer the two first research questions. Sight Word Efficiency Test was administered to answer Research Question 1, which refers to decoding skills of real word reading:

RQ1: Will low SES at risk ELLs' performance improve on decoding skills of sight word reading after multisensory structured language intervention is carried out?

As can be seen on Table 6, there was no statistically significant difference from Pre- to Post-test for ELLs concerning reading skills of real words for ELLs and non-ELLs. The *p* values of 0.52 ($\alpha = 0.05$), for ELLs' performance, and 0.25 ($\alpha = 0.05$), for non-ELLs' performance, indicate that intervention did not significantly improve their achievement as regards reading ability of real words. Mean (M) values show M = 97 and M = 98, for ELLs, in Pre- and Post-tests respectively, and M = 95 and M = 94, for non-ELLs, in Pre- and Post-tests, accordingly.

Table 6. *T*-test results for TOWRE Sight Word Efficiency Test – Pre- and Post-tests

ELLs	
M - TOWRE Sight Word Pre-test	97
M - TOWRE Sight Word Post-test	98
p	0.52
non-ELLs	
M - TOWRE Sight Word Pre-test	95
M - TOWRE Sight Word Post-test	94
p	0.25

$\alpha = 0.05$

Thus, Hypothesis 1 was not confirmed:

H1. Low SES at risk ELLs' performance will improve on decoding skills of sight word reading after multisensory structured language intervention (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986)

The fact that ELLs did not significantly enhance their decoding skill performance on reading sight words may be explained by some factors. One point to be observed is that although adequate instruction was supplied according to students' individual needs, it is possible that intervention period was not enough to produce statistically significant gains in participants' performance (Macaruso & Hook, 2007). One other point may be that participants could have become more aware of their reading behavior as a consequence of appropriate intervention provided (Almeida, 2010; Gagné et al., 1993), which demanded more time and more consciousness when performing the Sight Word Efficiency Test. As explained in chapter 3, when describing the tests, participants had 45 seconds to read the list of words, both the practice list and the actual test one. One last point could be that teachers that applied the testers were stricter in the Post-Testing assessment than in the Pre-test, fact that could have been checked had we applied another compatible method of assessment.

Goldenberg and Coleman acknowledge that "standardized test scores are a *type* of outcome that provides a certain *type* of information about students. But, obviously, standardized tests are limited (Goldenberg & Coleman, 2010, p. 4). Therefore, it is relevant to examine the performance of individual participants as a means to try to understand the effects of the multisensory structured language intervention. Besides, as mentioned in the introduction of this chapter, it seems perfectly reasonable to take as the departure point the level participants showed when beginning the intervention, that is, their Pre-test scores, and compare these scores with Post-test ones. In doing so, results show that a considerable number of participants had gains in their scaled scores. From the 43 participants, 17 (9 were ELLs and 8 non-ELLs) improved their performance from Pre- to Post-tests, 6 remained with the same scaled scores, and 20 had lower scores between the two testing phases. In spite of the fact that more participants show a decrease in their scores from Pre- to Post-tests, the quantity of students who showed an improvement cannot be disregarded, even though the statistical analyses do not indicate significant gains. It appears fair to say that individual performance scores show a substantial improvement in participants' achievement.

4.1.2 Research Question 2

TOWRE Phonemic Decoding test was administered to measure learners' performance on word recognition skills in pseudoword reading and to answer Research Question 2:

RQ2: Will low SES at risk ELLs' performance improve on phonemic decoding skills after multisensory structured language intervention is implemented?

Results are displayed on Table 7. There was a statistically significant difference in phonemic decoding skills in pseudoword reading from Pre- to Post-tests, for both ELLs and non-ELLs, but the difference reflects a decrease in participants' performance after intervention ($p = 0.01$ ($\alpha = 0.05$), for ELLs and $p = 0.02$ ($\alpha = 0.05$), for non-ELLs).

Table 7. *T*-test results for TOWER Phonemic Decoding Efficiency Test - Pre- and Post-tests

ELLs	
M - TOWER Phonemic Decoding Pre-Test	98
M - TOWER Phonemic Decoding Post-Test	92
p	0.01
non-ELLs	
M - TOWER Phonemic Decoding Pre-Test	94
M - TOWER Phonemic Decoding Post-Test	89
p	0.02

$\alpha = 0.05$

Mean scaled scores decreased as indicated by the mean values of M = 98 and M = 94, for ELLs, in Pre- and Post-tests respectively, and M = 94 and M = 89, for non-ELLs, in Pre- and Post-tests, accordingly. Consequently, Hypothesis 2 was not confirmed:

H2: Low SES at risk ELLs' performance will improve on phonemic decoding skills after multisensory structured language intervention is implemented (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

Similar to the results from Sight Word Efficiency Test, it is possible that participants were more diligent when taking the Phonemic Decoding Post-Test and, consequently, it took them more time to complete the task, which, in turn, may have affected their scores. The statistically significant decrease learners' achievement (mean scores) may indicate that learners were more aware of the decoding strategies they could employ to identify grapheme-phoneme correspondences taught and practiced during intervention, both via CORE 5 and from teacher-mediated instruction. Moreover, intervention instruction was primarily focused on phonemic discrimination via listening comprehension practices, mainly for learners who were struggling the most and needed direct and explicit instruction on word recognition skills. As a result, and contrary to expected, more awareness of grapheme-phoneme correspondence did not turn out in more fluent reading as participants might have slowed their pace when performing the task. Rather, it is likely that participants praised for accuracy in detriment of speed. As discussed in chapter 3, for TOWRE tests participants had 45 seconds to read the list of words, both the practice list and the actual test one. Therefore, it is likely that participants slowed down their reading speed and focused on accuracy as one of the consequences from intervention.

Additionally, Geva, Yaghoub-Zadeh, and Schuster (2000) draw attention to the assumption that ELLs are likely to perform more poorly in comparison to monolinguals on phonological awareness tests, which was not confirmed in this study. The authors explain that there is a consistent development of phonemic decoding skills throughout instruction time. As shown in Table 7, ELLs' performance was better than non-ELLs in both testing times. As Geva et al. adduce, phonological awareness measured in English as L2 is a reliable predictor of word recognition skills in ELLs, which is also confirmed if we consider mean scaled scores from Sight Word Efficiency Test.

Similar to the arguments put forward when discussing the Sight Word Efficiency Test results, it seems meaningful to explore individual participants' performance in an attempt to gain insights into the effects of the multisensory structured language intervention. More important, it is relevant to observe the individual development of participants because of the level of difficulty they demonstrated in the first place and that allowed them to them to be part of this study. Mean scaled scores from Pre- to Post-tests show that 10 participants improved their performance of reading pseudowords accurately and efficiently, whereas 4 remained

at the same level of proficiency. However, 29 participants had a poorer performance from Pre- to Post-tests.

Findings from both TOWRE Sight Word Efficiency Test and TOWER Phonemic Decoding Efficiency Test corroborate previous studies sustaining that English language learners perform similarly to native English speaking learners concerning word recognition skills of pseudoword reading (August & Shanahan, 2006; Ayre et al. 2010; Goldenberg & Coleman, 2010; Haynes & Halvorson-Bourgeois, 2012).

As discussed in the review of literature chapter, the Simple View of Reading (SVR) states that reading comprehension is the product of the two components, decoding and oral language comprehension (R = D x C) (Gough & Tunmer, 1986), in which decoding encompasses the ability to read individual words and pseudowords quickly while applying letter-sound correspondence rules. Both tests from TOWRE assess the ability to not only recognize familiar words, but also sound out complex and unfamiliar words and pseudowords fast and correctly.

As a matter of fact, the literature recommends using measures of pseudoword reading to evaluate learners' word reading ability. As pseudoword reading tasks require the learner to decode a combination of letters that are not real words, but that can be pronounced in the target language in an increasing level of difficulty, the learner cannot rely on previous knowledge to recognize the words from his sight vocabulary, or in the context, but he can certainly draw on his schemata of grapheme-phoneme correspondence. In this sense, pseudoword tasks provide insights into the learner´s basic decoding skills.

As a whole, TOWER test results may be partially explained by the fact that instruction on early stages of reading focuses on decoding, that is, emphasis is placed on phonological and orthographic processing skills (Hook & Haynes, 2009) delivered in a structured, sequential, and systematic way. Hence, it is possible that both groups of learners similarly benefited from this method of teaching, which, in turn, may have attenuated the difference in performance between groups (August & Shanahan, 2006; Ayre et al., 2010; Goldenberg & Coleman, 2010; Haynes & Halvorson-Bourgeois, 2012). Besides, in an irregular orthographic system such as English, decoding is an essential reading skill because it helps the learner recognize irregular and ambiguous words, and decipher complex and unfamiliar words (Frost, Katz, & Bentin, 1987; Katz & Frost, 1992; Seymour et al., 2003). Another aspect to be considered is that intervention lasted for about 8 weeks and although we worked hard to provide participants with the greatest amount and the best quality of instruction, it may not have been enough

to produce an evident difference from Pre- to Post-test scores considering the group as a whole (Macaruso & Hook, (2007).

In line with the stages of reading development (Chall, 1983; as cited in Adams, 1990 and in Moats, 2010), most participants successfully achieved Stage 1, *Initial Reading*, and were capable of matching letters-to-sounds for real words and pseudowords. They also accomplished Stage 2, *Confirmation* and *Fluency* phases and accurately and fluently applied their decoding skills as their mean scaled scores suggest. As previously discussed, although decoding may not be enough for comprehension to take place, research has demonstrated that decoding is a fundamental skill in predicting later reading comprehension. The ability to fast and accurately matching a letter, or combination of letters (graphemes), to their sounds (phonemes) allows the reader to build a sight vocabulary of familiar words, as well as helps them to decode unfamiliar and complex words. More important, rapid and effortless recognition of words and pseudowords leads to fluent reading, which, consequently, promotes comprehension, although not noticeable in statistical figures in this study.

Another point that it is worth some discussion is that ELLs' mean scaled scores were higher than non-ELLs, which could be somewhat explained by the fact that students who speak two or more languages may benefit from this ability and transfer knowledge from one language to the other, as proposed by the common underlying proficiency theory (Cummins, 1981; 2000; as cited in Genesse et al., 2006; Ellis, R., 1986; Gass & Selinker, 2008; Paradis et al., 2011). Unfortunately, as it will be posed in the limitations of the study, we could not assess participants' competence in their respective L1s due to lack of time and resources.

As mentioned before, my understanding for the fact that there was no significant difference for real word ability and for the decrease in mean score for pseudoword reading skill is also a qualitative one. I believe that participants were more careful when taking Post-tests than during Pre-tests for several reasons. First, it is possible that participants wanted to do better on tests. Participants are used to taking school tests several times during the year, so they knew that the Post-test was their chance to do better with the after-school program. Second, during CORE 5 intervention, there were several short ceremonies with the School Principal and the Speech Pathologist when learners received a certificate of level accomplishment (a sample of Certificate of Achievement is available on Figure 10, Chapter 3, Method), and the Post-test was a substantial accomplishment to be conquered. Third, because participants had studied a lot through intervention, it is likely

that they were more aware of the linguistic aspects, and, consequently, more diligent with test items. In turn, it took learners more time to perform the task on the test, as I mentioned before. Another circumstance that should be mentioned is that Post-tests were conducted right after students came back from Spring break and they were very excited about coming back to school. We had some difficulty controlling students in class and with other school activities. Such high-level of excitement may have also interfered in their performance. Finally, there is also the possibility that the study's teachers, that is, the MGH-IHP Master students that voluntarily participated in the testing phase, were stricter when administering the tests.

4.1.3 Research Question 3

Research Question 3 was posed to assess listening comprehension ability via CELF Understanding Spoken Paragraphs Test:

RQ3: Will low SES at risk ELLs' listening comprehension performance improve after multisensory structured language intervention is administered?

and its respective hypothesis:

H3: Low SES at risk ELLs' listening comprehension performance will improve after multisensory structured language intervention is administered (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

Table 8 shows the results for *t*-tests for Pre- and Post-tests as regards listening comprehension competency. There was no significant statistical difference after intervention was implemented in both ELLs' and monolinguals' performances, as $p = 0.16$ ($\alpha = 0.05$), for ELLs; and $p = 0.79$, for non-ELLs ($\alpha = 0.05$). As predicted in the literature, ELLs' mean scaled scores were lower than non-ELLs' M = 7.86, and M = 8.77, for ELLs, in Pre- and Post-tests; and M = 9.23, and M = 9.04, for non-ELLs, in Pre- and Post-tests. Hence, Hypothesis 3 was not confirmed because ELLs did not significantly ameliorate their listening comprehension achievement.

Table 8. *T*-test results for CELF Understanding Spoken Paragraphs Test - Pre- and Post-tests

ELLs	
M CELF Pre-test	7.86
M CELF Post-test	8.77
p	0.16
non-ELLs	
M CELF Pre-test	9.23
M CELF Post-test	9.04
p	0.79

$\alpha = 0.05$

Nonetheless, if we access participants' individual performance from Pre- to Post-test, we observe a considerable progress in 10 ELLs, whereas 6 ELLs remain at the same level. Thus, 6 ELLs had worse scores in Post-test. Regarding non-ELLs participants, most of them (11) had lower scores from Pre- to Post-test, 6 non-ELLs increased their performance, and 4 non-ELLs remained at the same level of listening comprehension.

As proposed by the SVR, the second component in reading comprehension refers to oral language comprehension. Following the most up-to-date literature, I agree that word reading skills are crucial for reading comprehension; nevertheless, they are not enough to develop reading proficiency (Goswami 2000; Tunmer & Hoover, Geva, 2000; Mancilla-Martinez & Lesaux, 2006). According to the SVR (Gough & Tumner, 1986), reading comprehension encompasses more than automatic and accurate word reading skills, and it highlights the importance of oral language understanding in reading acquisition, mainly for children with reading difficulties. Besides, Tunmer and Hoover (1993) contend that a measure of linguistic comprehension should assess the learner's ability to understand language, as it is the case of the CELF Test, in which a narrative is read to the examinee and questions about the content are asked. Comparing ELLs' mean scaled scores for TOWRE tests to the ones for CELF, it is apparent that ELLs had more difficulty in accomplishing the listening comprehension task.

Hook and Haynes (2009) underscore the importance of ELLs' socioeconomic status (SES) in an attempt to explain their poorer performance when compared to monolingual peers. They draw attention

to the impact that home language use and oral language exposure have on word recognition and reading comprehension skills. As previously discussed, ELLs' disadvantaged socioeconomic conditions, their parents' lower-income and educational level are considerable factors likely to result in lower-level of oral language comprehension when compared to monolingual peers. What is more, in agreement with Chall's stages of reading development (1983; as cited in Adams, 1990, and in Moats, 2010), learners' reading skills are expected to evolve as students develop and interact with their learning environment. In this sense, research has demonstrated that low SES ELLs' experiences are poorer in comparison to non-ELLs since they do not experience the same amount of oral (English) language within family and community (Hart & Risley, 1995; Steensel, 2006). This difference may be seen in the gap between ELLs' and non-ELLs' performance that although it is not a striking one, it is present. Besides, we should keep in mind that both groups of learners were characterized by the school as at risk of school failure. Thus, variation between groups is expected to be subtle.

As discussed deeply in the review of the literature chapter and briefly mentioned here, additionally to all individual characteristics that learners carry, ELLs add to the learning process the fact that they need to learn the content and the language itself while in the course of learning to read and write. For that reason, there is a considerable variation among learners in which the learning process takes place. Many factors, including internal and external aspects to the child, profoundly impact literacy acquisition and development, such as quality and quantity of (oral) English language spoken at home, interaction between child and parent/carer in English, parents/carer's level of education, to mention a few aspects. Unfortunately, it was not possible to have access to some of those factors due to confidentiality protection between Boston Public School and parents.

Similar to the qualitative reasons discussed in the prior test for word recognition skills (TOWRE), I believe that participants were more diligent when taking the Post-test and also more aware of the listening skills trained during intervention. Indeed, intervention lasted for only eight weeks as I already mentioned, which could not be sufficient to produce meaningful gains in terms of statistical relevance (Macaruso & Hook, 2007). Nonetheless, we could see the extent that learners improved, principally those participants who had been experiencing severe difficulties during the intervention with computer-based and teacher-mediated CORE 5. Unfortunately, in order to discuss these

cases, some further research had to be conducted in a separate case study.

4.1.4 Research Question 4

So far, results for decoding skills of real words, phonemic decoding competence, and listening comprehension skills were presented and discussed. Thus far, findings show that there was no statistically significant improvement from Pre- to Post-test, neither in ELLs', nor in non-ELLs' performance, to the extent that these skills are concerned. As previously discussed in chapter 2, those skills are considered fundamental to the effective development of the reading process. Next, Research Question 4 is put forward in order to assess reading comprehension ability as a conclusive set of skills:

RQ4: Will low SES at risk ELLs' reading comprehension skills improve after multisensory structured language intervention is administered?

Table 9 exhibits *t*-test results for Pre- and Post-tests for WRMT, a measure of reading comprehension skills. There was a highly significant improvement for both groups after intervention. For ELLs, $p = 0.00025$ ($\alpha = 0.05$), and for non-ELLs, $p = 0.00033$ ($\alpha = 0.05$). Indeed, mean scaled scores demonstrate the improved from Pre- and Post-tests for both groups: M = 88 and M = 96, for ELLs in Pre- and Post-tests, respectively; and M = 83 and M = 89, for non-ELLs in Pre- and Post-tests, respectively. Additionally, ELLs improved their mean scaled scores after intervention in 8-scaled-points, which can also be interpreted as a considerable progress in ELLs' performance. Similarly, non-ELLs also enhanced their performance in 6-scaled-points, as regards reading comprehension skills. At the risk of repetition, and described in the Method chapter, WRMT ceiling score depends on the examinee's performance since it is possible that the examinee advances beyond his/her age/grade.

ELLs' improvement in reading comprehension performance corroborates previous studies and literature discussed in the review of the literature chapter, which supports that several features incorporated in a structured and tailored instruction, such as development of oral language, spelling skills, vocabulary acquisition, promotes positive effects on ELLs that are at risk of school failure. Additionally, improvement in non-ELLs' reading comprehension strengthen the

evidence already available that effective intervention programs for ELLs tend to be also effective for on monolingual learners (August & Shanahan, 2006; Brown-Chidsey & Steege, 2010; Calderón, 2012).

Table 9. *T*-test results for WRMT Passage Comprehension Test - Pre- and Post-tests

ELLs	
M WRMT Pre-test	88
M WRMT Post-test	96
p	0.00025
non-ELLs	
M WRMT Pre-test	83
M WRMT Post-test	89
p	0.00033

$\alpha = 0.05$

Therefore, Hypothesis 4 was confirmed:

H4: Low SES at risk ELLs' reading comprehension skills will improve after multisensory structured language intervention is administered (August & Shanahan, 2006; Adams, 1990; Birsh, 2011; Gough & Tunmer, 1986).

The Passage Comprehension test in WRMT test is a type of cloze test that assesses the examinee's ability to study a sentence, in a lower-level, or a short passage, and to use his/her comprehension skills to identify the appropriate vocabulary that suits the missing word. Therefore, the examinee should understand not only the sentence, but the context of the passage, in order to complete the cloze task. As discussed, the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000) poses that reading comprehension is based on two competencies that are equally important: decoding and linguistic comprehension. If decoding is automatized and learners do not have trouble understating oral language, reading comprehension also progresses, as it was the case of the ELLs in this study. Moreover, as Tunmer and Hoover (1993) remark, the WRMT

suits as a measure of reading comprehension as a process that starts with print, and from which the reader draws upon many other skills.

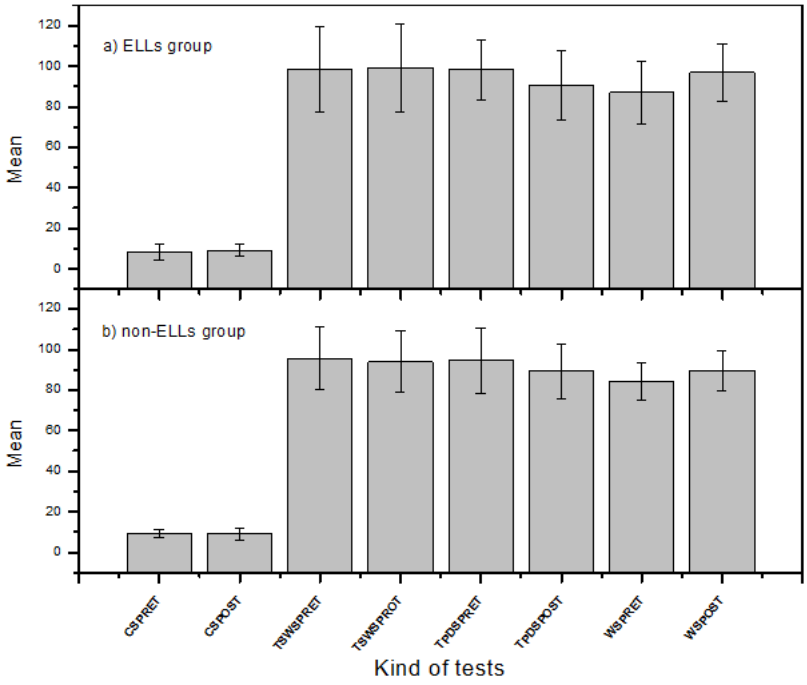
Albeit there was no statistically significant improvement from Pre- to Post-test in ELLs' achievement in decoding skills of sight words (TOWRE Sight Word Efficiency Test) and listening comprehension ability (CELF Understanding Spoken Paragraphs Test), and there was a decrease in performance in phonemic decoding competence (TOWRE Phonemic Decoding Efficiency Test), ELLs improved their reading comprehension performance as suggested by the meaningful statistical difference obtained after intervention was delivered. Results from WRMT tests provide evidence that ELLs' reading skills improved after intervention (p = 0.00025). Similarly, non-ELLs' performance also enhanced after intervention (p = 0.00033). In consonance with Chall's stages of reading development, findings support that learners were able to fluently and accurately decode words and pseudowords (TOWRE), and apply strategies to choose suitable vocabulary to complete the cloze task (WRMT). Additionally, reading comprehension is a process that happens simultaneously and in parallel (Gagné et al., 1993; Kintsh & van Dijk, 1978; Tomitch, 2003), so it is not possible to separate one skill from another, and the significant gain in the WRMT results suggests that participants were, to a certain extent, more aware of the processes they were supposed to employ.

Fluent readers apply reading skills unconsciously and automatically to make sense of the text. When skilled readers are confronted with an obstacle during reading, they almost always employ reading skills in order to comprehend (Almeida, 2010; Gagné et al., 1993, Tomitch, 2003). Contrary, struggling readers face difficulties in lower-level reading components, such as decoding, and are likely not to be aware of which strategies to adopt depending on the reading situation (Paris et al., 1983; Paris et al., 1991). Therefore, explicit teaching of reading strategies is necessary to enable struggling readers to develop their reading skills. During intervention learners were provided with systematic and explicit instruction to enhance automaticity and fluency in reading, to improve listening ability, and acquire vocabulary, all skills which would ultimately improve reading comprehension. Findings from WRMT Post-tests endorse that comprehension improved.

Figure 12 depicts the descriptive analyses of findings from Pre- and Post-Tests, according to each group of learners. Mean values of TOWRE tests provide evidence of the paramount roles that decoding skills of sight words and phonemic decoding play in developing reading in early stages of literacy development. Early attainment of word

identification and pseudoword recognition is important because it accurately predicts later reading comprehension skills. In this sense, if a child efficiently and accurately identifies a familiar word, or is able to read a made-up word, chances are that this child will become a skilled reader; and the contrary is also true: a learner who starts slow at decoding is more likely to have comprehension difficulties in later school grades (Matthew Effect, from Stanovich, 1988). Participants in this study were identified as at risk of reading failure and intervention helped them overcome such difficulties as results from WRMT confirm that ELLs' and non-ELLs' reading performance improved after intervention.

Figure 12: Mean values of descriptive analyses of Pre and Post-Tests



CSPRET = CELF Pre-Test
CSPOT = CELF Post-Test
TSWSPRET = TOWRE Sight Word Efficiency Test Pre-test
TSWSPROT = TOWRE Sight Word Efficiency Test Post-test
TPDSPRET = TOWRE Phonemic Decoding Pre-test

TPDSPOST = TOWRE Phonemic Decoding Post-test
WSPRET = WRMT Pre-test
WSPOST = WRMT Post-test

In agreement with the literature reviewed in the second chapter of this work, the intervention implemented followed research-based criteria, which was likely to assure a positive impact. Moreover, participants' progress was monitored closely in weekly reports provide by CORE5® database system. As Brown-Chidsey and Steege (2010) support, "the intervention (i.e., instruction) should be implemented as planned and intended…the intervention plan should include some form of verification to document whether the plan was implemented as intended. If an intervention is implemented as planned but does not work, it can be changed" (p. 11). Therefore, instruction was delivered according to each participant individual needs previously identified in the beginning of intervention phase. Additionally, continuous (weekly) data was collected by CORE5® regarding accuracy, frequency, rate, in six fundamental literacy and language skills, namely phonological awareness, phonics, structural analysis, automatic, vocabulary, and comprehension. At the same time that CORE5® data was collected, participants were provided with systematic and structured instruction via CORE5® computer-based and pencil-and-paper lessons. In a nutshell, the comparison from Pre- to Post-test results in the WRMT sustain that low SES, at risk ELLs' and non-ELLs' significantly improved their reading comprehension skills after multisensory structured language intervention was administered. This finding may be interpreted as an indication (displayed in Figure 12) that mastery of literacy skills develops together as a set of knowledge, and not separately. This means that although no significant growth could be perceived in the statistical measures run for TOWRE and CELF Pre- and Post-tests, a highly statistical significance was found in measures of reading comprehension tests (WRMT), which indicates growth in participants' performance as a whole.

4.2 A COMPARATIVE ANALYSIS OF THE EFFECTS OF MULTISENSORY STRUCTURED LANGUAGE (MSL) INTERVENTION IN ELLS' AND NON-ELLS' PERFORMANCE

Another point investigated in this study was whether multisensory structured language intervention would equally benefit ELLs and non-ELLs. For that interest, Research Question 5 was posed:

RQ5: Will multisensory structured language intervention equally benefit ELLs and non-ELLs? In case MSL intervention did not equally benefit ELLs and non-ELLs, which group of learners benefited the most from intervention?

and its respective Hypothesis:

H5: Multisensory structured language intervention will equally benefit ELLs and their monolingual peers (Birsh, 2011; Hook & Haynes, 2009; Macaruso & Hook, 2007; Macaruso & Rodman, 2011a; 2011b).

As demonstrated in Tables 10, 11, 12, and 13 below, there were no significant statistical differences between ELLs and non-ELLs' performance in Post-tests results, which indicate that all learners similarly benefited from MSL instruction delivered during intervention. Hence, Hypothesis 6 was confirmed.

Table 10: Post-test – TOWRE Sight Word Efficiency Test – ELLs and non-ELLs

	TOWRE Sight Word Efficiency Post-test	TOWRE Sight Word Efficiency Post-test
Mean	97.5	95.57142857
Variance	489.2142857	181.4571429
Observations	22	21
Pooled variance	339.0888502	
gl	41	
T Stat	0.343293621	
P(T<=t) two-tail	0.733131711	
t Critical two-tail	2.01954097	

$\alpha = 0.05$

Table 11: Post-test – TOWRE Phonemic Decoding Efficiency Test - ELLs and non-ELLs

	TOWRE Phonemic Decoding Post-test	TOWRE Phonemic Decoding Post-test
Mean	92.45454545	89.0952381
Variance	335.6883117	193.0904762
Observations	22	21
Pooled variance	266.1283919	
gl	41	
T Stat	0.674979987	
P(T<=t) two-tail	0.503477363	
t Critical two-tail	2.01954097	

$\alpha = 0.05$

Table 12: Post-test – CELF - ELLs and non-ELLs

	CELF Post-test	CELF Post-test
Mean	8.863636364	8.952380952
Variance	9.170995671	6.747619048
Observations	22	21
Pooled variance	7.988860733	
gl	41	
T Stat	-0.102916786	
P(T<=t) two-tail	0.91853076	
t Critical two-tail	2.01954097	

$\alpha = 0.05$

Table 13: Post-test – WRMT - ELLs and non-ELLs

	WRMT Post-test	WRMT Post-test
Mean	95.04545455	91.47619048
Variance	205.3787879	100.9619048
Observations	22	21
Pooled variance	154.4437229	
gl	41	

T Stat	0.941413256
P(T<=t) two-tail	0.352007185
t Critical two-tail	2.01954097

$\alpha = 0.05$

For TOWRE Sight Word, (Table 11), P(T<=t) was 0.73, $\alpha = 0.05$. For TOWRE Phonemic Decoding (Table 12), P(T<=t) was equivalent to 0.50, $\alpha = 0.05$. For CELF (Table 13), P(T<=t) corresponded to 0.91, $\alpha = 0.05$. Finally, for WRMT (Table 14), P(T<=t) was 0.35, $\alpha = 0.05$. These findings converge with previous studies in the sense that low-income limited English proficient children improve their reading competencies at the same degree as their monolingual peers do when exposed to MSL intervention in early stages of literacy instruction (Ayre et al. 2012; Lesaux, 2006; Lesaux, 2012; Mancilla-Martinez & Lesaux, 2011). This result may be confirmed mainly by the improvement in the reading comprehension test score, that is, the WRMT, which, in turn, may be understood as the result of instruction on decoding of real word and pseudoword reading, and listening comprehension practice in English. Some may argue that the task of reading one, two or three sentences may not be considered an actual task of reading comprehension. However, in order to investigate reading comprehension in beginning readers, low-level processes are involved, such as decoding and literal comprehension, the components that may provide some understanding on the reading difficulties that poor readers deal with (Gagné et al, 1993; Hook & Haynes, 2009).

Although listening comprehension ability showed a decrease in the scaled scores from Pre- to Post-tests (CELF), this result should be interpreted with caution. Kendeou and her research colleagues (2009) remark that in order to develop reading, along with decoding skills, oral language competencies are essential. The authors retake the discussion on the premises that compose the SVR and comment on the controversial findings about the importance of oral language skills in early reading comprehension. Kendeou et al. (p.774) appreciate that, controversies apart, "break(ing) the code by translating written symbols into meaningful words and the ability to extract meaning about events and facts and identify semantic relations between those events and facts" contribute to reading comprehension in early stages of reading acquisition.

In Macaruso and Rodman's study from 2011 with low SES English limited proficient kindergarten learners, intervention focused on

systematic and structured instruction on phonological awareness and phonics skills. Interestingly, results from listening comprehension subtests did not demonstrate a significant improvement, but, as a whole and similarly to results in the present study, learners that received computer-assisted instruction in English, ELLs and non-ELLs benefited from computer-assisted instruction.

The next section discusses the relationships among early reading skills and reading comprehension outcome.

4.3. CORRELATIONS AMONG READING SKILLS AND THE IMPACT ON READING COMPREHENSION

In order to gain some insight on ELLs' performances and to verify the premises proposed by the Simple View of Reading, that is, that reading is the product of decoding and listening comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000), Pearson correlations were run. The objective was to inquire which early reading skills exhibit correlations with ELLs' reading comprehension outcome. For that, Research Question 6 was formulated and its respective Hypothesis 6 proposed:

RQ6: Which early reading skills, that is, decoding of real words, phonemic decoding, and listening comprehension, significantly correlate with reading comprehension for at risk low SES ELLs?

and its hypothesis:

H6: Decoding of real words and phonemic decoding will more strongly correlate with reading comprehension than listening comprehension based on the fact that learners have limited English proficiency and come from low-income households (August & Shanahan, 2006; Adams, 1990; Gough & Tunmer, 1986).

Results for correlation among Pre-test are displayed on Table 14 and for Post-test on Table 15 below. From what was discussed in the section of aspects involved in reading development of at risk low SES ELLs, it was expected that sight word reading and phonemic decoding skills would correlate. Indeed, the hypothesis was partially confirmed by the strong correlation between Sight Word Efficiency and Phonemic Decoding Efficiency TOWRE ($r = 0.825597$, $p<0.05$, for Pre-tests, and $r = 0.803102$, $p<0.05$, for Post-tests).

Table 14. Pearson correlations among listening comprehension, decoding, phonemic decoding, and reading comprehension in Pre-testing phase

	Means	SD	CELF	TOWRE Sight Word	TOWRE Phonemic Decoding	WMRT
CELF	8.53	2.97888	1	-	-	-
TOWRE Sight Word	96.62	18.13445	-0.021792	1	-	-
TOWRE Phonemic Decoding	96.81	15.31301	-0.104246	0.825597**	1	-
WMRT	86.2	12.82401	0.065559**	0.484916**	0.463483**	1

**$p<0.05$

Table 15. Pearson correlations among listening comprehension, decoding, phonemic decoding, and reading comprehension in Post-testing phase

	Means	SD	CELF	TOWRE Sight Word	TOWRE Phonemic Decoding	WMRT
CELF	8.9	2.79297	1	-	-	-
TOWRE Sight Word	96.55	18.21996	0.305637	1	-	-
TOWRE Phonemic Decoding	90.81	16.20737	0.192119	0.803102**	1	-
WMRT	93.3	12.4107	0.370379**	0.607103**	0.494126**	1

**$p<0.05$

Hypothesis 6 predicted a stronger correlation between real word reading and phonemic decoding abilities. As discussed in the Review of the Literature and in the Method chapters, learners apply several strategies to identify some words as they read, whereas some others they recognize by sight, which may also be considered a strategy. Among the most employed strategies that early readers draw upon are blending phonemes, sounding out, grapheme-phoneme correspondence, to cite some. Therefore, it was predictable that real word and pseudoword reading skills would strongly correlate with each other as they did. Additionally, close mean scaled scores displayed on Tables 7 and 8 previously may also strengthen this correlation.

For the purpose of this study, I understand reading as a complex process that encompasses components that occur simultaneously and in parallel (Almeida, 2010; Gagné et al., 1993; Kintsch & van Dijk, 1978; Tomitch, 2003). Nonetheless, children become familiar with written language before school, meaning that literacy experiences start with oral language activities at home and with friends (Adams, 1990; August & Shanahan, 2006; Moats, 2010). Hence, it is possible to infer that decoding competencies for real word and pseudoword in ELLs' (and non-ELLs') are aligned with stages of reading development, as proposed by Chall (1983; 1983; as cited in Adams, and in Moats, 2010). Considering the moderate to strong correlation between TOWRE tests and WRMT, it seems reasonable to infer that learners not only successfully fulfilled Stage 1, Initial Reading, but also Stage 2, Confirmation and Fluency, in accordance to Chall's stages of reading development (1993; as cited in Moats, 2010). Findings indicate that learners began reading more fluently since their word recognition skills were more automatized. In addition to that, learners appear to have profited from the intervention and improved their decoding skills, at least for real word reading, fluency and learning strategies and also how to apply them to accurately decode pseudowords.

According to the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000), reading is the product of two components, decoding skills and oral language comprehension. In the case of limited English proficient learners, decoding skills correlate more with WRMT ($r = 0.484916$, $p<0.05$, and $r = 0.607103$, $p<0.05$ for Sight Word, Pre- and Post-tests, respectively; and $r = 0.463483$, $p<0.05$ and $r = 0.494126$, $p<0.05$ for Phonemic Decoding, Pre- and Post-tests, respectively) than measures of oral language comprehension ($r = 0.065559$, $p<0.05$ for CELF Pre-test and $r = 0.370379$, $p0.05$, for CELF Post-tests).

Another finding that corroborates previous research is the moderate to strong correlation between Phonemic Decoding TOWRE test and WRMT test ($r = 0.484916$, $p<0.05$ in the Pre-test). To a certain extent, findings from this study endorse findings from Mancilla-Martinez and Lesaux's study of 2010 with low-performance low-income Spanish-speaking students and provide evidence that the recommendation in the literature that systematic and explicit teaching of decoding skills and vocabulary may produce a substantial impact on reading comprehension performance.

Another aspect concerns the relationship between word recognition skills and oral language comprehension. There was a negative weak correlation in the Pre-testing phase between Sight Word and CELF ($r = -0.0217922$, $p>0.05$), as well as between Phonemic Decoding and CELF ($r = -0.104246$, $p>0.05$). Besides, there was a weak to moderate correlation in Post-testing phase between Sight Word and CELF ($r = 0.305637$, $p>0.05$), as well as between Phonemic Decoding and CELF ($r = 0.192119$, $p>0.05$). In my opinion, the negative correlation is in line with the assumption proposed by the SVR that reading comprehension difficulties may be caused by deficits in decoding skills, or in oral language comprehension, or in a combination of these two variables. In this sense, it appears acceptable to deduce that learners in this study exhibited more difficulties in comprehending oral language than in decoding written language. This is probably due to the fact that participants in this study were selected following the criteria that they were limited English proficient, low SES, and from low-income households, aspects likely to result in limited English oral language competency.

According to Hook and Haynes (2009) word identification and spelling components account for three subcomponents, namely, orthographic processing, phonological processing, and orthographic-phonological association. These subcomponents of the reading process are displayed on the top of the chart they designed, (and displayed on Figure 1 in the Review of the Literature chapter). Briefly retaking these concepts, while orthographic processing refers to the ability to process letter shapes individually or in groups, phonological processing refer to the ability to access the sound structure of a letter or a word. In this sense, orthographic-phonological associations encompass the capacity to fluently and accurately match grapheme-phoneme correspondences. TOWER Sight Word and Phonemic Decoding tests measured learners' abilities on word identification and spelling competencies. Thus, in line with Hook and Haynes' understanding and the SVR, EFA findings

support that word identification and spelling competencies measured by TOWER tests are factors that most contribute to reading outcomes.

In sum, results reported and discussed in Chapter 4 demonstrate that sight word and phonemic decoding skills largely contribute to reading comprehension. Listening comprehension skills do not seem to have the same impact as word recognition skills do, fact that may be explained because of the characteristics of the population of this study, at risk low SES English limited proficient learners. Findings from this study provide evidence that early reading skills stand out as fundamental competencies in at risk low SES learners.

The next chapter presents the final remarks regarding the present study.

CHAPTER 5
CONCLUDING REMARKS

Chapter 5 is divided into 3 sections. In the first section, Concluding remarks, I retake the main objectives of the present study, which guided the research questions proposed and the methodological procedures followed. I also summarize the main findings. Next, in section 2, limitations of the study and suggestions for further research are presented. Finally, in section 3, I tackle the pedagogical implications that derived from the present study.

5.1 CONCLUDING REMARKS

The main objective of this study was to examine early reading skills, namely decoding skills, which account for word recognition and phonemic decoding, as well as oral language comprehension in early literacy development, in low socioeconomically at risk ELLs. More specifically, it was also the objective to look into the effects of multisensory structured language teaching approach in ELLs' early reading skills development. For the purposes of this study, reading is understood as a complex cognitive process in which its subcomponents occur simultaneously and in parallel (Almeida, 2010; Gagné et al., 1993; Kintsch & van Dijk, 1978; Tomitch, 2003). Moreover, I am aligned with the literature that sustains that reading begins well before a child starts formal instruction at school and that emphasizes the importance of oral language proficiency, mainly for ELLs (Adams, 1990; Moats, 2010; Paradis et al., 2011). More specifically, and in agreement with the theoretical background that guided this investigation proposed by the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990; Hoover & Gough, 2000), reading is the product of decoding and oral language comprehension. Therefore, these early reading skills concur towards reading comprehension.

Additionally, this present investigation **also** verified the effects of multisensory structured language intervention in English limited proficient learners, based on previous studies' results that indicate that ELLs may benefit from computer-based and teacher-mediated intervention, to the same extent that their monolingual peers may (Macaruso & Rodman, 2011a; 2011b; Macaruso & Walker, 2008), given that the proper amount and quality of CAI is provided (Macaruso & Hook, 2006).

In order to verify those objectives, six research questions were formulated and their respective hypotheses posed. As follows, I succinctly retake the findings obtained as the results of these inquiries.

The first four research questions examined whether low SES at risk ELLs' performance improve on early reading skills, that is, real word reading, phonemic decoding, listening comprehension, and reading comprehension, after multisensory structured language intervention was carried out. As regards real word reading (TOWRE Sight Word Efficiency Test) and listening comprehension (CELF test), there was no significant statistical gains from Pre- to Post-test, but ELLs perform at considerable high-levels given their mean scale scores (Tables 6 and 8). As regards phonemic decoding (TOWRE Phonemic Decoding Efficiency Test), there was no significant statistical gain either, and mean scale scores decreased (Table 7), apart from the fact that they were above average. My hypotheses that MSL intervention would improve learners' achievement for all of these early reading skills were not confirmed.

My interpretation of those results is that first and foremost, phonics instruction largely applied by the school has been shown to be effective. Besides, compulsory administration of standard measures (DIBELS and ACCESS) by the school periodically evaluates students' development. It might be the case that tests applied by the school may not accurately reflect learners' competencies and produce biased results somehow.

Regarding the decrease in the phonemic decoding test, I believe that participants were more careful when taking this test because a great amount of MSL instruction focused on phonological awareness, phonics, and word attack strategies. Thus, it is possible that it took learners more time to go over the lists of pseudowords, on the grounds that they may tried to apply the strategies they learned, which, in turn, may have diminished their performance.

In the matter of listening comprehension, we can observe a difference in the mean scaled scores between ELLs and their monolingual peers, although not a very expressive one (Table 8). Perhaps, this is the early reading skill that actually differentiates English limited proficient participants from English-speaking ones in this study. Research has demonstrated that ELLs and monolinguals perform at the same level of accuracy and fluency as regards low level reading skills, such as decoding (August & Shanahan, 2006), which results from this study corroborate. As the SVR supports, oral language comprehension is an essential skill for reading, and since ELLs come from most

households which data indicate lack of oral English language exposure and low rates of income and education, their performance turned out poorer than their peers; nonetheless, not a significant one.

The fourth research question put forward investigated gains in reading comprehension achievement after MSL was implemented. There were significant gains relating to reading comprehension (Table 9). In agreement with the Simple View of Reading, reading is the outcome of two equally relevant competencies, i.e., decoding and oral language comprehension. Results demonstrated that decoding is automatized and learners successfully understood oral language, which resulted in meaningful improvement in reading comprehension (Table 9).

The fifth research question framed inquired whether multisensory structured language intervention would equally benefit ELLs and non-ELLs. Results shown in Tables 10, 11, 12, and 13 indicate that there were no significant statistical differences amongst Post-tests results between ELLs and non-ELLs, which supports that all learners benefited from MSL instruction delivered in intervention. Results endorse previous studies showing that at risk low SES ELLs enhance their reading achievement at the same degree as their monolingual peers do when exposed to MSL intervention in early stages of literacy instruction (Ayre et al. 2012; Lesaux, 2012; Lesaux, 2006; Mancilla-Martinez & Lesaux, 2011; Macaruso & Rodman, 2011a, 2011b). Findings are also supported by the WRMT Tests' results discussed above.

The last research question addressed which early reading skills, that is, decoding of real words, phonemic decoding, and listening comprehension, significantly correlate with reading comprehension for at risk low SES ELLs. As discussed, sight word reading and phonemic decoding skills strongly interrelated, result that may be also sustained by high scaled scores of Sight Word and Phonemic Decoding Tests, although there was no significant statistical gain from Pre- to Post-tests. In agreement with Brown-Chidsey and Steege (2010) and Birsh (2011), the development of oral (English) language and listening comprehension skills supported by systematic, structured and individually tailored intervention resulted in meaningful in reading comprehension for both English language learners and monolingual students that were at risk of school failure.

5.2 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

In spite of the fact that the present study was based on the most informed literature in the field, that the methodological procedures and standard instruments used for data collection were carefully designed, as Dörnyei (2007) advises, findings should be interpreted as suggestive, rather than conclusive. Additionally, limitations are acknowledged next and suggestions follow.

The first limitation concerns the sample size. The fact that 15 Master students from the Speech Pathology Program at the MGH-IHP dedicated their time and effort to contribute to improve reading skills of impoverished students is meritorious. However, a larger number of learners could have benefited from MSL intervention if we had more people involved in this study. In addition to that, a larger sample size would have provided more power to the statistical tests ran (Damásio, 2012; Dörnyei (2007; Larson-Hall, 2010)

Another drawback was that participants were not assessed in their L1s. Thus, it was not possible to set a relationship between L1 knowledge and L2 transfer. Although there were several L1s involved in this study, i.e., Cantonese, Spanish, Korean, Mandarin, Haitian, Cape Verdean, Chinese and Vietnamese, it would have been interesting to evaluate students' knowledge in L1. Some tests are already considered standard measures in other languages, and some other tests have Spanish versions, for example. My suggestion for this matter would be working with a smaller number of participants, given the limited resources to measure L1 and proficient staff available; nonetheless, it would have provided some resourceful data to scrutinize cross-linguistics relationships, as well as the similarities and differences in the case of more opaque languages, such as English, and more transparent ones.

There were other reading skills that were previously examined by the school and that were not examined in this study, which may be considered as another limitation. In DIBELS and ACCESS tests, learners are evaluated in phonemic awareness, alphabetic principle and phonics, and vocabulary, skills that were indirectly tests in TOWRE and WRMT tests. Having such measures at hand would help confirm or refute the school's results for DIBELS and ACCESS and the criteria as at risk learners.

There is another limitation that implicates studies conducted during scholarships programs as a whole, for instance, the PDSE. Apart from the fact that it is an extremely rewarding experience in itself, the

short period of time to organize and to conduct a study abroad is likely to counteract carrying out an empirical research. Although PhD candidates develop research projects before going abroad on the scholarship period, proposals are likely to be adapted several times until the researcher finds the place, population, schedule, to mention a few factors, to actually implement it. Additionally, having the District's permission to conduct experimental research with children in an American school may be more bureaucratic than one may imagine. The correct due date is one year before the study will be actually conducted, and its approval depend on several external factors. Consequently, it would be valid to consider starting the contact with potential collaborators and/or partners at least 1 year before the scholarship period. Indeed, the PhD candidate and the Brazilian and foreigner advisors may have enough time to plan and implement the study designed.

Intervention time is another drawback that directly derives from the lack of time described above. In this study, our research team (Dr. Haynes, LEXIA® staff, MHG-IHP professors, and MA students) managed to make 8 efficient weeks of intervention happen, and at least three more just for testing phases. Although following the guidelines set by Macaruso and Hook (2007) concerning proper implementation of intervention, I am sure that learners could have improved much more if we had more time for intervention with them.

Other limitations account for some qualitative resources, as well as quantitative ones, for instance, measures of home language use should be also considered, parents' profiles, and cultural aspects that may interfere in literacy acquisition and development.

Despite the limitations recognized above, this study provides empirical support for previous studies on the early reading skills of at risk low SES ELLs. Indeed, findings from the present investigation converge with up-to-date literature and empirical studies conducted.

Next, pedagogical implications are addressed.

5.3 PEDAGOGICAL IMPLICATIONS

To a certain extent, findings from this small scale exploratory study may help shed some light on how to readily identify struggling students and which methods to adopt to prevent them from failing school. As discussed in the Review of the Literature and supported by the results in this study, research has shown that although ELLs and non-ELLs perform similarly in word reading and spelling skills, ELLs

lag behind their English proficient peers in reading comprehension along school years. This performance gap may be explained by many different factors, including low educational level of ELLs' parents, impoverished socioeconomic status, and inadequate type of instruction and intervention. I believe that such elements resemble the most striking similarities between American learners and a considerable sample of Brazilian learners[21]: (1) parents' educational level is low, which directly influence students' performance at school; (2) families' income is much below average; and (3) struggling students do not receive adequate and necessary intervention. In this sense, findings from this study may also help inform pedagogy in the Brazilian context as discussed next.

Despite the fact that data for this study were collected in an American school with ELLs and native English speaking learners, I reckon that its findings are also relevant to the Brazilian educational scenario. The substantial gap in ELLs' literacy development results in reading difficulties that may be bridged to Brazilian learners resembling most striking similarities, such as (1) parents' educational level is low, which directly influences students' performance at school; (2) families' income is much below average; and (3) struggling students do not receive adequate and necessary intervention. Indeed, intervention and supplemental assistance may be applied to any educational context, since students come across similar obstacles in their learning to read process.

In addition to that, the Brazilian demographic scenario is gradually changing as we welcome more immigrants each year. Data from 2010 reveal that the number of immigrants doubled during the last decade: 268,201 immigrants live in Brazil compared to 143,644 from 2000, an increase of 86.7% (IBGE, 2010)[22]. More up-to-date numbers indicate that Brazil has received an increasing number of immigrants

[21] Data from IBGE (*Instituto Brasileiro de Geografia e Estatística*) show that Brazilian illiteracy rate of *analfabetos funcionais*, that is, those learners who completed only 4 years of instruction, correspond to 23.5%. Data from *Projeto Atenção Brasil* indicate that 20.1% of family breadwinners are illiterate or did not finish elementary school; 20.5% completed elementary school or did not finish middle school; 18.3% graduated from middle school or did not finish high school; 31.3% graduated from high school or did not finish an undergraduation course; and only 9.7% have an undergraduate degree.

[22] The immigrants come from: the USA (51,933), Japan (41,417), Paraguay (24,666), Portugal (21,376) and Bolivia (15,753).

from Haiti[23] and Syria[24], and certainly, these populations represent new challenges for Brazilian education scenario. Add to these numbers, multinational companies and business, research, tourists, and temporary workers that moved to Brazil because of worldwide events, such as Rio +20 (2012), the World Cup (2014), the summer Olympic Games (2016), to mention some factors that impact the needs for L2 instruction. These numbers indicate that the Brazilian work force needs L2 skills to be able to communicate in the workplace and that the Brazilian view as a monolingual country is antiquated and out-of-date.

According to the Evaluation System for Basic Education (*Sistema de Avaliação da Educação Básica* – SAEB)[25] devised by MEC - *Ministério da Educação* (the Brazilian Education Ministry) the three instances of Brazilian educational system (federal, state and municipal) are scrutinized with the aim to improve the quality, equality and efficiency of education provided to students. In 2013, the National Literacy Evaluation (ANA - *Avaliação Nacional da Alfabetização)*[26] was developed and incorporated into SAEB, with the objective to annually evaluate the literacy process development in 3rd grade learners in urban and rural public schools, in Portuguese (reading and writing) and in Mathematics.

The first ANA was applied at the end of 2013 school year and reached 2.3 million 8-year-old children attending 3rd grade in public

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[23] More information available at http://www.brasil.gov.br/cidadania-e-justica/2015/11/brasil-autoriza-visto-de-residencia-permanente-para-43-8-mil-haitianos.

[24] More information available at http://www.bbc.com/portuguese/noticias/2015/09/150904_brasil_refugiados_sirios_comparacao_internacional_lgb.

[25] The SAEB was restructured in 2005 and implemented two subsystems of evaluations: the National Evaluation of Basic Education (ANEB - *Avaliação Nacional da Educação Básica*)[25], and the National Evaluation of School Performance (ANRESC - *Avaliação Nacional do Rendimento Escolar*), also known as *Prova Brasil*. The ANEB runs on a survey basis covering 5th, 9th, and 11th grade learners, from public and private schools, in rural and urban areas, in Portuguese (reading and writing) and in Mathematics. The ANRESC - *Prova Brasil* runs on a census basis covering 5th and 9th grade learners from urban schools only, in Portuguese (reading and writing) and in Mathematics. For the full document, the reader is referred to http://portal.mec.gov.br/dmdocuments/saeb_matriz2.pdf.

[26] For the full document, the reader is referred to http://download.inep.gov.br/educacao_basica/saeb/ana/documento/2014/documento_basico_ana_online_v2.pdf.

schools. According to the *Pacto Nacional pela Alfabetização na Idade Certa* - MEC, 2012)[27], and as noted, students should be evaluated in 3rd grade, which is considered the last year of literacy learning cycle when students are expected to consolidate their literacy learning process. ANA results[28] showed that young students from 22 states in Brazil (out of 26 states and the Distrito Federal) have their reading level below the minimum expected. The Northern and Northeastern states presented the lowest levels of reading ability, while the Southern and Southeastern states had the highest indexes. More than half of the students in the North and Northeast regions displayed the two lowest levels (in a 4-point scale) concerning reading skills. In a similar vein, 20 states and the Distrito Federal held the two lowest level places of comprehension in Mathematics.

Other source that confirm Brazilian students ~~as~~ at risk of reading failure was data gathered from the questionnaire applied with *Prova Brasil* and its subsequent report *De olho nas metas* (2012)[29]. Results demonstrate that among Brazilian students most probable to fail in school are the African descendants and *Pardo*[30] learners (Louzano, 2012). Furthermore, data from PISA - ISEI and INSE note that families in the North and Northeast regions possess a very low SES, a fact that places these students at greater risk. Results from the report also ~~mentioned~~ indicate that in these regions, there is a 53% chance of an African descent student fails school and a 52% chance of the same student drops out of school The percentages diminished to 47% and 45%, respectively, if the student is *Pardo,* and to 46% if the student is White. The bottom line is that, as with ELLs in the US, cultural background and socioeconomic conditions seem to play a major role in

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[27] Comments available in http://pacto.mec.gov.br/images/pdf/Formacao/Ano_3_Unidade_3_MIOLO.pdf.

[28] The reader is referred to full comments and analyses available at http://download.inep.gov.br/educacao_basica/saeb/ana/resultados/2013/nota_explicativa_ana_2013.pdf.

[29] The reader is referred to the link http://www.todospelaeducacao.org.br//arquivos/biblioteca/de_olho_nas_metas_2012.pdf for the full document.

[30] According to IBGE, there are 5 skin-color or race groups that form the Brazilian population: White (Caucasian), Black (African descendant), Yellow (Oriental), and Indigenous and Pardo. The term *pardo* is used to describe a Brazilian person who has a mixture of races as their ancestors. For example: *mulato,* white and black descendant; *caboclo*, white and indigenous descendant; and *cafuzo*, black and indigenous descendant.

literacy acquisition of Brazilian students.

UNESCO also runs an independent assessment of the Brazilian elementary schooling system that shows the alarming school failure of 18.7% compared to 2.9%[31] worldwide. This means that 1 out of 5 students flunks elementary school and needs to be replaced in the 1st grade. The total average number is 7 million children and adolescents who fail learning to read and write during elementary school.

In addition to the Brazilian educational context discussed before, the results from the present investigation may also contribute to the field of English literacy development in English Language Learners. ELLs of all ages are an increasing population all around the world. People move to a foreign country, choose to live in another culture, accept a job offer on the other side of the globe, or decide to take up a graduate course. These are only some examples of "learners" of English language. Many other English language learners are limited proficient learners and need to have their individual differences observed in the literacy learning process. Research on low SES at risk ELLs remains sparse and needs replication and elaboration. Studies have demonstrated that ELLs and non-ELLs perform at a similar level of proficiency in word recognition skills, and when they experience difficulties, ELLs and non-ELLs share similar difficulties. However, in the long run, ELLs fall behind non-ELLs in measures of reading comprehension (August & Shanahan, 2006; Mancilla-Martinez & Lesaux, 2011). Findings from this study may shed some light not only for early readers of English who are at risk of flunking the school year; instead, they may be interpreted as a set of strategies that may aid teachers and students in the teaching-learning endeavor.

These strategies may be extended to Brazilian learners on the grounds that explicit and systematic instruction on linguistic aspects can be an effective tool to not only teach, but also identify struggling readers, and provide them with the necessary content they lack. Considering learners' individual differences and needs is a *sine quo non* condition to properly cater for their instruction. Strategy teaching should also be provided while accounting for central aspects that may influence the learning process, for instance, students' reading difficulties, their L1, type of instruction, to mention some factors.

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[31] *Relatório de Monitoramento da Educação para Todos Information* available at http://revistaescola.abril.com.br/formacao/repetencia-erro-se-repete-cada-ano-67983.shtml).

Moreover, findings from the present investigation also confirm the importance of adequate instruction, preferably multisensory structured language instruction that systematic, sequentially, and individually cater for learners' individual needs. Computer-assisted instruction (CAI) is a relative low-cost tool that may be used as an effective strategy. Since CAI is an adaptable resource, the program may foster for different levels of instruction and several fundamental reading skills.

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Appendix A - Parent Consent Form

Study Title: English Language Learners' Literacy Development after Computer-Aided Instruction in English

This is a consent form for your child to participate in a study. The text below tells you about this study and what to expect if you decide to let your child participate.

Why is this research being done?
Researchers at the MGH Institute of Health Professions want to see how second graders will respond to an after-school reading and language enrichment program with "LEXIA® CORE5®". LEXIA® CORE5® uses computer games and worksheets to teach children reading and language skills.

What you/your child will do
You have the right to decide if you do or do not want your child to participate in this after school program. To consent for your child to participate, please complete the last page of this form and return the entire form to Diane Gould at Harvard-Kent School. You will receive a copy of this completed form for your records.

The program will run from 3:45pm to 5:15pm, on Tuesdays, Wednesdays, and Thursdays, from January 20, 2014 to May 9, 2014. You will need to arrange for your child's transportation home after each session. If your child participates, he or she will continue to participate in school just like all of the other children in his/her class.

The Parent Consent Form should be signed and returned to school by January 17, 2014. Children from Grade 2 will be randomly selected to participate from the group of children who return a consent form. To be eligible:

- Children must be in the second grade,
- Parents and their children must have consented in writing to participate in the study,
- Participants must have normal hearing and vision; children who wear glasses or hearing aids must be able to see the computer screen easily and hear instructions easily

- Children may not have severe disabilities such as autism, developmental delays, or emotional disturbances. The reason these children are excluded is that they are more likely to have difficulty engaging in the instruction.

If your child is selected, you will be notified by phone and/or in writing between January 17 to January 19, 2014.

What will happen in the study

If your child is selected to participate, your child will be pre-tested and post-tested in language and reading by trained graduate students at the MGH-Institute of Health Professions. The pretesting will be done at the beginning of the study and the post-testing will be done at the end. The pre- and post-test sessions will each be 45-90 minutes long, depending on your child's needs. If necessary, this testing maybe divided into two or more shorter sessions. This testing will occur at the school during the after school enrichment program period, from 3:45 pm to 5:15 pm, on Tuesdays, Wednesdays, and Thursdays.

If your child is selected to participate, your child will be randomly assigned to one of two study groups. Group One will receive an average of 40, 30-minute sessions of CORE5® computer-based literacy instruction, twice a week. Group Two will also receive an average of 40, 30-minute sessions of literacy instruction twice a week. However, Group Two's sessions will be divided into 20, 30-minute sessions of CORE5® computer-based instruction and 20, 30-minute sessions of teacher instruction. For Group Two, teaching sessions will alternate between CORE5® computer-based literacy instruction and individualized instruction by a teacher. A doctoral student from the MGH-Institute of Health Professions will oversee the computer instruction and the teacher instruction.

Children in both Group One and Group Two will receive a total of 40, 30-minute instructional sessions, delivered twice weekly, in an after school enrichment program at the school from 3:45 pm to 5:15 pm on Tuesdays, Wednesdays, and Thursdays.

If a child misses a session, a back-up session may be scheduled with you in advance to complete the total number of 40 sessions.

All procedures for the study will happen in the after school enrichment program. Therefore, children will not miss any classroom instruction while participating in this study.

How will the information be collected and be kept confidential?

Your child's information will be given a unique identification code number. The code number and information about your child's performance will be carefully protected by research staff and stored in a secure location. This information will be available only to the research staff and the school principal.

Risks and Benefits

There are no known risks associated with your child's participation in this study.

The information obtained from this study may help us understand how to improve literacy instruction of English Language Learners and Native English Speaking Learners while providing students with personalized after school instruction in basic reading and language skills. Your child's participation may help us to better understand the effect of computer-based and teacher instruction on children's basic reading skills.

Questions and Concerns

You and your child are free to decide if you do or do not want to participate in this study. You or your child can also withdraw at any time without harming your relationships with the researchers, the MGH-Institute of Health Professions, or your school.

For questions and concerns about this study, you may contact the principal investigator, Dr. Charles Haynes at the MGH-Institute of Health Professions-room 418, in Charlestown Navy Yard, 36 1st Ave, Boston MA, 02129; phone: (617) 724-6311; email: chaynes@mghihp.edu.

You may also contact the co-investigator of this study Fabiana Almeida, at the MGH-Institute of Health Professions-room 223, in Charlestown Navy Yard, 36 1st Ave, Boston MA, 02129; phones: (617) 643-2830 (857) 333-5949; email: fachydealmeida@mghihp.edu

For questions about your child's right as a research participant, or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact MGH's Institutional Review Board at 617-952-6182.

How to give consent

To consent for your child to participate, please complete the next page of this consent form and return the entire form to Diane Gould at Harvard-Kent School. You will receive a copy of this completed form for your records.

Signing the Consent Form

I have read (or someone has read or translated for me) this form and I am aware that I am being asked to provide permission for my child to take part in this research study. I have had the opportunity to ask questions and have had them answered to my satisfaction.I am not giving up my legal rights by signing this form.

Please initial and complete one of the options below:

☐ **YES, I voluntarily agree to permit my child to participate in this after school enrichment program.**

_____

Printed name of subject (child)

_____

Printed name of the person authorized to provide permission for subject

_____

Signature of the person authorized to provide permission for subject

_____

Date

☐ **NO, I do not want my child to participate in this after school enrichment program.**

_____

Printed name of subject (child)

_____

Printed name of the person authorized to provide permission for subject

_____

Signature of the person authorized to provide permission for subject

_____

Relationship to the subject

_____

Date

Appendix B – Lexia CORE 5 Lesson

Lexia Lessons® | Picturing Details
COMPREHENSION: Levels 2, 3

Description

This lesson is designed to help students listen for details and form mental pictures of story events. Students are prompted to ask questions to improve understanding and clarify information.

Teacher Tips

You can use the structure of this lesson with other three-event narratives.

If this lesson involves more than one student, present the following rules for discussion: (1) Listen to each other, (2) take turns when talking, and (3) speak clearly.

Preparation/Materials

- A copy of the 4 pictures at the end of the lesson.

Warm-Up

(say) *Let's see what kinds of pictures we can make inside our head. Close your eyes. Now, picture a playground. What do you see?*

Elicit a variety of detailed responses (e.g., children on swings, two kids taking turns shooting baskets, or a big, yellow, covered slide).

(speech) *You just made pictures inside your head! When we listen to a story, we do the same thing. We picture what is happening to understand the story, even when we're not looking at pictures in a book.*

Direct Instruction

Display the picture of the bear on a swing.

(say) *Let's look at this picture. Listen as I describe what I see. The main thing I see is a bear at a playground. I can ask myself some questions to find the important details in the picture, like: How many? How big? What is happening?*

(speech) *How many bears do I see?* (one) *How big is the bear?* (she is little) *What is the bear doing?* (swinging) *So, some important details in this picture are the* ***number*** *of bears, the* ***size*** *of the bear, and* ***what*** *she is doing.*

Guided Practice

Display the picture of the two bears. Repeat the questions from Direct Instruction with this picture, eliciting responses to each question from the students. Then, display both bear pictures.

(say) *Listen to this sentence and pay attention to the details. Which picture shows what you hear in the sentence? "Bessie Bear is playing on the swingset."* (students point to picture) *"Bessie and Boris Bear are playing on the see-saw."* (students point to picture) *Do you have any questions about the main thing you see or the details in this picture? Remember that asking questions can help us understand better.*

Independent Application

Display the two clown pictures.

say *Remember, when we look at a picture, we look for the main thing. Be sure to ask yourself or others questions to help you understand better. What is the main thing in both of these pictures?* (clowns)

What are three important details you can ask yourself to find in the picture? (size, number, action)

If students have trouble answering, use the steps from Direct Instruction to elicit responses.

Now, listen to these sentences and pick the picture that shows what you hear. "The three tall clowns are juggling balls." (students point to picture) *"The two short clowns are making balloon animals."* (students point to picture)

Wrap-Up

Check students' understanding.

say *What are some questions you can ask yourself to make a detailed picture in your head?* (how many, how big, what are they doing).

Use students' responses to guide your choice of activities in the Adaptations section below.

Adaptations

For Students Who Need More Support

Option 1: Focus on simple pictures with only two questions to describe size and number.

Option 2: Use a wordless picture book to develop awareness of visual details. Look for pictures with clear numbers of objects, sizes, and actions. First describe something in a scene on one page. Ask a follow-up question for students to answer, first by visualizing and then by examining the page. For example:

say *The rain is falling hard on the city street. What do you think it looks like outside?* (Sample responses: Everything is wet; there are puddles; people have umbrellas.) *Let's look at the picture closely. What can we see?*

For Students Ready to Move On

Option 1: Add additional types of questions to the discussion about colors, shapes, and settings.

Option 2: When reading aloud from a picture book, give students opportunities to describe what they picture in their head before you display an illustration. Then talk about details that match the pictures they formed and other details that the artist included.

Students who complete this lesson should return to the online activities in ***Lexia Reading Core5****.*
For further development of automaticity with these skills, provide students with Lexia Skill Builders.

Description

This lesson is designed to help students understand the concept of antonyms and practice identifying appropriate antonyms for a variety of vocabulary words. As students engage in the lesson, they develop their vocabulary skills and broaden their vocabulary.

Teacher Tips

You can adapt this lesson by using vocabulary words that are appropriate for students' individual vocabulary levels. A list of possible antonym pairs to use in extending or adapting the lesson can be found at the end of this lesson.

Preparation/Materials

- Copies of the pictures and word cards at the end of this lesson.
- A thin, lightweight book and a thick, heavy book.

Direct Instruction

Say *Today we're going to work with antonyms. Antonyms are words that mean the opposite of each other.*

Display pictures of an elephant and a mouse.

Here is a picture of an elephant and a picture of a mouse. These animals are very different sizes.

Point to the elephant.

I wonder what word I can use to describe an elephant's size. How about ***big****? Yes, I can say that an elephant is big.*

Write the word **big** under the elephant and read it to students.

Point to the mouse.

What word I can use to describe the size of a mouse? How about ***little****? Yes, I can say that a mouse is little.*

Write the word **little** under the mouse and read it to students.

The words big and little both tell about sizes, but they have opposite meanings. They are antonyms. Antonyms are words that have opposite meanings. Big and little are antonyms.

When you want to figure out whether two words are antonyms, think about their meaning. If they have opposite meanings, then the two words are antonyms.

Guided Practice

Now let's work together to find antonyms for another word. Remember, antonyms are words that have opposite meanings, like big and little.

Pick up a thin, lightweight picture book.

This book doesn't weigh much. It is **light**.

Write the word **light**. Read it with students.

Now struggle to pick up a thick, heavy book.

This book weighs a lot. It is not light at all.

Write the words **wide** and **heavy**.

One of these words means the opposite of light. Which word means the opposite of light? (heavy) *Is this book heavy?* (yes) *Yes, it weighs a lot. It's not light. The words light and heavy are antonyms. They have opposite meanings. Wide does not mean the opposite of light; they are not antonyms.*

If students need additional practice before moving on to Independent Application, you can extend this task by using the antonym pairs provided at the end of this lesson along with objects or pictures from the classroom to illustrate.

Independent Application

Have students work in pairs or independently. Cut apart the picture cards at the end of the lesson and give each student/pair a set of picture cards along with the corresponding word cards.

Ask students to display the picture cards and find an antonym word card to match each picture. Not all word cards will be used.

Have students discuss what they see and read the word under the picture and the antonym they have selected (e.g., fast and quick). Have students use each word in a short sentence that tells about the picture and discuss whether the two sentences have opposite meanings.

If students need additional practice, you can extend this task by using the antonym pairs provided at the end of this lesson along with objects or pictures from the classroom to illustrate.

Wrap-Up

Check students' understanding.

What are antonyms? (Students may say they are words that are opposites, have opposite meanings, or are very different.)

How can you be sure that two words, like hot and cold, are antonyms? (Students' answers should get at word meaning. They might say that they decide if the words have opposite meanings or that cold means "not hot," so it's the opposite of hot.)

Use students' responses to guide your choice of activities in the Adaptations section below.

Adaptations

For Students Who Need More Support

Use the picture cards. Follow this procedure (which uses the hot sun card as an example):

say *I'm going to show you a picture of a word.*

Display the card and identify the target word **hot**. Have students repeat this word.

I'm going to show you a different word.

Display one of the word choices.

This word is ____ (yellow or cold, whichever you chose). Does (yellow or cold) mean the opposite of hot? Let's see.

Display an incomplete sentence using a blank for the target word (e.g., **It is __ today.**) Fill in the target word hot. Read it with students. (*It is hot today.*)

Insert the word you chose (yellow or cold) into the incomplete sentence. Ask students if this sentence has the opposite meaning of the first sentence.

Depending on the word you chose, sum up.

Hot and cold are antonyms. They are opposites. (Or say: Hot and yellow are not antonyms. They do not have opposite meanings.)

For Students Ready to Move On

Option 1: Use the antonym pairs at the very end of this lesson. Display and say one of the words, and then use it in an oral sentence.

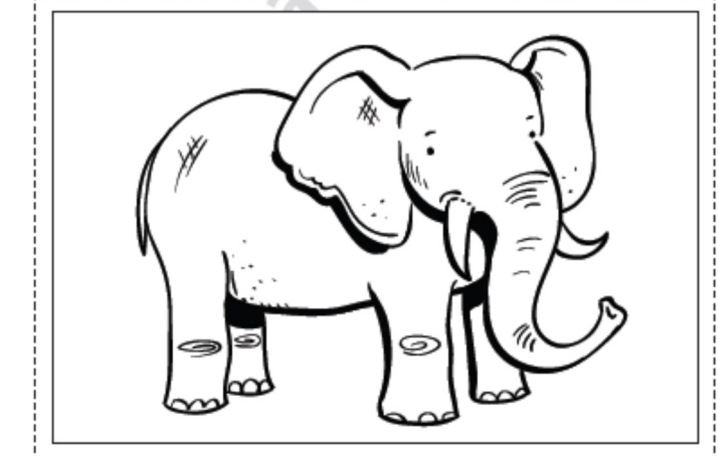
I'm thinking of a word that means the opposite as (pick one word in the pair). *It starts with* (give the beginning letter) *and ends with* (give the final letter). *What is the word?*

Option 2: Have students think of two words that are antonyms (or you might assign them a pair from the list at the very end of this lesson).

- Ask them to write these two words on the back of a piece of drawing paper.
- Direct them to the piece in half.
- On the blank side, they should draw two pictures, one in each half: a picture that goes with one of the words on one half, and a picture that goes with the other word on the other half.
- Have them display their picture and challenge classmates to figure out what two antonyms they pictured. (If necessary, have the drawer identify one of the words in the pair.)
- After the antonyms have been named, students can discuss each picture.

Students who complete this lesson should return to the online activities in ***Lexia Reading Core5****.*

For further development of automaticity with these skills, provide students with Lexia Skill Builders.



yellow

cold

dry

drip

Lexia Lessons® | Antonyms
VOCABULARY: Level 11

shell

fast

bed

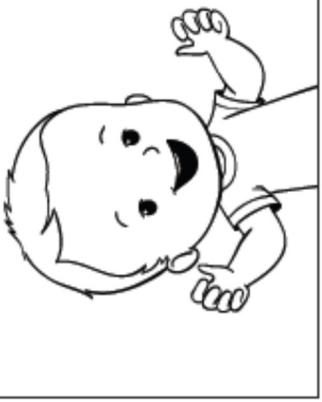
well

hard

mat

smile

sad



Antonym Pairs

First Word	Possible Second Word
sweet	sour
ugly	pretty
right	wrong
new	old
soft	hard
light	dark
slow	fast
shout	whisper
laugh	cry
found	lost
rainy	sunny
sick	healthy
give	take
thick	thin
dry	wet
happy	sad
sharp	dull
simple	fancy
high	low
come	go
start	end

Description

This lesson is designed to help students recognize common prefixes and understand that prefixes can change the meaning or form of a base word. The ability to identify prefixes serves as a foundation for understanding the structure of words (prefix, stem, suffix) and helps students develop word identification strategies for multi-syllabic words.

Teacher Tips

This lesson teaches prefixes using the prefix **re–**. Use the same sequence to give students practice with other prefixes (listed in the Adaptations section).

Preparation/Materials

- For each student, a piece of lined paper for use in Independent Application.
- Sticky notes (for Adaptations).

Direct Instruction

SAY *Today we are going to learn about prefixes. Prefixes are meaningful word parts that can be added to the beginning of a base word or a root.*

Write the word **return** on the board and read it aloud to students.

"I will return this book to the library." What does this sentence mean? (I will take back this book to the library.) *Re-turn, re– is a prefix.*

Circle the prefix: **(re)turn**

This prefix means back or again. Prefixes go at the front of words. In the word return, re– is in front of the word turn.

Underline the base word: **(re)turn**

Return means to take something back.

Write the word **replay** on the board.

Let's look at this word. To read words with prefixes, there are three steps we can use.
***Step 1**: Find the prefix and circle it.*

Circle the prefix: **(re)play**

***Step 2**: Underline the rest of the word and read it.*

Underline the base word: **(re)play**

***Step 3**: Read the whole word: re-play. Replay means to play something again. The prefix re– can mean again, like it does in the word replay.*

We can use these three steps every time we see a word with a prefix.

Guided Practice

Write the three steps for reading words with prefixes on the board.

Let's read some words together. Let's follow these three steps we just learned.

Point to the list of the three steps and read them again to students. Then, write a list of words on the board and ask students to take turns following these three steps to identify the parts of the word and read it aloud.

Words to use: **redo, rename, reread, remix, refold, redraw, reheat.**

Independent Application

Have students work independently or in pairs. Give students a piece of paper and ask them to number it 1-10 on separate lines. Write these 10 words on the board: **restring, retest, retell, redo, replace, refresh, resell, retype, repack, repaint.**

Let's see if you can find the prefix in these words on your own. Remember to circle the prefix, underline the rest of the word, and then read the word aloud.

Have the students complete the rest of the words on the word list while you walk around and check all students know how to do this while naming the steps.

Wrap-Up

Check students' understanding.

What is a prefix? (a meaningful word part that we add to the beginning of a word)

Which prefix did we learn today? (**re–**)

What does it mean? (again or back)

Use students' responses to guide your choice of activities in the Adaptations section below.

Adaptations

For Students Who Need More Support

Give students sticky notes.

On the board, write base words or roots that can be combined with the prefix **re–**.
Words to use: **do, mix, draw, name, read, place, type.**

Have students read the word, write **re–** on the sticky note, place it in front of a word, and read the new word.

For Students Ready to Move On

In subsequent lessons, four or five prefixes could be taught at a time.

Teach the prefixes in two groups: ones that can attach to base words, and ones that attach to roots.

Group 1: **un–, non–, mis–, dis–, in–**

Group 2: **pre–, con–, ad–, sub–, ex–, de–, pro–, ob–, ab–**

Students who complete this lesson should return to the online activities in ***Lexia Reading Core5.***
For further development of automaticity with these skills, provide students with Lexia Skill Builders.

Description

This lesson is designed to help students understand the concept of antonyms and practice identifying appropriate antonyms for a variety of vocabulary words. As students engage in the lesson, they develop their vocabulary skills and broaden their vocabulary.

Teacher Tips

You can adapt this lesson by using vocabulary words that are appropriate for students' individual vocabulary levels. A list of possible antonym pairs to use in extending or adapting the lesson can be found at the end of this lesson.

Preparation/Materials

- Copies of the pictures and word cards at the end of this lesson.
- A thin, lightweight book and a thick, heavy book.

Direct Instruction

(say) *Today we're going to work with antonyms. Antonyms are words that mean the opposite of each other.*

Display pictures of an elephant and a mouse.

Here is a picture of an elephant and a picture of a mouse. These animals are very different sizes.

Point to the elephant.

I wonder what word I can use to describe an elephant's size. How about **big**? *Yes, I can say that an elephant is big.*

Write the word **big** under the elephant and read it to students.

Point to the mouse.

What word I can use to describe the size of a mouse? How about **little**? *Yes, I can say that a mouse is little.*

Write the word **little** under the mouse and read it to students.

The words big and little both tell about sizes, but they have opposite meanings. They are antonyms. Antonyms are words that have opposite meanings. Big and little are antonyms.

When you want to figure out whether two words are antonyms, think about their meaning. If they have opposite meanings, then the two words are antonyms.

Guided Practice

SAY *Now let's work together to find antonyms for another word. Remember, antonyms are words that have opposite meanings, like big and little.*

Pick up a thin, lightweight picture book.

This book doesn't weigh much. It is ***light****.*

Write the word **light.** Read it with students.

Now struggle to pick up a thick, heavy book.

This book weighs a lot. It is not light at all.

Write the words **wide** and **heavy**.

One of these words means the opposite of light. Which word means the opposite of light? (heavy) *Is this book heavy?* (yes) *Yes, it weighs a lot. It's not light. The words light and heavy are antonyms. They have opposite meanings. Wide does not mean the opposite of light; they are not antonyms.*

If students need additional practice before moving on to Independent Application, you can extend this task by using the antonym pairs provided at the end of this lesson along with objects or pictures from the classroom to illustrate.

Independent Application

Have students work in pairs or independently. Cut apart the picture cards at the end of the lesson and give each student/pair a set of picture cards along with the corresponding word cards.

Ask students to display the picture cards and find an antonym word card to match each picture. Not all word cards will be used.

Have students discuss what they see and read the word under the picture and the antonym they have selected (e.g., fast and quick). Have students use each word in a short sentence that tells about the picture and discuss whether the two sentences have opposite meanings.

If students need additional practice, you can extend this task by using the antonym pairs provided at the end of this lesson along with objects or pictures from the classroom to illustrate.

Wrap-Up

Check students' understanding.

SAY *What are antonyms?* (Students may say they are words that are opposites, have opposite meanings, or are very different.)

How can you be sure that two words, like hot and cold, are antonyms? (Students' answers should get at word meaning. They might say that they decide if the words have opposite meanings or that cold means "not hot," so it's the opposite of hot.)

Use students' responses to guide your choice of activities in the Adaptations section below.

Adaptations

For Students Who Need More Support

Use the picture cards. Follow this procedure (which uses the hot sun card as an example):

I'm going to show you a picture of a word.

Display the card and identify the target word **hot**. Have students repeat this word.

I'm going to show you a different word.

Display one of the word choices.

This word is ____ (yellow or cold, whichever you chose). Does (yellow or cold) mean the opposite of hot? Let's see.

Display an incomplete sentence using a blank for the target word (e.g., **It is __ today.**) Fill in the target word hot. Read it with students. (*It is hot today.*)

Insert the word you chose (yellow or cold) into the incomplete sentence. Ask students if this sentence has the opposite meaning of the first sentence.

Depending on the word you chose, sum up.

Hot and cold are antonyms. They are opposites. (Or say: Hot and yellow are not antonyms. They do not have opposite meanings.)

For Students Ready to Move On

Option 1: Use the antonym pairs at the very end of this lesson. Display and say one of the words, and then use it in an oral sentence.

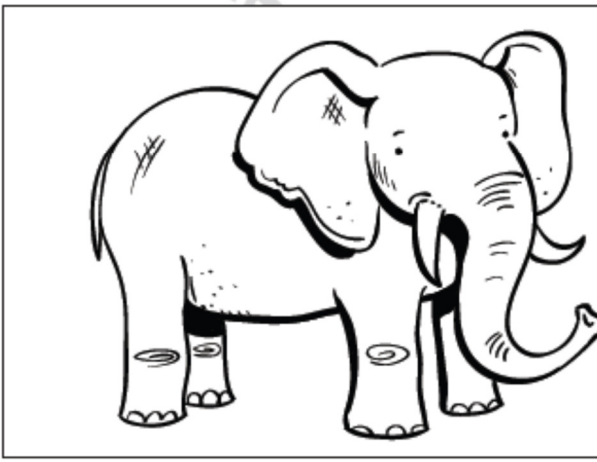
I'm thinking of a word that means the opposite as (pick one word in the pair). *It starts with* (give the beginning letter) *and ends with* (give the final letter). *What is the word?*

Option 2: Have students think of two words that are antonyms (or you might assign them a pair from the list at the very end of this lesson).

- Ask them to write these two words on the back of a piece of drawing paper.
- Direct them to the piece in half.
- On the blank side, they should draw two pictures, one in each half: a picture that goes with one of the words on one half, and a picture that goes with the other word on the other half.
- Have them display their picture and challenge classmates to figure out what two antonyms they pictured. (If necessary, have the drawer identify one of the words in the pair.)
- After the antonyms have been named, students can discuss each picture.

Students who complete this lesson should return to the online activities in ***Lexia Reading Core5****.*

For further development of automaticity with these skills, provide students with Lexia Skill Builders.



yellow

cold

dry

drip

shell

fast

bed

well

hard

mat

smile

sad

Antonym Pairs

First Word	Possible Second Word
sweet	sour
ugly	pretty
right	wrong
new	old
soft	hard
light	dark
slow	fast
shout	whisper
laugh	cry
found	lost
rainy	sunny
sick	healthy
give	take
thick	thin
dry	wet
happy	sad
sharp	dull
simple	fancy
high	low
come	go
start	end

Description

This lesson is designed to help students recognize common prefixes and understand that prefixes can change the meaning or form of a base word. The ability to identify prefixes serves as a foundation for understanding the structure of words (prefix, stem, suffix) and helps students develop word identification strategies for multi-syllabic words.

Teacher Tips

This lesson teaches prefixes using the prefix **re–**. Use the same sequence to give students practice with other prefixes (listed in the Adaptations section).

Preparation/Materials

- For each student, a piece of lined paper for use in Independent Application.
- Sticky notes (for Adaptations).

Direct Instruction

Today we are going to learn about prefixes. Prefixes are meaningful word parts that can be added to the beginning of a base word or a root.

Write the word **return** on the board and read it aloud to students.

"I will return this book to the library." What does this sentence mean? (I will take back this book to the library.) *Re-turn, **re–** is a prefix.*

Circle the prefix: (**re**)**turn**

*This prefix means back or again. Prefixes go at the front of words. In the word return, **re–** is in front of the word **turn**.*

Underline the base word: (**re**)**turn**

Return means to take something back.

Write the word **replay** on the board.

Let's look at this word. To read words with prefixes, there are three steps we can use.
***Step 1**: Find the prefix and circle it.*

Circle the prefix: (**re**)**play**

***Step 2**: Underline the rest of the word and read it.*

Underline the base word: (**re**)**play**

***Step 3**: Read the whole word: re-play. Replay means to play something again. The prefix **re–** can mean again, like it does in the word replay.*

We can use these three steps every time we see a word with a prefix.

Guided Practice

Write the three steps for reading words with prefixes on the board.

say *Let's read some words together. Let's follow these three steps we just learned.*

Point to the list of the three steps and read them again to students. Then, write a list of words on the board and ask students to take turns following these three steps to identify the parts of the word and read it aloud.

Words to use: **redo, rename, reread, remix, refold, redraw, reheat.**

Independent Application

Have students work independently or in pairs. Give students a piece of paper and ask them to number it 1-10 on separate lines. Write these 10 words on the board: **restring, retest, retell, redo, replace, refresh, resell, retype, repack, repaint.**

say *Let's see if you can find the prefix in these words on your own. Remember to circle the prefix, underline the rest of the word, and then read the word aloud.*

Have the students complete the rest of the words on the word list while you walk around and check all students know how to do this while naming the steps.

Wrap-Up

Check students' understanding.

say *What is a prefix?* (a meaningful word part that we add to the beginning of a word)

Which prefix did we learn today? (re–)

What does it mean? (again or back)

Use students' responses to guide your choice of activities in the Adaptations section below.

Adaptations

For Students Who Need More Support

Give students sticky notes.

On the board, write base words or roots that can be combined with the prefix **re–**.
Words to use: **do, mix, draw, name, read, place, type.**

Have students read the word, write **re–** on the sticky note, place it in front of a word, and read the new word.

For Students Ready to Move On

In subsequent lessons, four or five prefixes could be taught at a time.

Teach the prefixes in two groups: ones that can attach to base words, and ones that attach to roots.

Group 1: **un–, non–, mis–, dis–, in–**

Group 2: **pre–, con–, ad–, sub–, ex–, de–, pro–, ob–, ab–**

Students who complete this lesson should return to the online activities in ***Lexia Reading Core5****.*
For further development of automaticity with these skills, provide students with Lexia Skill Builders.

Appendix C – Pre-tests – ELLs and non-ELLs

Table C1: **Pre-test – TOWRE Sight Word Efficiency Test**

	TOWRE Sight Word Efficiency Pre-test	TOWRE Sight Word Efficiency Pre-test
Mean	97.5	95.28571429
Variance	420.547619	248.2142857
Observations	22	21
Pooled variance	336.4825784	
gl	41	
T Stat	0.39567547	
P(T<=t) two-tail	0.694395919	
t Critical two-tail	2.01954097	

$\alpha = 0.05$

Table C2: **Pre-test – TOWRE Phonemic Decoding Efficiency Test**

	TOWRE Phonemic Decoding Pre-test	TOWRE Phonemic Decoding Pre-test
Mean	97.09090909	96.52380952
Variance	247.1341991	232.7619048
Observations	22	21
Pooled variance	240.1233238	
gl	41	
T Stat	0.119957913	
P(T<=t) two-tail	0.905102391	
t Critical two-tail	2.01954097	

$\alpha = 0.05$

Table C3: **Pre-test - CELF**

	CELF Pre-test	CELF Pre-test
Mean	7.909090909	9.19047619
Variance	10.84848485	6.361904762
Observations	22	21
Pooled variance	8.659909196	
gl	41	
T Stat	-1.427282109	
P(T<=t) two-tail	0.16107085	
t Critical two-tail	2.01954097	

α = 0.05

Table C4: **Pre-test - WRMT**

	WRMT Pre-test	WRMT Pre-test
Mean	85.90909091	86.52380952
Variance	254.8484848	77.56190476
Observations	22	21
Pooled variance	168.3672263	
gl	41	
T Stat	-0.15528673	
P(T<=t) two-tail	0.877357275	
t Critical two-tail	2.01954097	

α = 0.05

Appendix D – Descriptive analyses on participants

Table D1: 1st Grade English Language Learners

1st Grade ELL

	Student	Male (0) Female (1)	Age (years/months/days)	Grade	ELL (0) non-ELL (1)
1	Participant 1	1	7.1.9	1	0
2	Participant 2	0	7.5.20	1	0
3	Participant 3	0	6.11.7	1	0
4	Participant 4	0	6.6.13	1	0
5	Participant 5	1	6.5.11	1	0
6	Participant 6	0	6.10.25	1	0
7	Participant 7	0	7.0.4	1	0
8	Participant 8	0	6.7.2	1	0
9	Participant 9	0	6.8.2	1	0
10	Participant 10	0	6.5.23	1	0
11	Participant 11	0	7.3.9	1	0

Table D2: 1st Grade non-ELLs

1st Grade non-ELL

	Student	Male (0) Female (1)	Age (years/months/days)	Grade	ELL (0) non-ELL (1)
1	Participant 1	0	6.6.11	1	1
2	Participant 2	0	7.4.8	1	1
3	Participant 3	1	6.9.10	1	1
4	Participant 4	0	6.8.1	1	1
5	Participant 5	1	7.4.17	1	1
6	Participant 6	0	7.0.2	1	1

Table D3: 2nd Grade English Language Learners

2nd Grade ELL

	Student	Male (0) Female (1)	Age (years/months/days)	Grade	ELL (0) non-ELL (1)
1	Participant 1	0	8.2.11	2	0
2	Participant 2	1	8.10.25	2	0
3	Participant 3	1	8.4.8	2	0
4	Participant 4	0	8.4.5	2	0
5	Participant 5	0	9.0.3	2	0
6	Participant 6	0	8.9.5	2	0
7	Participant 7	0	7.11.25	2	0
8	Participant 8	1	7.11.9	2	0
9	Participant 9	1	7.5.20	2	0
10	Participant 10	0	7.3.12	2	0
11	Participant 11	1	8.4.29	2	0

Table D4: 2nd Grade non-ELLs

2nd Grade ELL

	Student	Male (0) Female (1)	Age (years/months/days)	Grade	ELL (0) non-ELL (1)
1	Participant 1	0	8.7.28	2	1
2	Participant 2	0	7.11.5	2	1
3	Participant 3	0	8.2.9	2	1
4	Participant 4	0	7.10.28	2	1
5	Participant 5	0	8.6.1	2	1
6	Participant 6	1	8.6.1	2	1
7	Participant 7	1	8.2.2	2	1
8	Participant 8	1	7.11.20	2	1
9	Participant 9	1	8.0.9	2	1
10	Participant 10	0	8.0.13	2	1

11	Participant 11	0	8.0.11	2	1
12	Participant 12	0	7.5.16	2	1
13	Participant 13	1	8.8.18	2	1
14	Participant 14	1	8.7.8	2	1
15	Participant 15	1	8.0.15	2	1