Impact of Explicit Phonological Awareness Instruction on Spelling Knowledge, Orthographic Processing Skills, and Reading Speed and Accuracy of Adult Arab ESL Learners

Meshari Alshammari
IMPACT OF EXPLICIT PHONOLOGICAL AWARENESS INSTRUCTION ON
SPELLING KNOWLEDGE, ORTHOGRAPHIC PROCESSING SKILLS, AND READING
SPEED AND ACCURACY OF ADULT ARAB ESL LEARNERS

By
MESHARI ALSHAMMARI

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Meshari Alshammari defended this dissertation on November 6, 2015.

The members of the supervisory committee were:

Rebecca Galeano
Professor Directing Dissertation

Michael Uzendoski
University Representative

Elizabeth Jakubowski
Committee Member

Diana Rice
Committee Member

Phyllis Underwood
Committee Member

The Graduate School has verified and approved the above-named committee members, and certifies that the dissertation has been approved in accordance with university requirements.
To my parents Hassan and Mashael:
The reason of what I become today,
Thanks for your great care and continuous support.

To my beloved wife Eman:
The reason of all my accomplishments,
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ABSTRACT

This quantitative study investigated potential effects of providing explicit phonological instruction on international students’ spelling knowledge, orthographic processing skills, and reading speed and comprehension. In addition, the study compared Arab participants to their non-Arab peers in four particular aspects: gains, interaction, performance and differences between the two groups before and after the treatment. The phonological instruction consisted of five groups of the English sounds, six groups of blends, five phonetic skills, and two decoding skills. The phonological instruction was carried out during the reading class time and delivered for a month.

A total of 53 ESL international students participated in the study. Analyses employed three different grouping criteria: one whole group (n = 53), two main groups: Arab (n = 38) and non-Arab (n = 15), and three main groups: foundation (only Arab n = 4), beginner (Arab n = 27 + non-Arab n = 8) and low intermediate (Arab n = 7 + non-Arab n = 7). All participants took pretests in spelling, pseudowords (nonsense words), and reading speed and comprehension, went through the phonological instruction treatment, and took posttests in the same skills. The spelling and pseudoword pre and posttests were identical across all participants in all proficiency levels. However, reading speed and comprehension pre and posttests were identical in each proficiency level but different across all proficiency levels.

Due to an unexpected change in the study design, all participants were exposed to the phonological instruction treatment and there was no control group. Consequently, the study could not provide a direct evidence for the impact of the phonological instruction treatment on the target skills. Nevertheless, in the first aspect where the study analyzed gain scores of participants in the target skills, findings from this study revealed that all participants (n = 53)
scored in the posttests significantly higher than the pretests in both spelling and pseudoword. However, when separating participants into two groups: Arab and non-Arab, findings showed that the Arab group increased significantly in both spelling and pseudoword whereas the non-Arab group increased significantly only in spelling but not in pseudoword. Further, while each group of Arab and non-Arab participants in the beginner level did not significantly increase in reading speed, each group of Arab and non-Arab students in the low intermediate level significantly increased in the posttest. Moreover, each group of Arab and non-Arab participants in both beginner and low intermediate levels did not significantly increase in the comprehension posttests.

In the second aspect, the study examined differences in performance between the two groups of participants in the target skills. Findings showed that differences found in the way the two groups changed over time in the gain scores of all target skills were not statistically significant.

In the third aspect, the study compared Arab to non-Arab participants based on their gain scores in the target skills. In spelling, findings showed that none of the two groups outperformed the other because both groups significantly increased in spelling. In pseudoword however, findings suggested that Arab participants outperformed their non-Arab peers because only Arab students significantly increased in their pseudoword gains scores. In reading speed, because none of the two groups in the beginner level significantly increased in their gain scores, findings suggested that none of two groups outperformed the other. Similarly, findings suggested that none of the two groups in the low intermediate level outperformed each other because both groups significantly increased in reading speed.
The Arab and non-Arab groups in both the beginner and the low intermediate levels did not significantly increase in the comprehension gain scores, therefore, findings suggested that none of the groups in either proficiency level outperformed the other.

In the fourth aspect, the study analyzed differences in the pre-existing knowledge between Arab and non-Arab groups in the target skills according to their mean scores in the pretests. Findings suggested that while spelling background knowledge of the non-Arab group is substantially significantly richer than the spelling background knowledge of the Arab group, the two groups did not significantly differ in their background knowledge in English orthographic conventions. Furthermore, findings exhibited that non-Arab participants in the beginner level were reading with a significantly higher rate in the pretest than their Arab counterparts. On the other hand, findings revealed that there were no significant differences between low intermediate Arab and non-Arab groups in their reading speed prior to the phonological instruction. In comprehension, findings showed that the non-Arab group in both beginner and low intermediate levels scored significantly higher than their Arab peers in the pretest.
CHAPTER ONE
INTRODUCTION

Adult international students, who seek academic degrees in foreign countries such as the United States, usually undergo two phases. The first phase is devoted to learning the English language skills at university-based intensive English programs. By the end of this phase, international students are expected to possess sufficient proficiencies in English skills such as grammar, composition, reading, speaking and listening that would make them competent not only academically but also socially. The second phase begins when international students depart the intensive English programs to attend their specific academic programs. During this phase, international students should be able to preserve, practice and use their English language skills effectively to achieve success in their academic programs.

Despite the fact that international students receive intensive instruction on English skills in the first phase, some of them fall short of one or more of English skills during the second phase for various reasons. One possible reason is that students might leave the intensive English programs lacking sufficient proficiency in language skills. This would consequently lead to other complex problems that might impede their academic success. For instance, Mori (2000) rationalizes international students’ inability to understand lectures, take notes, complete tests and homework in reading and writing, verbally express their opinions and thoughts, and ask questions in class discussion by students’ inadequate English language skills.

Lagging behind in one or more of English language skills in second language learners does not necessarily indicate a linguistic flaw. In reading for example, Geva (2000) stresses that teachers of ESL students must be able to distinguish reading difficulties pertaining to L2 linguistic deficiencies from difficulties related to general reading/learning disorders such as
dyslexia. Consequently, ESL teachers need to adopt accurate measurements to determine students’ strengths and identify their weaknesses in reading skills. However, assessing students’ reading abilities and identifying their limitations are very challenging tasks (Durgunoglu, 2002; Harrison & Krol, 2007). This is because of issues such as heterogeneity in students’ linguistic and socioeconomic backgrounds and due to their varying degrees of literacy in their first languages (Harrison & Krol, 2007).

Difficulties in reading and its sub-component skills are common in international students and widely investigated in the field of second language acquisition. Examples of studies looked at different reading sub-component skills are orthographic processing skills (Ryan & Meara, 1991; Cunningham, Perry & Stanovich, 2001), reading fluency (Nation, 2009; Grabe, 2010; Yamashita & Ichikawa, 2010) and phonological awareness and spelling (Jongejan, Verhoeven & Siegel, 2007; Yeung, Siegel & Chan, 2013).

Raising the awareness of ESL teachers to accommodate various reading needs of low proficient second language learners becomes a necessity. According to Tindall & Nisbet (2010), it is important that teachers of English as a second language have a substantial understanding of how reading works in L2 and what physical and mental processes are carried out while reading in order to help learners of English to become skillful readers. ESL teachers need to accommodate not only reading difficulties of second language learners but also the other major language skills. For instance, Zhang and Mi (2010) point out some language-related problems that international students encounter in their academic degrees such as difficulties in speaking, listening and writing.
Background to the Study

The National Reading Panel (2000) defines reading as a complex system of deriving meaning from print comprised of five essential components: phonological awareness, decoding skills, fluency, vocabulary, and comprehension. Reading is fundamental because it is the way to learn all other subject matters whether learners are children or adults and whether they learn how to read in their first languages or in a second or foreign language (Dong, 2004; Mayer, 2004).

Whether in the first language or in a foreign or second language, reading is the core receptive skill that contributes to children and adults’ cognitive growth and academic development. Nation (2009) describes the visual processes that occur during reading claiming that readers engage in three types of actions: fixation on particular words, moving to the next item to read, and regression or moving back to item(s) just been processed. Reading consists of many sub-skills that are essential to successful text processing and constructing of meaning. In order to comprehend a message signified in print, readers engage in two levels of processing: word level and sentence or text level processing. First, at the word level, recognizing a word requires complex processes to access its meaning. Examples of basic processes at the word level are orthographic processing, phonological processing and access to lexical entries (Grabe, 2009). For instance, when beginning readers encounter an unknown word either in their native language or in their second language, they may engage in several techniques in order to identify the word and comprehend its meaning. For example, Tindall and Nisbet (2010) suggest that beginning readers can start by analyzing the word phonetically (What sounds do I know?) then they proceed to analyze the pattern of the word (What part of the word do I know?). Beginning readers may use context to identify the word (What can I use for help?). They can look at accompanying illustrations, take all the clues available, read to the end of the sentence and figure
out how this word makes sense in the sentence. Furthermore, at sentence and extended text level, readers engage in further complex processes.

Two models explain how readers comprehend meaning of sentences or extended texts: the text model and the situational model. In the text model, readers’ understanding is shaped by the message imposed by the text whereas in the situational model, message of the text is shaped by readers’ interpretations according to their own experiences and background knowledge (Grabe, 2009). A pressing concern is how intensive English programs should focus classroom instruction when teaching reading skills to adult international students.

**Adult English Learners and Intensive English Programs: First Transition**

Transition to new educational and cultural environments creates new needs, expectations and demands. Adult non-native speakers of English who come to the U.S. to pursue academic degrees often start their journeys in English intensive programs. Regardless of similarities and differences between the English language and adult international students’ first languages, some adult English learners face some struggles in reading.

Although reading is fundamental for success in academic endeavors, it can be challenging for adult English learners in various ways. Cheng (1996) asserts that obtaining higher degrees for foreign language learners in English medium universities depends primarily on students’ academic reading competency. For instance, adult learners of English as a second language, who already learned how to read in their first languages, must learn to read all over again but in a different language with different text structure and perhaps for different purposes. ESL learners will need to engage in learning different reading styles, techniques and strategies that they might not be aware of before learning a second language. In addition, ESL students need to expect that they will encounter features and aspects of English language that do not exist in their first
languages. For example, orthography, syntax and spelling conventions of international students’ first languages may not be similar to English orthography, grammar and spelling. Therefore, intensive English programs are expected to put into perspective not only these linguistic differences but also social and cultural differences.

Grabe (2009) explains three major sets of differences between reading in a first language and second language: linguistic and processing differences, developmental and educational differences, and sociocultural and institutional differences. Grabe warns that linguistic and processing differences mean that readers use their L2 linguistic resources to process L2 texts for comprehension instead of their L1 linguistic resources. For example, L2 readers will have to use their knowledge of L2 decoding skills, lexicon and grammar structures to understand L2 texts. In addition, Grabe states that developmental and educational differences in L2 reading refer to the higher-level cognitive abilities that are used to understand L2 texts. For instance, L2 text readers differ in their abilities to identify main ideas, draw inferences and conclusions, search for main ideas or for specific details, and integrate new learned information to their background knowledge. Moreover, Grabe claims that the sociocultural and institutional differences refer to the broader cultural, societal and institutional contexts that influence how and why students learn to read in second language context. For instance, institutional and cultural expectations in both L1 and L2 environments have differing impacts on literacy, types of texts produced and read, objectives of reading, text interpretation, and literacy experiences.

Since not all adult learners of English are proficient readers (Burt, Peyton & Adams, 2003), intensive English programs are responsible for assessing international students’ reading competencies, determining their weaknesses, and designing curricula and instructional methodologies accordingly (Zhang & Mi, 2010). A noteworthy fact though about reading is that
it has an unobservable nature in that one cannot see the process or observe a specific mental product of reading therefore, all assessment of reading must be inferential (Abeywickrama & Brown 2010). In addition, Van Staden’s (2011) study supports studies of (Burt et al., 2003; Zhang & Mi, 2010) and asserts that despite the fact that many learners of English as a second language lack adequate reading skills, much research is still needed to investigate reasons for such limitations and suggest useful solutions.

**Adult Learners of English and Higher Education: Second Transition**

After completing an intensive English program and achieving the threshold of university admission requirements, a second transition is made from the intensive English programs to the academic settings where second language learners pursue actual academic degrees. Upon entering an academic program, adult learners of English are expected to read, understand and discuss materials that are related to their various academic fields at a rate comparable to that of their native English-speaking classmates.

Nevertheless, some adult learners of English lack reading skills (e.g. associating letters to sounds, word recognition and decoding skills, reading speed and spelling) and therefore they take more time to process texts focusing on basic skills which negatively affects text comprehension (LaBerge & Samuels, 1974). As a result, their classroom performance is not sufficient and their overall achievement is more likely to be below what English learners would expect (Robertson, Line, Jones & Thomas, 2000). Therefore, it is important to make sure that before adult learners of English leave intensive English programs, they have mastered the skills that are crucial for fulfilling the expectations in academic programs.

This study attempts to analyze some difficulties that occur at different reading sub-skills in the performance of adult international students who study English in a university-based
intensive English program in the United States. Specifically, this study investigates the effect of explicit phonological awareness instruction on spelling knowledge, orthographic processing skills, and reading speed and accuracy of adult Arab and non-Arab learners of English as a second language at the Center for Intensive English Studies at the Florida State University. In addition, this study aims at comparing performance and gains of Arab speaking students to those of their non-Arab speaking peers before and after implementing the intervention.

**Statement of the Problem**

University-based Intensive English Programs in the United States face the challenge of preparing diverse international students for undergraduate/graduate classes in various academic programs where the primary language of classroom discussion is only English. A central issue of concern is that some of these students struggle to read and understand specialized materials relevant to their academic fields of study and may take more time to process texts than their native English speaking classmates would take in reading and comprehension. Existing literature suggests that inadequate performance of international students in L2 reading is associated with the lack of basic skills in word identification such as phonological processing, orthographic processing, spelling knowledge and decoding.

Further, literature available supports that a deficiency in one or more of these basic skills would negatively affect reading fluency and comprehension. Moreover, insufficiency in reading skills could make international students more vulnerable to abstain from discussing reading materials with their classmates and could negatively affect their grades. This could lead international students to fall behind classes and eventually leave the university before the completion of their intended degrees.
Purpose of the Study

The literature supports that implementation of explicit phonological awareness instruction could positively influence variety of reading skills of international students who learn English as a second language. Therefore, the purpose of this study is to examine whether delivering explicit phonological instruction during the reading class time would impact the spelling, orthographic processing skills and reading speed and comprehension of two groups of participants: Arab and non-Arab adult ESL students within their proficiency level and across all proficiency levels. Furthermore, the study aims to investigate whether international students with various language backgrounds would significantly benefit from the phonological instruction. Moreover, the study attempts to examine whether one group of participants would significantly differ in performance from the other group and whether one group of participants would significantly outperform the other group in the target skills. In addition, the study also aims to investigate whether the two groups were already different in the target skills prior to implementing the phonological instruction. In other words, the study compares Arab participants to their non-Arab peers in their gains, performance and background knowledge differences in the target skills taking in account their various proficiency levels.

Research Questions

This study consists of four overarching research questions each of which comprises a bundle of specific research questions. The major questions and their related sub-questions are described below.

Research Question #1

The overarching question: How do Arab students compare to non-Arab students in spelling?
a) Does explicit phonological awareness instruction influence the English spelling knowledge of adult international Arab and non-Arab students?

b) Looking at spelling gain scores of the entire sample regardless of their L1 background (Arab and non-Arab) or their proficiency levels (foundation, beginner or low intermediate), do students score significantly higher on the spelling posttest than the pretest?

c) Does performance of the two groups vary significantly in spelling gain scores from pretest to posttest?

d) Comparing spelling gains of Arab students to the spelling gains of their non-Arab peers, does one group of participants outperform the other?

e) Comparing Arab to the non-Arab participants according to their spelling baseline and ending mean scores, do the two groups significantly differ from each other?

Research Question #2

The overarching question: How do Arab students compare to non-Arab students in pseudoword?

a) Does explicit phonological awareness instruction have an impact on the English orthographic processing skills of adult Arab and non-Arab students?

b) Looking at pseudoword gain scores of all participants regardless of their L1 background (Arab and non-Arab) or their proficiency levels (foundation, beginner or low intermediate), do students score significantly higher on the pseudoword posttest than on the pretest?

c) Does performance of the two groups vary significantly in pseudoword gain scores from pretest to posttest?
d) Comparing pseudoword gains of Arab students to the pseudoword gains of their non-Arab peers, does one group of participants outperform the other?

e) Comparing Arab to the non-Arab participants according to their pseudoword baseline and ending mean scores, do the two groups significantly differ from each other?

Research Question #3

The overarching question: How do Arab students compare to non-Arab students in reading speed?

a) Does explicit phonological awareness instruction influence reading speed of adult international Arab and non-Arab students?

b) Does performance of the two groups in the beginner level vary significantly in reading speed gain scores from pretest to posttest?

c) Comparing reading speed gains of beginner Arab participants to those of their beginner non-Arab peers, does one group of participants outperform the other?

d) Comparing beginner Arab students to their beginner non-Arab peers according to their reading speed baseline and ending mean scores, do the two groups significantly differ from each other?

e) Does performance of the two groups in the low intermediate level vary significantly in reading speed gain scores from pretest to posttest?

f) Comparing reading speed gains of low intermediate Arab students to those of their low intermediate non-Arab peers, does one group of participants outperform the other?

g) Comparing low intermediate Arab students to their low intermediate non-Arab peers according to their reading speed baseline and ending mean scores, do the two groups significantly differ from each other?
Research Question #4

The overarching question: How do Arab students compare to non-Arab students in comprehension accuracy?

a) Does explicit phonological awareness instruction influence comprehension accuracy of adult international Arab and non-Arab students?

b) Does performance of the two groups in the beginner level vary significantly in comprehension gain scores from pretest to posttest?

c) Comparing comprehension gains of beginner Arab participants to those of their beginner non-Arab peers, does one group of participants outperform the other?

d) Comparing beginner Arab to their beginner non-Arab peers according to their comprehension baseline and ending mean scores, do the two groups significantly differ from each other?

e) Does performance of the two groups in the low intermediate level vary significantly in comprehension gain scores from pretest to posttest?

f) Comparing comprehension gains of low intermediate Arab students to those of their low intermediate non-Arab peers, does one group of participants outperform the other?

g) Comparing low intermediate Arab students to their low intermediate non-Arab peers according to their comprehension baseline and ending mean scores, do the two groups significantly differ from each other?

Definition of Terms

EFL: An acronym that refers to learning or teaching English as a Foreign Language.

ESL: An acronym that refers to learning or teaching English as a Second Language.
**Extensive Reading**: An activity in which learners read materials for pleasure with only known words to receive meaning from the text (Nation, 2009).

**International Students**: International students are those who are at university level, neither citizens nor permanent residents in a country where they apply to study, and are required to have a student visa for a set of time period to gain academic qualifications (Ramachandran, 2011).

**L1**: An acronym that refers to someone’s first language or native language.

**L2**: An acronym that refers to a target language someone knows, learns or acquires in addition to his/her first language.

**Onset and Rime**: In a syllable, the onset refers to the initial consonant or consonants, and the rime refers to the vowel and any consonants that follow it (e.g., the word rat, the onset is “r” and the rime is “at”. In the word clip, the onset is “cl” and the rime is “ip”).

**Orthographic Processing**: “The ability to represent the unique array of letters that defines a printed word, as well as general attributes of the writing system such as sequential dependencies, structural redundancies, letter position frequencies” (Vellutino, Scanlon, & Tanzman, 1994, p. 314).

**Phonological Awareness**: A term that is used to refer to one’s sensitivity to the phonological structure of words in one’s language. Phonological awareness includes awareness of individual words in sentences, syllables, and onset-rime segments, as well as awareness of individual phonemes.

**Pseudowords**: A synonym to nonsense words that only carry correct sequences of vowels and consonants without having a meaning in lexicon (Wang & Geva, 2003).

**Reading Fluency**: This term refers to “the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing” (Grabe, 2009, p. 291).
The Regular “Traditional” Reading Instruction at CIES: This type of instruction refers to the Top-Down reading method that comprises teaching of skills such as previewing vocabulary, predicting, skimming/scanning, main idea and inference.

Speed reading Courses: A composition of specific number of texts of fixed length, compiled within a restricted lexicon and followed by some multi-choice questions to ensure that students are reading for comprehension (Macalister, 2010).

Syllable: This term refers to a segment of a word that contains one vowel sound that may or may not be preceded or followed by a consonant.

The National Reading Panel (2000): The Congress initiated a collaborative work between the U.S. Department of Education (ED) and the National Institute of Child Health and Human Development (NICHD) in 1997. The collaboration produced a panel consisted of 14 members from different backgrounds including school administrators, working teachers, and scientists engaged in reading research to evaluate existing research and evidence to figure out the best ways to teach children to read. In 2000, the National Reading Panel submitted its final report and concluded its work.

Timed Reading: In this activity, teachers have students read texts under time pressure to achieve an optimal reading rate that facilitates comprehension (Chang, 2010).
CHAPTER TWO

LITERATURE REVIEW

Theoretical Framework

A theoretical framework for understanding reading provides a foundation to conceptualize how phonological awareness can contribute to reading fluency, spelling knowledge, and orthographic processing skills. Several theories and models looked at many processes by which second language readers can derive meanings from texts they read.

Barnett (1989) reviewed characteristics of three main models proposed to explain how reading works: the bottom-up models, the top-down models and the interactive models. In the bottom-up models, Barnett elucidates that readers start with the text and construct meaning gradually and sequentially from letters, words, phrases and sentences. In addition, bottom-up models are text-driven in which the message of a text must be retrieved initially before its meaning is transformed and recoded eventually by subsequent higher-level mental processes (e.g. readers’ general knowledge of the world and experience in a particular type of texts). Thus, text in bottom-up models is processed linearly in a series of disconnected stages. Examples of bottom-up models are: (LaBerge & Samuels, 1974; Carver, 1977).

On the other hand, Barnett cautions that top-down models are reader-driven in which understanding the message of a text is shaped initially by readers’ general background knowledge, experiences and interpretations. In addition, top-down models are also linear however, they start with higher-level mental processes and move down to the lower-level mental processes such as identifying letters, words, phrases and sentences. Examples of top-down models are: (Goodman, 1968; Smith, 2004). Barnett postulates that both bottom-up and top-down models do not allow occurrence of simultaneous interactions between low-level and high-
level stages/processes but rather each one of those lower/higher level processes leads to the other in a successive way.

On contrary to both bottom-up and top-down models, Barnett affirms that interactive models are not linear but rather cyclical in that the message of a text is processed and understood by simultaneous interaction between both the written text and the reader’s mind: lower-level and higher-level processes are working together to comprehend the text. In other words, information imposed by text (e.g. processing graphic, grammatical, lexical, semantic, and pragmatic information) and readers’ mental activities/processes (e.g. background knowledge and experience in text genres) have a simultaneous and equally important influence on text comprehension. Examples of interactive models are (Just & Carpenter, 1980; Anderson & Pearson, 1988).

The Information Processing IP theory of (LaBerge & Samuels, 1974) has two versions. The earlier version was presented in 1974 and employs a bottom-up approach to reading. The later version was proposed in 1983 and operationalizes an interactive approach to reading. This study is influenced by the earlier version of Information Processing theory that adopts a bottom-up approach to reading.

**Information Processing IP Theory**

Lightbown, Spada, Ranta, and Rand (2006) stated that psychologists were not convinced that humans have a specific linguistic module in their brains from the day of birth as was claimed in the Critical Period Hypothesis proposed by Lenneberg (1967) or that learning and acquisition are distinct mental processes as suggested in Krashen’s Monitor Model (1982). Cognitive psychologists LaBerge and Samuels (1974) proposed their IP model in which they declared that the human brain has a limited capacity to process information simultaneously. The IP model (1974) emphasizes several concepts related to processing information in text such as attention,
automaticity and fluency. Attention refers to the process of allocating cognitive resources to a stimulus or task at hand (LaBerge & Samuels, 1974; Bruning, Schraw, Norby & Ronning, 2004). The IP model suggests that readers may be able to process many things at once when reading texts. However, they can direct their attention to only one thing at a time while processing texts. For example, readers engage in two basic processes during reading: decoding that refers to the ability to articulate printed words in a form of phonological representation, and comprehension that refers to deriving meaning from material being read (LaBerge & Samuels, 1974).

LaBerge and Samuels (1974) asserted that the more processing is devoted to decoding, the less processing is available for comprehension. In other words, the fewer cognitive resources assigned for decoding skills, the more room of cognitive resources will be available for comprehension. Consequently, less proficient readers will have less attention for comprehension, as they are paying more attention to applying decoding skills.

LaBerge and Samuels define automaticity as one aspect of fluency that refers to the ability by which a fluent reader can translate letters to sounds then to words effortlessly. Thus, automaticity in a skill or subskill in reading is achieved only when it is completely processed while attention is directed elsewhere. In other words, the IP model suggests that fluency only is achievable when low-level processes in reading (e.g. sound-letter association, letter patterns and combination, and meaning of words) become automatic. The basic premise of automaticity in the IP model is that once decoding of words becomes automatic, cognitive resources will be less used in decoding and more used in comprehension. This shows how automatic processing is essential to fluent reading and reveals how fluency in reading is fundamental to comprehension.
The earlier version of the IP model of (LaBerge & Samuels, 1974) is adopted in this study because although second language reading specialists have not favored bottom-up models (Bernhardt, 1986), Barnett (1989) points out the importance of bottom-up models in providing insights into methods and approaches of second language readers who have limited proficiency in reading skills. Moreover, several studies stressed the importance of mastering the lower-level reading processing skills in L2 contexts (Eskey, 1988; McLaughlin, 1990; Segalowitz, 1991).

**Age and Second Language Acquisition**

Amongst many thorny issues in the second language acquisition field are the age of exposure to the foreign/second language being learned and the ability by which non-native speakers can acquire native-like processing procedures. Several research studies and hypotheses attempted to examine how age could hinder or facilitate the acquisition of a second/foreign language and to explain how age could be a cutting edge of determining whether native-like processing abilities are attainable for second/foreign language learners.

From psychological and biological points of view, Lenneberg (1967) proposed the Critical Period Hypothesis CPH in which Lenneberg postulated that around the time of puberty, humans reach completion of hemispheric brain lateralization, and consequently they lose their biological predisposition for language acquisition. The critical period for language acquisition is the time span between two years and puberty (Lenneberg, 1967). In Lennerberg’s interpretation, there is a very slim possibility, if any, for adult second language learners to acquire native-like language processing skills.

Many research studies that have scrutinized the CPH for decades and looked at whether adult second language learners could acquire native-like linguistic processing abilities have come to opposite conclusions. Proponents of the CPH define specific ages for acquiring different skills.
of a second language such as phonological processing skills, morphology and syntax. For instance, in his study titled “Maturational Constraints on Language Development”, Long (1990) analyzed numerous studies that examined the relationship between the Critical Period Hypothesis and various aspects of second language acquisition since early 1960s and concluded:

The ability to attain native-like phonological abilities in an SL [second language] begins to decline by age 6 in many individuals and to be beyond anyone beginning later than age 12, no matter how motivated they might be or how much opportunity they might have. Native-like morphology and syntax only seem to be possible for those beginning before age 15. (p. 280)

In addition, Hyltenstam and Abrahamsson (2008) examined the role of age in second language acquisition, discussed maturational constraints that impede native-like performance and concluded that “Given that maturation has the strong influence on second language outcomes that our review has indicated, it should come as no surprise that native-like proficiency in a second language is unattainable” (p. 578). Although Hyltenstam and Abrahamsson (2008) acknowledged the existence of some instances where some second language learners were able to achieve extraordinary native-like processing abilities, they attributed these high achievements to exceptional talents and “miracles” not to success in language acquisition.

In another study, Abrahamsson (2012) observes that unlike children who are able to attain native-like processing procedures in L2 grammar and phonetics depending on implicit and unconscious learning strategies, students who start learning grammar and phonetics of a second language in their adulthood fail to acquire native-like processing procedures therefore they rely more on explicit, intentional and conscious learning strategies.
On the other hand, several research studies either neutral to or against the CPH have examined its basic principles. For example, a study of (Birdsong, 2005) that stands in a neutral position to the notion of the CPH argues that instances of success in achieving native-like linguistic processing abilities in older second language learners should not be taken as an evidence to falsify the CPH. Similarly, Birdsong (2005) proclaims that deficiencies in language abilities of adult second language learners should not be deemed as an evidence to support the claims of the CPH.

Apparently, the Critical Period Hypothesis and its proponent studies do not leave much hope for adult second language learners. However, opponent research studies of the CPH contradict its basic assumptions and provide evidence that acquiring native-like processing is achievable in second language skills such as grammar (Montrul & Slabakova, 2003; van Boxtel, Bongaerts & Coppen, 2005) and speaking (Nikolov, 2000; Chiswick & Miller, 2008).

One opponent study that counters the basic premises of the CPH and questions the credibility of its assumptions is a study of (MARINOVA TODD, Marshall, and Snow, 2000). In their study, they refuted the notion of the CPH and critically denied three false assumptions it proposes. The first assumption is that children are faster and more efficient than adults in acquiring L2. MARINOVA_TODD et al. (2000) argue that in literature there are vast data that show that children learn new languages slowly with great efforts. The second assumption is that Critical Period Hypothesis attributes language proficiency to facts about brain activities. MARINOVA_TODD et al. (2000) assert that current data available on brain functions in children versus adult second language learners do not reflect observable relationships between language proficiency and functions of the brain. The final misconception is that there are many cases where adult second language learners fail to achieve native-like proficiency. However,
MARINOVA, TODD et al. (2000) claim that this is only true when adult second language learners engage in tasks in which they lack adequate motivation, commitment and support from the surrounding environments. Furthermore, MARINOVA, TODD et al. (2000) concluded their study claiming “The misconception that adults cannot master foreign languages is as widespread as it is erroneous” (p. 27).

Other studies that are not influenced by the notion of biological constraints on second language acquisition have investigated whether younger learners are more advantageous than the older learners because of their early exposure to the second language. For example, Krashen, Long and Scarcella (1982) attempted to answer this question, extensively reviewed 23 research studies published between 1962 and 1979 in second language acquisition and concluded that older second language learners can perform better than younger learners initially because of a variety of potential factors such as cognitive maturity, availability of instruction and metalinguistic abilities. However, younger second language learners might be able to perform better than older learners in the end because they always catch up and exceed learners who started learning a second language in their adulthood if the younger learners reside in the L2 environment for many years (Krashen et al., 1982).

Assessing the Construct of Reading

Assessing reading proficiency depends on how reading is defined and whether it is considered to be one holistic skill or having multiple sub-skills related to one another. For example, Carr and Levy (1990) proposed the component skills approach in which the construct of reading is looked upon as having distinguishable various sub-skills. The basic assumption of the component skills approach is that reading is a complex system of information processing and comprises of empirically separable sub-skills. According to this approach, it is possible to isolate
a specific sub-skill of reading and test L2 reading development of second language learners in this sub-skill either qualitatively or quantitatively (Koda, 2012). Examples of studies that tested relationships between sub-skills of reading in two languages include working memory (Abu-Rabia, 1995; Gholamain & Geva, 1999), decoding (Wade-Woolley & Geva, 2000) and phonological awareness (Wang, Perfetti, & Liu, 2005). Despite the fact that these studies generated more detailed descriptions of how reading subskills are related across languages, these studies are not based on cause and effect experiments and provide only indirect evidence (Koda, 2012).

On the other hand, some studies of reading proficiency with bilinguals looked at reading as one holistic construct when comparing reading achievement in L1 to L2 to examine whether skills acquired in the first language could transfer to the second language (Cummins, Swain, Nakajima, Handscombe, & Green, 1981). Yet, treating reading as a unitary construct may not result in effective assessment or identification of students’ specific needs. In addition, measuring reading as one holistic skill and designing classroom instruction accordingly may have several drawbacks such as inaccurate classification of students’ actual proficiency levels, focusing only on common weaknesses of students and leaving out their individual shortcomings and strengths (Dennis, 2009). Additional defect of studies with holistic approach to reading construct is that these studies compare overall scores of L1 reading tests to overall scores of L2 reading tests and do not take in account how individual reading sub-skills might functionally interconnect within or across languages (Koda, 2012).

**Implicit versus Explicit Instruction**

Many studies scrutinized scaffolding, explicit learning of and direct instruction on phonological awareness skills and emphasized its effects on other reading skills. For instance,
literature shows that explicit instruction on phonological awareness is beneficial for fluency (Harrison & Krol, 2007), comprehension (Van Staden, 2011), and word reading and spelling (Yeung et al., 2013).

In the first study, Harrison and Krol (2007) maintained “without carefully designed, explicit instruction in the phonological aspects of the language, it is possible that reading difficulties will persist in those adults experiencing phonological processing difficulties” (p. 389). Furthermore, explicit instruction and scaffolding have been found beneficial to improve various reading sub-skills of second language learners such as sight word automaticity, vocabulary knowledge, syntactic awareness, low and high order skills of reading comprehension (Van Staden, 2011). Moreover, Yeung et al. (2013) demonstrated that explicit instruction in phonological awareness significantly enhanced English word decoding, spelling, phonological processing skills, and expressive vocabulary in Hong Kong Chinese ESL Kindergarteners and suggested that embedding direct phonological awareness instruction in vocabulary learning activities is one way to improve kindergartners’ English reading skills.

As the previous studies pointed out positive influence of explicit phonological awareness instruction on various reading sub-skills, it is fundamental to have a better understanding of characteristics of both explicit and explicit instruction and how could they be effectively employed in reading classrooms. Grabe (2010) extensively discussed characteristics of implicit and explicit instruction and explained their differences and importance in specific contexts. Grabe (2010) states that explicit instruction is not enough for ESL students to acquire phonological awareness skills. He explains that reading skills such as automatic word recognition, retaining large vocabulary, grammatical processing abilities, and the ability to form basic meanings only emerge as a virtue of implicit learning. Grabe argues that implicit learning
requires extended periods of exposure and meaningful time on task. Grabe defines implicit learning as “gradual, initially very fragile, and strongly based in repetition of form and process over a long period of time” (p. 73). In addition, Grabe points out that many researchers and teacher trainers have underestimated the importance of implicit learning that is fundamental for reading fluency and comprehension.

Nonetheless, researchers and educators should not ignore advantageous role of direct instruction and explicit learning. Both explicit and implicit learning have their own context in which they work appropriately and in some learning contexts, a combination of both could yield significant gains (Stanat, Becker, Baumert, Lüdtke, & Eckhardt, 2012). Moreover, some researchers suggest that explicit and implicit instruction can be seen as two ends of a continuum rather than being different reading strategies. To illustrate, readers with low literacy and second language learners may start acquiring reading skills explicitly and once they are able to read and comprehend on their own, they can start to read and learn implicitly (Yeh, McTigue, & Joshi, 2012).

**Phonological Awareness**

Many studies contend that the phonological awareness is an important combination of processing abilities by which readers can recognize the sounds’ structure of a language, identify syllables, onsets and rhymes, segment speech into phonemes and manipulate individual phonemes (Goswami & Bryant, 1990; Adams, 1994; Jongejan et al., 2007). The importance of the phonological awareness, as reported by plethora of studies, stems from its contribution to developing several sub-skills of reading and eventually enhancing reading comprehension. For example, Ball and Blachman (1991) examined the influence of phonemic awareness training on English native speaking kindergarteners’ word recognition and spelling development. In this
study, there were three groups: the control group that received no intervention, the language activity group that received only training on letter names and letter sounds, and the treatment group that received training in not only letter names and letter sounds but also on segmenting words into phonemes. Findings show that instruction in letter names and letter sounds in addition to segmenting words into phonemes significantly improved reading and spelling skills of participants in the intervention group. In a like manner, instruction in letter names and letter sounds alone did help participants of the language activity group to show significant changes in their segmentation, early reading skills and spelling skills when compared to the control group. This is also emphasized in a study of Perfetti and Marron (1995) who suggest that monitoring decoding abilities should take place in early instruction because earlier possessing of phonological awareness skills would foster reading.

Two questions would then arise: To what extent methods implemented to improve phonological awareness abilities of first language learners are appropriate and plausible to develop the same abilities of second language learners and whether measurements of phonological processing and word-level reading of monolingual children and adults are also applicable to ESL adults. Regarding the first question, the Reading National Panel (2000) report proclaims that research-based strategies that are effective with English native speakers are also beneficial for ESL learners especially when strengths and weaknesses of this population are assessed and appropriately accommodated. The answer to the second question is reported in a study of Harrison and Krol (2007) who examined L1 (Mandarin) and L2 (English) phonological processing and word-level reading relationships in adult Chinese immigrants to Canada. Harrison and Krol (2007) hypothesized that the orthographical difference between Mandarin (logography) and English (alphabetic) would influence the way in which L2 words are phonologically
processed and recognized. Findings exhibit that measures of phonological awareness such as pseudoword repetition, phoneme deletion and phoneme detection that predict phonological awareness abilities in L1 monolingual children and adults are valid and useful to assess word recognition performance in ESL adult Chinese learners of English. In addition, Harrison and Krol (2007) insist that in order to avoid persistence of reading difficulties stemming from lacking phonological awareness abilities in adult second language learners, students must receive a well-planned instruction on various aspects of L2 phonological awareness.

Assessing various phonological awareness abilities of second language learners is crucial in order to decide whether the intended instruction is necessary and whether students could have other weaknesses that are untouched by instruction. Toyoda and Scrimgeour (2009) estimated that over 80 published papers that examine the relationships between phonological awareness and reading went under a meta-analysis and most of which did not take in account measuring pre-existing abilities of word recognition and knowledge of sound-letter associations of participants.

One might think that the phonological awareness processes are trivial and have little effects on overall reading comprehension because of the fact that they are sub-skills of reading. Nevertheless, studies have shown that in spite of the fact that phonological awareness is considered to be one of the low-level reading processes (Grabe, 2009), its critical role in improving fluency and promoting reading comprehension should not be underestimated (Mellard, Woods & Fall, 2011; Van Staden, 2011). In addition, Keung and Ho (2009) claim that although phonological awareness is not solely sufficient to enable learners to read, it is as necessary and fundamental as other processing skills such as phonological memory, naming speed, orthographic knowledge and morphological awareness. In the same manner, Berninger,
Abbott, Nagy, and Carlisle (2010) examined the growth of reading and spelling of first through sixth graders and asserted that learning to read and to spell words not only depends on developing phonological awareness but also on other two kinds of linguistic awareness: orthographic and morphological. In addition, findings of this study have been supported by the findings of a study of Ford, Cabell, Konold, Invernizzi, and Gartland (2013) who emphasized the fundamental contribution of orthographic skills to the phonological awareness skills in order to successfully learn to read, as phonological awareness alone is not sufficient.

Some research studies have compared potential influence of various phonological awareness processing skills on decoding, reading fluency and comprehension to measure the extent to which a particular phonological awareness sub-skill would be more effective. For example, one research study that examines impacts of phonological awareness processes on particular reading sub-skills in Arabic is a study of (Taibah & Haynes, 2011). In this study, Taibah and Haynes (2011) conducted an experiment on Arab speaking children to assess potential contributions of phonological processing skills, rapid naming and phonological memory to early decoding abilities, fluency and comprehension. Findings show that while phonological memory had almost no impact on reading performance, phonological awareness has a stronger influence on reading performance than rapid naming.

Further, some studies have examined the influence of phonological awareness on other major language skills that are beyond reading such as writing. For instance, Erdogan (2011) examined the extent to which the phonological awareness skills could influence the writing performance of Turkish first graders. Findings of Erdogan’s study show that phonological awareness positively affected writing skills of students and facilitated their movement to the formal writing process. Erdogan (2011) recommends that using activities in rhythm, riddles and
rhymed kids’ songs may improve students’ phonological awareness and help them differentiate the sounds of the language.

In addition, some studies have compared the effect of teaching only phonological awareness skills to teaching vocabulary in addition to the phonological awareness skills on early literacy. For instance, in their study, Filippini, Gerber, and Leafstedt (2012) investigated whether incorporating vocabulary instruction into phonological awareness instruction would be more beneficial than only phonological awareness instruction to Spanish speaking English language learners. Because of the positive effects of vocabulary building, findings exhibit that it is critical to assign a small portion in instruction dedicated to vocabulary building while still providing instruction on phonological awareness and word decoding. Findings of this study also strengthen findings of (Keung & Ho, 2007; Berninger et al., 2010; Ford et al., 2013) who emphasize the importance of combining phonological awareness instruction to other processing skills in order to enhance reading.

Moreover, other studies have investigated the influence of grapheme-phoneme corresponding knowledge on the acquisition of literacy and spelling. For example, Ehri (2013) proposes that theory and evidence show that learning to read is essentially alphabetic process in which phonemic awareness and letter knowledge are important determiners of reading acquisition.

Phonological awareness instruction is found to be beneficial not only for L2 readers’ word recognition abilities but also for their passage-level abilities. For instance, Yamashita (2013) scrutinized the contribution of three subcomponents of word recognition: (decoding, sight word reading and lexical meaning access), and the overall English language ability to reading
comprehension and reading rate. Findings of Yamashita (2013) exhibit that in addition to the general English ability of Japanese university students learning English, access to mental lexical meaning was a significant predictor of both reading rate and reading comprehension, and decoding was a predictor of only reading rate.

**Reading Fluency and Comprehension**

Although an extraordinary important skill, L2 reading fluency has not been present much in assessment, research and classroom instruction. To illustrate, Fuchs, L, Fuchs, D, Hosp and Jenkins (2001) observed vast number of reading competence measurements and examined whether these measurements have accounted for the role of reading fluency throughout the current century. Fuchs et al. (2001) claimed that teachers and researchers not only have overlooked theoretical and empirical accounts that emphasize the role of fluency as a measurement tool of reading proficiency but also have underestimated current claims for the pressing need of oral fluency assessment. In addition, Grabe (2009) reported that wide range of research studies in the past two decades have investigated the association between reading fluency and reading comprehension mostly in English L1 contexts. Further, Mellard et al. (2011) asserted that most reading fluency research has been done with young readers rather than adults.

**Characteristics of Fluent Readers**

Teachers could spot fluent readers at the very beginning of the school year and differentiate them easily from the struggling readers. This is because fluent readers possess some characteristics that make them better readers. Nevertheless, educators drastically differ in specifying those characteristics. Some include comprehension into the elements of fluency such as Harris, Hodges and International Reading Association (1995) that maintain that fluent readers read “smoothly, without hesitation and with comprehension” (p. 85). Some studies deem reading
with expression as a component of fluency that indicates comprehension. For example, the National Reading Panel Report (2000) describes fluent readers as those who read accurately, quickly and expressively. In contrast, some studies put more emphasis on the ability of simultaneous processing by which fluent readers decode words and comprehend its meaning at the same time (Samuels, 2002). Fluent readers in some other studies are those who read with accuracy, speed and fluidity (Kuhn & Stahl, 2003). Some studies, on the other hand, condemned emphasizing rapid reading over comprehension and asserted that comprehension is the ultimate goal of reading (Manning, 2004). Moreover, fluent readers are those who read for comprehension and possess “the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing” (Grabe, 2009, p. 291). Furthermore, in an extreme point of view, fluent readers must have the ability to process and produce target language easily just like native speakers of the target language (Macalister, 2010).

**Appropriate Speed for L2 Reading**

Determining the acceptable reading speed that readers should be achieving whether in L1 or in L2 is controversial. This is because reading speed presumably differs according to the purpose of reading. For instance, generally speaking, skimming for main ideas for average readers takes time less than scanning for specific details in a text. Carver (1990) differentiates five types of reading: scanning, skimming, rauding (just to understand the message of the text), learning (to acquire information of a text) and memorizing (to be able to recall facts of a text) and suggested that each type is associated with a different reading rate. Carver (1990) suggests that the average reading rate for a college student when rauding is 300 word per minute WPM, 200 WPM for learning and 138 WPM for memorizing. Nevertheless, for foreign and second
language learners, Nation (2009) claims that a good careful silent reading speed is around 250 words per minute whereas a good oral reading speed is around 150 words per minute.

**Alternative Ways to Increase Reading Speed and Fluency**

Although instruction in phonic decoding, vocabulary and sight word recognition are very helpful ways to develop fluency of struggling readers (Mellard et al., 2011), it appears that fluency could be improved by other helping contributing factors. Literature available shows that some other educational approaches and classroom activities and practices are also found to be beneficial to improving reading fluency such as extensive reading (Bamford & Day, 1998; Bell, 2001; Yamashita, 2008), timed reading (Chung & Nation, 2006; Chang, 2010; Macalister, 2010), and meaningful chunking and segmenting words (Yamashita & Ichikawa, 2010). Teachers must take into account that those skills serve as an additional means to enhance reading fluency not as competitors to the phonological awareness. Therefore, ESL reading teachers are advised to employ various reading skills and activities, and diversify their classroom instruction in a way that accommodates the needs of students and improve their reading skills.

In extensive reading tasks, one advantage is that learners read a large amount of familiar texts. Exposure to familiar texts several times would allow students to meet the same patterns of letters, words, and combinations of words repeatedly and would help students in becoming rapid and accurate in word processing and gain large frequent vocabulary (Bamford & Day, 1998; Nation, 2009). For instance, Bell (2001) examined impacts of extensive reading courses on reading fluency and comprehension of young adult Arab learners of English who work for different ministries in Yemen. The control group in the study received only the regular intensive reading course. The intervention group, on the other hand, received the extensive reading course using graded reading materials that are linguistically accessible for the students according to
their determined proficiency levels, and had regular visits to the library to practice free reading. Findings of the study demonstrate that participants of extensive reading group outperformed their counterpart group exhibiting significant change in their reading speed and significant higher scores when measuring their reading comprehension. Bell (2001) proclaims that reading speed will develop naturally if the students are motivated to read graded texts that do not interfere with their understanding because of lexical difficulties. This shows that choosing appropriate reading materials that do not challenge the vocabulary knowledge of learners could have significant influence on reading speed and comprehension. Nevertheless, although extensive reading has been found promoting reading speed and comprehension, it did not help ESL readers to acquire L2 linguistic abilities (Yamashita, 2008).

Timed reading activities implemented in speed reading courses are another way to foster reading speed (Chung & Nation, 2006), enhance reading fluency and comprehension (Chang, 2010; Macalister, 2010), and transfer improvement gained in speed and comprehension to different text genres (Macalister, 2010). For example, Chung and Nation (2006) designed a unique study to measure the influence of timed reading exercises on reading speed of 40 adult Korean learners of English in South Korea. This study attempts to answer three questions. How to determine the amount of change in reading speed? If students are to read more than 10 texts, at which point most of the increase in reading speed occurs? And are there any observable patterns in speed? To calculate the change in the reading speed, Chung and Nation (2006) used three different measurements: Average Scoring Method, Highest Minus Lowest Scoring Model and 20th Minus 1st Scoring Method. In the Average Scoring Method, the average of scores of the first three texts was subtracted from the average of scores gained in the last three texts whereas in the Highest Minus Lowest Scoring Model, the amount of increase in reading speed was measured by
taking the highest speed reached minus the lowest from the entire experiment. In the 20\textsuperscript{th} Minus 1\textsuperscript{st} Scoring Method, scores students gained in the first text were taken away from the scores gained in the last text assuming that there will be an obvious improvement in reading speed towards the end of the experiment. Chung and Nation (2006) reported that all measures convey observable gradual changes in reading speed and this should offer students confidence on their ability to read more texts faster. Chung and Nation (2006) concluded that a well-organized speed reading course that consists of timed readings of various paragraphs and contains controlled in length vocabulary, is very effective way to increase reading speed.

Another study that supports findings of (Chung & Nation, 2006) is a study of Chang (2010) who conducted her study on 84 Taiwanese college students to examine the effect of timed reading activity on reading speed and comprehension. The Taiwanese students are enrolled in English courses taken to enhance their scores on the Test of English for International Communication TOEIC. Findings exhibit that treatment group improved 25\% or 29 word per minute in speed and .63 in comprehension whereas the control group increased 5\% or 7 word per minute in speed and .58 in comprehension. Despite the fact that there was no statistically significant changes between the two groups at each testing time, when comparison was done within the group, only the experimental group shows observable improvement in both speed and comprehension. Chang (2010) concluded that including a timed reading activity in curriculum even once in a week lasting for 15 minutes could improve reading speed and reading comprehension.

Moreover, the findings of (Chung & Nation, 2006; Chang, 2010) are echoed by a study of (Macalister, 2010) that investigated not only impacts of timed reading activity on reading fluency and comprehension but also whether any improvements achieved because of speed
reading courses transfer to other types of text that are unfamiliar to adult ESL students in New Zealand. The intervention group received speed reading treatment whereas the control group received only extensive reading treatment. Results show that as measured in word per minute, students in speed reading treatment group showed an increase in their reading speed when comparing their reading rates at the beginning and at the end of the program. The findings of the study surprisingly show that students in a complete span of the language program may show an increase in their reading speed even if they are not assigned to a specific speed reading program. Nevertheless, students participating in speed reading program appear to be more advantageous. Moreover, students who participated in the speed reading program are significantly quicker readers of authentic unfamiliar texts at the end of the speed reading program than at the beginning unlike students who were participating in the control group.

Another way to increase the reading fluency is to make use of meaningful chunking of words and segmenting words in sentences while reading. Chunking a few but meaningful words depends on visual processing skills performed during reading. For instance, Yamashita and Ichikawa (2010) conducted a study on adult Japanese leaners of English to examine the influence of chunking words on L2 reading fluency and the impact of text segmentation on comprehension, rate and regression. Regression is one of the visual processes that occur while reading and it means moving the eyesight back to item(s) just been processed (Nation, 2009). Findings show that while difficulty of text chunking adversely impacted comprehension of intermediate participants, participants of advanced level were able to overcome chunking difficulty. Yamashita and Ichikawa (2010) concluded that text segmentation and chunking meaningful words during reading are essential skills for L2 fluent reading.
Spelling Knowledge and Orthographic Processing Skills

Spelling Knowledge

Beside punctuation, spelling knowledge is an aspect that is under the umbrella of orthography conventions of a language. In a spelling activity or process, students engage in naming or writing letters of a word. Available literature shows that instruction in phonological awareness could enhance word recognition skills and develop spelling abilities (Ball & Blachman, 1991), and improve word reading skills and spelling knowledge (Conrad, 2008; Ehri, 2013; Yeung et al., 2013). In addition, learning how to read and to spell words relies not only on instruction on phonological awareness skills but also on orthographic and morphological skills (Berninger et al., 2010).

Few studies show that adult Arab ESL learners exhibit difficulties in identifying forms of English words and recognizing short and long vowels when reading words (Ryan & Meara, 1991; Saigh & Schmitt, 2012) and that Arab students show weaknesses in spelling skills that affect their general reading abilities (Fender, 2008). In order to help Arab students overcome their weaknesses, it is crucial to investigate whether differences in the writing systems of Arabic and English would impose any complications that could impede Arab English learners from acquiring the spelling knowledge and the orthographic processing skills in English.

In their study, Ryan and Meara (1991) looked at how adult native speakers of Arabic process vowels in English words. Ryan and Meara stated that native speakers of Arabic often show considerable and exceptional difficulty in comprehending ESL reading texts. Ryan and Meara thought that this occurs because Arab speakers of English might apply their L1 word identification strategies when reading English texts as they rely heavily on consonants and tend to pay less attention to vowels in English words. Therefore, Ryan and Meara hypothesized that
Arabic speakers might get confused when processing vowels in English words because they are less aware of vowel letters in English texts. In order to check the veracity of their hypothesis, Ryan and Meara presented a large number of ten-letter English words to adult native speakers of Arabic, non-Arabic speakers and native English speakers. Each word was presented two times with two seconds delay between the two presentations. The first presentation of an item is the correct spelling whereas the second presentation of the items is either similar to the first presentation (no change) or missing a vowel from a certain position of the word. Findings show that native speakers of Arabic do have great struggle when processing vowels in English words. In addition, findings support that native speakers of Arabic rely heavily on consonantal segments of English words and they use mental representations of English words that pay almost no attention to English vowels.

In another study, Fender (2008) investigated the relationships between spelling knowledge and general reading skills in intermediate adult Arab ESL students. Fender compared Arab students to a group of non-Arab intermediate ESL learners who study in an English for Academic Purposes program EAP. Both groups participated in one spelling task to assess their orthographic knowledge and two standardized listening and reading tests to assess their general language processing abilities and comprehension skills. Findings show that although there was no significant difference in performance of both Arab and non-Arab ESL learners in listening comprehension, Arab ESL students show significantly lower scores in both reading comprehension and spelling test. Fender explains that spelling is related and important to reading and word recognition ability whereas no relationship is found between listening comprehension and spelling, or word recognition ability. Fender claims that Arab ESL students show difficulty the most in digraphs and consonants with complex digraph spellings.
In the same study, Fender (2008) discussed two ways that could influence the acquisition and development of L2 spelling. The first way is the manner by which L2 word forms are processed and acquired. For instance, Chinese learners of English might process English words in the same way they process words in Chinese. Fender claims that because Chinese is logographic, this might lead Chinese learners to perceive English words as one whole unit rather than as phonemes associated to graphemes. The second way that might affect the acquisition of L2 spelling is the transfer of phoneme-grapheme corresponding skills. Fender asserts that orthographies with Roman alphabetic background such as German or Spanish would help ESL learners transfer not only familiar words but also phoneme-grapheme association.

Saigh and Schmitt (2012) examined how Arab ESL students learn English vocabularies to bring to light potential problems that Arab learners would face in L2 vocabulary acquisition. Saigh and Schmitt recruited for their study Arab participants who have already shown difficulties in recognition of short and long English vowels. Saigh and Schmitt provided Arab ESL students with erroneous words that have either a missing vowel or a vowel represented by a wrong vowel. Findings exhibit that Arab ESL learners were able to notice spelling mistakes with missing vowels somewhat better than noticing the spelling errors with wrong vowels. This, according to Saigh and Schmitt, suggests that Arab ESL students process short and long English vowels in the same manner they process short and long vowels in Arabic. Consequently, Arab ESL students would not accurately be able to spell, recognize and acquire English words.

**Orthographic Processing Skills**

In alphabetic writing systems, Vellutino et al. (1994) define orthographic processing skills as “the ability to represent the unique array of letters that defines a printed word, as well as general attributes of the writing system such as sequential dependencies, structural redundancies,
letter position frequencies” (p. 314). Although many alphabetic languages may share the same writing system, they differ in terms of mapping sounds to symbols in print. Writing systems of some of alphabetic languages are considered to be shallow whereas writing systems in some other alphabetic languages are opaque. The distinguishing factor that categorizes languages into deep or shallow is the consistency in mapping sound into symbols. For example, a language is considered shallow when each of its sounds is represented in one written symbol. On the other hand, a language is deep or opaque if a sound is represented in multiple symbols or a symbol is represented in multiple sounds.

In an attempt to explain orthography-based processing variations, Frost (1994) examined the validity of Orthographic Depth Hypothesis (ODH) and concluded that readers of shallow languages rely more on phonological processing because orthography is consistent, regular and reliable whereas in deep writing systems, readers rely more on orthographic processing and less on phonological processing because of the opacity in sound-letter relationships.

Because the ability to process and spell nonsense words (pseudowords) is considered to be an indicator of mastering the orthographic processing skills of a language, Perfetti and Marron (1995) warned that if adults fail to read pseudowords, explicit instruction on orthographic skills, decoding skills and phonological awareness becomes necessary to improve the word recognition skills of adults. Failure in spelling pseudowords signifies inability to recognize correct word patterns in the second language therefore reflects a weakness in the general reading performance. According to Cunningham et al. (2001), the visual recognition of word forms from the print is one of the key sub-skill processes in reading.

children to young native speakers of English. Findings of their study show that although ESL Chinese students performed well in spelling English words just like their English peers, they performed very poorly in spelling pseudowords that only carry correct sequences of vowels and consonants without having a meaning in lexicon. This is because Chinese children were unable to recognize phoneme-grapheme association in English words. In addition, they exhibited the tendency to acquire forms of English words as one visual orthographic unit in the same way they process words in Chinese logographic texts. This Finding of (Wang & Geva, 2003) supports the point of view of (Fender, 2008) that focuses on the acquisition and development of L2 spelling.

It is noteworthy to mention that orthographic differences between L1 and L2 will be challenging for students who learn reading in a second language. Linan-Thompson and Vaughan (2007) argued that the degree of difficulty experienced by ESL learners and time required to learn to read are determined by how the writing system of L1 is different from English orthography.

Research studies exhibit that orthographic processing skills have been found as fundamental as phonological awareness to reading performance (Keung & Ho, 2009), essential to learn to read and to spell words (Berninger et al., 2010) and vital contributor to phonological awareness skills to successfully learn to read (Ford et al., 2013).

Yamashita (2013) explains how differing languages in the basic linguistic units represented in individual written symbols would engage various cognitive resources and processes. For instance, Yamashita elucidates that in alphabetic writing systems, the basic representational unit is the phoneme, in syllabaries (e.g. Japanese kana), it is the syllable, and in logographies (e.g. Chinese), the basic representational unit is the morpheme. This is why,
Yamashita continues, various cognitive processes are activated during reading texts of different languages.

**Differences between Arabic and English orthographies.** Lado (1957) made one of the earliest claims to use similarities between languages as a means to foster the learning process of a second language. Aspects of L2 that are similar to the aspects of second language learners’ first language will be easier and faster than the differing aspects (Lado, 1957). Orthography and spelling conventions are one example of many varying aspects among languages. Therefore, according to the point of view of Lado, providing instruction to second language learners focusing on similarities in orthography and spelling between their first and second languages would facilitate their acquisition of these aspects. After mastering these similarities, discussing differences in orthography and spelling conventions would make second language learners aware of how to deal with these variations and overcome any difficulties that might occur because of such variations.

Despite the fact that both Arabic and English are alphabetic, when comparing the Arabic writing system to the English, one can identify several differences. For instance, the most obvious difference between writing systems of Arabic and English is the print directionality. While text in English flows from left to right, text in Arabic flows from right to left. Further, when mapping phonemes into graphemes, Arabic orthography has only thirty-one phonemes associated to the same amount of graphemes whereas English has forty-two representations of phonemes. This shows that the English writing system is opaque while the Arabic writing system is shallow. For instance, the phoneme /shːf/ in Arabic is represented in only one grapheme /ش/.

On the other hand, English has quite different graphemes that represent the same phoneme in either one grapheme or a combination of two graphemes “digraph” or more. For example, the
phoneme /ʃ/ is represented in /sh/ as in (shine), /ch/ as in (machine), /ti/ as in (negotiate), /ci/ as in (appreciate), /s/ as in (Sean), /tion/ as in (nation), /cion/ as in (suspicion), and in the Southern accent also (s) if it is followed by the letter (u) as in (FSU). Thus, differences in grapheme representations make it difficult for speakers of Arabic and other international students to acquire so many different representations of just one phoneme. Ziegler and Goswami (2005) observe that irregularities in English orthography challenge abilities of beginning readers to create consistent phonological representations for orthographic patterns.

Arguably, differences between Arabic and English orthographies will require further processing procedures. For instance, the shallowness of Arabic sound-letter mapping might help English learners of Arabic to process Arabic phonemes mapped into graphemes faster than Arabic learners of English when they process phoneme-grapheme mappings in English words. To illustrate, from the sound-letter mapping perspective, one can assume that Arab learners of English would take more time when decoding English words with varieties of the phoneme /ʃ/ than those English learners of Arabic when decoding Arabic words with just one representation of the same phoneme. Of course, this is not taken for granted because other factors might falsify this assumption however, as far as sound-letter mapping is concerned, decoding one grapheme representing only one phoneme takes less time than decoding many grapheme representations of only one phoneme.

Another difference between Arabic and English orthographies is that the former does not have the first-letter capitalization feature. Nevertheless, shapes of letters differ according to the position of letters in written words: initial, medial, final or isolated. Table 1 illustrates the relationship between position and shape in the Arabic writing system.
Additionally, not only the feature of position plays a role in shaping Arabic letters but also the connectedness feature. The connectedness feature of a letter is the inherent capability and readiness to be connected in writing to preceding or following letters according to its position (Alshammari, 2006). Connectedness conveys the same meaning as the cursive writing in the English orthography where letters of a word are jointed-up and connected to each other to form a single complex word/unit (Supon, 2009). While one purpose of joining letters in the cursive writing is to make writing faster, connecting letters to each other in Arabic is a must because of rigid orthographic rules. However, Arabic letters differ in its capability of connectedness: fully connected, partially connected and disconnected. Separating fully connected or partially connected letters of a word in Arabic is deemed to be an error that empties the word from its meaning or content. Table 2 demonstrates the connectedness feature of letters that are either fully connected, partially connected or disconnected from the neighboring letters: preceding or following.

### Table 1. Position and Shape in Arabic Letters

<table>
<thead>
<tr>
<th>Position and Shape</th>
<th>The letter (ن: ن) at the beginning of a word</th>
<th>The letter (ن: ن) in the middle of a word</th>
<th>The letter (ن: ن) at the end of a word</th>
<th>The letter (ن: ن) at the end of a word preceded by disconnected letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>نـ</td>
<td></td>
<td></td>
<td>نـ</td>
<td>نـ</td>
</tr>
</tbody>
</table>

### Table 2. Feature of Letter Connectedness in Arabic Orthography

<table>
<thead>
<tr>
<th>Connected to the following letter</th>
<th>Fully connected Example (ب: ب)</th>
<th>Partially connected Example (ر: ر)</th>
<th>disconnected Example (ة: ه)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the beginning</td>
<td>In the middle</td>
<td>At the end</td>
<td>At the beginning</td>
</tr>
<tr>
<td>Connected to the preceding letter</td>
<td>Connected to both preceding and following letters</td>
<td>Connected to the preceding letter</td>
<td>Only connected to the preceding letter</td>
</tr>
</tbody>
</table>

Connected to the following letter Connected to both preceding and following letters Connected to the preceding letter Only connected to the preceding letter This form of the letter only occurs in the middle or at the end of a word Cannot be connected to preceding or following letters Cannot be connected to preceding letters
Furthermore, Arabic has three long vowels represented in three graphemes and three short vowels represented in three diacritics above or underneath consonants. Omitting the three short vowels (i, u and α) from the written text is a unique feature of Arabic writing system (Hayes-Harb, 2006), and this usually occurs after the third grade of schooling (Taibah & Haynes, 2011). Hayes-Harb (2006) explains how skilled Arab readers could easily anticipate the missing short vowels when reading texts. She points out several grammatical contextual clues that skilled Arab readers use to predict the function of short-vowel lacking words such as part of speech, person, number, case, tense and voice. Table 3 shows how a word consists of only three similar consonants could have many different meanings and pronunciations based on varying omitted diacritics.

Table 3. Arabic Short Vowels "Diacritics" Differentiate Words' Meanings and Function

<table>
<thead>
<tr>
<th>The word (ملك m-l-k) appears in text without diacritics</th>
<th>The word (ملك m-l-k) in Arabic with varying diacritics:</th>
<th>Part of Speech</th>
<th>The meaning of the word (ملك) according to different diacritics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ملك</td>
<td>مَلا-كَا</td>
<td>verb</td>
<td>Someone owned something</td>
</tr>
<tr>
<td>ملك</td>
<td>مِلْ-كَا</td>
<td>verb (passive voice)</td>
<td>Something is owned by someone</td>
</tr>
<tr>
<td>ملك</td>
<td>مَلا-كَـ</td>
<td>verb</td>
<td>Someone makes something a property of someone else</td>
</tr>
<tr>
<td>ملك</td>
<td>مِلْ-كَـ</td>
<td>noun</td>
<td>A property</td>
</tr>
<tr>
<td>ملك</td>
<td>مِلْ-كَـ</td>
<td>noun</td>
<td>Ownership</td>
</tr>
<tr>
<td>ملك</td>
<td>مَلْ-كَـ</td>
<td>noun</td>
<td>Angel</td>
</tr>
<tr>
<td>ملك</td>
<td>مِلْ-كَـ</td>
<td>noun</td>
<td>King</td>
</tr>
</tbody>
</table>

On the other hand, English has eleven vowels long and short all represented in graphemes (Barry, 2008). This consistent representation of English vowels in graphemes in text would be beneficial for Arab English learners in that they do not need to anticipate any missing vowels. Yet, this consistency in vowel representation might be disadvantageous for Arab students if they apply their L1 orthographic processing procedures and transfer it to the English text. In this case, although all English vowels are written in the text, Arab students would look for any “missing vowels” despite the fact that all of which are obviously written in the text. Although Fender
(2008) claims that ESL spelling research conducted with children and adults indicates that emergent L2 spelling skills could be influenced by spelling skills of L1. Fender emphasizes that differences in some aspects of spelling such as short and long vowels might hinder the acquisition of unfamiliar phonemic segments and patterns that do not exist in the L1.

In addition, another difference between English and Arabic writing systems is that Arabic has no representation of the following consonant phonemes: /p/ sound as in (pray), /ch/ as in (cheap), /g/ as in (gold), /s/ as in (vision), and /v/ as in (vote). Nonetheless, some of the mentioned phonemes have been used and informally pronounced in some current Arabic dialects. For example, speakers of Egyptian Arabic dialect widely use the sound /g/ as in (gold) in the daily speech. Yet, the /p/ sound remains problematic for Arabic speakers across the Middle East because it is not differentiated from the /b/ sound even in Arabic dialects. According to Diaz Rico & Weed (2010), “Arabic speakers may say “barking lot” instead of “parking lot” because to them /p/ and /b/ are not distinguishable sounds” (p. 18).

**Transfer of L1 Skills to Corresponding L2 Skills**

An essential question in the field of second language acquisition is whether reading skills already acquired in the first language could foster the acquisition of matching L2 reading skills taking into account potential similarities and differences between the two languages.

In the developmental interdependence hypothesis proposed by Cummins (1979), the basic assumption is that knowledge acquired in the first language can transfer when acquiring a second language. In other words, linguistic knowledge and skills learned in the first language can serve as facilitators to learn corresponding skills and abilities in the second language once L1 skills were adequately acquired prior to the exposure to the second language. However, the notion of Cummins’s hypothesis was skeptically questioned for several reasons. For instance, Geva and
Ryan (1993) critiqued Cummins’s interdependent developmental hypothesis because it is too general, does not clarify how interdependence between L1 and L2 occurs and does not explain individual differences in the cognitive abilities. In addition, this hypothesis, controversially, gives more credit to skills acquired in the first language to secure success in the acquisition of L2 skills but does not count on the role of L2 acquired skills to improve L2 skills.

Many research studies have attempted to examine whether transfer of L1 skills would have impacts on skills learned in second languages. For instance, a study of Koda (1998) examined the influence of the nature of L1’s orthography on adult learners’ phonemic awareness, decoding and comprehension. Koda compared two groups of participants: Korean with alphabetic orthography background to Chinese with non-alphabetic (logographic) orthography background. Koda expected hypothetically that Korean learners of English would outperform their Chinese counterparts because of their L1 alphabetic experience. However, results show that there was no direct evidence that different alphabetic experiences were associated to L2 phonemic awareness among the participants of the study. In addition, having less alphabetic experience did not amount to be a hindrance that impedes decoding skills of the Chinese participants, as they did not drastically differ from the Korean participants. Moreover, Korean participants showed evidently that phonemic awareness, decoding and reading comprehension are correlated more than the Chinese students did. The findings of (Koda, 1998) contradict claims of (Fender, 2008) that deemed similarities in some aspects of orthographies of L1 and L2 as a facilitator that would foster the acquisition of L2 spelling. Additionally, the findings of (Koda, 1998) also deny the findings of (Wang & Geva, 2003) in which they claimed the notion that Chinese students tend to treat English words as one visual unit rather than being a sequence of graphemes associated to phonemes.
Although the study of (Koda, 1998) did not show evidence that L1 orthographic skills transfer to and influence the corresponding skills in the second language, other studies have provided ample evidence for transfer. For example, Durgunoglu (2002) reviewed vast number of studies that focused on how cross-linguistic transfer influence literacy development. Durgunoglu declares that recent research studies have shown evidence that L1 phonological awareness is a good predictor of later reading and decoding skills in another language.

The study of Hayes-Harb (2006) provides another example that shows how L1 skills could transfer to the second language. Hayes-Harb conducted a study to scrutinize whether native speakers of Arabic transfer their L1 word identification processes when they read English texts. Since there are differences in vowel representation between Arabic and English, Hayes-Harb (2006) hypothesized that difficulties in reading comprehension of Arabic speakers stem from the discrepancy in word identification processes between Arabic and English. The target group of this study comprises native speakers of Arabic whereas the control groups are English native speakers and non-Arabic ESL students. All participants went through two experiments to explicate possible differences in word identification processes and attention to consonants and vowels in target words. The first experiment is Identity Judgment Task in which participants are to judge whether the second word they are shown is identical to the first word. The target word is either identical, missing a vowel or missing a consonant. The second experiment is Letter Detection in which participants are instructed to circle all instances of a target letter be consonant or vowel while reading for comprehension. For example, participants might be asked to circle all instances of the letter (p) or the letter (i) in all words while reading for comprehension. Findings show that while the first experiment was unsuccessful to support the hypothesis that Arab speakers transfer their L1 visual word processing strategies to English reading texts, the second
experiment did provide evidence that supports the study hypothesis. Findings also exhibit that differently from both control groups, Arab speakers treat vowels in English words in the same way they process vowels in their L1 texts.

To examine the extent to which L1 reading skills might affect L2 reading skills, Sparks, Patton, Ganschow, Humbach, & Javorsky (2008) designed a longitudinal study in which they included several skills. Sparks et al. aimed at scrutinizing whether early L1 word decoding, phonological awareness, reading comprehension, spelling, receptive vocabulary and listening comprehension can predict later second language word decoding, spelling and reading comprehension for high school students who had learned their L1 reading and spelling long time ago. Sparks et al. also wanted to investigate whether L2 word decoding skill is essential to L2 reading comprehension. Findings show that the best predictor of L2 decoding skill was the measure of L1 decoding and the best predictors of L2 spelling were L1 spelling and L1 phonological awareness measures. In addition, L2 reading comprehension is best predicted by L1 reading comprehension measure. Further, L2 word decoding skill is found to be an important predictor of L2 reading comprehension. Sparks et al. (2008) concluded that even after many years students learned how to read and spell their L1, word decoding, spelling and reading comprehension skills do transfer from the first language to the second language.

Similarly, Keung and Ho (2009) conducted a study on Chinese second grader students to examine whether phonological awareness, orthographic skills and rapid automatized naming transfer across Chinese (L1) and English (L2) and whether these skills would be accurate predictors of reading performance in both languages. Keung and Ho (2009) compared the R1 = R2 reading model to the Developmental Interdependence Hypothesis implemented in the study of Cummins (1991). While the former model suggests that there is no difference between native
speakers and non-native speakers of a language when they learn to read in that language, the latter model hypothesizes that skills developed in the first language would be transferrable to the second language only if learners have gained a threshold of linguistic competency in their L2. The notion of the R1 = R2 Model therefore by default refutes transfer of skills between the first and second languages whereas the Developmental Interdependence Hypothesis postulates the otherwise. Findings of Keung & Ho (2009) study show that when controlling for age and IQ, phonological awareness and rapid automatized naming measures in English and Chinese were significantly correlated hence easily transferrable unlike the orthography awareness.

**Synthesis of the Literature Review**

The preceding review of literature for the present study is composed of sections covering Information Processing theory, age and second language acquisition, assessing the construct of reading, implicit versus explicit instruction, phonological awareness, reading fluency, spelling knowledge and orthographic processing skills, and transfer of L1 skills to corresponding L2 skills.

Within the first section, characteristics of top-down, bottom-up and interactive approaches to reading and comprehension were discussed. Then, it was pointed out that the present study employs the first version of the Information Processing model “IP” as a framework as it appropriately fits with the needs of less proficient second language learners. Afterwards, the study presented some key concepts of the “IP” model that have direct relationships to the focus of the study such as attention, automaticity and fluency in addition to the difference between simultaneous and successive processing during reading L2 texts.

The next section discussed the idea of how age relates to the acquisition of second languages in light of biological and bilingual background approaches. While the Critical Period
Hypothesis “CPH” claims that adult second language learners are deprived from achieving native-like processing abilities because of inevitable biological constraints, bilingual perspectives emphasize the role of training and residing in the second language environment in order to achieve native-like abilities.

The third section was devoted to elaborate on approaches and practices that provided various ways to assess reading. Reading has been looked at as either one whole construct or as having different sub-skills that could be measured separately. This study shed light on drawbacks of treating reading as one whole construct and therefore is in favor of the component skills approach of (Carr & Levy, 1990). Additionally, the study reviewed several studies that followed both approaches and pointed out potential weaknesses in ways in which reading skills were assessed and measured.

The following section focused on differences between implicit and explicit instruction on phonological awareness implemented in second language classrooms. Several research studies were reviewed to discuss which type of instruction (implicit or explicit) is appropriate and more advantageous to second language learners. The present study supports the idea that looks at implicit and explicit instruction as a continuum and that adult second language learners move from explicit to implicit instruction as they advance their L2 proficiency.

The fifth section concentrated on reviewing vast number of studies that investigated how instruction on phonological awareness contributed to and improved various reading sub-skills such as word recognition, spelling, decoding, fluency, and comprehension. These studies were not limited to specific age of participants nor to any ethnicity in particular, but rather the usefulness of the phonological awareness instruction for second language learners.
The section of reading fluency pointed out the need for more studies on the relationships between fluency and reading comprehension in second language contexts. Afterwards, characteristics of fluent readers and the appropriate reading rate for L2 were discussed. In addition, the present study covered many alternative approaches, activities and classroom practices that would increase reading fluency such as extensive reading, timed reading and meaningful chunking and segmenting words while reading.

The succeeding section presented the idea that the spelling knowledge and orthographic processing skills of second language learners could be improved and enhanced. This section focused more on studies that examined spelling deficiencies of adult ESL Arab students and discussed how these shortcomings could be explained in light of the reliance on Arabic word recognition strategies rather than English word recognition strategies. Moreover, this section encapsulated several differences between the Arabic and English writing systems such as the direction of text, opacity and shallowness, number of consonants and vowels, omitting short vowels, capitalization, and existence of some sounds in English but not in Arabic.

The last section concluded the literature review by reporting the possibility of transferring linguistic skills learned in the first language to the second language being learned so students could use these skills to support their acquisition of the second language. The present study reviewed several studies that scrutinized the notion of transferring L1 skills to L2 contexts in the hope that using L1 skills in L2 classrooms would foster the acquisition of matching L2 skills. Further, this section elaborated on how discrepancies in the writing systems between various languages could play a role in aiding or impeding the acquisition of L2 reading skills.
Gap in Literature

Within the studies that focused on challenges of ESL adults in L2 reading skills, reading performance of adult Arab ESL students has not been sufficiently well studied. Literature available nonetheless shows that there were some attempts to explain quite few reading difficulties encountered by adult Arab ESL learners. For instance, a study of Emery (2005) focused on investigating reasons of misspelled English words made by adult Arab ESL learners. In addition, some other studies provided evidence for L1 Arab transfer of written word identification processes to English texts (Hayes-Harb, 2006). Moreover, some of these studies looked broadly at reading strategies of adult Arab learners of English as a foreign language EFL not ESL context (Malcolm, 2009).

In addition, most of studies that examined reading struggles focused on children rather than adults and in L1 rather than L2. For example, when comparing minority studies conducted on children to studies on adults, it appears that reading deficiencies in minority adults were less represented in research in comparison to minority children. Harrison and Krol (2007) claimed that there has been much research about literacy problems of minority children but not on adults. Additionally, Grabe (2009) cautioned that L2 fluency research is limited in number of studies. This was rebounded in the study of Chang (2010) who pointed out that development of L2 reading fluency has not received much attention in comparison to L1 reading fluency development. Further, current research lacks empirical studies that provide practical steps to improve adults’ reading skills. According to Tindal and Nisbet (2010), there is a need for empirical research to create effective reading practices to help adult limited English proficient students. This is because there was no sufficient information about why ESL learners struggle in their reading performance or how to overcome these struggles. Van Staden (2011) pointed out
that many ESL learners are unable to read at their appropriate level and suggested that much research is needed to learn about reasons and solutions for this phenomenon. Therefore, this study aims to fill this gap in literature by examining the influence of explicit phonological instruction on spelling knowledge, orthographic processing skills and reading speed and comprehension accuracy of adult Arab and non-Arab ESL students. Moreover, the current study also attempts to compare Arab students to their non-Arab classmates according to their performance and gains.
CHAPTER THREE

METHODOLOGY

This study investigates international students who are enrolled in the English as a second language program at the Center for Intensive English Studies (CIES) at Florida State University. Established in 1980, CIES provides English as a second language instruction to international students in five areas: grammar-in-use, composition, reading, speaking and listening. The main goal of this program is to enable students to become automatic at both processing and producing English. CIES forces a very strict “English Only” policy therefore; students are not allowed to speak their first languages while in the center. In addition, the mission of this program is to encourage graduate and undergraduate students at CIES to use their English in various academic and social situations and to motivate them to read, write, speak and listen in English in order for them to become automatic at these skills (“Teaching Philosophy,” n.d.).

The CIES has recently adopted a methodology for teaching reading that specifically focuses on explicit decoding and phonological processing skills to enhance different reading abilities of adult English language learners. However, this method has not been regularly taught to students at all proficiency levels and in most instances, it was only offered to students in the foundation groups. This method comprises the teaching of 42 English sounds (consonants, vowels, murmur diphthongs, diagraphs, and special vowel sounds). In addition, the method includes the teaching of six groups of blends of letters (l, r, s, three-letter s blends, extra blends and diagraph blends). Furthermore, this method consists of five phonetic skills and two main decoding skills. Components of this method are shown in Appendix A.

The study aims to assess the impact of the phonological instruction on international students’ spelling, orthographic processing skills, and reading speed and comprehension. In
addition, the study compares two groups of participants according to their gains, performance and the differences in their pre-existing knowledge in the target skills taking in account their various proficiency levels.

**Recruiting Participants**

**Classification of Potential Participants**

International students enrolled at CIES are either newly admitted to the program or continuing students. Placement tests serve as a tool for screening and categorizing newly admitted students into proficiency levels that match their abilities in the five English language skills taught at CIES: grammar-in-use, composition, reading, speaking, and listening. For instance, CIES adopts the Compass® ESL reading test that is developed by the American College Testing “ACT® improve yourself”. Compass® ESL reading test measures a wide range of skills starting from recognizing the main idea of a picture, inferring meanings of words, locating explicit details, applying concepts in the passage to new situations, recognizing the main idea of a paragraph, inferring the meaning of a phrase, and inferring tone, style and intended audience. The classification of international students in proficiency levels appropriate to their performances in the Compass® reading test meets the following criteria. The score breakdown of this test is (1-37) for pre-level 1 equivalent to the foundation group, (38-64) for level 1 corresponding to beginners, (65-79) for level 2 equal to low intermediate, (80-91) for level 3 equivalent to high intermediate, and (92-99) for level 4 corresponding to the advanced group. On the other hand, at the beginning of every session, continuing students take diagnostic tests to ensure that they are put in groups that match their proficiency levels determined by their improvements in English abilities.
Sampling Procedure

International students at CIES represent different countries and cultures, various ethnicities and diverse socioeconomic and linguistic backgrounds. Classrooms at CIES are heterogeneous in which students from all over the world are mixed up regardless of first languages they speak. Characteristics of potential participants are adult second language learners of English, native speakers of Arabic, native speakers of languages other than Arabic or English, enrolled at CIES, assigned to either foundation, beginner, low intermediate, high intermediate or advanced proficiency groups. Moreover, characteristics also include male, female, single, married, in the pursuit of graduate or undergraduate academic programs in U.S. universities, and working on passing standardized tests such as TOEFL®, IELTS™, GRE® or GMAT®.

Approximately, 130 international students were enrolled at CIES during the first session in summer 2015 divided into ten different reading classes. At the beginning, informed consent forms were given to all teachers of reading classes at CIES. Only half of reading teachers gave consent and showed interest to participate in the study. The other half of reading teachers were not interested to participate because they felt they need more training on the phonological instruction method before they can implement it in their classrooms. Thus, only students in reading classes of participating teachers (n = 60) were conveniently sampled and given informed consent forms and were asked to participate in the study. In addition to giving consent to be part of the study, students were asked to share some demographic information.

The total number of participants is 60 students but due to attrition, some of them withdrew from the study. For instance, at the beginning of the treatment, one of the participants was hospitalized and then was returned back to his country. In addition, two students moved to two different English institutions in the U.S. Moreover, towards the end of the session and just
before the posttests, three students went back to their countries because they did not meet the criteria required to grant them a scholarship from their governments. In addition, one of the participants had to withdraw because she delivered a baby and started her maternity vacation. All these attrition cases were from the Arab group and all their data were deleted from the analyses. The categorical scaled variables in demographic characteristics of the study participants were analyzed using frequency and percent.

**Demographics of Participants**

The demographics information gathered from participants include gender of Arab and non-Arab students, age range, ethnicities in detail, first languages of students, proficiency levels, their distribution according to their reading teachers in five classes, exposure to English in their home countries, preference of language spoken at home, and highest academic degree achieved prior to arriving to the United States. Table 4 shows that 38 male students participated in the study; 31 (81.6%) Arabs and 7 (18.4%) non-Arabs in addition to 15 females; 7 (46.7%) Arabs and 8 (53.3%) non-Arabs. For the age range of students, Table 5 demonstrates that 28 (52.8%) were between 18 to 22 years old, 18 (34%) were between 23 to 27 years, 6 (11.3%) were in the range of 28 years to 32 years and 1 (1.9%) was 33 years or older.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Arab</th>
<th>Non-Arab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>31</td>
<td>81.6%</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>46.7%</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>53.3%</td>
</tr>
</tbody>
</table>

In addition, Table 6 shows that ethnicities of participating students are 38 (71.7%) Arab, 2 (3.8%) Turkish, 6 (11.3%) Asian, 1 (1.9%) White Non-Hispanic, 4 (7.5%) Hispanic and 2 (3.8%) African American or Black.
Table 5. Age Range of Students

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Years to 22</td>
<td>28</td>
<td>52.8</td>
<td>52.8</td>
</tr>
<tr>
<td>23 Years to 27</td>
<td>18</td>
<td>34.0</td>
<td>34.0</td>
</tr>
<tr>
<td>28 Years to 32</td>
<td>6</td>
<td>11.3</td>
<td>11.3</td>
</tr>
<tr>
<td>33 Years and Older</td>
<td>1</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 6. Ethnicities of Arab and non-Arab Students in Detail

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>38</td>
<td>71.7</td>
<td>71.7</td>
</tr>
<tr>
<td>Turkish</td>
<td>2</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Asian</td>
<td>6</td>
<td>11.3</td>
<td>11.3</td>
</tr>
<tr>
<td>White Non-Hispanic</td>
<td>1</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>African American or Black</td>
<td>2</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 7 specifies varieties of students’ first languages, 38 (71.7%) Arabic, 2 (3.8%) Turkish, 3 (5.7%) Japanese, 1 (1.9%) Portuguese, 3 (5.7%) Korean, 4 (7.5%) Spanish and 2 (3.8%) French.

Table 7. First Languages of Students

<table>
<thead>
<tr>
<th>Language</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic</td>
<td>38</td>
<td>71.7</td>
<td>71.7</td>
</tr>
<tr>
<td>Turkish</td>
<td>2</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Japanese</td>
<td>3</td>
<td>5.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Portuguese</td>
<td>1</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Korean</td>
<td>3</td>
<td>5.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Spanish</td>
<td>4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>French</td>
<td>2</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 8 presents number of students according to their proficiency level, 4 (7.5%) were in the foundation level, 35 (66%) were beginners and 14 (26.4%) were in the low-intermediate level.

| Table 8. Proficiency Levels of Students |
|-------------------------------|-----------------|-----------------|-----------------|
| Frequency | Percent | Valid Percent |
| Foundation | 4 | 7.5 | 7.5 |
| Beginner | 35 | 66.0 | 66.0 |
| Low-Intermediate | 14 | 26.4 | 26.4 |
| Total | 53 | 100.0 | 100.0 |

Five reading teachers took part in the study anonymously identified as MM, AA, CC, JJ, and VV. Table 9 displays that teacher MM had 4 (7.5%) students, teacher AA had 14 (26.4%) students, teacher CC had 10 (18.9%) students, teacher JJ had 11 (20.8%) students and teacher VV had 14 (26.4%) students in their reading classes. MM was a teacher of the foundation group, VV was a teacher of the low-intermediate group whereas AA, CC and JJ were teachers of the beginner groups.

| Table 9. Number of Students in each Teacher’s Class |
|-----------------------------------------------|-----------------|-----------------|-----------------|
| Anonymous Teachers | Frequency | Percent | Valid Percent |
| MM | 4 | 7.5 | 7.5 |
| AA | 14 | 26.4 | 26.4 |
| CC | 10 | 18.9 | 18.9 |
| JJ | 11 | 20.8 | 20.8 |
| VV | 14 | 26.4 | 26.4 |
| Total | 53 | 100.0 | 100.0 |

Table 10 exhibits number of years participants were exposed to English in their home countries prior to their arrival to the U.S., 22 (41.5%) of international students were exposed to English less than a year. Moreover, 8 (15.1%) reported two to four years of exposure to English,
12 (22.6%) were exposed five to eight years to English whereas 11 (20.8%) were exposed to English more than nine years.

Table 11 displays languages that were mostly used at home in the daily conversations during the span of the study. 13 (24.5%) participants reported that they speak their first language at home, 7 (13.2%) of students said they speak only English at home, 12 (22.6%) stated that they use their first languages and English equally.

Table 10. Exposure to English in Home Country

<table>
<thead>
<tr>
<th>Years of English</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than a year</td>
<td>22</td>
<td>41.5</td>
<td>41.5</td>
</tr>
<tr>
<td>Two to Four Years</td>
<td>8</td>
<td>15.1</td>
<td>15.1</td>
</tr>
<tr>
<td>Five to Eight Years</td>
<td>12</td>
<td>22.6</td>
<td>22.6</td>
</tr>
<tr>
<td>More than Nine Years</td>
<td>11</td>
<td>20.8</td>
<td>20.8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Furthermore, 1 (1.9%) used both English and Spanish, 1 (1.9%) used both the first language and English but emphasis is on English, and 19 (35.8%) said that they speak their first languages and English but emphasis is on their first languages.

Table 11. Spoken Language at Home in the U.S.

<table>
<thead>
<tr>
<th>Language Preference</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The First Language</td>
<td>13</td>
<td>24.5</td>
<td>24.5</td>
</tr>
<tr>
<td>English</td>
<td>7</td>
<td>13.2</td>
<td>13.2</td>
</tr>
<tr>
<td>The First Language and the Second Equally</td>
<td>12</td>
<td>22.6</td>
<td>22.6</td>
</tr>
<tr>
<td>English and Spanish</td>
<td>1</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>The First and the Second but emphasis on English</td>
<td>1</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>The First and the Second but emphasis on the First</td>
<td>19</td>
<td>35.8</td>
<td>35.8</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 12 shows highest academic degrees the sample of the study had achieved in their home countries before they attended the Center for Intensive English Studies. For instance, 25 (47.2%) students had their high school diploma whereas 4 (7.5%) had some college education. Further, 4 (7.5%) participants earned two year degrees, 14 (26.4%) had four years degrees, 4 (7.5%) received their Master’s degrees and 2 (3.8%) earned their PhD degrees.

<table>
<thead>
<tr>
<th>Academic Degree</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>25</td>
<td>47.2</td>
<td>47.2</td>
</tr>
<tr>
<td>Some College</td>
<td>4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>2 Year Degree</td>
<td>4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>4 Year Degree</td>
<td>14</td>
<td>26.4</td>
<td>26.4</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>PhD</td>
<td>2</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>53</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

All participants received instruction on reading skills appropriate to their proficiency levels according to the planned curriculum at CIES and in the same time received explicit instruction on phonological awareness.

**Data Collection Instruments**

Data collection took place during the summer semester in the year of 2015 at the Center for Intensive English Studies. Throughout this semester, CIES had two sessions each of which lasted for seven weeks. In the span of the first session, several instruments were used for data collection and analysis. Prior to the intervention, participants took pretests on spelling, pseudowords, and a timed reading task that measures reading speed and comprehension accuracy. After the completion of the intervention towards the end of the session, students took posttests on the same skills. Copies of pretest and posttests are available upon request.
Spelling instruments measure the spelling knowledge by which Arab and non-Arab speaking participants can write correctly words they hear at the end of the intervention better than what they were doing before applying the new phonological awareness method. The pseudowords instruments measure whether participants show understanding of acceptable word patterns in English orthography at the end of the phonological awareness instruction better than what they were showing before applying this method. Timed reading instruments measure whether participants achieve reading speed and comprehension gains at the end of the intervention higher than what they had achieved before implementing the explicit phonological awareness instruction.

**Pretests**

Along with the placement tests and diagnostic tests, participants were tested using three instruments prior to the implementation of the phonological awareness instruction.

**Spelling knowledge pretest.** The purpose of the spelling pretest is to determine the primary level of spelling knowledge of participants Arab and non-Arab speakers. The study utilized the Upper-Level Spelling Inventory (USI) adopted from the book titled *Words THEIR WAY* the fifth edition written by Helman, Templeton, Invernizzi, Bear, & Johnston (2011). Specific domains measured in the spelling pretest are within word pattern, syllables and affixes, and derivational relations. The previous spelling domains have their own features and are divided into three stages; early, middle, and late. Features of the first domain (within word pattern) are blends and diagraphs, vowels, and complex consonants. The second domain (syllables and affixes) includes inflected endings and syllable juncture, unaccented final syllables, and affixes. The third domain (derivational relations) comprises reduced vowels in unaccented syllables, Greek and Latin elements, and assimilated prefixes. Participants were
tested in 31 words that represent the target domains. Students heard their reading teachers call each word aloud naturally without emphasizing phonemes or syllables. Each word students heard was followed by a sentence that contains the target word. Afterwards, teachers read aloud the target word again and students started writing the word. The participation condition is that if a student gets 25 correct words out of the 31 words, s/he shall not be allowed to participate because s/he shows mastery in English orthographic processing skills. All students met the participation condition in that no one of them correctly spelled 25 words or above therefore, all of them were recruited.

**Pseudowords pretest.** In this pretest, adult Arab and non-Arab ESL students were tested in their ability to spell nonsense words as a means to evidence their awareness of how English writing system works. Pseudowords test is important because it measures participants’ knowledge of legitimate word patterns accepted in English orthography. Participants heard 31 nonsense words one word at a time. Teachers called each word aloud two times with five seconds delay. After the second time of reading the nonsense word, students wrote what they heard on a piece of paper. The pseudoword test adopted is the © *Spelling Under Scrutiny* created by Allcock, J., (2009). This test measures seven different domains in spelling but in nonsense words. The target domains are one letter consonants, blends (initial and final), long and short vowels, other vowel sounds, diagraph patterns, spelling rules or conventions, and suffixes. The purpose of this test is to examine participants’ English orthographic processing skills and to ensure that they qualify for participation in this study. The participation condition for the nonsense words test is similar to the participation condition of the spelling test. For instance, if a student gets 25 correct nonsense words out of 31, the student shall not be allowed to participate because the student shows mastery in English orthography. None of the participating students
did correctly write 25 nonsense words or above in the pseudowords pretest thus, all of them were allowed to participate. As Perfetti and Marron (1995) clearly put it:

Knowledge of a writing system can be determined in a simple manner: the ability to read orthography legal nonwords (i.e., pseudowords). Absent any neurological problems, a failure at pseudoword reading indicates a misapprehension of the writing system. An adult who cannot read pseudowords needs direct instruction on the writing system, some combination of decoding and phonological awareness instruction. Conversely, an ability to read pseudowords implies an understanding of the writing system, and instruction on something else is implied. (p. 23)

**Timed reading pretest.** Participants took a timed reading pretest in order to identify their initial reading speed and comprehension accuracy. Students silently read a passage and wrote their reading time right after they had finished reading the passage. To measure the accuracy of participants’ understanding, they were asked to answer ten multiple-choice comprehension questions. Comprehension questions were included to ensure that students are reading for comprehension not for the sake of high scores in reading rate. The purpose of timed reading is to assess participants’ actual level of reading speed and comprehension accuracy and to ensure that participants have an indicator of slow reading speed or inaccurate comprehension therefore they are qualified to participate in the current study. The participation condition is that if a student reads silently at a rate of 200 to 250 words per minute and gets 8 to 9 correct items out of ten, then this participant shall be excluded because s/he is in the range of the acceptable silent reading speed described in (Nation, 2009). All students met this condition therefore were allowed to participate.
Passages for the timed reading pretest and posttest were chosen from the book titled *Timed Readings Plus* written by Spargo (1998). This book has a series of ten books and has been designed to be a supplementary material to help slow readers to practice speed reading and enhance reading comprehension. The Fry Read-Ability Scale (1968) was used in the series to assess readability of the selected passages. In the Read-Ability Scale, Fry (1968) developed a method to calculate the average number of sentences and syllables per hundred words.

This book has two selections of passages: the “Timed Reading” selection and the “Plus” selection. The former selection comprises passages that are 400 words in length, followed by 10 multiple-choice comprehension questions: 5 fact questions and 5 thought questions, and covers various genres: factual, nonfiction, and textbook-like. Comprehension skills tested by this selection are recognizing words in context, distinguishing fact from opinion, keeping events in order, making correct inferences and understanding main ideas. On the other hand, the latter (the “Plus” selection) is more narrative, contains non-timed texts, and relates to the “Timed Reading” selections with varying length. Reading instructors at CIES oftentimes use all books in the series of the *Timed Reading Plus* (Spargo, 1998) to assess reading speed of students and to check their comprehension throughout all proficiency levels. For this study, the timed reading pretest and the posttest were chosen from the “Timed Reading” selections not the “Plus” selections. For the foundation group, book one in the series was used. In addition, book three was chosen for beginner group whereas book five in the series was selected for participants in the low intermediate group.

**Posttests**

In the same manner of the pretests, participants took posttests in spelling, pseudowords, and timed reading in order to capture any differences in participants’ gains in the skills tested that
could be associated to the implementation of the explicit phonological awareness instruction method. The pre and posttests in both spelling and pseudowords were identical across all proficiency levels. In other words, all participating students in all proficiency levels took the same pre and posttests in spelling as well as pseudowords. On the other hand, pre and posttests in reading speed and comprehension were identical in each proficiency level but different across the proficiency levels.

Scoring

For the purpose of consistency, the same scoring criteria were used in all similar tasks whether they are pretests or posttests. The scoring criteria are explained in the following description.

Spelling

The higher raw score is 99 points. A student scores 31 points for correctly writing 31 words and scores 68 points for correctly writing 68 features of the 31 words.

Pseudowords

The higher raw score is 151 points. A student scores 31 points for correctly writing 31 pseudowords and scores 120 points for correctly writing 120 features of the 31 pseudowords.

Timed Reading: Reading Speed and Comprehension

Two components were measured in timed reading test; reading speed and comprehension. The reading speed was measured by word per minute. The formula used to calculate reading speed is total words divided by total seconds multiply by 60. The higher score for reading comprehension is 10 points one point for each correct item.
Variables

The study examined the contribution of incorporating explicit phonological awareness instruction into reading instruction to the following dependent variables explained as follows.

1 – Independent Variable: explicit instruction on phonological awareness

2 – Dependent Variables:

a) Spelling knowledge measured by the Upper-Level Spelling Inventory (USI).

b) Knowledge of word patterns in English writing system measured by © Spelling Under Scrutiny pseudoword test.

c) Reading speed measured by timed reading passages adopted from the book Timed Readings Plus of Spargo (1998). The reading speed is measured by word per minute.

d) Comprehension measured by the correct items achieved in comprehension multiple-choice questions that follow the reading passage.

Data Analysis

Data gathered from pretests and posttests were analyzed using several analysis procedures.

Descriptive Statistics

The software SPSS v.19 was used to compute the mean to get the average of all scores in the data set, variability to measure the extent to which scores in the data distribution are clustered together or spread out, and the standard deviation to estimate the average distance from the mean score of each participant.
Resistant Rules of Outlier Labeling Methodology

This method was used to determine whether the data set has any outliers that might affect the accuracy of the analyses.

\textit{p-value}

It means the likelihood or probability of obtaining results even more extreme, assuming that the null hypothesis is true. For results to be statistically significant in education and in most social science research, \( p \) value must be less than .05.

Repeated Measures ANOVA

This statistical procedure was used to examine differences found between the two groups of participants in spelling, pseudoword, reading speed and comprehension when analyzing the pretests and the posttests of the participants. It is usually used to measure changes within subjects and between subjects and to determine the effect of a treatment on one groups of participants or more.

Pairwise Comparisons Test

This test was produced to locate differences between groups that were not specified in ANOVA analysis. Without the pairwise comparisons test, ANOVA only indicated that there were some significant differences existed among the groups but did not indicate which groups, the pairwise comparisons test could specifically determine which group that was significantly different from the other group.

HLM

The Hierarchical Linear and Nonlinear Model was used to capture any gain differences that were not captured by the repeated measure ANOVA in students Arab and non-Arab with reference to their proficiency levels.
Procedures

Prior to data collection, participating reading teachers, who signed the informed consent form as shown in Appendix B, gave their Arab and non-Arab ESL students an introduction about the study and its purpose, details on how it works and how they can be part of it. Afterwards, interested students were asked to sign informed consent forms to show their willingness to participate in the study. The consent form shown in Appendix C is written carefully in a very direct and simple word choice in English so students in the lower proficiency levels can understand their expected role in the study and learn their rights. All participants were explicitly told that they have the right to discontinue participating at any time they want however, they were encouraged to participate to the end of the intervention as there is no likelihood to face any potential risk. Participants were assured that all data and their personal information will remain confidential and access to it is highly restricted. To have a better understanding of how actual tests and tasks might look like, reading teachers also discussed briefly the target skills with their students and explained the process of taking pre and posttests in those skills. At the day of placement tests, participants took three pretests in spelling, pseudowords and timed reading. Towards the end of the treatment, students took posttests in the same skills.

Fidelity Check

The purpose of the fidelity checks is to make sure that explicit phonological awareness instruction is taught adequately to the international students who participated in the study. In addition, it is important to make sure that English sounds, groups of blends, phonetic skills and the decoding skills included in the phonological methodology are sufficiently taught for students across all proficiency levels. Therefore, to avoid giving misleading information about the explicit phonological awareness instruction implemented at CIES and its potential contribution to
specific reading sub-skills, the researcher made several visits to CIES to observe the delivery of the phonological awareness instruction. Each classroom was visited at least two times and each visit lasted for 15 minutes. Permission was obtained from the Director of CIES and from the reading teachers who were very enthusiastic to implement the new phonological instruction method in their classrooms.

During the classroom visits, students in general appeared to be excited to learn this method as this type of instruction was new to them. According to some of the participants, they liked it because they have not been exposed to this type of instruction in their home countries. For instance, students stressed the fact that they were motivated to explore how phonics could help them learn relationships between letters and sounds in English. Nevertheless, some of the students were not satisfied with this method saying that it works only for children not for adults. Moreover, reading teachers promoted students’ understanding of this method by using varieties of classroom activities and providing them with abundant opportunities to practice what they learned. For example, students were given markers and small white boards on which they were asked to write example words that have similar blends, phonetic skills or decoding skills being discussed. Eventually, the observed classroom hands-on phonological activities encouraged students and led their phonological curiosity to develop and evolve.

**Limitations of the Study**

Despite the fact that this study investigates a barely touched area specifically the influence of explicit phonological awareness instruction on spelling knowledge, English orthography, and reading speed and comprehension of international students, the current study has some limitations.
First, just right before the implementation of the phonological instruction, half of the reading teachers at CIES opted out and did not want to participate in the study because they thought they were not sufficiently trained on the phonological method being implemented. As a result, classrooms of those teachers were not accessible. Students in the classrooms of teachers who were not willing to participate could have been used as controlling groups but this unfortunately was not an option. The reason is that participation of teachers is a prerequisite condition that must be achieved before asking their students to participate. In other words, reading teachers must have given consent to partake in the study prior to asking their students to participate. Thus, asking teachers who were not willing to participate to administer three pretests and three posttest before and after the phonological instruction treatment simply was not possible.

Second, because the initial sample size of participants is relatively small \((n = 60)\), all students in the five participating classes have been exposed to the phonological instruction treatment and there was no control group. Consequently, the design of the study changed from being experimental that consists of intervention and control groups to becoming a one group pretest-posttest design with no control group. As a result, the sampling procedure changed from random sampling to convenience sampling. Due to the abrupt shift in the study design and lacking random assignment of participants to control and intervention groups, the results could not be generalized to other international students who study English as a second language in intensive English programs in the United States.

Another limitation is that lacking control groups in the design of the current study does not allow explaining any significant gains found in the posttests exclusively due to implementing the explicit phonological treatment. However, it would be possible to claim that a significant
statistical correlation was found between the intervention and the dependent variables: (spelling, orthography and reading speed and comprehension).

Further, various methodologies with bottom-up approach to reading use explicit classroom instruction on phonological awareness in combination with varieties of computerized phonological software to enhance students’ spelling knowledge, pronunciation and reading speed. However, this study is limited to only classroom instruction and no computer software programs on phonological awareness were involved in the treatment.

A fifth limitation lies in the length of the treatment that lasted only for a month. Grabe (2009) points out that rapid reading is gradually learned therefore detecting significant changes in reading speed in short-term studies may be difficult to evidence.

Furthermore, several attrition cases occurred during the course of the study in which some students had to withdraw from the intensive English program at CIES. Consequently, the number of participants slightly decreased. One negative consequence of attrition is pitfall in effectiveness of the results of the study as some data entries would be missing therefore deleted.
CHAPTER FOUR

RESULTS

Using multiple data analysis tools, this chapter is devoted to examining the research questions and to reporting the study results. Statistical analyses used to analyze data in this chapter were descriptive Statistics, resistant rules of outlier labeling methodology, $p$-value, repeated measures ANOVA, pairwise comparisons test and HLM.

Preparing Data and Subjects for Analysis

In order to accomplish accurate results, it is critical to examine the data to detect outliers and to organize the way by which participants are grouped to cultivate analyses that are more effective.

Possible Outliers

Prior to conducting the analyses, all data were examined to ensure that there are no possible outliers that could affect the accuracy of the results. To identify any potential outlier, data were tested using the Resistant Rules of Outlier Labeling methodology of Hoaglin, Iglewicz, & Tukey (1986). According to this method, any observation below $F_L - 2.2(F_U - F_L)$ or above $F_U + 2.2(F_U - F_L)$ is considered outlier in samples $20 \leq n \geq 100$ where $F_L$ refers to the lower quartile and $F_U$ refers to the upper quartile.

Scores of both spelling and pseudoword pre and posttests did not include any outlier. Similarly, scores of comprehension pre and posttests did not contain any outlier. However, there were two outliers in the reading speed pretest and four outliers in the reading speed posttest. One of the cases was found to be an outlier in both pre and post reading speed tests so the total of the outliers is five cases. To figure out whether these outliers could have any possible impacts on the
results, further details about those outliers in the reading speed pre and posttests will be forthcoming in the timed reading analyses.

Organizing Students for Data Analyses

Three main grouping criteria were employed when conducting the analyses. The first criterion looked at all participants as one whole group ($n = 53$). The second criterion took in consideration the L1 background of participants as a means to divide them into two main groups without looking at their proficiency levels: Arab ($n = 38$), non-Arab ($n = 15$). The third criterion looked at both the L1 background of participants and their proficiency levels they were assigned to: foundation (only Arab $n = 4$), beginner (Arab $n = 27 +$ non-Arab $n = 8$) and low intermediate (Arab $n = 7 +$ non-Arab $n = 7$).

The purpose of the first criterion is to find out whether the phonological awareness treatment could be beneficial for adult second language learners in general as they learn how to read in English. The intent from the second criterion however is to assess whether participants of the Arab group would differ from participants of the non-Arab group in the way they reacted to the phonological instruction according to their first language backgrounds. In other words, would one of the two groups be better off and more advantageous than the other group if they were exposed to the phonological instruction treatment? Moreover, the third criterion was implemented because measurements of reading speed and comprehension were differentiated according to the proficiency levels of students. Therefore, comparisons between Arab and non-Arab participants were only possible within their specific proficiency level.

In sum, grouping of students was appropriately differentiated when analyzing pre and posttests in the target skills to examine how much an individual in the sample tended to change
over time and to scrutinize how individuals differed from each other in their scores depending on their categorical grouping e.g. L1 background and/or proficiency level.

Sensitive Analyses

To control for the outliers, sensitive analyses were carried out with and without outliers. Any significant change brought by either including or excluding the outliers was reported. Due to lacking a comparable non-Arab group, analyses included results of participants of foundation level only in spelling and pseudoword but not in reading speed and comprehension.

Research Questions from the Study

Listed below are the research questions the study attempted to answer. The research questions of the current study were analyzed using various statistical tools.

Research Question #1

a) Does explicit phonological awareness instruction influence the English spelling knowledge of adult international Arab and non-Arab students?

The first part of the first research question could not be answered because of the aforementioned haphazard change in the study design that led to lacking a comparable control group. Therefore, the study was unable to directly estimate the influence of the explicit phonological awareness instruction on students’ spelling knowledge.

b) Looking at spelling gain scores of the entire sample regardless of their L1 background (Arab and non-Arab) or their proficiency levels (foundation, beginner or low intermediate), do students score significantly higher on the spelling posttest than the pretest?
To answer the second part of the first research question, a repeated measures ANOVA was conducted to compare mean scores of all participants in the pretest to the mean scores of the posttest to determine whether participants in general made significant gains in spelling. Table 13 shows the marginal mean scores in spelling pre and posttests for all participants ($n = 53$). Results of the repeated measures ANOVA showed that there was a significant difference between the pre and posttest $F(1,51) = 20.5, p < .001$. Table 14 depicts a follow-up pairwise comparisons test obtained to assess the difference between spelling pre and posttests. Results of the pairwise comparisons test suggested that participants did improve in spelling score with a significant mean increase of 4.88 points throughout the span of the study.

| Table 13. Marginal Means of all Participants in Spelling Pre and Posttests |
|-----------------------------|------------------|----------------|------------------|------------------|------------------|
| Time      | Mean | Std. Error | 95% Confidence Interval | |
|           |      |             | Lower Bound | Upper Bound |
| Pretest   | 29.196 | 1.247 | 26.693 | 31.700 |
| Posttest  | 34.078 | 1.607 | 30.853 | 37.304 |

| Table 14. Pairwise Comparisons in Spelling Score Change in all Participants |
|-----------------------------|------------------|----------------|------------------|------------------|------------------|
| (I) Time | (J) Time | Mean Difference (I-J) | Std. Error | Sig.a |
| Pretest   | Posttest  | -4.882* | 1.077 | .000 |
| Posttest  | Pretest   | 4.882* | 1.077 | .000 |

c) Does performance of the two groups vary significantly in spelling gain scores from pretest to posttest?

To answer the third part of the first research question, participants were separated into two groups coded as Arab and non-Arab.
Table 15 shows the descriptive statistics of Arab and non-Arab participants in the spelling pre and posttests.

<table>
<thead>
<tr>
<th></th>
<th>Students:</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Arab</td>
<td>18.5263</td>
<td>7.33277</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Pretest Non-Arab</td>
<td>39.8667</td>
<td>10.07732</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Pretest Total</td>
<td>24.5660</td>
<td>12.64076</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Posttest Arab</td>
<td>22.2895</td>
<td>10.30588</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Posttest Non-Arab</td>
<td>45.8667</td>
<td>11.12826</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Posttest Total</td>
<td>28.9623</td>
<td>14.96273</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>

A repeated measures ANOVA was performed to assess the direction of the performance of the two groups in spelling from pre to posttest. In other words, the current study is interested to measure whether there is a significant difference in the way the two groups changed over time from the pretest to the posttest. Results showed that there was no significant interaction between time (pre - posttest) and group (Arab – non-Arab) in spelling gains, $F = (1.51) = 1.07, p = .304$.

Due to the small sample size of participants in both groups and because of large standard deviation values in the spelling mean scores of both groups, a more sophisticated statistical analyses were conducted to capture any possible significant difference in spelling performance of Arab and non-Arab students from pre to posttest. Thus, a Hierarchical Linear and Nonlinear Model with two nested levels was performed. In the HLM analysis depicted in Table 16, Arab participants were coded as 0 for Arab status, which meant that Arab served as the reference group. The non-Arab group had a mean pretest score that was 21.34 point higher than the Arab mean pretest score (18.53).
Table 16. HLM Results for Spelling Score Change in Arab and non-Arab Participants

<table>
<thead>
<tr>
<th></th>
<th>L1 background</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept: Mean pretest score</td>
<td>18.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.17)</td>
<td></td>
</tr>
<tr>
<td>Non-Arab</td>
<td>21.34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.49)</td>
<td></td>
</tr>
<tr>
<td>Slope: Pretest to posttest change</td>
<td>Score change 3.76 &lt;.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.23)</td>
<td></td>
</tr>
<tr>
<td>Non-Arab</td>
<td>2.24</td>
<td>.207</td>
</tr>
<tr>
<td></td>
<td>(1.75)</td>
<td></td>
</tr>
<tr>
<td>Random effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (variance between people on mean pretest score)</td>
<td>141.07 &lt;.001</td>
<td>48.46 &lt;.001</td>
</tr>
<tr>
<td>Slope (variance between people in score change)</td>
<td>12.48 .054</td>
<td>13.13 &lt;.05</td>
</tr>
</tbody>
</table>

Confirming the finding produced by the repeated measures ANOVA, results of the HLM analysis revealed that the non-Arab group did not have a significant effect on change of spelling score. In other words, there was no significant difference in spelling score change between the Arab group and the non-Arab group.

d) Comparing spelling gains of Arab students to the spelling gains of their non-Arab peers, does one group of participants outperform the other?

To determine which group performed better in spelling tests than the other, a pairwise comparisons test shown in Table 17 was conducted. The pairwise comparisons test revealed that each participating group had a significant increase in spelling gain scores. Thus, results suggested that none of the two groups outperformed the other group because both groups were significantly increasing in spelling gain scores in tandem.
Table 17. Pairwise Comparisons in Score Change between Arab and non-Arab Participants in Spelling

<table>
<thead>
<tr>
<th>Students</th>
<th>(I) Time</th>
<th>(J) Time</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-3.763*</td>
<td>1.146</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>3.763*</td>
<td>1.146</td>
<td>.002</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-6.000*</td>
<td>1.825</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>6.000*</td>
<td>1.825</td>
<td>.002</td>
</tr>
</tbody>
</table>

e) Comparing Arab to the non-Arab participants according to their spelling baseline and ending mean scores, do the two groups significantly differ from each other?

Table 18 shows that there was an obvious gap between Arab and non-Arab groups in their baseline and ending mean scores in both pre and posttests. Therefore, it was important to assess whether this difference was significant. The repeated measures ANOVA determined that the difference between the two groups in their baseline and ending mean scores in spelling pre and posttests is statistically significant, $F(1,51) = 70.92, p < .001$.

Table 18. Spelling Marginal Mean Scores of Arab and non-Arab Groups

<table>
<thead>
<tr>
<th>Students</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>18.526</td>
<td>1.327</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>22.289</td>
<td>1.709</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>39.867</td>
<td>2.112</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>45.867</td>
<td>2.721</td>
</tr>
</tbody>
</table>

Table 19. Pairwise Comparisons between Arab and non-Arab Groups in Spelling Pre and Posttest Mean Scores

<table>
<thead>
<tr>
<th>Spelling</th>
<th>(I) Students</th>
<th>(J) Students</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-21.340*</td>
<td>2.494</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>21.340*</td>
<td>2.494</td>
<td>.000</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-23.577*</td>
<td>3.213</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>23.577*</td>
<td>3.213</td>
<td>.000</td>
</tr>
</tbody>
</table>
A follow-up pairwise comparisons test shown in Table 19 revealed that both baseline and ending mean scores of Arab students were significantly lower than those of their non-Arab peers in both pre and posttests.

![Graph showing comparison between Arab and non-Arab students in spelling scores](image)

**Figure 1. Comparing Arab to non-Arab Students in Spelling**

To summarize, Figure 1 shows that students in both groups did change in spelling scores over time because the lines that represent the two groups increased in the spelling posttest. However, parallel lines indicated that there was no significant interaction between time (pretest - posttest) and group (Arab – non-Arab) and thus no significant difference was found between the two groups in the way they responded to the phonological instruction. Further, the increase in
spelling gain scores achieved by each group was significant. Thus, none of the two groups performed better than the other group. Nevertheless, comparing the spelling baseline and ending mean scores of non-Arab participants to those of their Arab peers, the difference between the two groups was found to be significant and as a result, the lines representing the two groups were rather far apart.

**Research Question #2**

a) Does explicit phonological awareness instruction have an impact on the English orthographic processing skills of adult Arab and non-Arab students?

There was no possible way to answer the first part of the second research question because the study lacked comparable control groups due to the aforementioned sudden change in the study design. Thus, the study was unable to directly assess the effect of the explicit phonological awareness instruction on the orthographic processing skills of the study participants.

b) Looking at pseudoword gain scores of all participants regardless of their L1 background (Arab and non-Arab) or their proficiency levels (foundation, beginner or low intermediate), do students score significantly higher on the pseudoword posttest than on the pretest?

For the second part of the second research question, a repeated measure ANOVA was performed to examine whether all students in general significantly changed in their pseudowords from the pretest to the posttest. Table 20 exhibits the marginal mean scores of all students \((n = 53)\). Results of the repeated measures ANOVA showed that scores of students did significantly change from the pretest to the posttest, \(F(1,51) = 12.07, p = .001\).
Table 20. Marginal Means of all Participants in Pseudoword Pre and Posttests

<table>
<thead>
<tr>
<th>Time</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>74.088</td>
<td>1.748</td>
<td>70.579</td>
<td>77.597</td>
</tr>
<tr>
<td>Posttest</td>
<td>78.162</td>
<td>1.391</td>
<td>75.369</td>
<td>80.955</td>
</tr>
</tbody>
</table>

Table 21. Pairwise Comparisons in Pseudoword Score Change in all Participants

<table>
<thead>
<tr>
<th>(I) Time</th>
<th>(J) Time</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Posttest</td>
<td>-4.075*</td>
<td>1.173</td>
<td>.001</td>
</tr>
<tr>
<td>Posttest</td>
<td>Pretest</td>
<td>4.075*</td>
<td>1.173</td>
<td>.001</td>
</tr>
</tbody>
</table>

A follow-up pairwise comparisons test shown in Table 21 indicated that students changed in pseudoword scores with a significant mean increase of 4.07 points from the pretest to the posttest.

c) Does performance of the two groups vary significantly in pseudoword gain scores from pretest to posttest?

In order to answer this question, students were divided into two groups according to their L1 background; Arab and non-Arab. Table 22 demonstrates the descriptive statistics of the two groups in pseudoword pre and posttests. A repeated measures ANOVA was conducted to examine how the two groups progressed from the pre to the posttest. Results revealed that there was no significant interaction between time (pre – posttest) and group (Arab – non-Arab) in pseudoword gains, $F(1,51) = .4, p = .530$. Because of the high standard deviation values and small sample size of both groups, a Hierarchical Linear and Nonlinear Model with two nested
levels was conducted to detect any significant difference between the two groups in the way they performed from the pretest to the posttest.

<table>
<thead>
<tr>
<th>Pseudoword</th>
<th>Students</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>72.8421</td>
<td>10.81672</td>
<td>38</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>75.3333</td>
<td>13.02013</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>Pretest</td>
<td>73.5472</td>
<td>11.40945</td>
<td>53</td>
</tr>
<tr>
<td>Arab</td>
<td>Posttest</td>
<td>77.6579</td>
<td>8.44466</td>
<td>38</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Posttest</td>
<td>78.6667</td>
<td>10.71492</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>Posttest</td>
<td>77.9434</td>
<td>9.04777</td>
<td>53</td>
</tr>
</tbody>
</table>

In the HLM analysis shown in Table 23, Arab participants were coded as 0 for Arab status, which meant that Arab served as the reference group. The non-Arab group had a mean pretest score that was 2.49 points higher than the Arab mean pretest score (72.84). The non-Arab group did not have a significant effect on change of pseudoword score.

<table>
<thead>
<tr>
<th>L1 background</th>
<th>Intercept: Mean pretest score</th>
<th>Slope: Pretest to posttest change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arab 72.84 (1.73) Non-Arab 2.49 (3.68)</td>
<td>Score change 4.82 &lt;.01 Non-Arab -1.48 .573</td>
</tr>
</tbody>
</table>

Random effects

| Intercept (variance between people on mean pretest score) | 107.12 <.001 |
| Slope (variance between people in score change) | 12.30 .094 |
In other words, the HLM analysis supports the finding produced by the repeated measures ANOVA in that there was no difference in pseudoword score change between the Arab group and the non-Arab group.

d) Comparing pseudoword gains of Arab students to the pseudoword gains of their non-Arab peers, does one group of participants outperform the other?

In order to examine whether one of the two groups performed in the pseudoword better than the other group, a pairwise comparisons test as displayed in Table 24 was conducted. The pairwise comparisons test indicated that both Arab and non-Arab groups were increasing in the pseudoword gain scores and they progressed in the same direction. However, while the Arab students improved in pseudoword score with a significant mean increase of 4.81 points, the mean increase of 3.33 points achieved by the non-Arab participants was not significant. Therefore, it could be assumed that the Arab group did outperform the non-Arab group in the pseudoword measurement.

<table>
<thead>
<tr>
<th>Table 24. Pairwise Comparisons in Score Change between Arab and non-Arab Participants in Pseudoword</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Arab</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Non-Arab</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

e) Comparing Arab to the non-Arab participants according to their pseudoword baseline and ending mean scores, do the two groups significantly differ from each other?
The baseline and ending mean scores in the pseudoword pre and posttest for both Arab and non-Arab groups did not appear to be drastically different as depicted in Table 25.

Table 25. Pseudoword Marginal Mean Scores of Arab and non-Arab Groups

<table>
<thead>
<tr>
<th>Students</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>72.842</td>
<td>1.860</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>77.658</td>
<td>1.480</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>75.333</td>
<td>2.960</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>78.667</td>
<td>2.356</td>
</tr>
</tbody>
</table>

However, a repeated measures ANOVA was performed to assess whether the two groups in this particular instance were significantly different. Results revealed that there was no significant difference between the two groups in their baseline and ending mean scores in pseudoword pre and posttests, \( F(1,51) = .356, p = .553 \).

Table 26. Pairwise Comparisons between Arab and non-Arab Groups in Pseudoword Pre and Posttest Mean Scores

<table>
<thead>
<tr>
<th>Pseudoword</th>
<th>(I) Students</th>
<th>(J) Students</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-2.491</td>
<td>3.496</td>
<td>.479</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>2.491</td>
<td>3.496</td>
<td>.479</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-1.009</td>
<td>2.782</td>
<td>.718</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>1.009</td>
<td>2.782</td>
<td>.718</td>
</tr>
</tbody>
</table>

Table 26 depicts a follow-up pairwise comparisons test obtained to explain how the two groups compare to each other according to their marginal mean scores. The pairwise comparisons test demonstrated that there was no significant difference between the two groups in both pseudoword pre and posttests.
To sum up, Figure 2 indicates that participants in both groups did change in pseudoword scores over time because the lines that represent the two groups increased in the pseudoword posttest. However, only the mean increase of the Arab group in pseudoword was significant. Although lines that represent the two groups were not parallel, the interaction between time (pre-posttest) and group (Arab - non-Arab) was not significant because lines did not intersect. Therefore, the two groups did not significantly differ in the way they reacted to the phonological instruction. Further, Arab students outperformed their non-Arab peers in pseudoword because only Arab students significantly increased in pseudoword. Additionally, comparing the pseudoword baseline and ending mean scores of non-Arab students to those of their Arab peers,
the difference between the two groups was found to be not significant and consequently, the lines for the two groups were rather close together.

**Research Question #3**

a) Does explicit phonological awareness instruction influence reading speed of adult international Arab and non-Arab students?

This question could not be answered because all participants were exposed to the phonological instruction treatment and there was no control group. Therefore, the study was not able to generate a direct evidence on the effect of the phonological instruction method on the reading speed.

b) Does performance of the two groups in the beginner level vary significantly in reading speed gain scores from pretest to posttest?

Table 27 demonstrates the descriptive statistics of the two groups in the reading speed pre and posttests. A repeated measures ANOVA was conducted to scrutinize how the two groups changed over time from the pretest to the posttest.

| Table 27. Descriptive Statistics for Beginner Arab and non-Arab Students in Reading Speed Tests |
|-------------------------------------------------|--------------------------------|----------------|----------------|
| Reading Speed                                   | Students | Mean     | Std. Deviation | N   |
| Pretest                                         | Arab     | 77.6296  | 36.16325       | 27  |
|                                                | Non-Arab | 116.5000 | 29.69367       | 8   |
|                                                | Total    | 86.5143  | 38.15554       | 35  |
| Posttest                                        | Arab     | 89.7778  | 57.02249       | 27  |
|                                                | Non-Arab | 125.8750 | 61.11216       | 8   |
|                                                | Total    | 98.0286  | 59.09239       | 35  |
Results indicated that there was no significant interaction between time (pre – posttest) and group (Arab – non-Arab) in reading speed, $F(1,33) = .02, p = .873$.

c) Comparing reading speed gains of beginner Arab participants to those of their beginner non-Arab peers, does one group of participants outperform the other?

Reading speed gains of Arab students were compared to the reading speed gains of non-Arab students in the beginner level. Table 28 shows a pairwise comparisons test that investigated the change in the reading speed of both groups. Results showed that although both groups increased separately over time in reading speed gain scores, the increase was not significant. This finding suggested that none of the two groups outperformed the other in the reading speed.

<table>
<thead>
<tr>
<th>Students</th>
<th>(I) Reading Speed</th>
<th>(J) Reading Speed</th>
<th>Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-12.148</td>
<td>8.223</td>
<td>.149</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>12.148</td>
<td>8.223</td>
<td>.149</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-9.375</td>
<td>15.107</td>
<td>.539</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>9.375</td>
<td>15.107</td>
<td>.539</td>
</tr>
</tbody>
</table>

d) Comparing beginner Arab students to their beginner non-Arab peers according to their reading speed baseline and ending mean scores, do the two groups significantly differ from each other?

When comparing the baseline and ending mean scores of Arab students to those of their non-Arab peers in the beginner group, results of a repeated measures ANOVA showed that there was a significant difference in general between the two groups, $F(1,33) = 4.74, p = .037$. Table 29 shows reading speed baseline and ending mean scores of both groups and Table 30
demonstrates a follow-up pairwise comparisons test that assessed the starting and ending mean scores of both groups.

Table 29. Reading Speed Marginal Mean Scores of Arab and non-Arab Participants in Beginner Group

<table>
<thead>
<tr>
<th>Students</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>77.630</td>
<td>6.715</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>89.778</td>
<td>11.146</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>116.500</td>
<td>12.336</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>125.875</td>
<td>20.476</td>
</tr>
</tbody>
</table>

Although results revealed that there was no significant difference between the two groups in their ending mean scores, there was a statistically significant difference between Arab and non-Arab students in their reading speed baseline mean scores.

Table 30. Pairwise Comparisons between Beginner Arab and non-Arab Participants in Reading Speed Pre and Posttest Mean Scores

<table>
<thead>
<tr>
<th>Reading Speed</th>
<th>(I) Students</th>
<th>(J) Students</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-38.870*</td>
<td>14.045</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>38.870*</td>
<td>14.045</td>
<td>.009</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-36.097</td>
<td>23.313</td>
<td>.131</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>36.097</td>
<td>23.313</td>
<td>.131</td>
</tr>
</tbody>
</table>

In sum, when dividing the beginner group into two groups; Arab and non-Arab and measuring the change in reading speed of both groups separately, there was no significant difference in reading speed performance between the two groups because both groups increased over time. However, the increase achieved by each group was not significant. Thus, none of the two groups outperformed the other in the reading speed gains. Nevertheless, Figure 3 shows that there was a difference in the reading speed of both groups in their baseline and ending mean scores. Thus, the lines represented both groups in the chart were far apart from each other.
However, only the difference found between the two groups in their baseline mean scores was significant.

![Graph showing estimated marginal means for Arab and Non-Arab students in reading speed pre and posttests.](image)

**Figure 3. Comparing Arab to non-Arab Students in Reading Speed within the Beginner Group**

e) Does performance of the two groups in the low intermediate level vary significantly in reading speed gain scores from pretest to posttest?

Table 31 shows the descriptive statistics of the two groups in the reading speed pre and posttests. A repeated measures ANOVA was performed to investigate how the two groups changed over time from the pretest to the posttest. Results revealed that there was no significant
interaction between time (pre – posttest) and group (Arab – non-Arab) in reading speed, $F(1,12) = 1.67, p = .220$.

Table 31. Descriptive Statistics for Low Intermediate Arab and non-Arab Students in Reading Speed Tests

<table>
<thead>
<tr>
<th>Reading Speed</th>
<th>Students</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>68.7143</td>
<td>22.83064</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>46.4286</td>
<td>15.02062</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>57.5714</td>
<td>21.87276</td>
<td>14</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>98.8571</td>
<td>32.54960</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>98.2857</td>
<td>29.02134</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>98.5714</td>
<td>29.62773</td>
<td>14</td>
</tr>
</tbody>
</table>

f) Comparing reading speed gains of low intermediate Arab students to those of their low intermediate non-Arab peers, does one group of participants outperform the other?

Table 32 depicts a pairwise comparisons test obtained to compare the two groups to each other according to their reading speed gain scores. Results indicated that the increase in the reading speed mean scores was significant in both Arab and non-Arab groups. Thus, this finding suggested that none of two groups outperformed the other because they significantly increased in the reading speed over time.

Table 32. Pairwise Comparisons in Score Change between Low Intermediate Arab and non-Arab Students in Reading Speed

<table>
<thead>
<tr>
<th>Students</th>
<th>(I) Reading Speed</th>
<th>(J) Reading Speed</th>
<th>Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-30.143*</td>
<td>11.864</td>
<td>.026</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>30.143*</td>
<td>11.864</td>
<td>.026</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-51.857*</td>
<td>11.864</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>51.857*</td>
<td>11.864</td>
<td>.001</td>
</tr>
</tbody>
</table>

89
g) Comparing low intermediate Arab students to their low intermediate non-Arab peers according to their reading speed baseline and ending mean scores, do the two groups significantly differ from each other?

A repeated measures ANOVA indicated that there was no significant difference between Arab and non-Arab students in their starting and ending mean scores, $F(1,12) = 1.09, p = .315$. Table 33 depicts the estimated marginal means of each group in reading speed pre and posttests and Table 34 shows a follow-up pairwise comparisons test performed to assess the difference between the two groups. Results showed that Arab participants in the low intermediate group scored higher than their non-Arab peers in the reading speed baseline mean scores.

### Table 33. Reading Speed Marginal Mean Scores of Arab and non-Arab Participants in Low Intermediate Group

<table>
<thead>
<tr>
<th>Students</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>68.714</td>
<td>7.304</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>98.857</td>
<td>11.655</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>46.429</td>
<td>7.304</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>98.286</td>
<td>11.655</td>
</tr>
</tbody>
</table>

However, the difference between the two groups in the baseline mean scores was not significant. Similarly, the difference between the two groups in the ending mean scores was also not significant.

### Table 34. Pairwise Comparisons between Low Intermediate Arab and non-Arab Participants in Reading Speed Pre and Posttest Mean Scores

<table>
<thead>
<tr>
<th>Reading Speed</th>
<th>(I) Students</th>
<th>(J) Students</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>22.286</td>
<td>10.329</td>
<td>.052</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>-22.286</td>
<td>10.329</td>
<td>.052</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>.571</td>
<td>16.483</td>
<td>.973</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>-.571</td>
<td>16.483</td>
<td>.973</td>
</tr>
</tbody>
</table>
To summarize, when comparing Arab to non-Arab students within the low intermediate group, both groups Arab and non-Arab made a significant mean increase in reading speed. Thus, the groups did not differ from each other in their reading speed performance. In addition, because both groups significantly increased in reading speed, none of which outperformed the other. Furthermore, Figure 4 shows that Arab students in the low intermediate group did not significantly differ from their non-Arab peers in the baseline and ending mean scores in reading speed. Thus, lines representing both groups were close to each other.

Figure 4. Comparing Arab to non-Arab Students in Reading Speed within the Low Intermediate Group
Research Question #4

a) Does explicit phonological awareness instruction influence comprehension accuracy of adult international Arab and non-Arab students?

The answer to this question could not be provided because all participants were exposed to the phonological instruction treatment and there was no control group. Therefore, the study was not able to produce a direct evidence on the impact of the phonological instruction method on comprehension.

b) Does performance of the two groups in the beginner level vary significantly in comprehension gain scores from pretest to posttest?

Table 35. Descriptive Statistics for Beginner Arab and non-Arab Students in Comprehension Tests

<table>
<thead>
<tr>
<th>Comprehension</th>
<th>Students</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>6.2593</td>
<td>1.50876</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>8.2500</td>
<td>1.38873</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.7143</td>
<td>1.69031</td>
<td>35</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>6.4815</td>
<td>1.78391</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>8.0000</td>
<td>1.06904</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.8286</td>
<td>1.75710</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 35 shows the descriptive statistics of the two groups in the comprehension pre and posttests. A repeated measures ANOVA was performed to examine how the two groups changed over time from the pretest to the posttest. Results revealed that there was no significant interaction between time (pre – posttest) and group (Arab – non-Arab) in comprehension, $F(1,33) = .54, p = .468$.

c) Comparing comprehension gains of beginner Arab participants to those of their beginner non-Arab peers, does one group of participants outperform the other?
Table 36 exhibits a pairwise comparisons test that assessed comprehension gains of both groups. Results revealed that while beginner Arab students were increasing in comprehension, their non-Arab peers were decreasing. However, neither the increase achieved by Arab students nor the decrease occurred in the non-Arab gain scores were significant.

### Table 36. Pairwise Comparisons in Score Change between Beginner Arab and non-Arab Students in Comprehension

<table>
<thead>
<tr>
<th>Students</th>
<th>(I) Comprehension</th>
<th>(J) Comprehension</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-.222</td>
<td>.307</td>
<td>.475</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>.222</td>
<td>.307</td>
<td>.475</td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>.250</td>
<td>.565</td>
<td>.661</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>-.250</td>
<td>.565</td>
<td>.661</td>
</tr>
</tbody>
</table>

d) Comparing beginner Arab to their beginner non-Arab peers according to their comprehension baseline and ending mean scores, do the two groups significantly differ from each other?

When investigating the two groups according to their starting and ending mean scores in comprehension, the pairwise comparisons test shown in Table 37 indicated that Arab participants scored in comprehension significantly lower than non-Arab students in both the baseline and ending mean scores.

### Table 37. Pairwise Comparisons between Beginner Arab and non-Arab Participants in Comprehension Pre and Posttest Mean Scores

<table>
<thead>
<tr>
<th>Comprehension</th>
<th>(I) Students</th>
<th>(J) Students</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-1.991*</td>
<td>.597</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>1.991*</td>
<td>.597</td>
<td>.002</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>Non-Arab</td>
<td>-1.519*</td>
<td>.668</td>
<td>.030</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>Arab</td>
<td>1.519*</td>
<td>.668</td>
<td>.030</td>
</tr>
</tbody>
</table>
Figure 5 demonstrates how the two groups compare to each other in comprehension gains. To summarize how the two groups in the beginner level compare to each other in comprehension, both groups did not significantly differ from each other in the way they changed over time in comprehension. In addition, as none of each group significantly increased in comprehension gain scores, results suggested that none of each outperformed the other. Nevertheless, the beginner Arab participants scored significantly lower than the beginner non-Arab students in both baseline and ending mean scores.

e) Does performance of the two groups in the low intermediate level vary significantly in comprehension gain scores from pretest to posttest?
Table 38 exhibits the descriptive statistics for the two groups in the comprehension pre and posttests. A repeated measures ANOVA was conducted to investigate how the two groups changed over time from the pretest to the posttest. Results indicated that there was no significant interaction between time (pre – posttest) and group (Arab – non-Arab) in comprehension, $F(1,12) = .34, p = .567$.

<table>
<thead>
<tr>
<th>Comprehension</th>
<th>Students</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Arab</td>
<td>5.000</td>
<td>1.41421</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>7.143</td>
<td>1.34519</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.071</td>
<td>1.73046</td>
<td>14</td>
</tr>
<tr>
<td>Posttest</td>
<td>Arab</td>
<td>5.286</td>
<td>1.97605</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Non-Arab</td>
<td>7.000</td>
<td>1.15470</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.143</td>
<td>1.79131</td>
<td>14</td>
</tr>
</tbody>
</table>

Comparing comprehension gains of low intermediate Arab students to those of their low intermediate non-Arab peers, does one group of participants outperform the other?

Table 39. Pairwise Comparisons in Score Change between Low Intermediate Arab and non-Arab Participants in Comprehension

<table>
<thead>
<tr>
<th>Students</th>
<th>Comprehension</th>
<th>Comprehension</th>
<th>Mean</th>
<th>Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>-286</td>
<td>.515</td>
<td>.589</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>286</td>
<td>.515</td>
<td>.589</td>
<td></td>
</tr>
<tr>
<td>Non-Arab</td>
<td>Pretest</td>
<td>Posttest</td>
<td>143</td>
<td>.515</td>
<td>.786</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>-143</td>
<td>.515</td>
<td>.786</td>
<td></td>
</tr>
</tbody>
</table>

Table 39 shows a pairwise comparisons test that examined the comprehension gains of both groups. Results indicated that comprehension gain scores of Arab students increased whereas gain scores of non-Arab students declined. However, neither the increase in the gain
scores of Arab participants nor the decline in the gain scores of the non-Arab students were significant.

g) Comparing low intermediate Arab students to their low intermediate non-Arab peers according to their comprehension baseline and ending mean scores, do the two groups significantly differ from each other?

When examining the two groups according to their baseline and ending mean scores, results of a repeated measures ANOVA indicated that there was a significant difference between the Arab and non-Arab groups in the starting and ending comprehension mean scores, $F(1,12) = 7.24, p = .020$. A follow-up pairwise comparisons test depicted in Table 40 revealed that while there was no significant difference between Arab and non-Arab students in their ending mean scores, Arab students in the low intermediate group scored significantly lower than the non-Arab participants in the comprehension baseline mean scores. Figure 6 shows how the two groups compare to each other in comprehension gains.

<table>
<thead>
<tr>
<th>Table 40. Pairwise Comparisons between Low Intermediate Arab and non-Arab Participants in Comprehension Pre and Posttest Mean Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
</tr>
<tr>
<td>Pretest</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Posttest</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

To sum up how low intermediate Arab participants compare to their non-Arab peers in comprehension, both group did not significantly differ from each other in their progress in comprehension from the pre to posttest. In addition, as none of each group significantly increased in comprehension gain scores, results indicated that none of each outperformed the
other. Nevertheless, the low intermediate Arab participants scored significantly lower than the low intermediate non-Arab students in the baseline mean scores but not in the ending mean scores.

![Graph showing comparison between Arab and non-Arab students in comprehension within the low intermediate group.](image)

**Figure 6. Comparing Arab to non-Arab Students in Comprehension within the Low Intermediate Group**
CHAPTER FIVE
DISCUSSION AND CONCLUSION

The purpose of this research study is to investigate how providing explicit phonological awareness instruction during reading class could help adult second language learners of English improve their spelling knowledge, orthographic processing skills, and reading speed and comprehension. Moreover, the study is interested to compare Arab participants to the non-Arab participants according to their gains, performance and possible differences in their background knowledge in the target skills. The current study took place at the Center for Intensive English Studies CIES at Florida State University in the summer of 2015. In addition, participants involved in this research study were Arab and non-Arab international students who were enrolled in three different proficiency levels: foundation, beginner and low intermediate.

The implementation of the phonological awareness instruction lasted for a month and was delivered fifteen minutes a day, three days a week. All students were exposed to the explicit phonological awareness instruction and there was no control group. Consequently, the study could not claim that there was a direct influence of the phonological awareness instruction on the spelling knowledge, orthographic processing skills and reading speed and comprehension of participants. Moreover, any significant differences detected among the groups of participants or any changes in the scores achieved by participants of the study could not be associated exclusively to the implementation of the explicit phonological awareness instruction. This is due to the absence of a cause and effect relationship between the independent variable (the phonological instruction treatment) and the dependent variables (spelling, pseudoword, and reading speed and comprehension). Nonetheless, it could be claimed that any significant differences observed or any significant changes found in students’ scores might be correlated to
the reception of the phonological instruction treatment. The answers to the main research questions for this study can be synthesized into five main topics. To put this discussion in context, Tables 41, 42 and 43 summarize the findings of research questions.

Table 41. Summary of Results in the Spelling and Pseudoword

<table>
<thead>
<tr>
<th></th>
<th>Spelling</th>
<th>Pseudoword</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Gain scores of all participants (n = 53):</td>
<td>Increase of 4.88 points, p &lt; .001.</td>
</tr>
<tr>
<td>b</td>
<td>Difference in performance from pretest to posttest between Arab students (n = 38) and non-Arab students (n = 15):</td>
<td>The two groups did not significantly differ from each other, p = .304.</td>
</tr>
<tr>
<td>e</td>
<td>Arab group vs. non-Arab group in baseline mean scores:</td>
<td>1 – Non-Arab students scored 21.3 points higher than the Arab students did. 2 – Difference is significant, p &lt; .001.</td>
</tr>
<tr>
<td>f</td>
<td>Arab group vs. non-Arab group in ending mean scores:</td>
<td>1 – Non-Arab students scored 23.5 points higher than the Arab students did. 2 – Difference is significant, p &lt; .001.</td>
</tr>
</tbody>
</table>

Table 42. Summary of the Results in Reading Speed and Comprehension within the Beginner Level

<table>
<thead>
<tr>
<th></th>
<th>Reading Speed</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Difference in performance from pretest to posttest between Arab students (n = 27) and non-Arab students (n = 8) within the beginner level:</td>
<td>The two groups did not significantly differ from each other, p = .873.</td>
</tr>
<tr>
<td>b</td>
<td>Measuring gain scores of the two groups individually within the beginner level:</td>
<td>1 – Arab: Increase of 12.1 points, p = .149. 2 – Non-Arab: Increase of 9.3 points, p = .539.</td>
</tr>
<tr>
<td>c</td>
<td>Arab group vs. non-Arab group in baseline mean scores within the beginner level:</td>
<td>1 – Non-Arab students scored 38.8 points higher than the Arab students did. 2 – Difference is significant, p = .009.</td>
</tr>
<tr>
<td>d</td>
<td>Arab group vs. non-Arab group in ending mean scores within the beginner level:</td>
<td>1 – Non-Arab students scored 36 points higher than the Arab students did. 2 – Difference is not significant, p = .131.</td>
</tr>
</tbody>
</table>
Table 43. Summary of the Results in Reading Speed and Comprehension within the Low Intermediate Level

<table>
<thead>
<tr>
<th></th>
<th>Reading Speed</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Difference in performance from pretest to posttest between Arab students (n = 7) and non-Arab students (n = 7) within the low intermediate level:</td>
<td>The two groups did not significantly differ from each other, (p = .220).</td>
</tr>
<tr>
<td></td>
<td>1 – Arab: Increase of 30.1 points, (p = .026).</td>
<td>1 – Arab: Increase of .28 points, (p = .589).</td>
</tr>
<tr>
<td></td>
<td>2 – Non-Arab: Increase of 51.8 points, (p = .001).</td>
<td>2 – Non-Arab: Decrease of .14 points, (p = .786).</td>
</tr>
<tr>
<td>b</td>
<td>Measuring gain scores of the two groups individually within the low intermediate level:</td>
<td>1 – Non-Arab students scored 22.2 points lower than the Arab students did.</td>
</tr>
<tr>
<td></td>
<td>2 – Difference is not significant, (p = .052).</td>
<td>2 – Difference is not significant, (p = .013).</td>
</tr>
<tr>
<td>c</td>
<td>Arab group vs. non-Arab group in baseline mean scores within the low intermediate level:</td>
<td>1 – Non-Arab students scored 2.14 points higher than the Arab students did.</td>
</tr>
<tr>
<td></td>
<td>2 – Difference is significant, (p = .013).</td>
<td>2 – Difference is not significant, (p = .071).</td>
</tr>
<tr>
<td>d</td>
<td>Arab group vs. non-Arab group in ending mean scores within the low intermediate level:</td>
<td>1 – Non-Arab students scored .57 points lower than the Arab students did.</td>
</tr>
<tr>
<td></td>
<td>2 – Difference is not significant, (p = .973).</td>
<td>2 – Difference is not significant, (p = .071).</td>
</tr>
</tbody>
</table>

**Five Main Topics of the Study**

**Gains Achieved in the Target Skills**

This section is devoted to examine whether participants changed significantly from pretest to posttest either together as one whole group or separately into two groups taking into account comparing their gains to each other.

**Spelling.** First, analyses showed that all international students who participated in the study significantly improved in spelling posttest. This finding generally indicated that participants were able to make a significant difference in their spelling knowledge at the end of the treatment session in this particular study. This finding is surprising because despite the fact that the phonological instruction treatment was carried out in a very relatively short time, participants were able to cultivate significant spelling gains. Second, when separating the participants into Arab and non-Arab groups, analyses exhibited that each group made a significant increase in spelling means scores. This finding supports findings of a study of (Ball &
Blachman, 1991) in that instruction in phonological awareness could enhance word recognition skills and develop spelling abilities. In addition, this finding also supports findings of a study conducted by (Ehri, 2013; Yeung et al., 2013) in which they asserted that phonological instruction would improve word reading skills and spelling knowledge.

**Pseudoword.** First, analyses exhibited that all participants in general made a significant increase in the pseudoword posttest. This finding indicated that participating international students were able to significantly advance in their orthographic processing skills. In other words, they became more aware of the conventions in the English writing system. Second, when dividing participants into Arab and non-Arab groups, analyses showed that Arab participants did significantly increase in the pseudoword posttest while the non-Arab participants did not. This variance might be explained by the orthographic distance between English and the first languages of participants and by the number of participants representing different language backgrounds. To elaborate, while orthographies of the non-Arab participants represent various language backgrounds some of which is not alphabetic: Turkish ($n = 2$), Japanese ($n = 3$), Portuguese ($n = 1$), Korean ($n = 3$), Spanish ($n = 4$) and French ($n = 2$), the L1 writing system of the Arab participants ($n = 38$) is alphabetic.

**Reading Speed.** In the beginner proficiency level, each group of Arab and non-Arab students increased in reading speed posttest however, the increase in reading speed of both groups did not amount to be significant. On contrary, each group of Arab and non-Arab participants in the low intermediate proficiency level significantly increased in the reading speed posttest. The insignificant gains in reading speed of beginner participants might be explained in part by their proficiency level. Students in this level are anticipated to be limited in their reading speed. According to Yamashita & Ichikawa (2010), slower reading rate in L2 in general could be
explained by many reasons such as L2 proficiency, L1 – L2 distance, and L2 learning environment. In addition, the purpose of reading might also explain the insignificant gains in reading speed of beginner Arab and non-Arab students. In the pretest and posttest, students were reading passages silently to learn new information and to answer the comprehension questions in the timed reading task. Carver (1990) maintained that a college student should be able to read with an average of 200 WPM when reading to learn. For foreign and second language learners however, Nation (2009) claimed that a good careful silent reading speed is around 250 words per minute.

**Comprehension.** In the beginner proficiency level, Arab participants made an increase in comprehension posttest whereas non-Arab participants decreased. Both the rising and the declining in the comprehension posttest scores were not significant. Likewise, Arab participants in the low intermediate proficiency level made an insignificant increase in comprehension posttest whereas non-Arab participants insignificantly decreased. The insignificant comprehension gains of both Arab and non-Arab participants in both proficiency levels beginner and low intermediate might be attributed to the difficulty of the reading materials. Passages in the timed reading tasks were selected from books 1, 3 and 5 from the same series in order to match the reading abilities of participants according to their proficiency levels. This means that the reading passage provided to low intermediate participants was much more difficult than the passage given to the beginner participants albeit both passages consisted of the same number of words and were match for their abilities. For instance, low intermediate students were tested with a reading passage that has more advanced vocabulary words, consists of longer sentences and contains more dependent clauses. Another reason for insignificant comprehension gains in both beginner and low intermediate Arab and non-Arab students might lie in lacking familiarity in general with topics of the reading
passages and lacking familiarity in particular with vocabularies used in the reading passages taking in consideration that students did not receive training on unfamiliar vocabulary prior to the time reading tasks. Additional reason could be possibly explained in the way the phonological instruction works. For example, this method teaches students how to decode words faster but does not add new learned words to their mental lexicon because it only focuses on the English sounds, groups of blends, phonetic skills and decoding skills. In other words, students who were exposed to the phonological instruction may have learned how to process words quickly but this does not mean necessarily that they understand the meaning of words they read.

**Interaction between Time and Groups in the Target Skills**

In this section, analyses looked specifically at how the two groups changed over time from the pretest to the posttest in their gain scores in all the target skills. In other words, did the two groups change in the same manner or did they differently change from the pretest to the posttest? No significant differences have been found between Arab and non-Arab participants in the way they responded to the phonological instruction treatment in all the target skills measured. In other words, when comparing Arab to non-Arab participants in terms of their change in the gain scores from the pretest to the posttest in spelling, pseudoword, and reading speed and comprehension, it appeared that the two groups of students did not significantly differ from each other after the exposure to the phonological instruction treatment. Nevertheless, it is insightful to get a glimpse of the nature of the insignificant differences found between the two groups in all the target skill and discuss what might have led those differences not to be significant. First, in spelling, pseudoword and reading speed, both Arab and non-Arab groups were increasing in their gain scores and changing over time in the same direction. However, both groups significantly increased in spelling whereas only Arab students significantly increased in pseudoword.
Moreover, beginner Arab and non-Arab groups insignificantly increased in reading speed whereas low intermediate Arab and non-Arab groups significantly increased in reading speed. On contrary, in comprehension, both groups were changing over time in the opposite way though the change found in both groups was not significant. To illustrate, while Arab students in both beginner and low intermediate groups were insignificantly increasing, non-Arab participants in both beginner and low intermediate groups were insignificantly decreasing.

The insignificant differences in the way Arab and non-Arab students change over time in the target skills could be explained by the design of the study that lacks a control group. In the experimental design studies, groups that receive treatment are hypothesized to change over time with either an increase or a decrease according to the experiment whereas control groups are expected to remain approximately the same over time. In the current study however, all participants were exposed to the phonological instruction treatment and there was no control group. In spelling for instance, significant gains achieved by both Arab and non-Arab students would hypothetically imply that the phonological instruction helped both groups to improve in the same manner.

**Performance in the Target Skills**

In this portion, the Arab group was compared to the non-Arab group in all the target skills specifically in terms of their gain scores. A group would be considered as outperforming the other group only if it significantly increased in a skill from pretest to posttest while the other group did not.

**Spelling.** Because Arab and non-Arab students were significantly increasing in a simultaneous manner in spelling gain scores, it could be claimed that none of the two groups
outperformed the other. This might suggest that the phonological instruction treatment could more likely be beneficial for both groups.

**Pseudoword.** Although both Arab and non-Arab participants increased in pseudoword gain scores, only Arab participants achieved significant increase in pseudoword gain scores. Therefore, it might be claimed that Arab participants outperformed their non-Arab peers in the pseudoword gains. Consequently, it could be anticipated that the phonological instruction has been more of a help for Arab students to spell nonsense words than it has been for the non-Arab students.

**Reading Speed.** Beginner Arab and non-Arab participants did not significantly increase in reading speed therefore, none of each outperformed the other. This might imply that the phonological instruction was not enough to enhance students’ reading rate. Hence, to improve reading speed of participants, employing other methods in addition to the phonological instruction is advised such as meaningful chunking of words (Yamashita & Ichikawa, 2010), speed reading (Chung & Nation, 2006; Macalister, 2010) and extensive reading (Bamford & Day, 1998; Bell, 2001; Yamashita, 2008). On the other hand, it seemed that the phonological instruction has been beneficial for both Arab and non-Arab participants in the low intermediate proficiency level as both groups showed significant increase in reading speed. Because both groups significantly increased in reading speed, none of each group outperformed the other.

**Comprehension.** Arab and non-Arab students in both beginner and low intermediate levels were performing in the same manner. Arab students were insignificantly increasing whereas the non-Arab students were insignificantly decreasing. Because the comprehension increase achieved by Arab students in beginner and low intermediate levels was not significant, none of the two groups outperformed the other. A possible reason for not showing significant
comprehension gains in beginner and low intermediate Arab and non-Arab groups could be attributed to the short time of the phonological instruction. For instance, Grabe (2010) pointed out that most research studies provided word recognition training for learners of a second language did not yield a direct significant positive effect on reading comprehension. This indicated that Arab and non-Arab students in both beginner and low intermediate groups might have needed more training time in order to show any improvement. In addition, Fukkink, Hulstijn, and Simis (2005) examined the influence of two days training on L2 word recognition but did not find a significant improvement in comprehension. Indeed, two days training on L2 word recognition is a very short time to measure a possible increase in comprehension and so was a one month training on the phonological instruction.

**Differences between Groups in Pre-existing Knowledge in the Target Skills**

In this section, the baseline and ending mean scores of the Arab students were compared to the baseline and ending mean scores of the non-Arab students in all the target skills. These comparisons were conducted to assess whether there were gaps between the two groups in their background knowledge in spelling, pseudoword, reading speed and comprehension.

**Spelling.** Analyses found that there was a significant difference in the spelling background knowledge between the two groups. Particularly, it could be assumed that spelling background knowledge of the non-Arab group is substantially significantly richer than spelling background knowledge of the Arab group. This finding supports a study of Fender (2008) in which he compared Arab ESL students to a group of non-Arab students and found that Arab students showed significantly lower scores in both spelling and comprehension tests. Moreover, this gap in spelling between the two groups of participants may imply that non-Arab students were more knowledgeable in English vocabulary words than their Arab peers.
**Pseudoword.** Unlike spelling, analyses showed that Arab participants did not significantly differ from the non-Arab participants in their baseline and ending mean scores. According to this finding, it could be presumed that both groups were similar to each other in their background knowledge in English orthography.

**Reading Speed.** Although beginner non-Arab participants were reading with a significantly higher rate in the pretest than their Arab peers, both groups ended up reading in an insignificant converging rate. According to this finding, it might be suggested that beginner participants of the non-Arab group were reading significantly faster than beginner Arab students before the implementation of the phonological instruction treatment. However, both baseline and ending mean scores of both groups in the low intermediate level were found to be not significant. According to this finding, both groups were reading in a comparable reading speed prior to the phonological instruction.

**Comprehension.** In the beginner level, the non-Arab group scored significantly higher than the Arab group in both baseline and ending mean scores. However, low intermediate non-Arab participants scored significantly higher than their Arab peers only in the pretest but not in the posttest.

**Effects of the Study Design on the Results**

To put findings of the study in perspective, this section is dedicated to discuss the influence of lacking a control group on the study results. As it was mentioned at the beginning of this chapter, the answer to the first partial question in each one of the four overarching research questions in the study was the same. Due to lacking a control group, the study was unable to provide a direct evidence on the impact of the explicit phonological awareness instruction on spelling, orthographic processing skills and reading speed and comprehension. In addition, the
study was also unable to generalize the findings of the study from the particular sample participated at CIES to the population of international students who learn English as a second language in intensive English programs.

Moreover, significant changes observed in the posttests over the pretests could not be deemed as an indicator of an impact produced by the treatment because of potential confounding extraneous variables. Johnson and Christensen (2010) discussed examples of common extraneous variables that might affect the results accuracy of the posttests in control-group lacking designs such as history, maturation, testing and regression artifacts. History refers to any historical event that occurred during the course of the treatment that could be responsible for changes in the posttests whereas maturation refers to the natural process of getting older that would enable participants to get better or worse by themselves. In addition, testing refers to the familiarity with the testing procedure. In other words, it refers to the process by which participants take a test before the treatment and they retake it again after the treatment is finished. This might lead participants to understand tricky questions or to learn the answers so that they improve in the posttest. Furthermore, regression artifact donates to a possible increase in the posttest because participants were deliberately selected because of their initial low scores in the pretest therefore they are expected to improve their scores in the posttests after they receive the treatment.

A crucial question would then arise: Which one of these extraneous variables would have been a confounding factor that might have more likely brought change to scores of participants? For this current study, it could be argued that maturation was highly unlikely to have a confounding influence on students’ gains. This is because the treatment lasted only for a month which is apparently not enough period of time that would make a difference in participants’
maturity. In other words, participants were only one month older when time elapsed between the pretest and the posttest. Similarly, a regression artifact was excluded from being a potential confounding extraneous variable just by its definition. To elaborate, the basic assumption for the regression artifact to be a confounding factor is that selection of participants for the experimental classroom would exclusively be focusing on students who scored lowest on the initial pretest. In this study, all students were given pretests and posttests and there was no exclusion of students who scored high in the pretests. Thus, the regression artifact was not a possible confounding variable. However, testing and history were more likely to be confounding extraneous variables that might have affected the scores of students in addition to the phonological instruction treatment. History could be an extraneous variable because students were selected to receive special attention in addition to the treatment. Reading teachers motivated participants, gave them special phonological instruction and engaged them in various classroom activities. Testing was the most obvious potential confounding variable because of the short time elapsed between pretesting and posttesting. Students were more familiar with the posttests because they have already been exposed to the same tests at the beginning of the treatment.

In essence, changes occurred in students’ scores could not be attributed to only receiving the phonological instruction because the study did not include a control group. There might be other confounding extraneous variables that could have contributed to any change existed in the scores of students. Precisely, while maturation and regression artifacts were not potential reasons for the change in students’ scores, it appeared that history and testing effects might have been more likely possible confounding extraneous variables that could slightly partially explain some of the changes occurred in the scores of participants.
Implications of this Study

This study aims to explore the importance of adopting explicit phonological instruction not only for adult international students but also for teachers of English as a second language and other educational entities.

English Language Institutions ELI

The HLM analyses employed in this study showed that both groups of participants Arab and non-Arab who received the phonological instruction had significant achievements in spelling and orthography. Therefore, it is recommended that English language institutions in the United States include the phonological instruction in their intensive English programs in order to enhance the spelling knowledge and the English orthographic processing skills of their international students.

In addition, Intensive English programs oftentimes administer placement tests in the general skills of English e.g. grammar, composition, reading and comprehension, and listening and speaking in order to assign international students to appropriate classes according to their needs. An additional implication of this study is that including spelling, pseudoword and reading speed in the placement tests would give ESL teachers an insightful picture of their students’ abilities and would assist them plan their lessons and build their curriculum accordingly.

Teacher Educators and their Pre-service Teachers

Because phonological awareness instruction is a bottom-up approach to reading and depends primarily on drilling, excessive practice and continuous exposure to the English sounds, groups of blends, phonetic skills and decoding skills, some teachers of adult international ESL students might not feel comfortable implementing this type of instruction. Other ESL teachers might underestimate advantages of the phonological instruction and prefer to employ only top-
down reading instruction. Thus, an implication of this study is that ESL teacher educators need
to encourage their pre-service teachers to understand the importance of phonological instruction
and to learn about best practices that could be applied in their ESL classrooms.

**In-service Teachers of ESL International Students**

A key implication of this study is that ESL teachers are encouraged to diversify their
teaching methods and use varieties of teaching approaches and strategies in order to reach for
their students’ needs and build up on them. For instance, after the exposure to the phonological
instruction, beginner participants in this study did not significantly increase their reading speed.
Thus, teachers of beginner students may incorporate other alternative assisting instruction that
could improve students’ reading speed such as meaningful chunking of words, repeated reading,
extensive reading and speed reading.

When reading teachers delivered phonological awareness instruction during the span of
this study, students most of times were challenged by the sight words “frequent words”. Some of
the sight words are not consistent with the decoding skills taught and tend to differ in
pronunciation from the way it is written. For instance, the words (head/beard/heart) have the
same special vowel sound (ea) however, they are pronounced differently. This inconsistency
appears to be challenging for international students when they learn the decoding skills in the
phonological instruction method, therefore, reading teachers should address the phenomenon of
inconsistency from the beginning. Otherwise, students will have doubts about the usefulness and
effectiveness of the phonological instruction methodology.

Moreover, in composition classes, when teachers grade essays of their students and spot
misspelled words, oftentimes they neither correct the misspelled words nor explain how to
correct it. This is because international students especially in the lower proficiency levels make
enormous amount of spelling mistakes in their essays or daily journals. Correcting misspelled words in all students’ writings would take up longer time. To make sure that spelling rules are taught adequately, it is recommended that composition teachers analyze students’ writings, find common mistakes and then assign occasionally a whole class time to discuss what went wrong and explain how to avoid such spelling mistakes. Further, offering spelling activities such as dictation and minimal pairs in a daily or weekly basis to international students who are in lower proficiency levels e.g. foundation, beginner and low intermediate would definitely bridge gaps in students’ spelling knowledge. Another implication of this study is that prior to employing this method in ESL classrooms, ESL teachers are advised to discuss with their students the importance of this method, explain its contribution to their growth in English and motivate their students to positively participant in it.

**International Students**

It is not enough that only teachers of ESL students understand the importance of the phonological instruction. ESL international students also need to understand and appreciate the role of the phonological instruction in improving their second language abilities. Some of the international students who participated in this study were not interested in phonological awareness instruction because they perceived the method was only appropriate for children not for adults. Nevertheless, when they received this method and participated in several classroom activities related to the phonological instruction, they liked it and appeared to be more motivated to explore it and more interested in it.

**Future Research Directions**

One potential future research direction could implement phonological instruction in an experimental design where a treatment group is compared to a control group in spelling,
pseudoword and reading speed and comprehension. The current study intended to implement the treatment/control experimental design but could not because only reading teachers of lower proficiency levels at CIES were willing to participate in the study. Because international students enrolled in high intermediate and advanced proficiency groups at CIES are not comparable groups to participants of the lower proficiency levels, the study did not have a control group.

Due to differences between Arabic and English in the consonants and vowels, another research direction might examine the influence of explicitly teaching English vowels and consonants that do not exist in Arabic on spelling and pronunciation of the Arab ESL students. Possible benefits of this direction would be raising the awareness of Arab students about the importance of overcoming these differences and helping them to develop their word recognition skills.

Another direction for future research is to examine the impact of extensive reading and repeated reading on international students’ word recognition skills. These reading practices have been used as a means to enhance reading rate of students but not their word recognition skills. In extensive reading and repeated reading activities, international students are exposed to vast number of words and expressions. It would be interesting to investigate the effects of these reading activities on students spelling and orthography.
APPENDIX A

PHONOLOGICAL AWARENESS METHODOLOGY TOOLS

42 English Sounds

<table>
<thead>
<tr>
<th>19 Consonants</th>
<th>b (c/s) (k/q) d f g h j l m n p r t v w x y z</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 vowels</td>
<td>a e i o u (short vowels) a e i o u (long vowels)</td>
</tr>
<tr>
<td>3 Murmur Diphthongs</td>
<td>ar or (er ir ur)</td>
</tr>
<tr>
<td>5 Digraphs</td>
<td>ch sh wh th (voiced) th (unvoiced) ph gn kn ck</td>
</tr>
<tr>
<td>5 Special vowel sounds</td>
<td>(au aw) (ou ow) (oi oy) (oo long vowel) (oo short vowel)</td>
</tr>
</tbody>
</table>

6 Groups of Blends

<table>
<thead>
<tr>
<th>L – Blends</th>
<th>bl cl fl gl pl sl</th>
</tr>
</thead>
<tbody>
<tr>
<td>R – Blends</td>
<td>br cr dr fr gr pr tr</td>
</tr>
<tr>
<td>S – Blends</td>
<td>sc sk sl sm sn sp st sw</td>
</tr>
<tr>
<td>3 – Letter S – Blends</td>
<td>scr spr str spl squ</td>
</tr>
<tr>
<td>Extra Blends</td>
<td>dw tw</td>
</tr>
<tr>
<td>Digraph Blends</td>
<td>shr thr phl phr chl chr sch</td>
</tr>
</tbody>
</table>

5 Phonetic Skills

<table>
<thead>
<tr>
<th>CVC</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVCC</td>
<td>Hand</td>
</tr>
<tr>
<td>Cv</td>
<td>Go</td>
</tr>
<tr>
<td>CCVCV</td>
<td>Smile</td>
</tr>
<tr>
<td>CCVVC</td>
<td>train</td>
</tr>
</tbody>
</table>

2 Decoding Skills

<table>
<thead>
<tr>
<th>2 Decoding skills: Defining syllables in words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill 1</td>
</tr>
<tr>
<td>Skill 2</td>
</tr>
<tr>
<td>Skill 1 and 2</td>
</tr>
</tbody>
</table>
APPENDIX B

INFORMED CONSENT FORM FOR READING TEACHERS

Consent Form
Florida State University

Impact of Explicit Phonological Awareness Instruction on Spelling Knowledge, Orthographic Processing Skills, and Reading Speed and Accuracy of Adult Arab ESL Learners

Dear teacher of reading at the Center for Intensive English Studies CIES at Florida State University:

You have been asked to participate in a research study conducted by Meshari Alshammari, a doctoral student in the School of Teacher Education at Florida State University who had been a former student and teacher at CIES. This research involves the study of the influence of phonological awareness instruction on the spelling knowledge, orthographic processing skills and reading speed and accuracy, and is part of Meshari Alshammari’s dissertation. You are being asked to participate in this study because you are a reading teacher of international students who learn English as a second language at the Center for Intensive English Studies at Florida State University.

Before you agree to participate in this research study, it is important that you read carefully and understand the information provided in this Informed Consent Form. In case you face any confusion, please do not hesitate to ask the researcher for clarification.

Why is this Study Being Done?
The purpose of the study is to examine the extent to which explicit phonological awareness instruction could improve the spelling skills of adult Arab English learners and their international peers. Additionally, this study aims to investigate whether the explicit phonological awareness instruction could enhance orthographic processing skills of adult Arab English learners and their non-Arab classmates. Furthermore, the study aims to investigate whether the explicit phonological awareness instruction is beneficial for fostering reading speed and increasing comprehension accuracy of adult Arab and non-Arab English learners.

How Long Will I Be in the Study?
At the beginning of the session I in the summer of 2015, the study involves three pretests in spelling, orthographic processing skills and reading fluency. At the end of the same session, international students will take posttests in the same skills. Each of the mentioned above tests will take no more than 10-15 minutes, administrated during your regular reading classes and printed on paper. In a span of six weeks, international students will receive the regular reading instruction offered at CIES corresponding to their English proficiency levels. In addition, they will also receive the explicit phonological awareness instruction.
What are the Risks of the Study?
The risks to you are considered minimal and there is no likelihood that you may experience some emotional discomfort during or after your participation. Should you experience such discomfort, please contact the University Counseling Center at the Florida State University provided in the attached list.

The total reading hours in the entire session I in the summer is 34 hours. The risk is minimal. The potential risk associated with this study is that, it will require you to spend ten minutes per reading class three times a week to implement the explicit phonological awareness instruction and reinforce it throughout the session. Prior to the intervention, you are asked to administer three pretests and at the end of the session, you will be asked to administer three posttests in the same skills. All pre-posttests are ready to be used and you are responsible for neither preparing the tests nor grading the tests. Pre-posttests will take no more than one hour and a half to be administrated. The one hour and a half are divided into two segments: approximately 45 minutes for the pretests at the beginning of the session and 45 minutes for the posttests at the end of the same session.

What are the Benefits to Taking Part in this Study?
The benefit of taking part in this study is twofold. First, you will gain important insights with respect to how explicit phonological awareness instruction could help your international students increase their spelling knowledge, develop their orthographic processing skills, and speed up their reading rate and enhance their comprehension accuracy. Second, your participation in this study will help Intensive English Programs across the United States to better understand linguistic needs of adult international students who learn English as a second language.

New Findings:
The findings of the study will be available for you upon request after the completion of the final report. Please contact the researcher to express your interest via email provided in the attached list.

What about Confidentiality and Protection?
Your name and identification information provided in the informed consent form will be confidential. Only the researcher, his supervising faculty and a research assistant will have access to the data therefore your identity will remain anonymous. The data will remain available for future research however all materials that would identify you as a participant will be destroyed by shredding or permanent deletion from the computer approximately three years after the completion of the study.

Participation in Research Is Voluntary
You are free to decline to participate or to withdraw from this study at any time, either during or after your participation without negative consequences. Should you withdraw, your data will be deleted from the study and will be destroyed.

Compensation
There will be no compensation provided for participation.
**Additional Information**
If you have any questions about any aspect of this study or your involvement, please tell either the director of CIES, Dr. Kennell, or the researcher before signing this form. You may also contact the supervising faculty if you have questions or concerns about your participation in this study. The supervising faculty has provided contact information at the bottom of this form. You may also ask questions at any time during your participation in this study. If at any time you have questions or concerns about your rights as a research participant, contact the Human Subjects Office at Florida State University by email at asduke@fsu.edu or by telephone at (850)644-7900.

**Attached List:**

1 - The University Counseling Center at Florida State University
   a) Website: [http://counseling.fsu.edu/](http://counseling.fsu.edu/)
   b) Address:
      201 Askew Student Life Building
      942 Learning Way
      Tallahassee, FL 32306-4175
      P: (850) 644-2003 | F: (850) 644-3150

2 – The Human Subjects Office
   a) Website: [http://www.research.fsu.edu/humansubjects/](http://www.research.fsu.edu/humansubjects/)
   b) Address: 2010 Levy Avenue
      Suite 276
      Tallahassee, FL 32306-2742
      Ph: (850) 644-7900
      Fax: (850) 644-4392

3 – The researcher:
Meshari Alshammari
   a) e-mail:
   b) Ph:

4 – The Supervision Faculty
Dr. Galeano, Rebecca
   a) e-mail: rgaleano@fsu.edu
   a) Ph: (850)644-4880
APPENDIX C

INFORMED CONSENT FORM AND DEMOGRAPHIC INFORMATION FOR STUDENTS

Consent Form
Florida State University

Impact of Explicit Phonological Awareness Instruction on Spelling Knowledge, Orthographic Processing Skills, and Reading Speed and Accuracy of Adult Arab ESL Learners

Dear international learner of English at the Center for Intensive English Studies CIES at Florida State University:

You have been asked to participate in a research study conducted by Meshari Alshammari, a doctoral student in the School of Teacher Education at Florida State University who had been a former student and teacher at CIES. This research involves the study of the influence of phonological awareness instruction on the spelling knowledge, orthographic processing skills and reading speed and accuracy, and is part of Meshari Alshammari’s dissertation. You are being asked to participate in this study because you are an international student learning English as a second language at the Center for Intensive English Studies at Florida State University.

Before you agree to participate in this research study, it is important that you read carefully and understand the information provided in this Informed Consent Form. In case you face any confusion, reading teachers will assist you and help you understand your role in this study. If you still have any questions, please do not hesitate to ask the researcher for clarification.

Why is this Study Being Done?
The purpose of the study is to examine the extent to which explicit phonological awareness instruction could improve the spelling skills of adult Arab English learners and their international peers. Additionally, this study aims to investigate whether the explicit phonological awareness instruction could enhance orthographic processing skills of adult Arab English learners and their non-Arab classmates. Furthermore, the study aims to investigate whether the explicit phonological awareness instruction is beneficial for fostering reading speed and increasing comprehension accuracy of adult Arab and non-Arab English learners.

How Long Will I Be in the Study?
At the beginning of the session I in the summer of 2015, the study involves three pretests in spelling, orthographic processing skills and reading fluency. At the end of the same session, you will take posttests in the same skills. Each of the mentioned above tests will take no more than 10-15 minutes, administrated during your regular reading classes and printed on paper. In a span of six weeks, you will receive the regular reading instruction offered at CIES corresponding to your English proficiency level. In addition, you will also receive the explicit phonological awareness instruction.
What are the Risks of the Study?
The risks to you are considered minimal and there is no likelihood that you may experience some emotional discomfort during or after your participation. Should you experience such discomfort, please contact the University Counseling Center at the Florida State University provided in the attached list.
The total reading hours in the entire session I in the summer is 34 hours. The risk is minimal. The potential risk associated with this study is that, it will require you to spend only one hour and a half out of the 34 reading hours to respond to the pretests and the posttests during the regular reading class. The one hour and a half are divided into two segments: approximately 45 minutes for the pretests at the beginning of the session and 45 minutes for the posttests at the end of the same session.

What are the Benefits to Taking Part in this Study?
The benefit of taking part in this study is twofold. First, you will gain important insights with respect to how explicit phonological awareness instruction could help you increase your spelling knowledge, develop your orthographic processing skills, and speed up your reading rate and enhance your comprehension accuracy. Second, your participation in this study will help Intensive English Programs across the United States to better accommodate the language needs of adult international students who learn English as a second language.

New Findings:
The findings of the study will be available for you upon request after the completion of the final report. Please contact the researcher to express your interest via email provided in the attached list.

What about Confidentiality and Protection?
Your name and identification information provided in pretests, posttests, informed consent form and the demographic form will be confidential. Only the researcher, his supervising faculty and a research assistant will have access to the data therefore your identity will remain anonymous. The data will remain available for future research however all materials that would identify you as a participant will be destroyed by shredding or permanent deletion from the computer approximately three years after the completion of the study.

Participation in Research Is Voluntary
You are free to decline to participate or to withdraw from this study at any time, either during or after your participation without negative consequences. Should you withdraw, your data will be deleted from the study and will be destroyed.

Compensation
There will be no compensation provided for participation.

Additional Information
If you have any questions about any aspect of this study or your involvement, please tell either the researcher or your reading teacher before signing this form. You may also contact the supervising faculty if you have questions or concerns about your participation in this study. The supervising faculty has provided contact information at the bottom of this form. You may also ask questions
at any time during your participation in this study. If at any time you have questions or concerns about your rights as a research participant, contact the Human Subjects Office at Florida State University by email at asduke@fsu.edu or by telephone at (850)644-7900.

Attached List:

1 - The University Counseling Center at Florida State University
   a) Website: http://counseling.fsu.edu/
   b) Address:
      201 Askew Student Life Building
      942 Learning Way
      Tallahassee, FL 32306-4175
      P: (850) 644-2003 | F: (850) 644-3150

2 – The Human Subjects Office
   a) Website: http://www.research.fsu.edu/humansubjects/
   b) Address: 2010 Levy Avenue
       Suite 276
       Tallahassee, FL 32306-2742
       Ph: (850) 644-7900
       Fax: (850) 644-4392

3 – The researcher:

Meshari Alshammari
   a) e-mail:
   b) Ph:

4 – The Supervision Faculty

Dr. Galeano, Rebecaa
   b) e-mail: rgaleano@fsu.edu
   c) Ph: (850)644-4880

Demographic Information

Name___________________________________ (Your name will not be used in any public files. Your identity will remain confidential)

1. In what year were you born? _____________________
2. What is your country of birth?_____________________
3. What is your sexual orientation? (Gender)
   a. female
   b. male
   c. Other___________________________________
4. What is your race/ethnicity? (Select all that apply)
   a. Arab
   b. White, non-Hispanic
   c. African American or Black
   d. Hispanic
   e. Asian
   f. American Indian or Alaska Native
   g. Native Hawaiian or Other Pacific Islander
   h. Other___________________

5. What is your marital status?
   a. Married
   b. Divorced
   c. Widowed
   d. Separated
   e. Never married

6. What is your:
   a. First language____________
   b. Second language____________
   c. Third language________________
   d. Fourth language_______________

7. Currently in the U.S., you live:
   a. Alone.
   b. With an American family
   c. With an American roommate
   d. With an international student who speaks your first language
   e. With an international student who does not speak your first language
   f. With your family

8. At home, you mostly speak:
   a. Your first language
   b. Your second language (English)
   c. Both first and second language equally
   d. Both first and second language but emphasis is on first language
   e. Both first and second language but emphasis is on English
9. What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.
   a. Less than high school
   b. High school
   c. Some college
   d. 2-year college degree (Associates)
   e. 4-year college degree (BA, BS)
   f. Master’s degree (MA, MFA, MS, MBA)
   g. Doctoral degree (PhD)
   h. Professional degree (MD, JD)

10. What was your previous major?
    a. ______________________
    b. Not applicable.

11. What is your intended major that you want to study in the U.S.?
    a. ______________________
    b. Not applicable.

12. For how many years did you study English in your home country?
    a. Less than a year
    b. Two to four years
    c. Five to eight years
    d. More than nine years
APPENDIX D

IRB APPROVALS

Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM
Date: 02/24/2015
To: Meshari Alshammari
Address: Dept. CURRICULUM AND INSTRUCTION
From: Thomas L. Jacobson, Chair
Re: Use of Human Subjects in Research
Impact of Explicit Phonological Awareness Instruction on Reading Speed and Accuracy, Spelling Knowledge, and Orthographic Processing Skills of Adult Arab ESL Learners

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 02/23/2016 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.
Cc: Rebecca Morgan <rgaleano@fsu.edu>, Advisor
HSC No. 2015.14667

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APPROVAL MEMORANDUM (for change in research protocol)

Date: 03/30/2015

Meshari Alshammari

CURRICULUM AND INSTRUCTION

From: Thomas L. Jacobson, Chair

Re: Use of Human subjects in Research

Project entitled:
Impact of Explicit Phonological Awareness Instruction on Spelling Knowledge, Orthographic Processing Skills, and Reading Speed and Accuracy of Adult Arab ESL Learners

The application that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 02/23/2016, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or our major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Rebecca Morgan <rgaleano@fsu.edu>, Advisor
HSC NO. 2015.15266
REFERENCES


Durgunoglu, A. Y. (2002). *Cross-linguistic transfer in literacy development and implications for language learners*


Goswami, U., & Bryant, P. (1990). *Phonological skills and learning to read* Wiley Online Library.


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BIOGRAPHICAL SKETCH

Meshari Alshammari is currently in his 4th year of study in the Curriculum and Instruction Program at Florida State University. In December 2015, he will graduate with a PhD of Curriculum and Instruction degree, with a focus in Foreign and Second Language Education. Meshari earned his Bachelor and Master’s degrees from Kuwait University majoring in Arabic Language and Literature. He worked for the Ministry of Education in Kuwait and taught formal Arabic to high school boys for eleven years. Meshari then moved to Tallahassee and learned English as a second language at the Center for Intensive English Studies CIES at Florida State University. He earned his second Master’s degree in Multicultural/Multilingual Education with a TESOL concentration from Florida State University.

During his coursework studies, Meshari received recognitions for his academic achievements in the field of education from the Golden Key International Society, Kappa Delta Pi, and Pi Lambda Theta Honor societies. In addition, Meshari has joined the CIES faculty members to teach English as a second language to international students.

Meshari is an active member of TESOL International Association, Georgia TESOL, Alabama and Mississippi TESOL, and American Council on the Teaching of Foreign Languages ACTFL. During his PhD studies, he presented many research papers in various professional educational conferences and conventions.