

**BENEFITS OF LITERACY INTERVENTIONS  
TO EARLY READERS  
WITH SPECIFIC LANGUAGE WEAKNESSES**

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## **Declaration of Originality**

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

I also certify that the research in this thesis has been approved by the University of Canterbury Human Ethics Committee.

Joel Ginj Chang

28 November 2019

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To God

*provider, comforter, healer, friend*

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## Acknowledgment

“The wound is the place where the Light enters you.”

- Rumi

Countless stories lie underneath every page of this PhD thesis: A terrible vehicular accident, crowdfunding, falling out with friends, massive earthquake, depression, mass shooting, sense of loss, homesickness, theft, poverty and desperation. Each individual experience is thick in texture, bound by color and layered with every conceivable pain. However, despite of it all, I managed to triumph. I prevailed not because I was special, but because at every turning point of my struggle, there was someone who was able to selflessly share his/her wisdom and compassion without asking anything in return.

Hence, I would like to thank all my friends back home in the Philippines and those around the world who ceaselessly prayed for me. The same form of recognition is dedicated to my New Zealand friends and to my partner who inspire me daily. My heartfelt appreciation is also extended to my secondary supervisor Bridgid McNeill and associate supervisor Dina Ocampo, who were steadfast in their guidance. My most profound gratitude though goes to my primary supervisor, Prof. John Everatt, who tirelessly motivated me to keep writing, despite of my numerous personal setbacks.

My PhD journey concludes with a deeper sense of understanding to Gibran's words that “our pain is the breaking of the shell that encloses our understanding”. If we

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can allow our pain to present itself and lead us to how we ought to grow, then we come closer to realizing our truth and purpose.

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## Abstract

It has been estimated that children who learn and are exposed to two languages prior to puberty will become the majority worldwide (Tucker, 1998). Communities evolving into highly linguistically-diverse environments have the potential to pose a considerable challenge not only among individuals, but also to educational institutions, as immersion in languages learned does not guarantee linguistic proficiency. Hence, more ethnically-disparate countries, such as the Philippines and New Zealand, will need to develop responsive educational programs that accommodate successful bilingualism and support a range of learners. For example, children presenting with language learning deficits can be placed at a greater disadvantage in educational contexts, especially when this hinders proficiency in the language of education and leads to difficulties in literacy acquisition. Studies reported in this thesis focused on methods that might be valuable to reduce difficulties experienced by such populations of early learners.

The thesis studies assessed two treatment approaches: one focused on phonological awareness and a second targeted morphological skills. Both approaches were assessed to determine their efficacy in facilitating the growth of language and reading skills among children with specific language weaknesses in their first formal year of primary school. Improvements in language processing (phonological, morphological and vocabulary), word identification, and sentence comprehension in two country contexts (New Zealand and the Philippines) were the focus of the research.

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In the first study, the focus was on children from monolingual versus bilingual backgrounds in New Zealand who showed evidence of weaknesses in the English language. Twenty year 1 pupils (*mean age* = 5.8) were selected from a group of students identified by their classroom teachers as language weak. In the second study, the sample comprised 16 typically-developing bilingual and 15 English language weak bilingual children from the Philippines (*mean age* = 6.3) who were all Filipino speakers but were using English as the language of education in school. In both studies, participants were screened using standardized language assessments and measures of non-verbal intelligence, basic reading skills (comprehending words and sentences), language skills (including vocabulary), phonological and morphological awareness levels. All children showed no evidence of sensory, behavioural or neurological problems and their non-verbal intelligence score was within 85 to 115 points on the Primary Test of Non-verbal Intelligence. Students with language weaknesses were those who showed poor scores in several areas of verbal language processing. The design evaluated the performance of the children at three different time points: once prior to the introduction of the interventions, once after the first intervention was given and once after the second intervention was completed. In both country contexts, roughly half of each group completed the phonological intervention first whereas the rest completed the morphological intervention first.

Results indicated that specific gains in phonological processing were observed for the phonological-based intervention across groups in both countries (New Zealand and the Philippines). However, for the New Zealand context, gains for both monolingual

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and bilingual language weak children were generally more evident with the phonological intervention, whereas in the Philippines, the morphological intervention showed specific gains in morphology and word meaning tasks. When students had completed both interventions, there was evidence for all groups to show gains across the range of measures used in the study. The findings suggest that providing an integrated phonological and morphological awareness intervention among school-aged children may be an effective approach to support the language and reading development of students experiencing difficulties with the acquisition of English language skills. Such positive effects may be evident whether children are from a predominantly monolingual or bilingual/second language background.

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## Presentations with published abstracts

Chang, J., Everatt, J., McNeill, B., & Ocampo, D. (2019). *Early classroom-based literacy interventions for young readers with specific language weaknesses*. Oral Presentation at the 2019 Association for Reading and Writing Conference, 28<sup>th</sup> February – 1<sup>st</sup> March, BITS Pilani, Goa, India.

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## Chapter 1 Literature Review

### Introduction

At the heart of every society's guaranteed existence is its capability to preserve knowledge and transfer essential information from one generation to the next. Written language has made it possible that abstract and concrete concepts are made tangible and conveyed conveniently to individuals across time and place. However, such rich and vital information will become insignificant, if the ability to comprehend the symbols that carry meaning is inaccessible to people. Hence, educational institutions were created to ensure that proficiency in understanding and even creating written text are maintained and well-established.

Since the acquisition of such competency is a developmental process, impacted by differing contexts (e.g. home beliefs, community ideologies, educational institutions etc.) that shape distinct situations learners are in (Durgunoğlu & Verhoeven, 2013), simply providing exemplars of the written medium does not secure successful acquisition of particular sets of skills and knowledge; instead, reading and writing specific skills, as well as knowledge, must be integrated, nurtured and advanced in every child. Researchers even highlight the importance of developing reading skills in the early years of school and deem it as a crucial milestone in literacy (Kamhi & Catts, 2012; Kern & Friedman, 2008). Having an improved reading skill set is fundamental in attaining academic success in every aspect of the school curriculum, as it remains an imperative skill for almost all jobs and the basic key element to continuous learning (Tunmer & Chapman, 2015). Such emergent literacy skills comprise meaning-related

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skills (e.g. grammar and vocabulary), narrative skills (Pullen & Justice, 2003, NICHD, 2005), and code-related related skills (e.g. grapheme knowledge, print concept and phonological knowledge) critical in unlocking the meaning of words and comprehending the relationship between the oral and printed forms of texts (Gillon, 2004; Ehri et al., 2001; Hulme et al., 2012). The aforementioned emergent literacy skills related to code and meaning may be supported by a literacy-rich environment and engaging activities that link relationships between print and meaning (Westerveld, Gillon, & van Bysterveldt 2015).

Apart from obtaining outstanding literacy instructional practices, reduction of inequality in literacy achievement between vulnerable readers coming from disadvantaged backgrounds and proficient readers from socially affluent families is needed to be resolved by existing educational systems. Prochnow, Tunmer and Arrow (2015) reported that research data taken from New Zealand and several other countries indicate that children enter school possessing huge disparities of individual differences, particularly in the aspects of literacy-relevant knowledge, experiences and capabilities crucial for gaining literacy. The real test contemporary education systems face would be the promotion of evidence-based approaches that bridge the gap between high and low-performing readers; addressing the inequities of existing literacy achievement.

Ensuring that children who enter schools become competent readers is a crucial issue in the field of education. Resolving such is a complex process requires a unified approach and initiative from parents, teachers, students, policy makers and researchers in various tiers of the system. A particular aspect of such processes that can be

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addressed is to ascertain that key contributors of literacy achievement are effectively assessed and taught in classrooms. Research has shown that the development of early literacy in preschool and primary grades is associated to gains in reading outcomes in later grades (Snow et al., 1999). As a linguistic skill, reading relies on the assimilation of phonological, morphological, semantic, syntactic and pragmatic knowledge (Kamhi & Catts, 2012; Lonigan, Schatschneider & Westberg, 2008).

The importance of phonology as a linguistic domain has garnered considerable interest among educators with its strong connection to early literacy development (Anthony, Williams, McDonald & Francis, 2007; Gillon, 2018) and later reading success (Anthony & Lonigan, 2004; Muter, Hulme, Snowling & Stevenson, 2004). Findings based on studies made by Muter et al. (2004) and Wagner et al. (1997) illustrated that learners displaying strong phonological awareness skills in the early grades are likely to be more proficient readers by the third grade of primary school. Not only is it a potent gauge of early literacy success (Catts, Wilcox, Wood-Jackson, Larrivee & Scott, 1997; Treutlein, Zoller, Roos & Scholer, 2008; Ehri et al., 2001; Gallagher, Laxon, Armstrong, Frith, 1996; Gillon, 2004), but it has also been observed to boost reading and/or spelling outcomes when given as an intervention to children diagnosed with weak phonological processing skills (Castle, Riach, & Nicholson, 1994; Torgensen et al., 1999), dyslexia (Duff, Hayiou-Thomas, & Hulme, 2012; Fukuda & Capellini, 2012); spoken language impairment (Gillon, 2000, 2002; Korkman & Peltomma, 1993; Warrick et al., 1993; Zens et al., 2009), childhood apraxia of speech (McNeill, Gillon, & Dodd, 2009a), and even developmental disabilities such as Down Syndrome (Burgoyne, Duff, Snowling,

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Buckley, & Hulme, 2013; Lemons et al., 2015; van Bysterveldt, Gillon & Foster-Cohen, 2010). The critical role of phonological awareness in the initial stages of reading led to its prominence in serving as a diagnostic marker for distinguishing potentially at-risk learners in first years of school (Blachman et al., 2000; Ehri et al., 2001; Goswami, 2001; Pressley, 2006). Researchers Catts et al. (1999) have identified that a number of struggling readers often possess deficits in phonological awareness knowledge.

In more than three decades, several research studies focused on gauging and imparting phonological awareness among children in highly-controlled clinical settings (Bradley & Bryant, 1983; Byrne, Fielding-Barnsley & Ashley, 2000; Ehri et al., 2001, Gillon, 2000, 2005; Gillon & McNeill, 2009). Hattie (2005) even discovered that phonological awareness skills contribute highly toward student achievement; above and beyond factors such as class size, socio-economic income and whole language type of program.

Aside from phonological awareness, another linguistic skill that likewise provides considerable support in analyzing and understanding written text is morphological awareness. Fostering morphological awareness aids children to identify relationships between the root/base word and its derived forms (Everatt, 2018). For instance, learners comprehend the word *pictorial* from the root word *picture*. Morphological awareness refers to the ability of reflecting upon and recognizing the fundamental components of words at the level of meaning (Gabig & Zaretsky, 2013). This also includes the manipulation of the smallest constituents of a word – the base/root and the affixes (i.e. prefixes and suffixes). With morphological awareness, an individual is able

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to realize that words are created in a language via processes and patterns of lexical construction inherent to the language, basically by inflection, derivation or compositions (Gabig & Zaretsky, 2013). Morphological information in the written text is transmitted through the base form or lexical root as unbound / free morphemes (i.e. units of meaning that can stand alone) and further conveyed in grammatical inflections and derivational relations as bound morphemes (Verhoeven & Perfetti, 2003). In contrast, phonological awareness allows a person to become familiar that a word is comprised of a sound or combinations of sounds that signal meaning and that phonological information within the written text is expressed through the association between the grapheme and phoneme (i.e. sound unit).

The contribution of morphological knowledge in literacy has been gaining considerable interest among researchers, for not only sound is evident within the English orthography, but also meaning. Several researchers argue that knowledge in the smallest meaningful structures of words leads to unique variance in areas of literacy such as word recognition, comprehension, spelling and vocabulary enrichment (Carlisle, 2003; Carlisle & Fleming, 2003; McCutchen, Logan & Biangardi-Orpe, 2009). Verhoeven & Perfetti (2003) suggested that competent identification of morphologically-complex words may promote skillful decomposition of words into underlying morphemic units that activate the employment of direct lexical route to obtain complete lexical representations.

In addition, morphemic knowledge can also be utilized as a compensatory strategy for individuals faced with learning difficulties. Elbro and Arnbak (1996)

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discovered that dyslexic adolescents' awareness of small meaningful units in spoken language contributed to their skill in using such strategy to support comprehension of written text. Increasing number of research studies focusing on morphological awareness corroborate its significance in improving literacy outcomes and serving as an invaluable teaching tool for primary students possessing language and literacy deficits (Bowers, Kirby, & Deacon, 2010; Carlisle, 2010; Goodwin & Ahn, 2010; Goodwin, Lipsky & Ahn, 2012; Reed, 2008). There are even data to support morphological awareness performance as an effective means to identify late emerging weak comprehenders in primary school (Tong et al., 2011).

The promising effects brought about by both phonological and morphological awareness remain an interesting area to investigate, particularly when these metalinguistic skills are used as treatment approaches to improve reading comprehension abilities of children with language weaknesses. Such knowledge can be capitalized on to design programs that optimize the quality of classroom experience for diverse learners, curtail underachievement and bridge gaps in literacy outcomes. The current research explores the benefits and effectiveness of two language-based intervention programs, phonological awareness training and morphological awareness training in increasing reading comprehension among children with specific language deficits across two country contexts.

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## **Specific Language Weaknesses**

The foundation of acquiring proficiency to read and write rests on early spoken language development (Hayiou-Thomas, Harlaar, Dale, & Plomin, 2010). Competency in spoken language, together with phonological associations of spoken words, fosters the development of phonological awareness that in turn paves the way for understanding the sound-symbol correspondence. Simultaneous to such competency is the activation of morphological, syntactic and semantic skills that allow immediate word recognition, further leading to efficient reading comprehension. Successful development of reading assists later spoken language ability all throughout the adolescent years (Nippold, 1998); yet, not all children possess robust oral language skills to make way for smooth written language acquisition. A large portion of children characterized with spoken language difficulties encounter learning deficits primarily related to reading, writing and spelling (Boudreau & Hedberg, 1999; Catts, Fey, Zhang, & Tomblin, 2001; Johnson et al. 1999; Larrivee & Catts, 1999; Lewis, Freebairn, & Taylor, 2002; Stoeckel et al., 2013). Such weaknesses are likely to be persistent and not instantly addressed (Gillon & McNeill, 2017).

However, determining those with likely reading, writing and spelling difficulties due to weaknesses in spoken language will depend on reliable identification procedures for the latter. Such identification depends on the definition of spoken language weaknesses and the type of weakness that we want to identify. For example, Law et al. (2000) found that, among children aged 7 years or younger in the United Kingdom, the median prevalence of receptive language delay/disorder ranged from 2.63% to 3.59%, whereas different types of expressive language delay/disorder ranged from 2.81% to



16%. Those exhibiting a combination of expressive and receptive delay/disorder were discovered to have a prevalence of 2.02% to 3.01% (Law et al., 2000). In contrast, an earlier study in Canada, which investigated prevalence of language impairment among kindergarteners, recorded an overall rate of 8.04%, with 8.37% prevalence for girls and 8.17% for boys (Beitchman et al., 1986). Similarly, in the Midwestern region of the United States of America, the prevalence of spoken language disorders, particularly those with specific language impairment, among kindergarten children was documented to be 7.4% overall, with an 8% rate for boys and a 6% rate for girls (Tomblin et al., 1997).

With regard to the two countries in which the current research was performed, a report by Gillon and Schwarz (2001) approximated that five percent of New Zealand children aged five to seven years old demonstrate idiopathic speech problems. This estimate, however, did not comprise children with diagnosed language impairment, unidentified language deficits or other wider communication difficulties. Meanwhile, in the Philippines, no comprehensive national data exist pertaining to the prevalence of language deficiencies among school-aged children. Differences in identification processes across countries makes it difficult to rely simply on local clinical/practitioner diagnoses to determine a sample for research purposes.

Given such potential differences, it is important to operationalize the definition of specific language weakness in order to provide a comprehensive description of the characteristics present in the language-based deficit. Adopting a primarily exclusionary definition (for example, as used in the research reported by Critchley in 1970) avoids

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other variables that may be deemed responsible for a weakness, but can lead to complications in identifying individuals presenting with a language difficulty. Utilizing exclusionary criteria alone in defining specific language weaknesses may not be sufficient, as it includes little description of the particular behaviours or deficits generally associated to the condition. It tells much more about what a specific language weakness is not than what it actually is. In the research performed as part of this thesis, an exclusionary perspective was supplemented with an identification of the inclusion criteria that would be likely to be present when a child is experiencing a specific language weakness.

Hence, in this doctoral research, children with specific language weaknesses referred to school-aged children exhibiting a receptive language index score below the norm average of 85 (i.e. a general inclusion criteria). These learners also showed evidence of weak letter-sound knowledge (another inclusion criteria associated with language weaknesses and the main reason for supporting children with their reading development). These weaknesses occurred despite having no record of learning, sensory, or behavior problems, and showing a nonverbal intelligence score within the norm of 85 to 115 range (i.e. exclusionary criteria). The latter IQ cut off approach was used as a means to ensure that the child does not qualify as having general cognitive impairments that is their nonverbal IQ was within the average range despite their verbal abilities falling below this average range.

Although these criteria would broadly fit those used to identify a developmental language disorder, none of the children in the study had been diagnosed as such by a

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trained professional – such a diagnostic procedure would have likely included further observations of the child’s language processing and interviews to determine the history of language development. As such, the term specific language weakness was adopted in the research. Children characterized with specific language weakness were hypothesized to have decoding-related phonological skill difficulties (though potentially milder than those assessed as having dyslexia), and poor reading comprehension levels related to non-phonological language skills, such as morphology, vocabulary and syntax. In order to evaluate this hypothesis, phonological and morphological awareness tests, single word decoding, word and text comprehension measures were administered to confirm problems with both decoding and language comprehension.

This study investigated primary 1 learners, presenting with specific language weaknesses and learning the English language as one of the two languages that they were using to communicate with others (i.e., bilingual learners).

In order to convey the rationale that lays the foundation of the investigations presented in this thesis, the subsequent literature review is partitioned into four main sections that encompass:

- 1.) Evidence of reading achievement gaps focusing on educational practices in two different countries – New Zealand and Philippines
  - 2.) Theoretical underpinnings of phonological and morphological awareness in relation to the advancement of reading skills
  - 3.) Significance of integrating interventions in the actual classroom environment
-

- 4.) Promotion of multi-component classroom-based intervention programs in addressing specific language weaknesses among English language learners

The review of related literature concludes with a synthesis of the discussions and outlines four broad hypotheses that will each be addressed in the ensuing chapters; in order to realize the principal aim of this research – to provide research-informed solutions that lead to equitable reading outcomes.

## **Bridging Reading Achievement Gaps: A Tale of Two Countries**

### **New Zealand**

For more than a decade, concerted efforts were initiated by the New Zealand government to address the increasing inequities of underachievement in the area of literacy education; one of which is the adoption of a national literacy strategy that highly regarded a constructivist approach, evident in its adoption of the Reading Recovery Program designed by Marie Clay during the 1970s (Tunmer & Chapman, 2015). Under the Reading Recovery Program, students are provided daily one on one instruction in the span of 30 minutes for 12-20 weeks by a Reading Recovery teacher. Scaffolding on the child's learning is made to continually alter the zone of the learner's performance (Clay & Cazden, 1990). Focus is on the development of compensatory strategies in reading using an assortment of semantic, syntactic, pictorial and graphophonic cues to monitor and repair errors in the derivation of meaning from text (Clay, 1991).

However, international data analysed for over twenty years based on surveys of reading achievement revealed that New Zealand has consistently demonstrated

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considerable levels of test score variability (Tunmer, Chapman & Prochnow, 2007, 2009). This was again validated by the 2016 Progress in International Reading and Literacy Study (PIRLS). The report indicated a trend of boys continuing to score worse than girls; with children of Maori and European descent (Pākehā) experiencing a decrease in mean scores since the last PIRLS assessment in 2011.

Overall, New Zealand ranked 33<sup>rd</sup> out of 49 other countries that participated. The nation also earned a mean scale score of 523 which was eight points lower than the previously attained 531 mean score back in 2011. The results of such international assessment not only exposed the extent of disparity between vulnerable and proficient readers, but also clearly indicate that New Zealand's national strategy involving well-meaning policies and substantial resources failed to attain its intended outcome.

In their article *Pedagogical Constructivism in New Zealand Literacy Education: A Flawed Approach to Teaching*, authors Tunmer, Greaney and Prochnow (2015) mainly attributed the country's underperformance in literacy achievement to the Ministry of Education's rigid adherence to the 'multiple cues' theory of reading (Greaney, 2011; Tracey & Morrow, 2006) also known as the 'searchlights' model of reading (Rose, 2006). Under this theory, skilful reading is viewed as a process requiring minimum word-level information to validate prediction of imminent words in printed form and relies on various sources of information such as picture cues, schema, sentence context clues and preceding passage information. Since early readers are urged to rely heavily on context cues under the searchlights model of reading, the process of learning to read is similar to recognizing 25, 000 telephone numbers instantly and accurately (Adams,

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1991). Because of such an ineffective, capacity-draining word identification method being taught under the whole language approach, students encounter continuous decline in reading comprehension development as they mature (Tunmer & Nicholson, 2011). More evidence of educational inequalities come from key findings of the recent 2018 UNICEF Innocenti Report Card which concluded that New Zealand is falling behind other high and middle income countries that comprise the Organization for Economic Cooperation and Development (OECD). Out of 38 countries within OECD, New Zealand was placed at 33<sup>rd</sup> in rank for the UNICEF study. The country was assessed based on three indicators of education equality: (1) Preschool indicator (relies on percentage of students who have equality of access to preschool education; (2) Primary school indicator (measured by looking at the gap in reading scores between the lowest and highest performing students at Grade 4; and (3) Secondary school indicator (evaluated by the gap in reading scores of the highest and lowest performers at age 15). Analysing each of the indicators, results showed that New Zealand, along with Australia and Slovakia, are at the bottom third for each stage of the indicators of equality in education. The persistent dismal results from international surveys simply underscore that New Zealand's educational system has not improved over the years, and has somewhat regressed in providing equal opportunities for all students.

### **The Philippines**

Much like New Zealand, the Philippine government has attempted to close the widening gap in literacy by focusing on initiatives that pave the way for equitable educational opportunities (e.g. Every child a reader program, Library Hub, Mother

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tongue-based multilingual education, K-3 Curriculum on language development) (Cristobal, 2015). Still, inequities in education persist particularly in levels of functional literacy (i.e. the level of literacy that includes reading, writing and numeracy skills) according to the 2008 Functional Literacy Education and Mass Media Survey (FLEMMS). The survey revealed a relevant gap between the rich and poor populations, with functional literacy higher among the non-poor (i.e. 9 out of 10) than individuals categorized as poor (i.e. 7 out of 10). In addition, the same survey indicated that functional literacy among individuals between the ages of 10 to 64 were greatly disparate with girls and women scoring higher (88.7%) than boys and men (84.2%). More recent data compiled by the United Nations Human Development report in 2016 (see Jahan, 2016) showed that although the country's literacy rates improved, inequality was observed with women aged 15-24 (i.e.98.9% literacy rate) compared to men of the same age range (i.e. 97% literacy rate). Meanwhile, the 2017 Philippine Statistics Authority Report cited apparent literacy gaps at the community level, where the number of out-of-school youth aged 16-24 were documented at 3.6 million. Two main reasons identified by the said Philippine government agency were lack of personal interest in school and learning disability.

Both New Zealand and the Philippines have similar literacy educational experience disparities, yet varied levels of educational equality. These differences are shaped by each country's education system that evolved within a distinct national context. Certain policies or even literacy practices may be applicable in one country, and not the other. Still, general principles exist that are deemed pertinent to any country

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aiming to reduce the inequitable gap in literacy education. The 2018 UNICEF Innocenti Report Card (see Chzhen et al., 2018) enumerated six main principles of reducing educational inequality. These are providing high quality childhood education and care, reducing socio-economic inequalities, closing the gender gap in achievement, ensuring achievement of meritorious minimum levels of core skills, producing high-quality, cross-country comparable evidence, and focusing on equality and not just averages. Of these principles, countries need a solid foundation for an equitable education system; which can be attained by utilizing the decisive ingredient required of any education system – the provision of basic/ core literacy skills to children that allows for them to participate fully in society (UNICEF, 2018). The research discussed in this thesis addresses the concern by exploring the ways of developing core reading skills and raising achievement through enhancement of metalinguistic awareness training (i.e. phonological and morphological awareness) among atypically developing children with language weaknesses. It has been documented that without sufficient instruction, the gap widens between fast starters and slow starters in a phenomenon described by Stanovich (1986) as the ‘Matthew Effect’. This was apparently seen in the results reported in the preceding international studies survey that measured a country’s education performance and literacy achievement equality.

### Bridging Gaps in Literacy: Phonological and Morphological Awareness Instruction

In the past 30 years, several research studies were conducted highlighting the benefits of phonological awareness (PA) evaluation and instruction (Anthony & Francis, 2005, Ehri et al., 2001). Phonological awareness refers to the ability to identify,

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discriminate and manipulate the smallest unit of sounds that are likely to be beneficial in word recognition (Anthony & Francis, 2005). Al Otaiba et al. (2012) discovered that the more sensitive learners become to the sound structure of words, the greater chances they have of becoming proficient readers. It is because according to the researchers, the awareness provides children with the understanding to associate sounds with the letters in deciphering printed text and accessing meaning. Phonological awareness not only supports reading comprehension indirectly via decoding and decoding fluency (Adams, 1990; Carnio, Vosgrau & Soares, 2017, Ehri et al., 2001; Engen & Hoiem, 2002; Gillon, 2000), but is able to bridge the gap between weak and proficient readers, as it supports written language development of children with or without linguistic deficits (Catts, Fey, Zhang & Tomblin, 2001).

Like Phonological awareness, morphological awareness (MA) contributes to reading comprehension in children (Carlisle & Goodwin, 2013; H. Zhang, 2016; Kirby et al., 2012; Kuo & Anderson, 2006; Levesque, Kieffer & Deacon, 2017; McCutchen & Logan, 2011) and adults (D. Zhang & Koda, 2012). To, Tighe & Binder (2016) defines morphological awareness as the ability to consciously manipulate morphemes which are smallest units that carry semantic information (e.g. base words, prefixes and suffixes). Morphological awareness also assists in word decoding as it provides learners the knowledge to parse words into their smallest meaningful units that paves the way in recognition of potentially ambiguous phoneme-grapheme associations (Carlisle, 2000, 2003). An example would be the correct differentiation of the combination of the letters 's' and 'h' when decoding the word *dishonest*, where the phonemes /s/ and /h/ are

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pronounced separately, as opposed to the to the word *dish* where /sh/ is a digraph representing one sound.

A significant aspect in morphological awareness that deserves further research is in the context of early literacy. Although previous researchers demonstrated the development of morphological awareness among kindergarteners and first graders (Berko, 1958; Carlisle, 1995, Carlisle & Nomanbhoy, 1993; Kirby et al., 2012; Reed, 2008), scant research pertaining to the impact of explicit morphological awareness instruction in fostering reading comprehension among emergent readers exists. Hence, investigating the development of morphological awareness in the early years of primary school is crucial to better understanding early childhood reading development.

Since the ultimate goal of reading is to assist children in the acquisition of skills necessary to understand meaning (Al Otaiba, Kosanovich & Torgesen, 2012), it is only timely that studies relating to instructional approaches that center on the development of both morphological and phonological awareness in advancing children's reading comprehension are explored. The inclusion of phonological awareness and morphological awareness training as part of the classroom core reading program, may promote and even bridge the existing inequalities in reading performance by making sure that children at risk of developing reading deficits are recognized early.

This doctoral thesis explores the benefits of classroom-based early reading interventions by looking at the following perspectives:

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- 1.) The study attempts to identify whether morphological and/or phonological awareness approach leads to immediate reading comprehension among five and six-year-old grade one students with specific language weaknesses at the end of the first five weeks of a ten-week intervention program
- 2.) The research investigates whether a significant difference in reading comprehension scores exists between monolingual and bilingual participants in the intervention program in New Zealand
- 3.) The experiment assesses whether relevant differences exist between typically developing and atypically developing bilingual English language learners in the Philippines
- 4.) The investigation compares and contrasts reading performance outcomes across two country contexts to identify common and contrasting patterns relevant to the development of reading skills and effective reading instruction for at-risk children
- 5.) The project monitors whether explicit literacy treatment approaches result in the maintenance of learned reading skills post-intervention

The research experiment discussed in this thesis provides additional information to educational research by offering new insights in integrating explicit instructional training related to the enhancement of phonological and morphological awareness skills with regular classroom teaching that supports early language and reading achievement.

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It emphasizes that inequalities in reading performance outcomes can be addressed by ensuring requisite knowledge, relating to the theoretical importance of combining phonological and morphological awareness instruction as crucial elements of effective classroom reading practice, is made clear to students and educators alike. Hence, the ensuing section enumerates and discusses significant theories of children's reading development, frameworks surrounding the classification of reading deficits and comprehensive models relevant to reading instruction.

### **The Development of Reading**

An awareness of how small sound structures and meaningful word units directly relate to an individual's capacity to comprehend and interpret printed forms of text accurately requires understanding of theoretical frameworks. Such knowledge further determines appropriate evaluation of instruction and identifies successful transference of reading comprehension strategies.

### **The Component Model of Reading**

Reading is a process impacted by a myriad of influences. A particular individual's reading performance may be enhanced or hindered mainly by intrinsic or extrinsic factors relative to his/her circumstances (Gillon, 2018). Gillon (2018) further outlines external and internal aspects that effect literacy development. Extrinsic factors include family, culture, socio-economic status, community and teaching methods; while intrinsic elements involve oral language skills, intelligence and knowledge of print concepts. Such factors that influence reading outcomes are grounded in the Component Model of Reading (CMR) espoused by Aaron, Joshi, Gooden & Bentum in 2008. The model was

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conceptualized to serve as a useful framework of reading and to identify different domains (i.e. cognitive, psychological and ecological) that impact successful reading acquisition. The CMR model depicts the cognitive component as the domain focusing on the mental skills crucial in advancing precise word recognition and text comprehension. Metalinguistic skills (e.g. phonological awareness and morphological awareness), orthographic knowledge, and vocabulary size and depth are all subsumed under the cognitive domain. Another domain is the psychological domain. This covers areas such as children's interest, motivation, confidence, expectations and self-perception of their ability as competent readers that determine their success in reading. The third is the ecological domain that focuses on environmental aspects surrounding the learners. These include home and family background, culture, and parental support toward reading skill development.

Although all three domains exert essential effects necessary for positive reading outcomes, more attention in research was placed on the cognitive domain (Aaron et al., 2008, Tunmer & Chapman, 2012). Researchers Kahmi and Catts (2012) mentioned that cognitive factors provide a more direct influence and play a fundamental role in learning to read as basic cognitive processes of encryption, storage and retrieval of linguistic information are performed and achieved by learners during the actual reading experience.

Since the development of phonological and morphological awareness are essentially cognitive achievements, the discussion of word recognition theories is considered in the next section.

## **Relevant Theories of Word Recognition**

In the last few decades, much of the interest in reading research shifted toward the cognitive processes involved in word recognition. Not only was it helpful in expanding knowledge pertaining to reading development, but it also became relevant in understanding struggling readers and their limited capacity to identify and pronounce printed information accurately. Cultivating efficient word recognition in relation to reading comprehension had been highlighted in several research studies on theories of skilled reading (Gough & Tunmer, 1986; Perfetti, 1985; Stanovich, Nathan & Zolman, 1988). Stanovich (1991) mentioned that not being able to efficiently recognize words lead to the comprehension challenges experienced by weak readers.

One basic model of reading comprehension that emphasizes the significance of word recognition is the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990).

### **The Simple View of Reading**

The central idea conveyed by this model is that reading consists of two important concepts. One is word recognition and the other is linguistic comprehension. The word recognition component involves the decoding process of transforming print into words; while linguistic comprehension (i.e. listening comprehension) refers to the process of interpreting words, sentences and discourses (Gough & Tunmer, 1986). The simple view of reading also serves as a framework for classifying reading deficits (Carson et al., 2013). This view of reading assists in distinguishing difficulties in reading based on word recognition (e.g. dyslexia, spoken language impairment), language

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comprehension (e.g. specific comprehension deficits) or a combination of weaknesses in both components (e.g. mixed reading disability).

There were other competing reading models developed to explain a person's ability to identify or recognize words. The dual route model (Coltheart, 1978; La Berge & Samuels, 1974; Marshall & Newcombe, 1973), together with the connectionist model of reading (Patterson, Seidenberg, & McClelland, 1989, Rumelhart & McClelland, 1986; Seidenberg, 1989; Seidenberg & McClelland, 1989), were among those widely discussed; hence, the models dominated much of the early literature pertaining to understanding the nature of reading (Gillon, 2018).

### **The Dual Route Model**

The dual route model of word recognition was one of the earlier models that explained how learners derive meaning from printed texts. It posits that individuals access meaning of an isolated printed word by utilizing either of the two existing routes: a phonological route or a visual route (Coltheart, 1978; Forster, 1976; Morton & Patterson, 1980).

In order to use the phonological route, the reader must be able to analyse and decode a string of letters found in a word, apply letter-sound association and assemble phonemes to construct precise phonological representations. Once accurate deciphering is completed, meaning is then accessed.

Coltheart (1978) added that in cases of words considered phonetically 'irregular' (i.e. words that do not conform to normal grapheme-phoneme conversion rules such as

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cough), a visual route that is independent of the phonological route as an alternative must be employed. Accessing meaning via the visual route requires learner's high dependence on memory, as it taps heavily on previous experience of the word form and word meaning. This entails obtaining orthographic representation of the entire word based on letter shapes, cues and legal patterns prior to subsequent understanding of the word's meaning. According to Coltheart (1978), readers further use the two routes interchangeably depending on the type of reading material and the goal of reading. For instance, the phonological route is deemed helpful for reading unknown or unfamiliar words encountered in the text. Knowledge on how to decompose words in smaller parts would aid in mapping letters onto sounds that later lead to the decoding of the word. The dual route model further suggests that a person with no knowledge of the word's internal sound structure, may still retrieve meaning via visual cues. An example would be reading words from flashcards and learning each word by visual rote learning. Successive repetitions of hearing the word and training visually on letter patterns are techniques to enhance the visual route. Other teaching strategies in line with reliance on the visual route include looking / visualizing the word and actually spelling the word repeatedly.

The standard dual route proposed by Coltheart in 1978 was heavily criticized by several researchers (Barron, 1986; Ehri, 1992; Humphreys & Evett, 1985). Ehri (1992) specifically targeted the lack of a phonological processing component attributed to the visual route in order to recognize words. Ehri argued that many of the irregular words in the English language are partially irregular. One example of such partial irregularity is

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found in the word *debt*. In this particular word only the “b” does not follow regular letter-sound mapping. Imparting knowledge of the sound-letter relationship for “d” and “t” may assist in the identification of the word. Ehri (2005) even conveyed that learners can take advantage of sound-letter correspondences in spelling and pronunciation; in order to help activate memory and reduce memory capacity, as opposed to learning the entire form by rote.

### **Modified Dual Route Model**

In 1992, Ehri presented a revised model explaining word recognition by redefining the visual route in the standard dual route model as a visual-phonological route. It was hypothesized that associations between the word’s pronunciation and spelling are immediate. The learner somewhat ‘sees’ the specific pronunciation of a word which paves the way of linking spelling with meaning (Ehri, 1992).

Simply stated, Ehri’s (1992) modified dual route theory of word recognition advances the idea that learning to read requires children to use the phonological route first and then deciphers the word through grapheme-phoneme correspondence strategies. After being able to decode a word, readers will adapt and recognize immediately the word; making it unnecessary to decipher each grapheme. Still, such recognition by sight is made possible with combined use of phonological cues within the word.

### **The Analogy Model**

The theories of reading analogy posited by researchers Glushko (1979), Goswami (1994), and Marcel (1980) argue that learners tap into their stored memory of

how words are pronounced and link it with similar and familiar spelling patterns rather than associate individual letters to corresponding phonemes. Identifying words based on spelling and phonological similarities has been characterized as “reading by analogy” (Goswami, 1991; Goswami & Bryant, 1992; Marsh, Desberg & Cooper, 1977; Treiman, 1992).

Early research using this word recognition model indicated that analogy proved useful in the later stages of reading progress, when connections between spelling-pronunciation patterns have been reinforced by the continuous practice of the sound-letter conversion (Marsh et al., 1977; Marsh, Friedman, Welch, & Desberg, 1980).

Goswami & Bryant (1990) argued that even young children can use analogy to decode novel words, if they are instructed to separate linguistic units, particularly at the onset-rime level. Goswami and Bryant (1992) then suggested that awareness at the onset-rime level provides relevant support in children’s development of orthographic categories; classifying words with common structural spelling patterns together. Eventually, children can read and spell newly encountered words by just utilizing knowledge of analogy based on common or known word patterns. Identifying words that rhyme, producing rhyming words or blending words at the onset-rime level are only some of the activities promoting the analogy theory of word recognition.

### **Connectionist Models**

A connectionist model of word recognition, also known as parallel distributed processing model, stresses the importance of the integration of various linguistic systems (i.e. orthographic, semantic and phonological) in accessing meaning of

regularly and irregularly spelled words (Invernizzi & Hayes, 2010; Plaut, 2007; Seidenberg, 1995; Seidenberg & McClelland, 1989). In this specific model, knowledge in phonology is essential to: (1) process unfamiliar words (realized upon testing pseudo word reading) (2) acquire words capable of being decoded letter by letter (e.g. shop); and (3) become familiar with words that possess irregular elements (e.g. doubt). The connectionist model acknowledges the interplay of multiple skills needed to read print, rather than differences in processing routes (Seidenberg, 1995). The proponents of the connectionist word reading theory used a computer program to model the contribution of phonological, orthographic and semantic knowledge related to reading development by generalizing facilitative or inhibitive effects on each language area and assessing its impact on word recognition ability (Harm & Seidenberg, 1999). Demonstrating the role and effect of phonological knowledge, by impairing the phonological unit in the computer model, revealed marked difficulty in decoding non-words and irregular words. Another pair of researchers Brown and Lossemore (1994) showed that by reducing connections in the activities representing both phonological and orthographic word form resulted to an identical performance of a dyslexic child.

To simplify, the connectionist model suggests that phonological knowledge assists novice readers to decode unfamiliar words. It likewise demonstrates that strong connections involving phonological, orthographic and semantic systems allow children the opportunity to derive meaning from printed text proficiently. The model implies that educators should develop among learners competence in different layers of phonological, orthographic and semantic knowledge; in order to recognize areas of

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deficit that needed to be strengthened. Such can impact pedagogical decisions and bring about informative teaching practices, if given utmost priority.

### **Developmental Models of Word Recognition**

The previous models discussed provided theoretical foundations that relate to how proficient readers recognize printed texts. However, it is also necessary to gain knowledge on the developmental phases that lead to proficiency in word recognition. The advancement of word recognition according to the proponents of the developmental model of reading involves gradual and defined stages of development (Ehri, 1991; Frith, 1985; Gough & Hillinger, 1980; Marsh et al., 1980).

The initial stage acknowledged by many stage theorists is the logographic stage. At this period, children typically do not utilize names of letter and do not map out sound-letter associations in order to recognize words. Ehri (1991) observed that children employ letters simply as visual cues due to their salient graphic features, not because they represent sounds in words. This leads to inability to read new words and vulnerability to misinterpret visual cues. Masonheimer, Drum and Ehri (1984) explored this concept by conducting an experiment among pre-schoolers. The researchers placed a Coca-Cola logo on a Kellog's Rice Krispies box and asked children what it said. More than half of the pre-schoolers who participated answered 'Rice Krispies.' Another was when the researchers replaced the 'P' in the Pepsi logo with 'X' to read 'Xepsi.' The result revealed that 74% of the pre-schoolers still read the logo as 'Pepsi.'

Although stage theorists have differing ideas pertaining to the number of stages required to promote efficient word recognition skills (Chall, 1983; Ehri, 2005; Frith,

1985), there is general consensus though the alphabetic stage begins when learners start to decode words by mapping out sound-letter relationships. The underlying principle is that readers enter the alphabetic stage the moment they utilize their knowledge based on connections between written and oral forms, and use these to decode printed words. The reader understands that the connections are not arbitrary as experienced in the logographic stage, but are actually systematic links between phonemes and graphemes. Such competency leads to the acquisition of the ability to assess spelling that allows correct translation of symbols to sounds at the sub-lexical level (Ehri, 1991; Frith, 1985). In the final stage – orthographic phase, children use knowledge of letter order and spelling patterns to immediately recognize words by sight, without resorting to phonological decoding. At the orthographic stage, readers are also able to perceive morphemic parts of words that are usually occurring letter patterns *-ing*, *-ment*, and *-ed* (Gillon, 2018). Instead of producing all the available phonemes in the new word, mature readers match the observed letter sequence of the new word to pre-existing letter patterns based on recognizable words stored in the semantic memory (Kahmi & Catts, 2012).

### **The Self-Teaching Hypothesis**

The self-teaching hypothesis proposed by Share (1995) and Share and Stanovich (1995) provides an alternative explanation for decoding printed words. In this item-based model, Share explained that readers utilize phonological decoding as a self-teaching mechanism; enabling them to acquire efficiency in determining orthographic representations vital for instant and accurate recognition of words, as well as

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competency in spelling. The learner starts the process of self-teaching after learning to map sound-letter correspondences, then attains improved proficiency in word recognition after increased encounters and exposures to printed texts. The reader eventually gains enhanced understanding of complex phoneme-grapheme associations, as they are discovered in various morphemic and orthographic restrictions (Share, 1995). De Jong and Share (2007) emphasized that such learning may transpire not only in actual oral reading, but also in independent silent reading.

Although Share and Stanovich presented convincing arguments in support of the significance of enhancing the phonological decoding skill, the researchers still pointed out that the presence of the said skill alone does not automatically guarantee self-teaching. They remarked that it only paves the way for opportunities to actualize the self-teaching process. Other factors may advance or impede the establishment of word-specific orthographic representations. One such factor that gained prominence to date would be morphological knowledge (Carlisle, 2003; Jarmulowicz, Hay, Taran, & Ethington, 2008) which will be discussed in the succeeding sections.

### **The Connected Text Reading Model**

The earlier models mentioned in this chapter illustrate how learners read printed words in isolation. Nevertheless, context provided by connected text also contributes substantial information that fosters word recognition among readers. This information involves semantic relationships within sentences, knowledge of sentence, paragraph and narrative structure, and context to access accurate meaning for words that convey numerous possible interpretations (Kim & Goetz, 1994; Roth & Spekman, 1989,

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Stanovich, 1984). The merging of information derived from word-level and higher-order processing has given birth to an interactive model of reading.

The model of interactive reading or the connected text reading model was a result of the merging of two opposite views that were prominent in earlier reading research – the bottom-up (Gough, 1972) and top-down processing views (Goodman, 1970; Smith, 1971). The bottom-up model or the word-level approach in reading emphasized the idea of reading being a sequential process involving series of increasing operations which begin with the conversion of printed letters into sounds, then the string of letters to the oral form which allow access of meaning stored in memory. The top-down approach, on the other hand, highlighted the importance of semantic and syntactic skills needed to derive meaning. The synchronous use of information supported by these higher order cognitive processes lead not only into fluency, but also efficient comprehension in reading (Smith, 1971). Goodman (1970) referred to this activity as a 'psycholinguistic guessing game.' Reading researchers supporting the top-down approach postulate that both semantic and syntactic knowledge in word structures trim down probabilities related to the meaning of upcoming texts; drawing out plausible guesses which aid the reader during word recognition (Athey, 1977; Goodman, 1985).

The bottom-up and the top-down models received heavy criticisms from reading researchers. For example, Rumelhart (1976) and Danks (1978) presented related research findings focusing on the influence of semantic and syntactic context in recognizing words unexplained by the bottom-up processing model. This is mainly

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because the bottom-up approach lacks a mechanism that explains how higher-level processes can impact lower-level processes (Stanovich, 1980). In the same way, the top-down approach with its emphasis on using contextual information in immediate word recognition was also disproved; as it was observed in experiments that weak readers were as capable of utilizing contextual cues to enable word recognition just like their typically developing peers (Stanovich, 1984). Recently, increasing support from researchers on how the interactive model provides explanation on the way learners use their knowledge to read connected text has gained ground (Gillon, 2018). The interactive model conveys readers' simultaneous synthesizing of lower-level and higher-level processes during reading engagement that improves accuracy in reading. As Share (1995) indicate, errors made by children in selecting the accurate word could be twice as much, if they simply rely on textual information. However, the reader is able to capitalize more and achieve proficient reading comprehension the moment he/she is able to merge several sources of information (i.e. syntactic, semantic, orthographic, pragmatic, phonological and morphological) simultaneously.

### **Section Summary**

The models discussed in this chapter provide a theoretical framework essential in gaining better insight on the development of reading skills. The inability to recognize printed text is a distinguishing feature of a reading deficit (Invernizzi & Hayes, 2010) which hinders fluency and comprehension. As researchers Fletcher, Lyon, Fuchs, and Barnes (2007) discovered, reading fluency is dependent on solid word recognition skills that are further enhanced through continuous usage of cognitive abilities such as

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automaticity and rapid naming; while, reading comprehension relies on efficient recognition of words that leads to the assimilation and discernment of information at the text level (Stanovich, 1994). Any deficiencies in word recognition and comprehension can negatively impact learning to read, and mark solidly and significantly in a model applied to categorize reading inadequacies.

### **Model for Categorizing Reading Deficits**

Reading models that provide a means of distinguishing reading difficulties give educators a system for classifying deficits that may impede the growth of a child's reading ability. It not only determines eligibility for services, but guides informed curriculum design and implementation. One of such models that has dominated reading literature, since its inception in 1986 is the Simple View of Reading.

As mentioned in the earlier section, the simple view of reading states that reading comprehension is a by-product of two things – word recognition and listening comprehension. The model argues that in order to know how well an individual comprehends printed text means measuring how well they decode words and how efficiently they understand the words and sentences that are read to them (Gough & Tunmer, 1986; Hoover & Gough, 1990). In order to determine the contribution of word recognition and listening comprehension variables on reading comprehension, researchers Hoover and Gough (1990) administered a longitudinal study among English-Spanish bilingual learners starting from their first year in school until their fourth grade. The outcome demonstrated that word recognition and listening comprehension accounted for the resulting variance in reading comprehension. The combination of the

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two variables contributed between 72 and 85 percent of the variance in reading comprehension across the four grades.

Adolf, Catts and Little (2006) in another longitudinal study involving 600 monolingual children, tested the simple view of reading model and observed that the areas of listening comprehension and word recognition collectively accounted for nearly 100 percent of the variance in reading comprehension performance in second, fourth, and eighth grades. Several researchers also provided convincing evidence in support of the Simple View of Reading (Aaron, Joshi & Williams, 1999; Carver, 1993; Catts, Hogan & Adolf, 2005; Catts, Hogan & Fey, 2003; de Jong & Van der Lief, 2002). Hence, knowledge in thoroughly understanding the Simple View of Reading can inform teachers regarding the most appropriate and most effective instructional practice framework for struggling readers that leads toward the attainment of enhanced reading competency, possible in classroom reading instruction.

### **Methods of Reading Instruction**

The stark difference between learning a language and learning to read fundamentally lies in one aspect – instruction. Language development for those characterized as within the norm of typical development is universal. Regardless of state, nation, society or culture, children without any cognitive, affective, sensory or physical deficits raised in a healthy social environment naturally learn a language, whereas literacy is far from universal. The development of an individual's ability to read typically requires explicit instruction and continuous practice in order to achieve proficiency.

Since it had been observed that children greatly differ in how fast and precisely they learn to learn (Snow et al., 1998), long-standing debates have persisted as to where exactly the emphasis of literacy teaching should be; especially among the emergent readers (Adams, 1990; Chall, 1996; Tunmer et al., 2014). Supporters of the idea that language learning and reading have non-shared aspects contend that the implementation of phonics instruction is vital for improving reading competency. Advocates of the said reading instruction method assert that the introduction of alphabetic reading must involve explicit discussion and training on mapping out sound-spelling associations including letter patterns. On the other hand, proponents that highlight the commonalities of language and literacy development focus on the significance of learning to read for meaning rather than simply decoding strings of letters and/or words. The emphasis of learning to read through connected text is the guiding principle behind the method known as “whole language instruction”.

### **Whole Language Approach**

The proponents of whole language instruction promote reading words as whole units which often are dependent on visual recognition (Seymour & Elder, 1986). Instructors of the whole language approach occasionally make connections on letter names, sounds, and words (e.g. castle begins with a /k/ sound); however, as Snow et al. (1998) observed in their research, teaching systematic phonics is often not included in the curriculum. The main goal is for children to extract meaning by utilizing context, which includes becoming sensitive to syntactic and semantic cues. The children’s

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acquisition of phonics knowledge is deemed implicitly honed as their experience with printed text increases (Goodman & Goodman, 1979).

Whole language instruction again highlights the assumption that children will naturally develop their ability to read with minimal directives, much in the same way they develop their oral language ability (Pressley, 2006; Tunmer, Chapman & Prochnow, 2004). Learners using whole language instruction approach the development of literacy using text-level processing or the top-down perspective in reading. In so doing, children are presented with strategies such as schema activation and inference-making to comprehend sentences (Moats, 2000; Pressley, 2006). In addition, they are given stories to read, not just isolated words or simple sentences. They are also taught to get acquainted with story structure, which proponents of the model emphasized as a means to veer away from the mechanical approach of sounding out letters during reading instruction (McBride-Chang, 2016).

The whole language approach to reading may accommodate children with special reading problems. Stanovich (2000) pointed out that there exists an estimated 10 to 20 percent of children who find it difficult to master the alphabetic principle (e.g. reading disabled, dyslexic and poor comprehenders). For such learners, grapheme-phoneme correspondences or sounding out words can cause perplexity, and that the strategy of recognizing words by sight may initially prove beneficial. Another advantage brought about by the whole language approach is that readers trained to develop early literacy skills using such instructional methods may find reading more enjoyable, as opposed to those trained under the traditional phonics instruction (Stahl & Murray,

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1994). McBride-Chang (2016) mentioned that this may be because children read for meaning which motivates them to come up with predictions regarding succeeding events in the story. Still, critics of the whole language approach to reading instruction have cited that high dependence on visual strategy to identify printed text is limiting an individual's capability to acquire words (Gough, Juel & Griffith, 1992; McBride-Chang, 2016). The researchers explained that cognitive storage delegated for unrelated information, specifically variety of word patterns is limited. Hence, it is utterly impossible to rely solely on a purely visual strategy without causing negative consequences on reading outcomes (Gough, Juel & Griffith, 1992). What is needed is a means to recognize printed forms of text that assist in retrieval and recall of more words from memory. As a result, a shift toward including phonics instruction as part of the classroom reading program has become more prominent in recent years.

### **Phonics Instruction**

Educating children to seamlessly unlock the codes of alphabetic conversions to infer meaning of words, specifically in an opaque orthography such as English, is vital in gaining competency in reading. This method of instruction is known as the phonics-based approach. Phonics instruction is basically viewed as a bottom-up process of recognizing words, upon which a person utilizes the orthographic and phonological features of printed forms of text to deduce meaning. Four different kinds of phonics-based methods have been reported in literature. These are analytic phonics, synthetic phonics, analogy phonics, and embedded phonics. In analytic phonics, instruction of letter-sound associations are imparted with phonemes related to specific graphemes not

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pronounced as separate units or produced in isolation. Learners are asked to identify the phoneme being studied by using a set of words containing a common phoneme. For instance, children may be presented with words such as bat, boy, bush and bin. Then the teacher, together with the students, discuss how the given words are alike. Through inferential learning, children deduce that the beginning phoneme in /ball/ is the same as the initial phonemes evident in the series of words provided. It is expected that children arrive at a conclusion to write the grapheme 'b' as a representation of the existing common phoneme. In contrast, synthetic phonics is an approach to reading instruction where phonemes associated to graphemes are taught in isolation; then combined or blended together to form a whole word. This entails imparting to a learner that sounds are represented by symbols (i.e. written letters) and that creating and pronouncing words mean knowing how to blend the sounds together. Meanwhile, analogy phonics involves teaching students to read unfamiliar words by capitalizing on their existing knowledge of known words. Familiarization of words requires remembering by rote stacks of riming units (i.e. phonograms) such as 'am,' 'an,' 'et,' and utilizing these to approximate the reading and spelling of unknown words. Lastly, embedded phonics is an approach to reading where children are taught sound-letter correspondence during the reading of connected text using authentic materials. For instance, a learner might be trained to decode the word 'train' within the context of a story about trains and various modes of transportation. Because children are exposed to a multitude of phoneme-grapheme relationships, they read and engage in stories. The means of instruction is non-explicit and learning thereby is incidental.

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Phonics instruction has gained prominence as it was observed to be efficient not only in decoding words, but also in fostering reading comprehension (Stanovich, 2000). In addition, phonics-trained learners were found to be more proficient spellers of English (Bruck, Treiman, Caravolas, Genesee, & Cassar, 1998). In another study by Foorman et al. (1998) which compared American first and second graders, in connection with the use of whole-language and phonics-based instruction, proved that children trained in the systematic approach of mapping phoneme-grapheme correspondences (i.e. phonics) performed significantly better in reading words. Researchers Foorman et al. (1998) and Juel & Minden-Cupp (2000) concluded that phonics-based instruction is beneficial, as it improves reading-related skills of children characterized as having lower-level reading abilities. Those children who underwent explicit phonics-based instructional approach displayed higher word recognition scores at the end of primary 1 (Connor, Morrison & Underwood, 2007). Immense support of a phonics-based approach is echoed by reports showing consensus from the United States of America's The National Reading Panel (Ehri et al., 2001) and The National Research Council's Committee on the Prevention of Reading Difficulties in Young Children (Snow et al., 1998). Additional documents from government agencies of other countries such as Australia's National Inquiry into the Teaching of Literacy (Australian Government, 2005), Scotland's The Effects of Synthetic Phonics teaching on Reading and Spelling Attainment (Johnson & Watson, 2005) and the United Kingdom's Independent Review of the Teaching of Early Reading (Rose, 2006) discuss the importance of phonics and advocate for the instruction of it in the classroom to be afforded the highest level of importance.

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Despite strong evidence demonstrating the effectiveness of phonics instruction in advancing reading-related skills in alphabetic orthographies, critics of the approach pointed out limitations in the very foundation of the program – consistent application of the sound patterns (Strauss & Altwerger, 2007). The problem highlighted by the aforementioned authors is that in non-transparent alphabetic languages such as English, simplifying letter-sound correspondences is unrealistic; as spelling patterns of words do not predict how they are pronounced. The sorting and pronunciation are often arbitrary; take for instance words such as post, most, host and ghost which are pronounced using a long vowel 'o' sound. The preceding words are marked differently than words frost, lost and cost; which have the same rime patterns, but uttered with short vowel sounds.

Further example where letters alone are insufficient to specify actual pronunciation is evident in the words wind (i.e. natural movement of air) and wind (i.e. twist and turn). Thus, instruction that provides efficient support to improve reading outcomes of weak-performing students have long been sought for.

### **Balanced Literacy Approaches**

A contemporary approach to reading instruction is the adoption of a balanced form of literacy approach, since literacy acquisition is multi-faceted (Tunmer, 2014). This method aggregates significant features of both phonics and whole language instruction into its core program (Moats, 2000; Pressley, 2006). Gaskin (2011) discusses that mapping links between letter-sound associations are better taught in isolation, but is not the sole focus of instruction. The knowledge children derive is then employed to figure

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out unknown words that appear in connected text. Learning phoneme-grapheme correspondences serve as the primary technique for deciphering unfamiliar words found in connected text. In a balanced literacy framework, learners are provided with different types of written language which they are encouraged to explore. Children are also given freedom to select books and texts they are interested to read. Likewise, the students have ample time to read independently or placed in small groups; in order to discover language. The role of the teacher is to scaffold literacy learning, which may be in the form of read alouds, word study and guided instructions (Au, Carroll & Scheu, 2001).

Knowledge in various types of reading instructional approaches is significant in order for educators to tailor their teaching strategies to the distinct learning needs of students in the classroom. Given that learners entering school differ immensely from one another, with regard to their reading-related skills; this requires variegated levels of instruction in metalinguistic awareness and letter-sound knowledge to pave the way for independent reading (Nelson, 2010). As Snow and Juel (2005) observed, there is a proportion of students who require detailed instruction and exposure to letter-sound correspondence; prior to attaining the means to unlock the alphabetic code. Still, other children need explicit and highly-structured educational support in becoming competent readers (Kahmi & Catts, 2012). Hence, one may think that ensuring a balanced approach to reading instruction that involves code-focused and print-focused reading strategies is critical when taking into account ways of reducing the growing inequality or gap in reading literacy achievement for emerging readers. Still, irregularities in reading outcomes can only be suitably addressed when there is a consideration of theoretical

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frameworks and reading contexts based on existing information regarding models of word recognition, approaches to reading instruction and classification of reading difficulties. Because the development of reading proficiency is a complex process, there is a need to establish a systematized implementation of phonological and morphological skills intervention with the aim of supporting word recognition, enhancing reading fluency and strengthen comprehension in a classroom-based reading program.

Authors Bowen and Snow (2017) in their book *Making Sense of Interventions for Children with Developmental Disorders: A Guide for Parents and Professionals*, cautioned against the Balance Literacy Approach because researchers believe that simply merging phonics and whole language instruction was just “well-intentioned and cleverly titled marketing” that attempted to strike a compromise by adopting approaches used in both. One teacher’s “balanced” approach may be implemented differently by another teacher, who most likely will also have a different perception and interpretation of what revolves around the concept “balanced”. The result would simply be educators, in the pursuit of what they deemed as balanced literacy, blending myriads of approaches that weaken instruction.

Evidence-based intervention programmes based on clear and systematic guidelines are essential in supporting language and reading-related skills of children with language deficits. The following sections then outline the role of metalinguistic skills in relation to the acquisition of reading; beginning with phonological awareness and concluding with morphological awareness skills. Discussion on the critical role of the

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said metalinguistic skills in the early identification and prevention of reading deficiencies in the classroom shall further ensue.

### ***Precursors of Literacy Development***

As researchers highlighted, different models that elucidate the acquisition of word recognition skills underscore the fact that proficiency in reading requires the consolidation of an array of knowledge and print experience (Invernizzi & Hayes, 2011; Konza, 2006). The establishment of robust skills that pave the way for emerging word-recognition abilities (e.g. phonological, morphological and alphabetic knowledge) guarantees that learners develop essential means to derive meaning from printed forms of information they encounter (Justice, 2006; Kahmi & Catts, 2012). Poor reading foundation skills limit children's chances of becoming proficient readers and compound the risks for continuing literacy failure and life-long educational underachievement (Bishop & Adams, 1990; Catts, Bridges, Little, & Tomblin, 2008; Conti-Ramsden & Purkin, 2007). Ergo, the integration of classroom-based literacy interventions that promote word-recognition development within the school curriculum is crucial in reducing the impact of existing literacy inequality.

### ***Sound and Print Information***

Pivotal to an individual's ability to learn how to read and write are abilities to discriminate, attune to, recall and manipulate speech sounds; coded in print from whole then to parts (McBride-Chang, 2016). Children require such use of phonological information that enables them to read words. However, this may not be an easy process

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for all children. For example, children may initially develop implicit phonological knowledge enabling them to evaluate whether a word is related to their native language or not. They may be able to perform auto-correction of errors evident in speech, and distinguish variations across spoken words that make the relationships between phonemes, graphemes and morphemes less clear (i.e. the phoneme-grapheme correspondence do not reflect actual speech sounds in words such as the English letter c which can represent two different phonemes /k/ and /s/). However, the variability in speech (i.e. utterance of a word becomes intricate as it differs among individuals based on voice quality, gender, age, nationality or even pronunciation) may make it more challenging for some children to derive phonemes from spoken words (McBride-Chang, 2016). McBride-Chang (2016) expressed that most children and a number of adults without undergoing detailed reading-related training cannot manipulate particular phonemes present within a word, especially those that do not constitute the onset of a given word. English-speaking children who are able to manipulate phonemes skilfully are placed at a greater advantage in learning to read English than those who are not (Adams, 1990; Brady & Shankweiler, 1991; Pressley, 1998).

For children, across cultures and ages, the ability to focus on and discriminate the speech sound system and gain understanding that spoken language can be broken down into minute components comprising syllables, onsets, rimes and phonemes offer greater significance in learning to read. In fact, consensus among various researchers exists that phonological awareness is strongly related to reading (Gillon, 2000; Shankweiler, 1999; Stanovich, 2000). Phonological awareness, in relation to an

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individual's reading ability, was reported in several cross language studies that focused on European Latin-based orthographies (Cossu, 1999; Wimmer, 1996; Wimmer, Mayringer & Landerl, 2000; Ziegler & Goswami, 2005), non-Latin based scripts particularly Hebrew (Bentin & Leshem, 1993), Arabic (Elbeheri & everatt, 2007; Taibah & Haynes, 2011), and Persian (Sadeghi, Everatt & McNeill, 2016). Phonological awareness was even found to influence reading of a non-alphabetic language such as Chinese (Ho & Bryant, 1997). Wagner & Torgesen (1987) noted that one of the potential triggers that set-off word recognition difficulties is a deficit in processing the phonological aspects of language and utilizing this in acquiring written language. The concept of phonological processing involves the employment of phonological information when engaged in oral and written language activities (Catts, Kahmi & Adolf, 2012). Wagner and Torgesen (1987) identified various types of phonological processing skills which include speeded naming (i.e. rapid automatized naming), phonological memory and phonological awareness.

The first type of phonological processing skill is speeded naming or rapid automatized naming which involves immediate identification, retrieval and visual sequencing of symbols or representation from long-term memory. Another type referred to as phonological memory can be measured by the accurate retrieval in particular order of a certain list of non-words or random real words from basic memory or context presented in sentential memory (Waters & Caplan, 1996). Lastly, the third type is phonological awareness which is defined as the awareness of access to and manipulation of the sound structure of a language (Gillon, 2004; Kahmi & Catts, 2012;

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McBride-Chang; 2016). Out of all the identified phonological processing skills, phonological awareness has been observed to show significant impact not only on literacy development, but also on literacy success (Branum-Martin et al., 2012; Melby-Lervag et al., 2012; Wagner et al., 1997).

The concept of learning to read using phonics has been around since the early 20th century; however, emphasis on its use was not given as much significance. For many English language students in 1930 America, phonics was only introduced after the child is able to recognize new words using picture and meaning clues (Chall, 1967). Phonics was taught about the same time as structural analysis, and was only one of the several mechanisms used in the identification of new words (known then as word perception). It was even only encouraged when other ways of instruction fail. In 1967, the credibility of the then perceived progressive whole word approach began to slowly deteriorate with the publication of Chall's *Learning to Read: The Great Debate*. The book presented research-based evidence in favour of phonics instruction. The ability of reducing whole words into their equivalent discrete speech sounds slowly began to gather steam, with basal readers in the 1970s being published that encouraged more phonics instruction in the early grades (Rehage, 1984). Soon, studies in the early 1970s focused on investigations relating to linguistic awareness existing at the phonological level (Calfie et al., 1973; Liberman, 1973; Liberman et al., 1974; Mattingly, 1972). These researchers associated children's understanding of words as made up of discernible components. It was only in the late 1970s and early 1980s that the term "phonological awareness" started to emerge in the research literature. This term

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specifically referred to a person's awareness of the sound structure of an uttered word. Marcel (1980) also linked phonological awareness to spelling by showing that children struggling with spelling performed weakly on tasks measuring phonological awareness. By the 1990s, the number of research studies conducted to explore the significance of phonological awareness in relation to reading and spelling increased; which resulted in the term being widely cited in scientific journals and other forms of literature in the fields of psychology, speech-language therapy, linguistics and education.

### **Phonological Awareness Development**

An encompassing view pertaining to the development of phonological awareness among children explains that skills signifying sensitivity to the sound structure in a language exist along a continuum (Anthony et al., 2009; Lonigan et al., 2009). It depicts a framework highlighting a hierarchical nature of sensitivity to linguistic units at distinct levels/tiers (Hempstall, 1997). In general, learners become aware of larger sound units (i.e. syllables and rhymes) prior to perception of smaller sound components (i.e. phonemes) (Schuele & Boudreau, 2008).

### **Levels of Phonological Awareness**

Phonological awareness is comprised of different levels: syllable, onset-rime and phoneme awareness. Initially, children exhibit knowledge that multi-syllabic words can be divided at the level of syllables, and that a specific word such as *mommy* can be segmented into *mom-my* or that the word *pancake* can be broken into two parts *pan* and *cake*. Eventually, the children display high sensitivity to discriminate within intrasyllabic units also known as onset-rime awareness (Goswami & Bryant, 1990;

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Moats, 2010). Onsets are the initial sounds of the word, which could be a consonant cluster (where two or three consecutive consonants are evident like 'tr' in *trip* or 'str' in *strip*). On the other hand, in words like *ball*, *trip* and *strip*, the rime would be comprised of sounds that follow the onset such as 'all' in *ball* and 'ip' in words *trip* and *strip*.

There are observable patterns governing the development of children's sensitivity to intrasyllabic units in the syllables (Justice et al., 2013). In the beginning phase of their awareness to syllables, when phonemes are not yet viewed as a fundamental linguistic component, children demonstrate more competence in separating syllables into onsets and rimes; when onsets occur as solitary consonants as compared to consonant cluster (Treiman, 1983). For example, children are better likely to separate the word *rip* into an onset and rime, as opposed to *trip*.

Another means of breaking down words into minute units is by segmenting them into distinct sounds. This is the phoneme level of awareness. A phoneme is defined as the smallest component that influences a word's meaning. For instance, the word *ball* is comprised of three distinct phonemes: /b/, /ɔ/, /l/. Altering one of the phonemes within the word such as /b/ to /m/ or /l/ to /t/ would change the meaning conveyed by the word. Phonemes represent an abstract idea. In the utterance of a word, the listener hears the phonemes blended into syllables within speech rather than segmented phonemes. Hence, an individual needed to learn the perception of phonemes in speech (Liberman, Cooper, Shankweiler & Studdert-Kennedy, 1967), as they are critical requisites in becoming a proficient reader (Justice et al., 2013).

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Supporting evidence related to the developmental continuum of phonological awareness were based on previous research demonstrating that sensitivity to syllable structure appears earlier than sensitivity to phonemes (Anthony et al., 2005; Lonigan et al., 1998, 2009). Developmental studies indicate that explicit awareness of syllabic distinctions in words emerges between three and four years of age (Schreiber, 2008), while the awareness to detect and create rhyme patterns has been documented in children as young as two years of age (Hempenstall, 1997). In contrast, early phoneme sensitivity, particularly accurate identification of shared phoneme across words (e.g. toy and tin) begins to show between four and five years of age; with succeeding development at the phoneme level in conjunction with the beginning literacy instruction (Dodd & Gillon, 2001; Lonigan et al., 2008). A significant period for screening and monitoring majority of children in relation to phonological awareness is advised to be conducted at around four years of age, as consistency in phonological awareness ability becomes evident during this period.

Phonological awareness at the smallest component of sound in a language (i.e. phoneme awareness also known as phonemic awareness) is considered to be more complex; which makes it difficult to master easily or become proficient in. As opposed to rhymes or syllables, phonemes are hard to perceive acoustically (Liberman, 1980). Phonemes are not obvious even to native speakers, unless explicit instruction is provided to them (Bowey & Francis, 1991). Despite this, children who become skilful in identifying sound units tend to be more proficient in learning to read (McBride-Chang, 2016). Researchers even concurred that sensitivity to phonemes in spoken words is

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highly associated to early reading success, above and beyond rhyme and syllable awareness (Schreiber, 2008; Gillon, 2004).

A longitudinal study conducted by Muter and Snowling (1998) that tracked rhyme and phoneme awareness skills of 34 children in Britain revealed that rhyme detection at ages four, five and six failed to predict reading accuracy at age nine. However, phoneme deletion tasks at five and six years of age highly predicted reading proficiency at age nine. The results strengthen and confirm previous claims of existing research which suggest that measures in rhyming decrease in prognostic value as learners move up the education system (Muter, Hulme, Snowling & Taylor, 1997). Additional studies on phoneme level awareness indicate its capability to assist in the improvement of rhyme and syllable awareness; whereas the opposite is less probable to occur (Brown, 1998; Yeh, 2003). Such findings provide further reasons for classroom instructions to place greater emphasis in teaching phonological awareness at the phoneme level.

### **Overlapping Continuum**

Even though phonological awareness development seems to follow a continuum, the development of sensitivity to words, syllables, onset-rimes and phonemes overlaps rather than emerges in discrete stages (Anthony et al., 2003). Researchers refer to it as a “quasi-parallel progression,” where mastery at a simpler level is not a pre-requisite for displaying development at a succeeding complex level. This means that children may increase sensitivity in onset-rime, while simultaneously developing awareness of phonemes; although the former may be closer to mastery than the latter (Anthony et al., 2013). Knowing the “quasi-parallel” nature of the development of phonological

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awareness convey that learners should not be restricted in becoming proficient in one ability (e.g. onset-rimes) before embarking in the mastery of another (e.g. phoneme awareness). Those two areas of phonological awareness can be developed at the same time. It further suggests that classroom-based programs need not focus on complete mastery of shallow levels of phonological awareness (i.e. syllable or onset-rime awareness) before focusing on deeper levels of sensitivity such as phonemic awareness. Carson et al. (2013) even mentioned that a particular emphasis on the instruction of phoneme-level skills may be critical and time-efficient rather than focusing on broad skills at all levels of awareness.

### **The Development of Literacy and Phonological Awareness**

The critical role performed by phonological awareness in relation to the development of reading skills sparked interest among many researchers to conduct studies about it, within the framework of the development of literacy. In the context of this doctoral thesis, literacy is characterized as the acquisition of both emergent literacy skills (i.e. knowledge and skills necessary for writing and reading) and conventional literacy skills (i.e. fluent and proficient reading and writing). The development of children's phonological awareness and print knowledge are fundamental to literacy development (Whitehurst & Logan, 1998) and offer underlying principles for the consequent achievement of conventional literacy (Justice et al., 2013).

Badian (2000), Christensen (2000), and Storch and Whitehurst (2000) discovered that children with higher or more refined levels of phonological awareness and print knowledge tend to advance into competent conventional readers and writers,

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compared to those with meagre levels of awareness. In the last ten years, a number of researchers described children's literacy and determined mediating factors that impact its development (i.e. linguistic, cognitive and environmental influences) (Justice, Pence, Bowles & Wiggins, 2006; Storch & Whitehurst, 2002). In the multitude of studies relating to literacy development among children, a particular set of variables representing phonological awareness has emerged with regard to its robustness in predicting reading success (Hogan, Catts & Little, 2005; Torgesen, Wagner & Rashotte, 1994). Sensitivity to the sound structure of the oral language allows children to decipher printed text, identify words in print, and spell words accurately (Gillon, 2004).

### **Phonological Awareness and Reading Development**

Three different views can be gleaned from related literature that examines the relationship between learning to read and phonological awareness (Castles & Coltheart, 2004; Elbro & Pallesen, 2002; Hatcher et al., 2006; Lukatela, Carello, Shankweiler & Liberman, 1995; Muter, Hulme, Snowling & Stevenson, 2004; Troia, 1999; Wagner, Torgesen & Rashotte, 1994). The first is that the degree of a child's phonological awareness ability impacts reading development. Available information that support this claim were from longitudinal studies that demonstrate high correlations between phonological awareness and later reading development, as well as research on phonological awareness training leading to significant impact on the growth of reading ability (Bradley & Bryant, 1985; Hatcher et al., 2006; Wagner et al., 1994).

Another perspective suggests that phonological awareness ability improves due to learning to read. Evidence reinforcing this outlook came from investigations

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displaying that illiterate adults or even individuals reading non-alphabetic scripts have minimal or no existing awareness involving the sound structure of spoken words (Morais, 1991). The last perspective proposes that a bidirectional relationship exists between phonological awareness and learning to read. The view asserts that initial phonological awareness skills promote the development of early word identification, which then fosters the learning of more intricate phonological awareness knowledge (Burgess & Lonigan, 1998; Castles, & Coltheart, 2004; Cataldo & Ellis, 1988; Perfetti, Beck, Bell & Hughes, 1987; Stuart & Coltheart, 1988). Apparently, each view features the significance of phonological awareness in learning to read, and the relevance of integrating phonological awareness in the early reading program.

Again, phonological awareness skill at the phoneme level (i.e. phoneme awareness or phonemic awareness) is pivotal for the enhancement of proficient word recognition ability. Al Otaiba et al. (2012) discussed that phoneme awareness is indispensable in offering children a means to comprehend that sounds in spoken words can be symbolized in text using alphabetic letters. In addition, phonemic awareness is crucial in strengthening children's ability to identify sound-letter correspondence, which integrates the growth of phonological representations that assist word-recognition fluency. Ultimately, phonemic awareness assists children in deciphering partially irregular words by simply sounding out the regular sound-symbol units within the word and inferring conceivable word meanings.

The research on phonological awareness mentioned above offers a rationale for educators, researchers, school administrators and policy makers to warrant its

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incorporation within the school curriculum, as it is a vital component of classroom evaluation and teaching practice at the initial stages of reading development.

### **Measuring Phonological Awareness**

There is a significant number of available standardized assessments aimed at evaluating phonological awareness ability of children in the classroom. Some have already been used to screen and monitor phonological awareness development, while others are utilized to supply diagnostic information regarding participant's phonological deficiency and/or reading disability.

In the article published by Sodoro, Allinder and Rankin-Erickson in 2002, the researchers enumerated the commonly utilized measures in assessing phonological awareness. These were: (1) the Lindamood Auditory Conceptualization Test, Revised Edition (LAC; Lindamood & Lindamood, 1979); (2) the Test of Phonological Awareness (TOPA; Torgesen & Bryant, 1994); (3) the Yopp-Singer Test of Phoneme Segmentation (Yopp, 1995); (4) the Phonological Awareness Profile (Robertson & Salter, 1995); and (5) the Comprehensive Test of Phonological Processing (CTOPP, Wagner, Torgesen & Rashotte, 1999).

Other forms of phonological awareness assessments that were cited in the literature include: (1) the Preschool and Primary Inventory of Phonological Awareness (PIPA; Dodd, Crosbie, MacIntosh, Teitzel, & Ozanne, 2000); (2) the Phonological Awareness Literacy Screening-Kindergarten (PALS-K; Invernizzi, Juel, Meier, & Swank, 2005); and the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2005).

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With proper training, teachers can independently administer measures that adequately support screening decisions, distinguish at-risk learners, identify target areas of improvement, and guide the provision of available levels of support for stakeholders.

### **Phonological Awareness, Phoneme Awareness and Phonics**

From a point of view of regular teaching, the concepts phonemic awareness or phonological awareness are often misconstrued to be simply another namesake of phonics; though these three are different and distinct terms that are not one and the same. However, all three have some association to sounds existing within words. Phonics simply refers to the instruction of sound-letter equivalents which is helpful for reading and spelling. In teaching phonics, an educator would highlight “D is for dog; E is for elephant” or mention letter ‘M’ and says “/m/ in his/her phonic activities. Meanwhile, phonological awareness tasks requires learners to consciously recognize the smaller sound units that constitute a word (Justice et al., 2013). Phonological awareness activities help students understand that the word dog has one syllable; the word dog has ‘d’ as an onset and ‘-og’ s the rime; the word dog has three phonemes; or that the words dog and log are rhyming words. These activities vary greatly for a simple sound-symbol correspondence for the phoneme [d].

In actual teaching practice, phonics is often taught as a skill and drill exercise using worksheets and workbook activities. Phonics has always been instructed separately from phoneme-level awareness with minimal emphasis given to expanding children’s awareness of the sound structure within words. Like phonics, phoneme awareness may

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be taught in isolation. In raising children's phoneme-level awareness, children can be taught to separate words into individual phonemes. For instance, a child is asked to segment the word *sand* into its component phonemes which result to four phonemes [s], [æ], [n], and [d]. Another task that aid the development of phonemic awareness is to blend a sequence of individual sounds and build it to form a larger linguistic unit. Still, studies have shown that the integration of phonics and phoneme awareness lead to excellent reading outcomes (Hatcher, Hulme & Ellis, 1994). This resulted to phonological awareness treatment approaches incorporating various phonic learning tasks in their intervention programs (Gillon, 2018).

### **Classroom-based Phonological Awareness Intervention**

At the beginning of formal schooling, much of the time in the classroom is allocated in fostering literacy-based skills (Johnston & Watson, 2005; Rose, 2006). Initial instruction in developing reading proficiency targets vital competencies that are fundamental to subsequent learning.

Researchers recognized that enhancing phonological awareness is a crucial area that holds greater promise in developing positive reading outcomes to learners (Carroll & Snowling, 2004; Catts et al., 2001; Ehri et al., 2001; Lonigan et al., 2008). Research studies on phonological skills were greatly influenced by the first ever large-scale research investigation conducted in Sweden by researchers Lundberg, Olofsson and Wall in 1980. This study provided strong evidence that children's deficiency in linguistic tasks, particularly phonemic analysis, were predictive of reading failure (Goswami & Bryant, 2016).

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In order to enhance the success of implementing a phonological awareness intervention inside the classroom, several considerations are needed to be taken into account. Detailed reports, based on earlier studies, highlight time efficiency as critical to ensure programs easily consolidate with class schedules and children possess adequate skills to benefit from reading instruction (Carson et al., 2013, McIntosh et al., 2007, Tyler et al., 2014). Elbaum et al., (1999) and Gillon (2004) confirmed that frequent and intensive sessions are vital aspects of effective phonological awareness training. High intensity sessions (i.e. intensive sessions) are those sessions that are conducted twice a week, with explicit instruction lasting for a minimum of 60 minutes per session. Such intervention focusing on phoneme-level skills accumulating 20 hours of teaching time in a span of ten weeks has been established to advance reading achievement of struggling learners in one-on-one and small group therapy contexts (Gillon, 2000, 2005; Gillon & McNeill, 2009). Exploring the impact of length, frequency and intensity of phonological awareness training in classrooms to reduce the inequality in reading outcomes also imparts invaluable information regarding the amount of time required by educators to allocate for phonological awareness training.

Carson et al. (2013) cited content of phonological awareness instruction as another criterion to be considered in the implementation of classroom-based phonological training program. She added that a narrow approach to content instruction (i.e. teaching children to develop awareness of phonological units at the phoneme level) would result in better outcomes in reading achievement; in contrast to a broad approach

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aiming to develop a wide range of phonological awareness skills such as syllable, onset-rimes, rhyme and phonemes.

Results from previous research demonstrated that effective implementation of phonological awareness instruction within classrooms can likewise lead to a significant effect on the reduction of reading difficulty incidence via highly-intensive and long-term classroom training that highlight phonological awareness at the level of phonemes (Shapiro & Solity, 2008). The authors Shapiro and Solity (2008) conducted a longitudinal study that examined the 251 Year 1 British students' reading outcomes after receiving intensive phonological awareness instruction in phoneme blending, phoneme segmentation and high-frequency phonics training. The strategy influenced reading performance of both typically-developing students and those with weak phonological awareness skills contributing to reducing the prevalence of reading deficits which was 20 percent among typically-developing children enrolled in the regular teaching program and five percent among weak learners receiving training in phonemic awareness after being evaluated at Year 3.

Another classroom-based research, this time made by Fuchs et al. (2001), contrasted the effectiveness of a teacher-delivered phonological awareness training with explicit training and without actual instruction in deciphering printed text. The investigation conducted was shorter in duration (i.e. less than one academic year), low in intensity (i.e. children received 15-minute sessions per week; less than the suggested two hours per week), and provided a broad phonological awareness focus. Three testing conditions were designed: (1) phonological instruction that targeted syllable,

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rhyme and decoding; (2) phonological awareness only; and (3) regular classroom instruction without phonological training at all. A total of 404 five-year old children participated in the study. Results indicated that children who underwent phonological awareness and word decoding training performed better than those learners who were taught phonological awareness skills only and those without actual intervention; on tasks involving reading and spelling immediately after instruction. However, five months post intervention, children who had phonological awareness and word decoding training no longer displayed a statistically relevant advantage in reading and spelling proficiency over the other groups. The study showed that instruction of a broad range of phonological awareness skills with very low intensity (i.e. 45 minutes every week) implemented over a short duration of time is less impactful in attaining continuous reading outcomes in the long run.

Justice et al. (2010) tested whether short duration, low intensity approaches that target a broad range of phonological awareness skills would help improve reading skills of children susceptible to developing reading deficiencies. The researchers included particular emphasis on teaching phonological awareness at the phoneme level among 66 children whose age range from three years and three months and five years and six months. The reading program termed as 'Read It Again' (RIA) was administered twice a week for thirty weeks, with each classroom lesson covering phonological awareness, print, vocabulary and narrative ability lasting for 20 to 30 minutes. Based on the results, the children under the RIA program demonstrated significantly higher reading performance than the comparison group on measures of literacy; directly evaluated

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following instruction. Additional findings revealed that learners with weak language abilities did not improve on phonemic awareness and alphabet knowledge in as much extent as children possessing average to high language skills.

Benefits resulting from a short duration, highly-intensive and broad phonological awareness program were explored by researchers McIntosh, Crosbie, Holm, Dodd and Thomas in 2007. The study observed the reading performance of 97 pre-schoolers coming from low socio-economic backgrounds. The said learners were given daily phonological awareness training that focused on syllable segmentation, initial sound recognition, rhyme identification and rhyme generation. Despite the relevant gains identified in phonological awareness knowledge after instruction, a succeeding inquiry made by researchers O' Connor, Arnott, McIntosh and Dodd (2009) revealed that the observed improvement in phonological awareness in preschool failed to support gains in the development of literacy in the early years of primary school. However, a post-hoc evaluation of individual students showed that a sub-group of participants, who were administered with phonological awareness and language intervention, managed to maintain their enhanced performance and that the same group of individuals attained similar scores on the phonological awareness tests to their aged-matched peers in the study.

A similar ten-week, highly intensive phonological awareness program was designed by Carson, Gillon and Boustead in 2013. However, the study specifically targeted the improvement of phonological awareness skills of students at the phoneme level. The experiment later demonstrated that the students who were given phonological

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awareness training showed higher literacy outcomes in comparison to children who received the 'usual' regular literacy curriculum.

The findings gleaned from the aforementioned studies suggest that classroom interventions conducted over a short ten-week period result to a significant effect in improving the reading performance of children experiencing language difficulties. Accordingly, exploring whether positive influence in reading could be achieved by integrating phonological awareness instruction with another aspect of metalinguistic awareness may support time-efficient identification of reading deficits, impact development of literacy and bridge existing inequalities between good and poor readers.

### **Metalinguistic Awareness**

The ability to reflect upon and manipulate language beyond its functional sense is essential in reading. Indeed, it was found that an association between a child's awareness of language and progress in reading exists (Mattingly, 1972; National Institute of Child Health and Human Development, 2000). This knowledge to consciously regulate and monitor language is referred to as metalinguistic awareness. Aspects of metalinguistic awareness that impact reading and writing outcomes include syntactic awareness, semantic awareness, pragmatic awareness, phonological awareness and morphological awareness. Of all the aspects comprising metalinguistic knowledge, phonological awareness has garnered increased attention with regard to written language acquisition (Gillon, 2018). However, other areas of metalinguistic awareness are also crucial in advancing word recognition processes. One of the relevant metalinguistic skills that helps children recognize the base form of a word, such

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as differentiating the word *jump* from *jumped*; which can likewise be an indispensable tool in reading and spelling complex words is morphological awareness (Apel & Thomas-Tate, 2009; Carlisle, 1995; Masterson & Apel, 2000).

Previous investigations had indicated that morphological awareness can account for unique variance in performance outcomes related to reading and spelling; and that treatment approaches that incorporate morphological awareness display promising results in fostering word reading and spelling (Apel, Diehm, & Apel, 2013; Carlisle, McBride-Chang, Nagy & Nunes, 2010; Good, Lance, & Rainey, 2015; Goodwin & Ahn, 2013; Kirk & Gillon, 2009; McCutchen & Stull, 2015; Wolter & Green, 2013). Thus, the following discussion outlines the importance of developing morphological awareness in relation to word recognition processes that foster reading comprehension.

### **Morphological Awareness**

Previous researchers described that learning to read is metalinguistic in nature (Mattingly, 1984; Nagy & Anderson, 1999). This means that in order to advance in one's reading skills, it is critical to be able to extract language from meaningful contexts and to contemplate on its structural features.

With regard to determining whether significant connections exist between facets of metalinguistic awareness and reading acquisition, much interest has been given to phonological awareness (Goswami, 2000), as it is influential in establishing phoneme-grapheme correspondences in learning alphabetic script (Bradley & Bryant, 1983; Wang, Yang & Cheng, 2009) and in providing information to parse syllables into onsets and rimes when learning logographic character recognition in a language such as

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Chinese (Ho & Bryant, 1997; Ho, Law & Ng, 2000; Li, Anderson, Nagy & Zhang, 2002; McBride-Chang & Ho, 2000; Pan et al., 2011; Shu, Peng & McBride-Chang, 2008; Zhang et al., 2013). Still, reading entails more than just the conversion of orthographic scripts into its equivalent phonological forms. Comprehension of underlying meaning within words can only be attained once the converted phonological forms become mapped onto semantic information. The smallest phonological component that possesses semantic information is referred to as a morpheme. For instance, the word *reformed* can be segmented into three morphemes – ‘re-,’ ‘form,’ and ‘-ed.’

If phonological awareness requires being conscious of how individual sounds make up words and is measured by one’s ability to merge sounds together or divide words into its component sounds (Anthony & Francis, 2005), morphological awareness is the recognition, understanding and analysis that word parts carry small meaningful units that develop good literacy (Carlisle, 2010).

Focus was given by researchers toward morphological knowledge and its effect on literacy, as it promotes a lighter cognitive load for learners by reducing the number of so-called “units” in language that they need to process (Cunningham & Carroll, 2012). One example is the *-ful* in the word *careful*, which can be read as either one morpheme or three distinct phonemes. In addition, morphological awareness assists in helping students grasp correct pronunciation, most particularly with words that veer away from the alphabetic principle in order to retain spelling of morphemes (e.g. *devotion* is read as *devo-shun and not devot-ion*).

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Several investigations reveal that morphological awareness contributes variance to word reading beyond phonological awareness (Berninger, Abbott, Nagy & Carlisle, 2010; Nagy et al., 2006; Wotler, Wood & D'Zatko, 2009). In addition, morphological awareness assists in helping children comprehend better syntactic structure surrounding sentences (e.g. that "John cooked his food" refers to a past event, with the action highlighted as "to cook").

A role played by morphological awareness in connection to reading comprehension rests on the utilization of morphological information when processing complex words (Clahsen, Sonnenstuhl, & Blevins, 2003; Harley, 2001; Nagy et al., 1989; Napp, 1989; Perfetti & Stafura, 2014). An example would be the frequency of root and affixes affecting the processing of words in alphabetic languages categorized as morphologically complex (i.e. words that consist of two or more morphemes such as the word *out-land-ish-ness*). Research studies that gleaned similar results were from investigations supporting a morpheme-based cognitive lexicon such as that surrounding the acquisition of Chinese logographic language (Zhou & Marslen-Wilson, 1994, 1995). The studies pointed out that the greater number of roots and affixes learners become familiar with, the more advantage they have on reading, writing and vocabulary knowledge (Reed, 2008; Templeton et al., 2015). Banking on the concept that the mental lexicon is arranged morphologically suggests that knowledge in morphology may act as a system to methodically store words (Casalis & Louis-Alexandre, 2000; Sandra, 1994). Hence, learners, especially children, with advanced morphological knowledge may benefit largely in gaining, expanding and accommodating morphologically complex

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vocabulary. Accelerated development of intricate morphological vocabulary is vital because such type of vocabulary comprises 60% to 80% of novel words learned by school-aged children (Anglin, 1993; Nagy & Anderson, 1984). Given that immediate recognition of words is a critical indicator of reading outcomes (Anderson & Freebody, 1981), morphological awareness then performs a valuable role in the development of reading proficiency.

Morphological awareness likewise proves indispensable in reading, as it paves the way for children to understand that different phonological forms can be utilized to represent the same morpheme; like in the case of words *hopped* [t], *robbed* [d], and *batted* [-ed]. Such knowledge would permit readers to read morphologically complex words precisely and efficiently.

Since word recognition is a significant aspect of reading (Adams, 1990), the more rapidly an individual recognizes the words, the more fluent he / she becomes as a reader (Yucel-Koc, 2015). Morphological awareness studies that focus on investigating the development of reading among young readers often concentrate on word recognition. As mentioned earlier, deriving meaning in words that facilitate successful comprehension of printed text relies on a learner's ability to discern the most basic meaningful components within a language (i.e. morphemes).

### **General Aspects of Morphemes**

Morphemes are regarded as 'building blocks of language' because each distinct morpheme carries syntactic and semantic information embedded in words (Carlisle, 2000). The ability to merge and segment units of meaning allows children to

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comprehend words in varieties of form. In discussing units of meaning, it is important to understand that a given morpheme can either be free or bound.

Free morphemes are words that do not rely on other forms of morphemes and can basically stand alone. Free morphemes are also known as base word or root that can be utilized on its own. Simply stated, it bears the main unit of meaning. Particular examples of free morphemes are words such as *run*, *kind*, and *place*. Bound morphemes, on the other hand, are usually morphemes that are merged with other existing morphemes (Templeton et al., 2015). Affixes (i.e. prefixes and suffixes) are classified as bound morphemes. Such word units convey meaning and are utilized to alter existing words such as adding 're-' to the word play or '-ness' in the root word kind. Affixes can also be in the form of a Greek root such as 'geo' meaning earth, which is seen in words such as geology or *geothermal*. It can appear as a Latin root such as 'dict' meaning "to speak;" observed in combination with words such as verdict, dictate, and contradict.

### **Three Specific Distinctions of Morphology**

Studies that revolve around children's acquisition and awareness of morphology have centered on three further distinctions of morphology: inflections, derivations and compound words. Inflections and derivations are basically classified as bound morphemes. Inflectional morphemes mark either syntactic or semantic relations among words found in a sentence without changing the meaning or part of speech of the stem. In English, verbs may be marked by inflections for tense (i.e. past or present) For instance, the words *jump* transforming into *jumped*. Inflectional morphemes may also

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mark nouns to indicate gender (i.e. masculine or feminine). An example would be the word *lion* turning into *lioness*. Nouns may be further marked for agreement in terms of number (e.g. one boy to two boys). In comparison, derivations require the inclusion of a morpheme, usually prefixes or suffixes, that eventually alters the part of speech or the meaning of the base; as in the verb *separate* changing into a noun by attaching a suffix ‘-tion’ which results to the word separation. Multi-morphemic words can be formed as a result in combining several derivational morphemes (e.g. The word *miscalculation* created by merging the prefix ‘mis-’ and the suffix ‘-tion’ to the root word *calculate*). Students may likewise benefit from learning Latin and Greek roots, as early as first grade, to comprehend the meaning of many English words such as *microcomputer* or *biology* through problem-solving skills during reading-related activities (Freeman, Townsend & Templeton, 2018). As opposed to inflectional morphemes, derivational morphemes are regarded as less constructive and more limiting with regard to what types of roots they can be merged with. In the English language, the morpheme ‘-able’ can only be combined with verbs but not with nouns to create adjectives. Lastly, compounds are two or more roots combined to form new words (e.g. notebook, seahorse, butterfly). The parts of a compound can include derived words (radio technician) or inflected words (housekeeping).

The concepts of inflections, derivations and compounding are significant in grasping the role of morphological awareness in the acquisition of language and literacy; which relies fundamentally on explicit depiction and control of obtained morphological rules.

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## **Morphological Awareness as a Predictor of Early Literacy Development**

Children who are explicitly aware that printed text is directly associated to meaning at an early age would be expected to map morphemic units directly on to symbols, thereby making connections between oral and printed morphemes easier (McBride-Chang, 2016). Such had been demonstrated by Byrne (1996) in a series of research studies that attempted to differentiate phonological and morphological awareness of children. He concentrated on distinguishing a single morpheme with a single phoneme, symbolized by one letter 's.' In order to evaluate the way children perceive 's' as a letter indicating grammatical number in many English words, he started teaching children to read pairs of words (e.g. bag/bags and book/books) up to a certain level upon which children were able to reach the criterion of six trials; where both words in pair were accurately answered. He, likewise, evaluated different singular - plural pairs such as those that need phonemic but not morphemic sensitivity (e.g. bug/bus). He then discovered that children perceived 's' as marking plurals because children achieved scores beyond chance levels in distinguished singular and plural versions of words; while children performed at chance levels only for word pairs based on phonemic contrasts. He argued that children seem to be more sensitive to the idea that script is associated to meaning rather than sound in the early literacy development of native English speakers.

Casalis and Louis-Alexandre's (2000) research shared the relevance of morphological awareness in learning how to read, by stating that word knowledge among individuals is often arranged according to morphemes in the mental lexicon. Hence, they concluded that children even at a young age display awareness of both

inflections and derivations. In addition, morphological awareness helps readers to focus on explicit cues evident in words that suggest morphological relations (Gombert, 1992). Explicit attention to cues is vital in reading, as several cues present in daily conversations are unavailable in text. Take for instance the sentence “Please understand that I am unhappy.” Such a sentence may be easier for children to interpret as part of a conversation due to facial cues, tone of voice, body language and emotional cues which are more salient than the words. In contrast, seeing the same words in print compels the reader to concentrate intensely on the words in the sentence. In particular, the reader would need to discriminate the ‘un-’ component which appears phonologically identical in the two words understand and unhappy within the sentence, but morphologically distinct and meaningful in the case of the word unhappy. The fact that readers tend to organize language on the basis of morphology, and that reading forces us to attend more cautiously to morphological knowledge to foster comprehension, validates the significance of morphological awareness in the development of reading skills.

### **Factors Affecting Word Identification**

Word recognition, in relation to the advancement of morphological awareness, is influenced by three aspects: frequency of the base word (Nagy, Andrews, Schommer, Scott, & Stallman, 1989), transparency of the morphemic structure (Goodwin et al., 2011), and the maturation stage of the learners (Carlisle, 2000).

Words with immensely productive bases have greater chances to be recognized because they appear often in printed form (Carlisle & Stone, 2005; Reichle & Perfetti,

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2003). Carlisle and Katz (2006) cited examples of words derived from a high frequency base word such as *intense*. The authors enumerated the following: *intensity, intensifies, intensified, intensifier, intensifiers, intensifying, intensive, intensively, and intensely*.

Such extensive word transformation can be contrasted to a low morpheme productivity.

The word *serene*, for instance, has a very limited word formation *serenely* and *serenity*.

Thus, it can then be said that the word *intense* is highly productive and more likely chanced upon regularly in print by readers compared to *serene* and its relevant word family.

Transparency of word structure further portrays an essential role in learning to read words (Carlisle, 2000). A particular word is classified as phonologically transparent if its pronunciation is not necessarily altered after morpheme inclusion. The word *crazy* is a phonologically transparent word evident in the word *craziness*. On the other hand, a word is phonologically opaque if the pronunciation of the derived word varies remarkably from the root, such as in *steal* and *stealth* (Carlisle & Stone, 2005).

Meanwhile, words are characterized as orthographically transparent when the spelling of the root is retained within the derived word, as evident in the words *peace* and *peaceful*. By distinction, a derived word is regarded as orthographically / morphologically opaque, if the spelling of its root is mostly not retained during its transformation; as observed in the word *old* to *elder*. The terms orthographic transparency and morphological transparency are two different terms referring to the same concept; hence, a morphologically opaque derivative is fundamentally a word that has undergone a notable spelling alteration during derivation. A word can be further

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described as phonologically opaque (e.g. word transformation of *sign* to *signature*), morphologically opaque or it can be both phonologically and morphologically opaque (e.g. word transformation of *five* to *fifth*).

Children's developmental stage also impacts word identification. A study by Berko (1958) which focused on the acquisition of inflectional morphemes, among English-speaking children, as young as four years old, demonstrated that children in preschool have already acquired some awareness of inflectional markers and may regulate its application with newly encountered words. Termed as the classic "Wug" study, Berko showed that children aged four to seven years old possess implicit knowledge of systematic patterns in the English language for marking plural forms of nouns, changing verb tenses, and performing morphological changes to word stems because they could place suitable endings to pseudowords they could never have previously encountered. In one aspect of the experiment, a child was shown a picture of a bird-like creature. The participant was told "This is a wug." Afterwards, another *wug* was presented and the child was then prompted, "Now there are two of them. There are two \_\_\_\_." The child was expected to answer "wugs." Findings from Berko's experiment revealed that inflectional morpheme knowledge develops prior to formal literacy instruction and that it increases considerably from pre-school to first grade in primary school. This outcome was corroborated in succeeding studies that analyzed young children's employment of inflections in natural speech (Berman, 1981; Cazden, 1968, Kuczaj, 1977, 1978; Marcus, Pinker, Ullman & Hollander, 1992).

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## Morphology Awareness Levels

Verifying the results attained by Berko (1958) ten years later, Cazden (1968) conducted a five-year longitudinal investigation that traced the acquisition of inflection among children. She observed participants aged 18 to 28 months and discovered parallel findings to those in Berko's research. Cazden found that plural markings of words are acquired primarily by children. She likewise observed that possessives are then attained afterwards and that knowledge regarding use of present progressive tenses are achieved prior to that of the simple past and present tenses.

Such investigations consistently reveal that the attainment of inflectional morphology follows a certain time course. Initially, children establish a straightforward schema for inflection (Berko, 1958; Cazden, 1968; Anisfeld & Tucker, 1968; Carlisle, 1995; Derwing & Baker, 1977). Then they undergo a period of overgeneralization of rules surrounding irregular words (e.g. *eated* for *ate* or *mouses* for *mice*) (King, 2006; Kuo & Anderson, 2006). Ultimately, the schema becomes more refined and children grasp knowledge of discriminating regular from irregular items (Kuo & Anderson, 2006).

Although learners exposed to alphabetic languages are able to comprehend the functional features of inflectional morphemes in the early grades, they may still encounter difficulties in the production and comprehension of inflectional allomorphs evident in various phonological realizations of the past tense morpheme '-ed' in *raced* [t] and *rated* [d] (Kuo and Anderson, 2006).

Derivational morphology follows a different development trajectory compared to inflectional morphology among English-speaking children. While knowledge in

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inflections usually becomes evident at age four, with the majority of inflectional principles gained in the early years of primary school, the acquisition of derivations starts later and takes a longer developmental course. Grade 1 students usually have basic knowledge of derived forms which is much less than their understanding of base and inflected forms (Anglin, 1993). A more explicit knowledge of structural rules and the meaning of derivations among children usually does not start to develop until the third or fourth year in primary school (Anglin, 1993; Carlisle, 2000; Tyler & Nagy, 1989). This awareness of derivational forms progresses through high school (Mahony, 1994; Nagy, Diakidoy, & Anderson, 1993). What makes derivations more challenging is that they involve underlying aspects of complicated relational, syntactic and distributional knowledge (Tyler & Nagy, 1989).

Relational knowledge pertains to the skill of identifying the stem of morphologically-complex words and perceiving the connection between the stem and the suffix (e.g. the learner understands that the word *teacher* comes from *teach*). Researchers Jones (1991) and Carlisle (2000) explored the impact of phonological neutrality (i.e. the phonological form of the stem is not altered) in obtaining relational knowledge of derivatives. Tyler and Nagy (1989) discovered that if the target word does not appear regularly in text (i.e. low frequency occurring word or its meaning is hard to derive from context), a child needs to employ relational knowledge to identify the stem. The authors added that primary four students have already developed some relational knowledge which increases until Year 8.

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In another study, Mahony et al. (2000) segregated non-neutral items into four classifications: stress shift and vowel change (e.g. government to governmental); vowel change (e.g. wide to width); consonant change (e.g. enunciate to enunciation); silent letter (e.g. bomb to bombardment). In line with the findings of Tyler and Nagy (1989), phonological neutrality does not guarantee higher stem recognition rate. This suggests that phonological neutrality performs a minor role in acquiring understanding of relational features of derivatives.

Another aspect of derivational morphology is understanding syntactic knowledge. This refers to the skill of being able to think and to control the order of words in a sentence (Nagy & Scott, 2000). For instance, in the test item “The trip sounded \_\_\_\_\_.” the learner is expected to fill in the missing word *adventurous* by using syntactic morphological knowledge to guess the most appropriate word needed; though it is not guaranteed that the child produces the word *adventurous* for he/she may not have the understanding that ‘-ous’ transforms a noun into an adjective. In gauging this type of derivational knowledge, children are asked to always evaluate the grammaticality of sentences that have derivatives with suffixes indicating a suitable or unsuitable syntactic category (Nagy et al., 1993; Singson et al., 2000). A sentence completion task is given to test syntactic knowledge. A pattern observed in research is that non-neutral items are more challenging than neutral items (Carlisle, 2000; Fowler & Liberman, 1995; Leong; 1983; Tyler & Nagy, 1989). Although in its infancy stage, awareness of syntactic information in relation to derivatives appears by age 6 (Brown, 1973; Crain & Thorton, 2000; McKee & Snedeker, 1998), improves gradually by mid-

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primary (i.e. fourth grade) and continues to expand in the middle school (i.e. eight grade) (Carlisle, 2000; Nagy et al., 1993; Singson et al., 2000; Tyler & Nagy, 1989).

The third aspect of derivational morphology, which trails behind the development of relational and syntactic morpheme knowledge, is known as distributional knowledge. It is the most challenging aspect because it requires the ability to distinguish linguistic restrictions pertaining to plausible combinations of various stems and suffixes affected by the grammatical category of the base word (Amirjalili & Jabbari, 2018). Kuo and Anderson (2006) provided an example using the morpheme ‘-ly’ which is only attached to adjectives and not to nouns; hence, the word beautifully is acceptable, but beautyly is not. Awareness of ill-formed derivatives become evident beginning in fourth grade to sixth grade in primary, but declines by the time the child reaches eighth grade (Tyler & Nagy, 1989).

With regard to the development of compounds, one of the earliest research on lexical compounding (i.e. creation of compounds) was conducted by Berko in 1958. In an experiment, she asked students to give explanations of words such as blackboard and thanksgiving. She observed limited awareness of compounds among preschool and first grade participants. Still, researchers contested Berko’s study stating that it involved word items that were highly lexicalized (i.e. words stored as single entry) that even adults would have difficulty noticing the words’ internal structure (Kuo & Anderson, 2006; Clark & Berman, 1987). Berko’s inclusion of problematic items may not have truly reflected children’s awareness of compound morphology and underestimated their existing knowledge (Kuo & Anderson, 2006). Almost three decades later, a series of

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studies on children's acquisition of compound morphology were made by Clark and Berman (1987) among Hebrew speaking learners that provided evidence of children's awareness of compounds. The researchers utilized new compounds made up of words recognizable to children. The researchers then discovered that at age four onwards, Hebrew-speaking participants could often recognize the head unit of a compound noun. Even during a challenging compound production task, five-year old children were observed to provide correct responses 75% of the time. Given that children displayed sensitivity and consistency in identification of certain salient features within compounds, evidenced by head compound noun discrimination, one might infer and generalize that English-speaking children would have perceived rules surrounding noun compounding. Meanwhile, Nagy et al. (2003) reported that at-risk grade two readers demonstrated slightly above chance levels in recognizing novel compound nouns and that at-risk fourth graders attained only 72% correct answers. This implies that weak readers grapple with noun compounding rules, particularly in the early and mid-primary school years.

The general trend that comes to light concerning the three types of morphology is that awareness of compound and inflectional morphology advances earlier (i.e. prior to beginning formal literacy instruction) than the acquisition of derivations; which transpires around mid-elementary grades, with attainment of significant inflectional rules generally completed by early elementary grades, compound and derivational morphological understanding continues to expand throughout primary school or even later.

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Equally worth noting is that acquiring morphological knowledge is impacted by the influence of linguistic factors; particularly productivity of word-formation guidelines, semantic transparency of affiliations between the parts of the complex forms, and the extent of phonological change necessary for word generation processes (Kuo & Anderson, 2006).

### **Similarities between Morphological Awareness and Phonological Awareness**

Morphological awareness parallels phonological awareness, as the former can also be measured implicitly or explicitly to evaluate different types of response. Morphological awareness can be further assessed at varying levels of representations, basically drawing on inflectional, derivational or compound knowledge (Carlisle, 1995; Gombert, 1992; Casalis & Louis-Alexandre, 2000).

A specific example of implicit morphological awareness assessment would be to request students to choose among four provided options the most suitable morphological transformation. In a longitudinal study of French children, Casalis and Louis-Alexandre (2000) demonstrated evidence of implicit awareness of morphological knowledge by showing participants an image of the French word *enrouler* (to roll up) from among choices of word such as: *derouler* (to roll up), *rouler* (to roll along), *rouleau* (roller), and the answer to the target item *enrouler*. Since the participating children were not required to produce the correct answer themselves in the activity, much like in speech perception tasks where there is a forced choice (e.g. sing / ring), the assessment was considered implicit.

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On the other hand, a morphological awareness task regarded as explicit involves children displaying awareness of roots in words. Casalis and Louis-Alexandre assessed this among children by having them pronounce two parts of a word by its morpheme (e.g. sinkable, sink and able). The task would entail differentiating between phonological and morphological awareness knowledge for the segmentation by syllable, as it could yield a conflicting answer than segregation by morphemes (e.g. *awful* in *awfulness*). The English word *awful* can be segmented syllabically, but it would compromise the significance of the morpheme *awful* in this specific example.

### **Measuring Morphological Awareness**

Distinguishing the varying skills typically-developing and at-risk readers are capable of employing is the fundamental way to determine the best course of action needed to remediate a reading problem. However, the limited investigations surrounding multi-component linguistic awareness interventions rarely measure the growth of morphological awareness. In a review conducted by Carlisle (2010) that evaluated several morphological awareness intervention studies administered to various learners from kindergarten to grade 12, she discovered only 16 studies that implemented a measure of morphological awareness. Fortunately, since Carlisle's (2010) meta-analysis of morphological awareness interventions, attention has been given to measuring morphological awareness (Apel & Diehm, 2013; Bowers, Kirby & deacon, 2010; Brimo, 2016; Goodwin & Ahn, 2010, 2013; Ramirez, Walton, & Roberts, 2013; Reed, 2008; Tighe, 2015; Wolter & Dilworth, 2013; Zoski & Erickson, 2017). The above investigations measured a range of literacy outcomes such as word recognition,

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word fluency, spelling and reading comprehension. The researchers involved were very critical in directly assessing the changes in specific morphemic analysis abilities acquired by learners. They even checked accompanying literacy outcomes to ascertain whether morphological awareness is a contributor to other reading-related skills. Despite the growing attention afforded to morphological awareness, there is no standardized assessment available that provides exact measurements of morphological awareness threshold levels by chronological age; except one standardized measure that was introduced in 2008 which was called the Test of Language Development Primary fourth edition (TOLD-P4; Newcomer & Hammill, 2008). The assessment contains a normed sample as young as four years old. However, in a feasibility study by Pike (2013), it was reported that the standardized nature of the task prevents an examiner from providing clear instructions that often result to misinterpretation. The author gave a specific example taken from the stimulus item where the examiner says to the child “Yesterday, I found one penny. Today, I found two more \_\_\_\_\_.” In this task, the child is expected to reply using the word *pennies* to indicate understanding of the plural ‘-s’ morpheme; yet, participants often get confused as they do not have any clear understanding that they were supposed to use the same word in the first sentence to complete the idea in the succeeding sentence. Pike (2013) documented that children provided answers that were not only grammatically correct, but also completely logical such as “puppies,” “aliens,” and “dollars.” Still, whether the child used a plural of the word ending in ‘-s’ their response was not considered based on the guidelines outlined in the test user’s manual. Hence, a range of morphological awareness measures seem

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to be limited for children and tasks appropriate for such population are necessary to be developed.

Over the years, attempts to create research designs and a variety of tasks were made to evaluate morphological awareness in various student participants; from four-year old children (Tyler, Lewis, Haskill & Tolber, 2002; Apel & Diehm, 2013) to adults (Leiken & Hagit, 2006; Tighe, 2015) that helped outline the types of morphological awareness in developmental stages as utilized by typically-developing readers.

Investigations concerning the various morphological forms utilized by students with differing reading deficits were likewise incorporated in existing measurement studies (Gilbert et al., 2013; Kearns, 2015; Leong, 1989). These were explored together with intervention approaches that comprise morphemic analysis (Arnbak & Elbro, 2000; Baumann et al., 2002; Berninger et al., 2003).

An analysis of varying morphological awareness assessments may bring us closer to adequately comprehend how morphological awareness develops; in order to make logical comparisons of student performance leading to informed educational instruction.

Previous researchers such as Apel et al. (2013) and Carlisle (2010) examined and evaluated the nature and the variegated types of morphological awareness tasks. Carlisle's (2010) research classified morphemic analysis interventions based on intended target outcome, apart from raising morphological awareness. She discovered that morphemic analysis interventions may be designed to assist phonological and

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orthographic awareness, even develop word learning. The efficacy of a morphological awareness intervention can be determined on how adequately it measures the morphemic analysis skills taught (Carlisle, 2010).

There are different morphological awareness tasks utilized by researchers in assessing learners: analogy tasks, identification tasks, production tasks and judgment tasks.

### ***Analogy Tasks***

The analogy tasks require students to create a word, either in derived or inflected form, based on the regularities in form of the existing ones. The items included in the measurement may vary in phonological and/or morphological opacity depending on the level of difficulty required. In addition, these tasks can take the form of either word tasks (see Kirby et al., 2012) or sentence tasks (see Deacon & Kirby, 2004).

An example of a word analogy task would be asking a child to guess the correct word that fills in the blank space. For instance “mortal:mortality::mature: \_\_\_\_\_”

On the other hand, a sentence analogy task would appear like “Today I play at school. Yesterday, I \_\_\_\_\_ at school.” Another example would be “Today I work at home. Yesterday I \_\_\_\_\_ at home.”

The most prominent analogy task was performed by Berko (1958) in her Wug’s test discussed in the preceding section. Apel et al. (2013) commented that sentence analogy tasks gauge only inflectional morphological awareness; otherwise, they begin to emerge as a production task. A longitudinal study conducted by Kirby et al. (2011)

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which assessed the morphological awareness of typically-developing grades 1, 2 and 3 students showed that word analogy task uniquely predicted reading comprehension beyond word recognition.

### ***Judgment Tasks***

The judgment task demands that a student determine whether two given words in the sentence are correctly utilized or whether the said words are related semantically. There are judgment tasks that simply require a child to provide yes or no responses, based on questions testing their morphological awareness (e.g. “Does moth come from mother?”) (Berninger et al., 2010; Ku & Anderson, 2003; Nagy et al., 2006). Another variation of the judgment task is in the form of a multiple choice type of assessment. An example would be the test item “*light, lighter, lightly, lit*. Will you turn on the \_\_\_\_\_?” (Apel et al., 2013).

Singson, Mahony and Mann (2000) suggested converting the multiple choice task into a grammatical judgment task. The researchers argued that doing so would lower the demand on short-term memory, when performing metalinguistic tasks orally. They recommended that instead of saying to children during the test “She is not very \_\_\_\_\_. A. activation B. activity C. active D. activate Which one is correct?”, it was best to simplify it by stating “She is not very activity. Does this sound right?”

These tasks mentioned above may be presented orally, in written form or a combination of both. The word items may be inflectional and/or derivational. Not only can it be presented as inflectional and/or derivational, but it can also be phonologically

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and/or morphologically opaque (Apel et al., 2013). Out of the other types of morphological awareness tasks, judgment tasks have the most number of variations.

### ***Identification Tasks***

Identification tasks were developed based on the research of Singson, Mahony and Mann (2000). This type of morphological awareness task demands test takers to choose a pseudoword with the most suitable derivational suffix needed to complete a sentence. It is expected that learners would depend on their understanding of correct derivational suffix use that results in correct pseudoword selection that is appropriate to complete the sentence in a grammatically accurate sense (e.g. “I could feel the *froodness*.”). Singson et al.’s (2000) study revealed that the identification task and word attack were moderately correlated ( $r = .57, p < .001$ ), although the identification task was not contrasted with a measure assessing reading comprehension.

### ***Production Tasks***

Morphological tasks relating to production often employ a cloze procedure to gauge student’s ability to derive a word such as in the example, “*sleep*. Yesterday, I \_\_\_\_\_.” (Wolter et al., 2009; Casalis, Cole & Soppo, 2004). Students are likewise expected to break down a multi-morphemic word for instance, “*teacher*. Miss Smith likes to \_\_\_\_\_.” (Berninger et al., 2010).

In a separate study, Wolter et al. (2009) required students to spell different words to confirm their awareness of spelling suffixes. Meanwhile, Kirk & Gillon (2009) employed an activity called ‘prompted spelling’ to encourage learners to spell words that are morphologically complex such as *mopping* and monomorphemic words like *trick*.

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There were also researchers who evaluated student's morphological production ability by asking them to read words aloud (Carlisle, 2000; Jeon, 2011); and some required students to provide definitions of real words and even multi-morphemic pseudowords (Tsesmeli & Seymour, 2006).

Another production task called Extract the Base, introduced by Goodwin et al. (2012), examined students ability to analyse and segment multi-morphemic words of differing phonological and morphological opacity. In the said assessment, each item is presented orally and visually to L1 and L2 participants (e.g. *height*. That box is too \_\_\_\_). Goodwin et al.'s (2012) Extract the Base assessment was actually a modification of an earlier production task developed by Carlisle in 1988, referred to as Base Forms Test.

In this regard, it is evident that current researchers modify and refine previously designed tasks; in order to create a more valid and reliable form of assessment tool, capable of explaining the nature of a particular phenomenon.

### **Morphological Awareness Intervention**

Without any form of intervention, language weak learners with low language and literacy skills who enter the early grades tend to lag behind their typically-developing peers all throughout their academic life (Snow, Burns, & Griffin, 1998). However, highly intensive interventions that concentrate on linguistic features may promote growth and bridge the gap (Justice, 2006). Even kindergarteners who get a highly-concentrated form of intervention, on top of excellent classroom instruction, respond positively in less

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than a year and were documented to maintain grade-level literacy competency across the elementary grades (Coyne, Kame'enui, Simmons & Harn, 2004).

Thus, increased importance has been allocated to studies focusing on the significance of morphological awareness intervention that are given to young school-aged learners at-risk for subsequent reading difficulties (Apel & Diehm, 2013; Ramirez, Walton & Roberts, 2013; Wolter & Dilworth, 2014). Morphological awareness intervention was reported to also improve gains in phonological awareness, word reading, spelling and reading comprehension for at-risk and weak readers including English language learners (ELLs), across different grade levels (Bowers, Kirby, & deacon, 2010; Carlisle, 2010; Goodwin & Ahn, 2010, 2013; Reed, 2008). In fact, Goodwin and Ahn's (2013) meta-analysis of morphological awareness intervention research detected a small overall effect size ( $d = .32$ ), with some moderate effect sizes for variables such as phonological awareness, morphological awareness and decoding. The interventions attaining large gains were those that on average provided a total of twenty hours.

The findings of previous studies suggest that administering a morphological intervention approach, by itself or as a component of a comprehensive treatment program, can improve literacy skills of children at risk of developing reading difficulties.

Additional evidence that demonstrated the positive reading outcomes gained by children from a morphological awareness intervention was provided by Apel et al. (2013) in a feasibility study involving kindergarteners, first graders and second graders from low socio-economic (SES) backgrounds. In the research, the participating students

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were given small group discussions four times a week with 25 minutes of teaching per day. For the kindergarteners, the intervention focused on deriving meaning only; while for first and second graders, the instruction centered on both meaning and print. The results of the investigations indicated that morphological awareness intervention starting in kindergarten can lead to large increase in gain scores concerning morphological awareness and moderate gain scores in other reading-related outcomes.

Continuing their research on morphological awareness intervention, Apel & Diehm (2013) in a separate study, focused on assessing spoken and printed words with inflectional and derivational affixes. The research again observed low SES students in Kindergarten, grade 1 and grade 2 primary school. The researchers randomly assigned the participants to a control and an intervention group. The students in the intervention group were administered with morphological awareness instruction, four times a week with 25 minutes per session for eight consecutive weeks. On the other hand, the control group received regular classroom instruction. The results indicated that significant gains for all students in the intervention group were attained; with the kindergarten group displaying the largest effect gains. Specifically, kindergarteners characterized with low-level ability showed significantly larger gains in sight word reading than learners with average skills. Such findings offer evidence that learners at-risk of developing reading deficiencies may gain most from a morphological intervention beginning in kindergarten.

Further evidence on the effectiveness of adopting a morphological awareness in the classroom was provided by Ramirez et al. (2013). In their research, teachers were given training to improve vocabulary and morphological awareness of kindergarten

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students coming from low SES families. The classroom teachers were given resource kits that contain ten picture books with high-utility vocabulary words to be targeted in the discussions (Beck, McKeown, & Kucan, 2002). Explicit teaching of vocabulary and morphological awareness were given 30 minutes daily totalling 24 sessions. Overall, learners achieved significant improvements in morphological awareness (partial  $\eta^2 = .61$ ) and vocabulary (partial  $\eta^2 = .53$ ). Closer inspection of student performance indicated that kindergarteners who garnered the lowest scores in morphological awareness and expressive vocabulary skills assessment at pre-test showed the greatest gains.

The consolidated findings from the above studies offer promising evidence on the effectiveness of morphological awareness intervention for at-risk children in the lower primary grades, specifically learners with low morphological awareness and vocabulary abilities.

### **Morphological Awareness and Reading Difficulties**

Although it has been discovered that morphological awareness leads to an important variance on word-level reading beyond phonological awareness in students from grade 2 in primary school to grade 8 in middle school (Apel, Wilson-Fowler, Brimo & Perrin, 2012; Deacon & Kirby, 2004; Roman, Kirby, Parrila, Wade-Wolley & Deacon, 2009), relatively few research studies have explored the impact of a morphological awareness intervention to children presented with reading difficulties. Elbro (1990) was among the growing number of researchers who provided evidence that children with reading deficits possess lower morphological awareness skills than reading level and aged-matched peers. Even with explicit instruction proven to be effective for learners

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struggling with reading deficiencies (Good, Lance & Rainey, 2014; Koutsoftas, Harmon, & Gray, 2009), regular classroom teaching has yet to incorporate a detailed form of instruction that centers on the manipulation of the word's morphemic structures (Henry, 1993; Nunes & Bryant, 2006).

Lyon, Shaywitz and Shaywitz (2003) characterized students with reading deficiencies as those whose reading performance scores on standardized tests are one standard deviation below the average range on measures relating to reading comprehension and/or word-level reading evaluation. In addition, they show lower performance than typically-developing readers on tests measuring oral inflection and derivational morphological awareness tasks.

Carlisle (1987) observed that students with reading problems display more noticeable shortcomings in written morphological awareness tasks; while Shankweiler et al. (1995) reported evidence of poorer production of directives in comparison with chronologically age-matched peers. The findings revealed by the preceding evidence-based studies that children are experiencing difficulty in reading, may benefit immensely from a combination of spoken and written language input; aimed at fostering morphological awareness skills. It can be further said that students experiencing reading deficits, may develop atypical morphological awareness abilities that are detrimental to their academic success compared to normally-developing reading-matched peers, if they are left to their own devices.

It is worth noting that even students with dyslexia can capitalize on morphological awareness support, as it was found that they read faster and more accurately when

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texts are presented to them morpheme-by-morpheme, as opposed to syllable-by-syllable (Elbro & Arnbak, 1996). Research by Law, Wouters & Ghesquiere (2015) supported such findings by reporting that strong morphological awareness skills result in compensation in reading for adults with dyslexia. Many researchers attested that morphological awareness improves reading comprehension of students diagnosed with learning disabilities (Carlisle, 2007; Katz & Carlisle, 2009; Lovett et al., 2000). Children with special literacy needs were likewise observed to benefit more from morphological training compared with their normal reading peers (Bowers et al., 2010; Nagy, Carlisle & Goodwin, 2014). A meta-analysis on 17 morphological awareness intervention studies revealed that morphological instruction was specifically effective for children observed to possess reading, learning, speech and language disabilities (Goodwin & Ahn, 2010). These findings offer optimism for children demonstrating language disorders such as those demonstrating language learning weaknesses.

### **Morphological Awareness and Other Cultures**

The significance of morphological awareness and its relevance to reading cuts across cultures because of the productivity of morphological systems. Bauer (2001) defined productivity as the ability to perform morphological coining; which fundamentally means creation of new words using morphemes. Knowledge of morphemes and how they can be shifted to obtain or perceive words represent the core of morphological productivity. Simply stated, it is crucial that users of a language acquire understanding about its morphemes, the different possibilities of morpheme combinations or even delimitations of its use. Whether such cognizance is implicit or explicit may be beneficial

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for both beginning and advanced learners in their reading and writing development (McBride-Chang, 2016).

In alphabetic languages, much of the work related to morphological awareness centers on unlocking the intricacies of morphemes in relation to grammar, prefixes or suffixes. One of the earliest accomplishments in morphological awareness in the English language revolves around verb tense usage. Learners must perceive the rule that verb changes reflect meaning changes which may be inconsistent (e.g. *go* to *goes*; *jump* to *jumped* and *catch* to *caught*).

English language learners must also become aware of the rules governing pluralization of nouns (bug to bugs; bus to buses) and the correct usage of affixes (i.e. prefixes and suffixes) that show relationships to words (e.g. *uncut* = *un* + *cut*; *underground* is not *un* + *derground*). In the case of French, marking of the word to indicate masculinity or femininity of nouns requires the employment of inflectional morphemes (e.g. *serveur* - *serveuse*).

Meanwhile, other languages that utilize different inflectional and derivational marks for word reading and writing in their scripts would be Arabic and Hebrew. In both Arabic and Hebrew, children are tested in morphological awareness tasks to point out root words amidst inflected and derived forms presented in front of them (Abu-Rabia, 2007; Ravid & Schiff, 2006). With regard to the Arabic language, marking shown by using inflections to indicate person, number, gender and time appears as either prefixes or suffixes (Abu-Rabia, 2007). The influence of morphology is so predominant that it has been documented that children, as early as grade 1, already use morphological

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processing for spelling (Saiegh-Haddad & Everatt, 2017). Meanwhile, in Hebrew, the concept surrounding inflectional morphology awareness is demonstrated to be grasped earlier by children than derivational morphology; much like in the English language (Levin, Ravid & Rapaport, 2001).

With Chinese, however, a relatively few number of grammatical intricacies relating to word forms exist. For instance, in the sentence the verb remains unchanged and unaffected in form regardless whether the subject is either singular or plural (McBride-Chang, 2016). Despite such features of the language, morphological awareness is still crucial in both speaking and writing in Chinese. One of the reasons is that the language makes use of a lot of homophones. Thus it is imperative, especially for children to associate which particular meaning of a specific homophone or homograph fits within the word or phrase (Packard, 2000; Perfetti & Tan, 1999). Even though many syllables sound the same, their forms vary when written. Children, then, must be able to distinguish meanings for the multitude of syllables that sound similarly for comprehending spoken language and mapping on to new characters in the reading acquisition process (McBride-Chang, 2016).

Another important aspect of morphological awareness in Chinese is that complex vocabulary items can be created from simple morphemes, as the simple morphemes are merged into a compound to build new meaning. Lastly, as opposed to English, McBride-Chang (2016) noted that the Chinese language has a near perfect one-to-one association of syllables and morphemes which proves beneficial for children to concentrate solely on meaning.

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## **The Response to Intervention Model**

In order to address the varying needs of children in terms of phonological awareness and morphological awareness skills, evaluation and treatment approaches must be customized to match the learner's existing skill level and instructional content (Fuchs, Fuchs, & Compton, 2012). The Response to Intervention is one framework that is suitable to target the differing needs by administering a three-tiered system of appraisal and intervention. The aim of the RTI is to avert the possibility of academic failure through implementation of evidenced-based classroom instruction, constant checking and monitoring of learner's progress, and the allocation of intensive levels of assistance for children presented with difficulties (Ehren & Nelson, 2005; Griffiths, Parsons, Burns, Van Der Heyden, & Tilly, 2006).

The RTI framework is intended to support the regular classroom curriculum by executing three levels of assistance based on individual student academic needs (Fuchs & Fuchs, 2006; Greenwood, Kratochwill, & Clements, 2008). Learners are evaluated to identify the present level of performance and treatment services are given to match such performance level in any one of the three existing tiers. Tier 1 which is the first level of support focuses on ensuring that all learners in the classroom receive high-quality, scientifically-based instruction. The first tier is where periodic screening and monitoring is applied to gauge the trajectory of the child's development over time. In so doing, students who are not making adequate progress are recognized. The students identified as non-progressing are provided with Tier 2 assistance. Such support is presented in small group instruction within or outside the classroom for 30 minutes, and conducted two or four times a week lasting for nine consecutive weeks. Constant

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monitoring at Tier 2 provides educators the opportunity to identify which of the students have positively responded or progressed to the additional instruction; in order for them to return to Tier 1 support. For children in Tier 2 who are making limited progress, the Tier 3 level of assistance is then offered. At this particular level, intensive, targeted and customized one-on-one teaching is given for more than 30 minutes during school days ranging from nine to twelve weeks. Complementary progress monitoring is still evident at this level. The highest and most intensive tier (i.e. Tier 3) is often referred to as “special education.” The RTI model is regarded as proactive, as it is designed to identify children at-risk of experiencing continuous academic underachievement (Griffiths et al., 2007; Nelson, 2010).

Research on reading confirmed that if reading deficiencies are left unattended, the difficulties persist throughout a child's academic life, resulting in a negative spiral of underachievement (Bender & Larkin, 2009; Podhajski et al., 2009). It is then important to highlight evidence from previous research suggesting that the provision of multi-levels of interventions, grounded on the RTI framework, appear to reduce reading problems of 75 to 90 percent of learners who were reported to initially grapple with in their reading skills (Bender & Larkin, 2009; Hughes & Dexter, 2008; Torgesen, 2007). The RTI framework has further been shown to tackle the problems of students with reading difficulties and English language learners (Denton et al., 2006; Linan-Thompson, Vaughn, Prater & Cirino, 2006; Lovett et al., 2008; Rinaldi & Samson, 2008; Simmons et al., 2008). Hence, providing children with the necessary supplemental instruction during specific periods helps them to get back on track toward successful

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reading; and eventually onwards continuous academic progress (Denton et al., 2006; Simmons et al., 2008).

Despite being employed primarily in the United States of America, the application of the RTI framework in classrooms worldwide may offer a means to alleviate inequalities in literacy achievement. Researchers Fuchs & Fuchs (2006), Greenwood, Carta, McConnell, Goldstein, & Kaminski (2009) assert that in order for the RTI model to work more effectively, screenings measures must not only be able to identify children requiring intensive level of support, but also monitor advancement over periods of time to improve relevant abilities during intervention. Still, the adoption of RTI must be taken with a grain of salt, as the RTI may simply identify low achieving students rather than students with learning disabilities. The research performed as part of this thesis, therefore, can contribute to improving the implementation of RTI approaches by providing educators with assistance on how to identify children with specific language weaknesses requiring Tier 2 support. A second problem with RTI approaches is that the period of time when success is evaluated can be difficult to determine. The research reported in this doctoral thesis can support educators in determining the appropriate duration and intensity of classroom-based language and literacy interventions needed to elevate student achievement and bridge the gap of disparities encountered during the acquisition of reading skill.

### **Intervention and socio-emotional factors**

Previous research studies provide evidence for the potential of educational interventions in improving not only academic reading-related skills (such as

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phonological awareness, phonological processing speed, reading accuracy and other early reading skills), but also socio-emotional development. For example, a research investigation conducted by Wood (2015) comprising Kindergarten/Grade 1 pupils and their parents in Ontario and Quebec, showed that parents given workshops on strengthening children's early reading and social skills had significant effects on children's academic and social success. The results revealed students' improved scores in initial sound fluency in DIBELS, increased sensitivity in grapheme-phoneme correspondence, produced higher listening comprehension scores and showed marked improvement in displaying positive prosocial behaviour. Similar studies highlighting literacy-based interventions and socio-emotional development have revealed that such programmes can promote academic learning gains and reinforce learners' self-efficacy to engage with other people (Denham, 2006; Shonkoff & Phillips, 2000). Wang, Haertel and Wallberg (1993) confirmed in their research on student achievement that social and emotional influences are one of the top contributors to individual learning. The evidence provided in the aforementioned research studies warrant the need to further promote literacy interventions among children with specific language deficits, for its positive impact becomes two-fold in learners: advancement of early literacy and cultivation of socio-emotional well-being.

### **Quantifying Intervention Effects**

The computation of the effect size may serve as a means to quantify the degree upon which an intervention approach has an impact on the participant's learning. The bigger the effect size, the greater the impact.

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In the field of education, Hattie (2009) evaluated 800 meta-analyses of studies to determine the most influential factors on learning in elementary and high school. This work used the magnitude of effect size to identify gains in performance outcomes. An effect size equivalent to 1.0 was associated with advancing the learner's improvement rate of learning by 50%. An intervention programme producing an effect size of 1.0 would indicate that 95% of average students who received the new instructional approach responded at a higher level compared to 84% of children who did not receive the treatment. According to Hattie (2009), any effect size above 0.40 would suggest that the instruction worked better than expected. Effect sizes equivalent to 0.20 may be judged to be small; those amounting to 0.40 would be deemed to be a medium effect; and those reaching 0.60 constitute large effect sizes. However, Timperley et al. (2007) in their book *Teacher Professional Learning & Development: Best Evidence Synthesis Iteration (BES)*, emphasized that an effect size between 0.20 and 0.40 should not be interpreted as trivial, but rather considered as a small but educationally significant effect. This conclusion was based on an analysis of 97 international studies of teacher professional development that resulted in (these findings are endorsed by the New Zealand Ministry of Education). Hence, attaining effect sizes between 0.20 and 0.40 for the intervention training implemented in this thesis over the 10-week treatment period is evidence for a small but potentially significant effect. In the present research, these effect sizes would be based on the difference between the average score on a measure before versus after an intervention divided by the standard deviation. These can be calculated via the tables provided within the results sections. In addition, effect sizes based on variability explained will be presented as part of the factorial analyses of

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variance conducted since these are better indicators of effect sizes for interaction effects.

### **Bilingualism and English Language Learners**

According to Jordan (2008), an estimated 70% worldwide are multilingual speakers. With the unprecedented rates of human movement brought about by migration and globalization, the number of bilingual speakers worldwide has grown rapidly (Chaber, 2016). Since a bilingual's acquisition of reading covers a myriad of mental, social, cultural and other contextual factors distinct from a monolingual child's learning perspective (Bialystok, 2000; Datta, 2000; Kenner, 2004), the reading models that were derived from monolingual English-speaking learners are now inadequate to fully explain the complexities involved in bilingual children's language and literacy development.

Further complications exist when a bilingual's language and literacy acquisition occur primarily in the second language. McBride-Chang (2016) reported that such situations transpire for children of immigrants around the world, who must constantly thrive amidst academic challenges by adapting to the predominant orthographic scripts used in their respective schools. The author added that this is observed in some parts of sub-Saharan Africa, as post-colonial schools still implement the teaching of lessons in their colonizer's language (i.e. English, French, Spanish or Portuguese). In South Africa as well, even though eleven languages are considered official languages, English still remains the medium of instruction in many schools (Tsui & Tollerson, 2003). This trend is likewise prevalent in Asia, where second-language reading has become widespread

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due to a great number of schools using English as the preferred language of instruction. Datta (2000) concurred that the predominance of English led to second-language reading even in India, where various regional and local home languages are officially recognized. Second-language reading is becoming pervasive, as it is expected in the Middle East, South America and large areas of Asia; particularly in countries in Southeast Asia such as Malaysia, Thailand, Indonesia, Vietnam and the Philippines (McBride-Chang, 2016).

This research then investigates the possible impact of bilingualism on language and reading-related skill development of English language learners. The research explicitly focuses on whether the improvement of reading performance brought about by the introduced treatment approaches is greatly influenced by children's language ability. Furthermore, the research focuses on English language learning in relation to changing contexts and evaluates the impact of treatment intervention on bilingual children with language weaknesses, reading for the first time in a second language.

Since several approaches are linked to particular types of bilingualism, it is critically important to clarify the participants considered in this study. In light of this research, a bilingual person is referred to as an individual who has awareness of two languages and is able to employ either of the two in a communicative context. The bilinguals observed in this study were further categorized into two. In New Zealand, specifically, the investigation focused on simultaneous bilinguals (i.e. children acquire two different languages at the same time due to early exposure from parents speaking respectively in those languages). However, in the Philippines, the research explored

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participants described as sequential bilinguals. Sequential bilingualism takes place when an individual becomes bilingual by initially learning one language and then another (Girbau, 2010). In the case of this investigation, the Filipino children who participated in the research were exposed to the English language first before learning the Filipino language (i.e. Tagalog). This may further mean that although the children are able to communicate in both languages they are exposed to, there is a stronger preference in utilizing the language they perceive they are more comfortable in. This was revealed during the interview when the Filipino participants said they find it more convenient communicating in the English language, as they use it at home more often than Tagalog.

Both simultaneous and sequential bilingual learners in this study are subsumed under the term English language learners (ELLs). An ELL is a bilingual who has developed communicative skills in English, yet is in the process of furthering their skills in the language.

In the New Zealand study, the bilingual school-aged children and these children were learning English as part of school literacy classes, but they also spoke a home language that belongs to any of five languages: Spanish, Samoan, Mandarin Chinese, Korean and Tagalog. Three of the languages can be classified as alphabetic writing system (Spanish, Samoan and Tagalog), one alphasyllabic (Korean) and the other logographic (Mandarin Chinese). Four of the writing systems could be as relatively transparent or shallow compared to the English orthography. A transparent orthography has a simpler mapping of letters onto phonemes. The Samoan, Spanish, Tagalog and

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Korean languages would fit this requirement for being a more transparent orthography compared to English (Hemsley, Holm & Dodd, 2013; Montanari, 2011; Leonet Sieso, Cenoz & Gorter, 2020; Westerveld, 2013). In contrast, Mandarin Chinese can be characterized as deep or more opaque given the level of predictability between pronunciation and the characters representing how to pronounce a written word (Lam & Sheng, 2016). However, the way in which written Mandarin Chinese is opaque differs from the way in which English is less transparent in its relationship between graphemes and phonemes. In Mandarin Chinese, a character represents a whole-word pronunciation, rather than different letters representing mostly part-word sounds in English. Hence, there are clear differences between the written forms of the two languages that these children are acquiring.

Limited research exists on the effectiveness of providing a morphological intervention, implemented either as a stand-alone or incorporated in a multi-linguistic awareness framework, with English language learners possessing language deficits in the lower elementary grades. One of those few investigations was a study made by Filippini et al. (2012) which observed grade one Spanish speaking ELLs from low socio-economic backgrounds. The participants were administered intensive instruction for 15 minutes per day, four times a week for eight weeks in small groups. The instruction focused on the following treatment approaches: (1) phonological awareness with decoding; (2) phonological awareness and decoding merged with vocabulary development through semantics; and (3) phonological awareness and decoding integrated with vocabulary through morphological awareness. Results indicated that no

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significant between group differences were recorded in vocabulary or decoding. However, students receiving treatments 2 and 3 made higher gains than those in treatment 1. Also, ELLs given intervention with additional morphological awareness showed the largest gains in decoding ( $d = 1.01$ ) compared to those administered with semantic intervention ( $d = .65$ ), and those simply given phonological awareness with decoding ( $d = .61$ ).

These results indicate evidence surrounding the effectiveness of morphological awareness intervention in conjunction with phonological awareness and decoding for ELLs; specifically those presenting with language deficiencies.

Indeed, administering an intensive form of intervention targeting morphological awareness skills alone or combined with other linguistic aspects has resulted in performance gains in a variety of language and reading-related outcomes, including phonological awareness, morphological awareness and reading (Bowers et al., 2010; Goodwin & Ahn, 2010, 2013). Such combined intervention proves beneficial to individuals with disabilities, at-risk of later reading problems, and those classified as ELLs (August & Shanahan, 2006; Bowers et al., 2010; Goodwin & Ahn, 2010, 2013). Moreover, results from the investigations indicated that merging morphological awareness with other linguistic awareness areas such as phonological awareness and letter-knowledge may improve literacy gains particularly word recognition, reading comprehension and spelling for children with reading difficulties and ELLs (Filippini et al., 2012; Morris et al., 2012; Wolter & Dilworth, 2013). There is further evidence that a combined linguistic awareness intervention for students with low literacy skills, including

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ELLs, resulted to large gains compared to students reported with already higher skills pre-treatment (Apel & Diehm, 2013; Filippini et al., 2012; Ramirez et al., 2013). The preceding evidence then calls for further research that would determine the effect of those interventions in remediating persistent reading deficits of children with specific language weaknesses in the primary grade.

### **Combined Morphological and Phonological Awareness Interventions**

Given the advantages of developing phonological and morphological awareness knowledge may lead one to prefer the instruction of either the former or the latter. However, a call for combined training in both essential features of the language may prove beneficial to optimize children's language and reading development. One reason is that the English language is morphophonemic in structure. This means representation of words are crafted through a combination of both morphological and phonological principles (Reed, 2008). Hence, understanding the influential roles played by phonological and morphological awareness is deemed necessary.

The following research studies further revealed that morphological awareness and phonological awareness appear to be interrelated. Research on the interface between morphology and phonology were investigated by Cohen-Goldberg et al. in 2013. The authors explored the relationship between the two essential features of language by observing an aphasic individual who displays impairment at the morpho-phonological interface. They concluded that phonological and morphological processes are tightly interrelated, especially in oral language. The researchers observed that morphological

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processes must merge the phonological content of morphemic units to create a phonological representation appropriate for triggering phonological processing.

Further evidence that highlight the effectiveness of a combined language and reading skills intervention was shown in the research conducted by Morris et al. (2012). The authors administered two experimental treatment approaches for Grade 1 and Grade 2 struggling elementary readers. The first experiment involved teaching phonological awareness that included letter-sound and spelling patterns, followed by sound mappings, then word recognition by analogy; using morphological knowledge on prefix and suffix manipulation. Afterwards, a combination of orthographic, syntactic and semantic features of words on top of phonology and morphology was introduced. In the second experimental condition, children learned to 'chunk' specific words using spelling and morphological patterns.

Compared with individuals placed in the control groups, learners in the multi-component treatment approach displayed significantly higher gain scores after a year of follow up that evaluated a variety of reading-related skills such as decoding, spelling, word reading, fluency, and reading comprehension. The results showed no significant differences exist across a range of demographic factors indicating the efficiency of combined treatment approaches for young school-aged children with reading deficits. One of the most recent studies exploring the benefits of a combined intervention was conducted by Zoski and Erickson (2017). The researchers investigated ten native Spanish-speaking English language learners (ELLs) and seven native English speakers in kindergarten who were below grade level literacy expectations. The students were

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given a six-week small group intervention program administered four times a week for 30 minutes a day. The participants were segregated into three intervention groups – a phonological awareness (PA) and letter-knowledge (LK) intervention group, a morphological awareness (MA) intervention group, a three-pronged intervention combining PA, LK and MA. Analyses of the results revealed evidence that learners within each group experienced significant gains in word reading, phonological awareness and spelling, but it was the three-pronged intervention that resulted not only in better word reading, spelling, and phonological awareness, but also significant difference in morphological awareness. The study demonstrated further confirmation for the feasibility of combined instructional approaches for at-risk English language learners.

The benefits derived from developing phonological and morphological awareness interventions in fostering improved reading ability are evident. Therefore, training students to build on their existing repertoire of language skills, may result in a deepening of a broad range of meta-linguistic skill set that struggling readers with specific language weakness may employ during a reading task.

### **Significance of the Study**

Efficiently integrating empirical evidence from research studies that support how language and reading-related skills can be improved among all learners into the classroom setting has always been the primary concern of researchers and educators. Since inequalities in academic performance still persist in schools, which may put students at risk or “fall into the cracks,” this doctoral research sought to contribute

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relevant knowledge to pedagogical practices that steer educational outcomes on both micro and macro levels.

On a global scale, this thesis shall evaluate the significance of providing immediate, short-term intervention approaches that target the development of reading comprehension for children with specific language weaknesses. It would likewise contribute additional information to the existing body of knowledge, vital for future theory generation in the field of second language acquisition, linguistics, bilingual reading development, and education. In addition, the findings of this investigation are hoped to steer direction of educational policy-making concerning issues pertaining to children presenting with language difficulties.

Meanwhile, on a national level, this research may offer a new lens in viewing current reading literacy standards; and improve such, if needed, to further academic achievement and reading experiences of school-aged children.

Specifically for New Zealand, where a large disparity between good and poor readers exist based on the Progress in International Reading Literacy Study in 2016, this research endeavors to provide an alternative and responsive form of instruction that aims to curtail underachievement, and to address specific learning needs of its ethnically-diverse students.

With regard to the Philippine educational context, this investigation may shed light on how educational practices may be enhanced; especially since emphasis in instruction throughout the country is still on rote learning. The intervention approaches suggested

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in this thesis shall allow struggling bilingual students the opportunity to manipulate understanding of concepts; which may prove vital in imparting knowledge to children with specific language weaknesses.

Ultimately, this research presents new possibilities for teaching children with language deficiencies to improve their reading abilities; which, in turn, is deemed to result in a more positive self-perception of themselves as autonomous readers.

### **Thesis Synopsis**

A critical issue in the field of education is to ensure that children entering schools are equipped with reading-related skills that would assist them to effectively cope with the ever-increasing academic demands posed by the curriculum. However, literacy disparities exist due to the prevalence of reading deficiencies, and inequality in literacy experiences; particularly instructional practices between proficient and weak readers. Research documented by the 2018 UNICEF Innocenti Report Card suggest that even in countries considered well-developed, children are still at-risk of falling behind in their reading acquisition abilities. The reduction of existing literacy inequities is an intricate process that requires the concerted efforts of stakeholders at various tiers of the educational system.

One of the possible means available for contemporary education is embedded in the process of introducing evidence-based approaches that foster the attainment of literacy success within the confines of the classroom. The pieces of evidence outlined in the preceding sections demonstrate the pivotal role played by phonological and morphological awareness in advancing reading proficiency.

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On its own, the contribution of phonological awareness in the development of reading competency has been widely tested and demonstrated in various feasibility studies, longitudinal studies, case studies, correlational research and intervention studies for over 30 years (Anthony, Williams, McDonald, & Francis, 2007; Bishop & Adams, 1990; Bus & Van Ijzendoorn, 1999; Catts, Fey, Tomblin & Zhang, 2002; Ehri et al., 2007; Gillon, 2004; Gillon & McNeill, 2009; Justice et al., 2013). The reputation of phonological awareness as a robust predictor of reading-related skill and an effective treatment approach for advancing at-risk learners' reading skills make it an indispensable form of language and reading support viable in implementing a more responsive and informed instructional practice; required in elevating reading performance outcomes against a national literacy standard.

Nonetheless, the value of morphological awareness in the development of reading has been steadily gaining recognition; as it has been found to be a significant skill able of contributing a unique variance to word-level reading of students from second to eight grade, beyond that of the phonological awareness construct (Apel, Wilson-Fowler, Brimo, & Perrin, 2012; Deacon & Kirby, 2004; Roman, Kirby, Parrila, Wade-Woolley & Deacon, 2009). Evidence also demonstrated that explicit instruction of morphological awareness is proven to be effective for learners inadequate reading capabilities (Good, Lance & Rainey, 201; Koutsoftas, Harmon, & Gray, 2009). In the past few years, the attention of researchers had been directed to evaluating the benefits of phonological awareness and morphological awareness training as it is merged with regular classroom instruction within a heterogeneous classroom environment (Shapiro

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& Solity, 2008; Brimo, 2016; Zoski & Erickson, 2017). Issues that need consideration would be the identification of the intensity of the treatment, its duration and the awareness skills to be improved. The development of a time-efficient interventional approach may be relevant in equalizing reading performance outcomes suitable in arresting the development of reading difficulties that may advance unnecessarily becoming severe.

A group of learners that are considered vulnerable to experiencing inequality in reading performance outcomes are those English language learners presenting with specific language weaknesses. This particular heterogeneous group were observed to show evidence of below norm standard receptive language index score and weak letter-sound knowledge; despite having no record of cognitive, sensory, or behavioral delays. Such a profile puts them at a disadvantage, since the language skills usually needed to foster immediate word recognition and reading comprehension are compromised in their case. Thus, identifying these cohorts and improving their reading performance outcomes to an appropriate level through consolidated treatment approaches are of grave importance.

The ideal educational settings to test the efficacy of the treatment approaches would be in countries that consistently displayed considerable inequities in literacy education – New Zealand and the Philippines. International data monitored for more than two decades showed that New Zealand has one of the widest literacy inequalities between the reading performance of competent and poor readers based on international studies that gauged developed countries' national reading achievement

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levels (Martin et al. 2007; PIRLS, 2016; Prochnow, Tunmer and Arrow, 2015). Much like New Zealand, the Philippines was cited to possess not only apparent gender literacy gaps, but also literacy gaps at the community level (Philippine Statistics Authority Report, 2017). The disparities in literacy achievement existing in these two nations can pose as a challenging, yet ideal context to meticulously test whether the provision of a classroom-based intervention program can significantly improve the language and reading achievement of learners experiencing reading deficits. In line with this goal, the experiments documented in this investigation addresses the following research questions:

- (1) Will a phonological followed by a morphological treatment approach facilitate word knowledge and sentence comprehension better than initiating an instructional awareness training in the reverse order among grade 1 students with specific language weaknesses?
  - (2) Do children with specific language weaknesses equally benefit from a classroom-based language intervention approach that targets improved reading comprehension, through increased word knowledge and sentence comprehension scores, in comparison to their typically-developing peers during their first formal year in primary school?
  - (3) Is there a significant difference in the outcomes of monolingual language weak versus bilingual language weak children after receiving the classroom-implemented phonological and morphological instruction during their first year in primary school?
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- (4) Will the gains in the assessment scores of year 1 students administered with classroom-based phonological or morphological awareness intervention approach be maintained after five weeks post-completion of the treatment program?
- (5) Is there a common trend evident among the reading performance scores of bilingual language weak participants in New Zealand and bilingual language weak participants in the Philippines?

The first research question is discussed through the experiment reported in Chapters 2 and 3. Chapter 2 addresses the effectiveness of implementing a phonological and morphological awareness intervention among monolingual and simultaneous bilingual five-year old learners in their first formal year of school. In Chapter 3, the impact of providing a phonological and morphological training among typically and atypically-developing sequential bilinguals is reported. Chapter 4 explores whether children's improved reading performance results in phonological and morphological skills are maintained five weeks post-intervention. In Chapter 5, a cross-country comparison identifying parallels among bilingual language weak learners' reading performance outcomes are presented and explained. Finally, Chapter 6 is an aggregation of research findings from the studies reported in the various chapters of this thesis. It gives an overall discussion and provides future directions that guide further research initiatives related to improving the language and reading-related outcomes of school-aged children; using intervention approaches that bridge inequalities in literacy education.

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## **Chapter 2 Effectiveness of Phonological and Morphological Awareness Training on the Literacy Outcomes of Children with Specific Language Weaknesses in the First Year of Primary School – A New Zealand Study**

### **Introduction and Background**

One of the most significant factors in gauging academic success is the development of literacy (Snow, Burns, & Griffin, 1998). Both phonological and oral language skills act as the main pillars of literacy development (McConnell, Wackerle-hollman & Bradfield, 2014; Senechal, LeFevre, Smith-Chant, & Colton, 2001; Snowling & Hulme, 2012; Whitehurst & Lonigan, 1998). Therefore, it is not surprising that such language skills have been given considerable importance by researchers and investigators due to their robust connection and contribution to improved reading outcomes across school grades (Anthony & Lonigan, 2004; Muter, Hulme, Snowling & Stevenson, 2004).

Related research findings have shown that learners possessing strong phonological awareness at an early age, particularly at the preschool and kindergarten level, have greater probability of becoming more adept readers at third grade (Muter et al., 2004; Wagner et al., 1997). In addition, Muter et al.'s (2004) research acknowledged certain subset skills that comprise phonological awareness, such as rhyming, alliteration, blending and elision, as factors that facilitate strong reading performance. The researchers added that a learner's performance in second grade tasks of word reading and comprehension can be predicted based on his or her ability to distinguish and segregate phonemes at age 4 and 5 years old. Similar findings have been reported by Lonigan, Wagner, Torgesen and Rashotte (2007) who discovered a high correlation

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between preschool-aged children's scores on blending tasks and their early reading assessments at the conclusion of grade 1.

The ability to contemplate and manipulate the sound structures of spoken words has been confirmed to have a vital role in the development of reading among lower grades in primary school (Anthony & Francis, 2005). Longitudinal studies (Bowey, 2005; Ehri et al., 2001; Hulme, Bowyer-Crane, Carrol, Duff, & Snowling, 2012) also support this claim, indicating that phonological awareness is a key predictor of success in learning to read.

For children in the primary grades who are showing evidence of typical or expected development, the connection between word reading efficiency and phonological awareness shows stability over time (Blachman, 2000; Hogan, Catts, & Little, 2005; Roman, Kirby, Parrila, Wade-Wooley, & Deacon, 2009). However, what needs to be explored is how lexical processing can be improved such that it guarantees long-term reading and linguistic proficiency, especially for those children experiencing specific language weaknesses in learning a language. Learners with language deficit are likely to find it challenging to attain a sufficient level of literacy competence. As they mature, they will face greater complexity in the words they are supposed to read or spell and hence further challenges in their literacy development.

However, phonological awareness is not the only skill that a child needs to learn to read successfully. A study by Law and Ghesquiere (2017) cited research that has shifted to a focus on exploring "alternative cognitive variables" that can explain extra variance in the literacy difficulties faced by the individuals discussed in the previous

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paragraphs. The cognitive variable they were referring to was morphological awareness. Like phonological awareness, morphological awareness is just one of the several aspects of broader metalinguistic knowledge crucial in enhancing linguistic proficiency. It is defined as the ability to recognize and manipulate the smallest segments of meaning found within words (Ramirez, Walton, & Roberts, 2013). Morphological awareness is a vital skill highlighted by researchers as 'critical' in language development (Carlisle, 2000; 2003; Kirby et al., 2012; Nunes & Bryant, 2006; Ramirez, Walton, & Roberts, 2013) among typically-developing and struggling language learners (Deacon, Parrila, & Kirby, 2008). Moreover, several studies highlighted the benefits of morphological awareness, even to learners with phonological awareness deficits, such as those with dyslexia, as it may offer a certain level of compensation for their underlying deficits in processing (Burani et al., 2008; Cavalli, Cole, Duncan, Elbro, & El Ahmadi, 2016; Elbro & Arnbak, 1996; Law, Wouters, & Ghesquiere, 2015).

Research has indicated that cognizance of morphemes (i.e. the smallest linguistic units containing meaning) supports word recognition, correct spelling and reading comprehension, independent of Rapid Automatized Naming, vocabulary, phonological awareness and orthographic processing (Carlisle, 2000; Casalis & Louis-Alexandre, 2000; Deacon & Kirby, 2004; Kirby et al., 2012; Kirby, Parrila, Wade-Wooley, Roman & Deacon, 2009).

Several factors can be considered as to why morphological awareness is useful to reading success. One is that individuals encounter morphemically complex vocabulary, with 60% of those estimated to be new words possessing relatively

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transparent morphological structures learned by children in school (Nagy & Anderson, 1984). Another is that several multi-morphemic words in the English lexicon are difficult to read in a single fixation (Law & Ghesquiere, 2017). This same thought was what prompted Elbro in 1989 to posit that the decomposition of words to their morphological structures would allow faster processing of lexical information during reading. Not only does awareness of morphological structures help in lexical processing, but it can also aid in the pronunciation of letter sequences (Bowers, Kirby & Deacon, 2010). For example, in the words 'realm' and 'realign,' segmenting along morpheme boundaries allows the correct pronunciation of the 'ea' in 'realm' where it is taken as one phoneme, as opposed to the 'ea' in 'realign' where it is processed separately because of its position in adjacent morphemes. Moreover, relying solely on phonics would make it difficult to explain the majority of the inconsistencies in the English language, as many of these inconsistencies only make sense from a morphological frame of reference (Nunes, Bryant, & Bindman, 2006). For instance, the word 'stealth' does not follow regular phoneme-grapheme correspondence rules, as the word is not written as 'stelth,' but is spelled 'stealth' to preserve the root morpheme 'steal.'

There is a growing amount of research that provides evidence highlighting the importance of morphemes as carriers of syntactic and semantic information which paves the way for vocabulary acquisition (Carlisle, 2000, Nagy, Berniger & Abbott, 2006; McBride-Chang et al., 2005; Singson, Mahony, & Mann, 2000; Sparks & Deacon, 2015), as well as children's reading comprehension (Carlisle & Feldman, 1995; Deacon & Kirby, 2014), and adult's reading comprehension (Nagy et al., 2006; Wilson-Fowler &

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Apel, 2015). Nagy et al., in their 2006 research, discovered a relationship between vocabulary and morphological awareness, with learners' reading skill to accurately utilize real or pseudo-derivations and inflections in sentences, allowing the retrieval of meaning.

### **Benefits of intensified classroom phonological and morphological awareness instruction**

Given associations between the development of metalinguistic knowledge (i.e. phonological and morphological) and literacy acquisition, investigations of instructional methods from controlled research settings to the actual classroom have been conducted to address the widening gap in achieving academic literacy.

Studies of phonological awareness in classrooms have grown over the past few years (Carson, Gillon & Boustead, 2013; McIntosh, Crosbie, Holm, Dodd & Thomas, 2007), with researchers advocating the inclusion of alphabet knowledge teaching in the classrooms (Justice et al., 2010; Lonigan, Purpura, Wilson, Walker, & Clancy-Menchetti, 2013).

Hatcher et al.'s seminal work in 1994 introduced the approach of combining training in phonological awareness with knowledge in understanding letter-sound correspondence by reinforcing it in the context of reading. The work of Hatcher et al. (1994) also influenced the practice of intervention trials conducted in classrooms.

A study by McIntosh et al. (2007) in Australia explored the effectiveness of teaching phonological awareness to 97 children aged 4;5 to 5;1 in classrooms. The study lasted for 10 weeks and involved teaching syllable and onset-rime level for two hours each

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week. After the program was introduced, significant increase in phonological awareness skills were observed in the treatment group compared with that of the control group who followed the regular curriculum. However, after a follow up investigation, it was revealed that the increase in phonological awareness did not result in better reading and spelling scores of the treatment group to that of the control. Researchers attributed the lack of effect to their failure of focusing on individual phonemes (phoneme awareness) in their instruction. This outcome is relevant given that previous research strongly advised on giving further attention to increase students' performance on phonological awareness tasks by ensuring expansion of phonological skills at the phoneme level (Gillon, 2018).

Meanwhile, a Phonology plus Reading program designed by Hatcher et al. in 2006 was created to include a reading aspect into the method. This same program was modified by Bowyer-Crane et al. (2008) to be more suitable for younger children with the added component of reading together in a group and reading independently.

The focus on younger children was also apparent in the study by Tyler, Osterhouse, Wickham, McNutt and Shao (2014). This time the study included children aged 3;10 and 4;11 who were categorized as "at risk" of literacy-related difficulties due to the lower socio-economic income level of their parents or some evidence of speech and language impairment. Instruction occurred 4 times per week, but would be considered low in intensity as it was no longer than two hours in total (i.e., only 20 minutes per session). In the intervention, the emphasis was on letter-sound knowledge, onset-rime, initial sound awareness, phonemes, blending, and segmentation of compound words. As with the previous study, the treatment groups receiving instruction in the phoneme tasks

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experienced significant improvement in their phoneme scores compared to the group placed in the regular curriculum.

Another study by Carson et al. (2013) assessed the effectiveness of intensified phonological awareness instruction among 129 participants aged 5;0 to 5;2 who were exposed to the treatment approach for over a period of six months. The results were promising as the researchers discovered that phonological awareness training, with the inclusion of better representation activities, led to sustained gains in scores of students.

In contrast to the use of phonological awareness training, the implementation of morphological awareness training among young learners (i.e. pre-school to grade 2), has not been given much attention. Among those who had attempted such research, much of the information pertaining to the investigation on the morphological development in classrooms focused on inflections and derivations. Such studies have also been conducted primarily on school-aged elementary native speakers of English and there were few studies that have focused on English speakers from other languages (Chen, Hao, Geva, Zhu, & Shu, 2009; Hiebert & Bravo, 2010). However, what evidence there is has suggested that morphological awareness in understanding the English language can be promoted among second language learners and children in early school grades. Such data argue that young individuals are responsive to morphological awareness instruction. One such study was conducted by Lyster (2002) who discovered that Norwegian children in their final year in preschool experienced improvement in morphological awareness after exposure to morphological awareness training for 30 minutes per week spanning 17 weeks. It was observed that the treatment

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group responded better than the controlled group who didn't receive any form of intervention. Similar positive outcomes were observed by Apel et al. (2013) who showed that kindergarteners characterized as 'at-risk' of developing reading problems made observable gains in multi-morphemic analysis of words after nine weeks (four times a week lasting 25 minutes each time) of morphological awareness intervention training. The researchers placed the children in small groups of four or five to be tutored by trained research assistants.

The benefits linked with the two interventions in facilitating literacy proficiency has led a substantial amount of researchers to argue for the inclusion of teaching phonological awareness (Kelly, Leitao, Smith-Lock & Heritage, 2017; Carson, Gillon & Boustead, 2013; McIntosh, Crosbie, Holm, Dad & Thomas, 2007) and morphological awareness (Apel, Brimo, Diehm, & Apel, 2013; McBride-Chang et al., 2005; Ramirez, Walton & Roberts, 2013) in typical mainstream classrooms. This, they argue would provide a means of practical support for educators, as well as to promote effective language learning and reading outcomes to struggling students. Despite the positive evidence for explicit instruction of phonological awareness and morphological awareness in the research literature, there is still no clear inclusion of phonological awareness training in the *Kei Tua o te Pae: Oral, Visual and Literacy (Book 17)* (MOE, 2009), which has been created by the Ministry of Education in New Zealand to serve as an appropriate model for educators teaching in the early grades (Carroll et al., 2016).

It is therefore timely to investigate the contribution of both phonological and morphological awareness with regard to improving literacy outcomes in New Zealand.

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This would be particularly useful if the evidence supported gains in reading comprehension skills, both in terms of word recognition and sentence understanding. Given the increasing multi-cultural context of New Zealand, it would be even more useful to show these positive outcomes in children from monolingual versus bilingual backgrounds who show evidence of weaknesses in language. Targeting children in the first year of school is likely to reduce negative outcomes in the long-term. This, in turn, would provide additional evidence leading to the permanent inclusion of explicit phonological or morphological awareness training in the New Zealand curriculum. Furthermore, studies of young monolingual and bilingual learners should offer a better understanding about the early stages of language acquisition and its influence on reading development. For example, there is currently a paucity of information that examines the relationship of morphological awareness development training and reading comprehension, especially in grade 1. This study would provide further data on whether initiating early literacy interventions focusing on morphological awareness development facilitates reading comprehension, particularly amongst struggling language learners in the early grades.

### **Adapting a Phonological Awareness Approach**

The benefits brought about by phonological awareness, emphasizing a focus on the development of phoneme-level skills is that it provides long-term reading and spelling success (Ehri et al. 2001; Gillon, 2018; Shapiro & Solity, 2008). This suggests that interventions focusing on phoneme-level skills may optimize short-duration treatment approaches that aim to attain sustained literacy improvements. Also, it is

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important that phonological awareness instruction is blended with phonics, in which alphabet knowledge teaching is emphasized (Justice et al., 2010; Lonigan, Purpura, Wilson, Walker & Clancy Menchetti, 2013). Teaching that is clear, detailed and direct will further enhance quality of phonological awareness instruction (Carson et al., 2013; Hiebert & Fisher, 2002; Torgesen, Rashotte, Alexander, & MacPhee, 2003).

Operating on the framework described in the Carson, Gillon and Boustead (2013) study, the adapted intervention program utilized in the current research can be described as short in duration (i.e., less than one academic year), low intensity (i.e., less than two hours of instruction per week) and broad (i.e., targeting a wide range of phonological awareness levels (e.g., phoneme, onset-rime and syllable) with prominence given on phonemic awareness. Although Carson et al.'s research (2013) recommend high intensity instruction, low intensity instruction was selected due to limited classroom time granted to the researcher by the participating schools, and it may be more realistic in the current climate of a perceived packed curriculum.

The phonological awareness training program implemented in this research was adapted from the Phonology + Reading Intervention (P+R) used by Bowyer-Crane et al. (2008) in their previous investigation. It is an approach made up of working out letter-sound correspondences, blending and segmenting, with the incorporation of group reading and reading independently twice a week respectively.

A more detailed outline of the session and its activities is presented in the succeeding table.

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*Table 2.1 Sample Phonological Awareness Intervention Group Lesson Plan*

Week 1	Key Component: Grapheme – Phoneme Association
Aim:	To strengthen students' understanding of letters and how each letter in the alphabet corresponds to a specific sound
Duration:	45 minutes
Material:	Detective Dog and the Disappearing Donut (Scholastic Books)
Target:	Students shall be able to recognize and to identify target letters, as well as produce appropriate sounds they represent
Activity:	<ol style="list-style-type: none"> <li>1. Start with 'Hello Song'</li> <li>2. Introduce "Spot doll" for Phonics Lesson</li> <li>3. Sing the Jolly Phonics Song</li> <li>4. Segue into the letters in the alphabet and the specific sounds they represent</li> <li>5. Initiate reading time by introducing the book "Detective Dog and the Disappearing Donuts"</li> <li>6. Focus on Core Words (i.e. Dog and Donuts) emphasizing target sound [d]</li> <li>7. Read the book and encourage children to raise hands if they hear the [d] sound</li> <li>8. Help student in isolating and segmenting CVC words with [d] sounds, as well as practice blending string of phonemes into words</li> <li>9. Distribute Donut-shaped letters</li> <li>10. Ask students to get the letter corresponding to their first name and sound it out</li> <li>11. Cut and decorate the letters using colorful sprinkles</li> <li>12. Close by focusing on the target sound</li> <li>13. Sing the closing song "Goodbye"</li> </ol>

## **Implementation of a Morphological Awareness Intervention**

The ultimate goal of reading is not only being able to recognize or sound out a string of letters, but to comprehend the meaning conveyed in the text. However, children with language weaknesses are at a greater disadvantage as they may possess a wide range of problems in reading comprehension, listening comprehension, grammar, narrative production, oral expression, figurative language, and vocabulary (Nation, 2005; Hulme & Snowling, 2009). Given that their difficulties are variegated, a morphological awareness intervention may offer a strategy to compensate for, if not surmount their shortcomings.

The current teaching program embedded research treatments that aimed to promote morphological awareness and to facilitate reading comprehension. The treatment approach was an adaptation of an oral language (OL) program described in Bowyer-Crane et al. (2008) and Clarke et al. (2010). The modified version of the intervention consisted of two 45-minute sessions per week (one conducted in a group and one done individually) for ten weeks with a total of 15 hours of intervention per child. Each session comprised of an introduction, followed by activities and a plenary session to consolidate what was discussed during the day. All the activities were designed to revolve on a particular theme and to be supplement by a text passage.

Following suggestions from Bowyer-Crane et al. (2008), the approach follows the principle of distributed practice. It is made up of four main components namely: vocabulary expansion, reciprocal teaching with spoken language, figurative language and spoken narrative activities. In vocabulary expansion, children are introduced to the

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“words of the day,” These were taught using Beck et al.’s (2002) multi-context learning approach. This technique requires focusing on the dialogue between the students and mentor that supports them to put the introduced words in appropriate and known contexts. It supplies children with the necessary tools they can employ to unlock meaning of words that strengthen depiction and scaffolding of familiar texts into the mind. Other related activities used within the multiple context learning approach include: verbal reasoning, visual and physical mnemonics, concept diagram, and drawings. Forty new words were presented to the participants (i.e., two words per session). After the vocabulary expansion comes reciprocal teaching. Under this component, children would first listen to a story read to them; then they would be asked to complete exercises that activate reading comprehension. The activities were created to improve learners’ knowledge of stories by instructing them to clarify unfamiliar words, to rely on their own schema to predict succeeding events, to fill in missing information, to infer implicit meaning, and to engage in inquiry. The programme encourages children to tap on their pre-existing knowledge for understanding. In continuation, children practiced figurative language through jokes, idioms, similes, metaphors and riddles to encourage them to explore expressive language using spoken narratives.

In the spoken narrative, the child is asked to come up with a story based on a sequence of pictures. Prior to closing each session, a run through of the topics discussed in the entire lesson was made with students. Rewarding of learners with stickers was also conducted to promote active participation.

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Below is an outline of session schedules for the morphological awareness intervention.

*Table 2.2 Outline of Session Schedule for Morphological Awareness Training*

<b>Morphological Awareness Intervention with Oral Language Training (adapted from Bowyer-Crane et al. (2008) and Clarke et al. (2010) studies)</b>	
<p>Group Session (45 mins.)</p> <ul style="list-style-type: none"> <li>• Introduction - Day of the Week and Outline of Activities for the day (5 mins.)</li> <li>• New Vocabulary Teaching / Multi-sensory Learning (10 mins.)</li> <li>• Learned Vocabulary Reinforcement (12 mins.)</li> <li>• Speaking, Listening and Inferencing through Group activities (15 mins.)</li> <li>• Revision of work, Promotion of sequencing, and Awarding of Gold Stars (3 mins.)</li> </ul>	<p>Individual Session (45 mins.)</p> <ul style="list-style-type: none"> <li>• Introduction - Settling the child into the session (5 mins.)</li> <li>• Vocabulary Revision (10 mins.)</li> <li>• Narrative Task (12 mins.)</li> <li>• Listening, Speaking and Inferencing (15 mins.)</li> <li>• Plenary - Session Review and Awarding of Gold stars (3 mins.)</li> </ul>

### **Reduction of student performance inequalities through PA and MA treatment approaches in classrooms**

A considerable amount of research has demonstrated the significance of phonological awareness and its connection to reading across alphabetic languages, despite existing individual differences in IQ, age, reading experience and vocabulary knowledge (Bradley & Bryant, 1983; Kirby, Parrila & Pfeiffer, 2003; Melby-Lervag, Lyster & Hulme, 2012). A focus on phonological awareness offers a significant effect in promoting reading skills of children with special needs, such as those with speech and language impairment, Down syndrome, expressive phonological impairment, and developmental verbal dyspraxia (Gillon, 2002, 2005; McNeill, Gillon & Dodd, 2009; Van Bysterveld, Gillon, & Foster-Cohen, 2010).

Like phonological awareness, morphological awareness training offers a means of assistance, or provides some levels of compensation to individuals experiencing dyslexia (Burani et al., 2008; Cavalli, Cole, Duncan, Elbro & el Ahmadi, 2016; Elbro & Arnbak, 1996; Law, Wouters & Ghesquiere, 2015).

Drawing on benefits observed from explicit phonological and morphological awareness training, and using it in heterogeneous classroom settings to enhance literacy skills of children in the early grades considered 'at risk' due to their language deficits, may pave the way to provide necessary tools for such children faced with linguistic difficulties to further optimize their potential in reading development. Hence, the current study investigating whether a focused phonological awareness approach at

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the phoneme level, coupled with phonics and reading activities, or a morphological awareness intervention through oral language, promotes the reading skills of weak English language learners in the early grades. Assessing which approach results in immediate gains in student literacy performance should also contribute to the implementation of efficient and effective reading programs that target the enhancement of literacy achievement, thereby reducing poor reading outcomes for this group of learners.

### **The Present Study**

The main goal of the research was to determine the effectiveness of implementing a phonological awareness and morphological awareness treatment approach, in advancing reading comprehension through word recognition and sentence understanding, among year 1 monolingual and bilingual language weak learners in New Zealand. It also evaluated which instructional training would be likely to offer immediate, observable and significant effect size. As discussed above, the study examined the potency of raising phonological and morphological awareness in children aged 5 to 6 years old, and children presenting with specific language weaknesses in learning the English language.

In the context of this research, children with specific language weaknesses refer to students exhibiting a score below the norm average of 85 in their Receptive Language Index score in the Clinical Evaluation of Language Fundamentals-Preschool, 2<sup>nd</sup> edition (CELF-P2). They also received below standard norm average scores for their age group in 3 out of 6 subset measures in the Preschool and Primary Inventory of

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Phonological Awareness (PIPA). These children also showed evidence of weak letter-sound knowledge. These weaknesses were evident despite the children having no record of poor learning experience, sensory impairments or behavior problem, and them producing a nonverbal intelligence score within the norm of 85 to 115 range, as revealed by the Primary Test of Nonverbal Intelligence (P-TONI).

### **Research Questions**

To reiterate, the current study aimed to better understand the effect of providing phonological awareness training + reading and morphological awareness with emphasis on oral language instruction, in facilitating the reading comprehension skills (i.e. word recognition and sentence understanding) of early readers in grade 1.

It is among the few investigations conducted in the field of education and language research that observed and compared the impact of using explicit intervention approaches among children with specific language weaknesses in learning English within a bilingual context. In this chapter, the following research questions are addressed:

- (6) Will the phonological awareness or morphological awareness intervention approach implemented in the classroom result in a significant difference in the language assessment scores, including word meaning and text comprehension, after five weeks among monolingual and bilingual language weak year 1 students in New Zealand?
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- (7) Will the phonological awareness and/or morphological awareness intervention result in significantly higher word meaning and text comprehension levels after ten weeks?
- (8) Is there a significant difference in the outcomes of monolingual language weak versus bilingual language weak children after receiving the classroom-implemented phonological and morphological instruction during their first year in primary school?

## **Methods**

### **Participants**

Participants in the present investigation were selected after screening forty-five (45) Year 1 children referred by classroom teachers as struggling language learners. Twenty (20) participants were recruited in the study having met the inclusion criteria and following university ethics committee approval. The mean age of participants was 5;8 years (SD = 4.47 months) and consisted of 11 monolinguals and 9 bilinguals. All children from the bilingual group were born and raised in New Zealand, but used at least one other language apart from English at home.

The students were from eight classes with an average of 20 to 25 pupils in each within three schools in Western Christchurch, New Zealand. The students attend public primary schools in urban areas in middle to high socio-economic areas (based on the Ministry of Education's school rating), and were taught using the same national standards set by the ministry for its educational curriculum. The students were working

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to attain the same curricular standards needed in the development of reading and writing.

Out of the chosen students, 12 were boys and 8 were girls. They were further segregated into two groups, with roughly half of the monolinguals and half of the bilinguals randomly assigned in Group 1 – PA1MA2 (i.e., students who begin with phonological awareness (PA) followed by morphological awareness (MA) training), and the remaining half from each group placed in Group 2 – MA1PA2 (i.e., students start with MA followed by PA intervention).

School administrators and teachers received consent forms confirming participation in the program. The teachers were also asked to distribute consent forms for both parents and students enrolled in their classes to give permission for their child to take part in the study. Table 2.3 illustrates the demographic profile of participants.

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*Table 2.3 Demographic Composition of Phonological (PA1MA2) and Morphological (MA1PA2) groups in comparison to primary school students aged 5-6 enrolled in the Canterbury and Chatham Islands Region Academic Year 2017*

	Gender		Language Background	
	Males	Females	Monolinguals	Bilinguals
Group A - PA1MA2 n = 11	7 63.63%	4 36.36%	6 54.55%	5 45.45%
Group B - MA1PA2 n = 9	5 55.56%	4 44.44%	5 55.56%	4 44.44%
*Canterbury & Chatham Islands Region	7, 232	7, 106		
*New Zealand-Wide	63, 909	60, 915		

Note: The percentages used in the table represent the proportion of the groups, as opposed to the entire sample (e.g. in Group B, 5 boys represent 55.56%)

\*Canterbury & Chatham Islands Administrative Region and New Zealand wide demographic data were retrieved from <https://www.educationcounts.govt.nz>

It was ensured in the conduct of this research that any form of assessment by the researcher had informed consent from the teachers, parents, students and school administrators of the participating schools, in line with the standards set by the University of Canterbury Ethics Committee and the College of Education, Health and Human Development.

All assessments were conducted in a quiet area in a classroom during school hours. Inclusion in the study required that none of the participants in the study were receiving any form of treatment to address linguistic or reading deficiencies for the duration of the research, other than that provided as part of the research.

For children with specific language weaknesses, a set of criteria necessary for inclusion are as follows:

- No recorded hearing, visual or neurological disorders (as reported in school records)
  - Normal cognitive ability based on school reports
  - Normal oral structure and function – articulation is within normal limits
  - Non-verbal intelligence score between 85-115 based on standardized assessment such as the Primary Test of Non-verbal Intelligence (PTONI; Ehrler & McGhee, 2008)
-

- Scores on either the Receptive Language or Expressive Index measured using the Clinical Evaluation of Language Fundamentals – Preschool 2<sup>nd</sup> edition (CELF-P2; Wiig et al., 2006) below 85
- Score on the Woodcock Reading Mastery Test III (WRMT - III; Woodcock, 2011) is one standard deviation below the mean
- Score is below the standard norm average in 3 out of 6 subset skill measured by the Preschool and Primary Inventory of Phonological Awareness (PIPA; Dodd, Crosbie, MacIntosh, Teitzel & Ozanne, 2000)

In practice, children who perform at least one standard deviation below the mean on a standardized measure of language functioning are considered to have impaired language skills (Tomblin, Freese, & Records, 1992).

### **Standardized Assessment Measures**

The following standardized instruments were used in the identification and evaluation of the research sample:

Clinical Evaluation of Language Fundamentals – Preschool 2<sup>nd</sup> edition- Australia and New Zealand edition (CELF-P2; Wiig et al., 2006)

The CELF – P2 is a language assessment test that measures language expression and language comprehension of children ages 3;0 to 6;11. The assessment was utilized to get students' receptive, expressive and core language skills profile. The students completed six sub-tests: sentence structure, concepts and following directions, word structure, basic concepts, expressive vocabulary, and sentence recall. The

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outcome of the sub-tests were obtained to produce receptive and expressive language index scores. An example taken from the word structure sub-test would be to show some pictures and ask the child to finish the things you say. "Finish what I say. This boy (point to the image) is standing. This boy is...(point to the image)" The child should answer "sitting." The test-retest reliability correlation coefficients range from adequate (0.79) to excellent (0.92) and internal consistency ranges from 0.82 to 0.96 across the sub-tests.

***Preschool and Primary Inventory of Phonological Awareness (PIPA ; Dodd, Crosbie, MacIntosh, Teitzel & Ozanne, 2000)***

The PIPA provides a standardized profile of a child's phonological awareness ability. It is suitable for children aged three years old to six years and 11 months old. The PIPA measures abilities in naming letters and their corresponding sounds, identifying initial letter sounds, segmenting syllables, isolating individual sounds, distinguishing number of sounds within words and detecting rhyming words. As an example, in the letter-sound knowledge task, the examiner points to a printed letter on the page and requires the child to produce the particular sound the letter makes. The test-retest reliability correlation coefficients ranged from 0.72 to 0.97 across the six sub-tests.

***Primary Test of Nonverbal Intelligence (PTONI; Ehrler & McGhee, 2008)***

This particular assessment measures the nonverbal intellectual ability of students from as young as 3 up until 9 years and 11 months of age. The test requires participants to inspect pictures on a page and distinguish which image appears to be the odd one

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out. The measure increases in difficulty from lower order reasoning skills, which focuses on visual and spatial recognition, to the more advanced categorical formulation, as well as sequential reasoning. The test-retest reliability was recorded to be excellent (0.96).

### ***Woodcock Reading Mastery Test III (WRMT-III; Woodcock, 2011)***

This assessment tool has been used to determine reading comprehension levels of children as young as five years old. The test is helpful in determining individual strengths and weaknesses related to reading that may direct the course of remediation and instructional design. An example of one task in word comprehension (antonyms) sub-test would be to say to a child one of the three printed words on a page and then ask him/her to read the word out loud and to say its opposite. Test-retest reliability scores ranged from 0.86 to 0.94 for the test.

### ***Informal Morphological Awareness Measures*** **Inflectional and Derivational Morphological Awareness Task**

An evaluation tool that assesses morphological awareness was adapted from items used in Kirby et al. (2012). The task asks learners to fill in a missing word to form an analogy using derived and inflected word forms.

A specific question pertaining to an inflectional morpheme item, for instance, would be to complete a word analogy task such as “walk: walked: bump: \_\_\_\_\_.” It is expected that the child will supply the correct inflected morpheme which contains the *ed* morpheme. Test-retest reliability scores were 0.76 and 0.79 for the inflection and derivation measures respectively. On the other hand, internal consistency was at 0.80.

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Tables 2.4 and 2.5 displays the groups' school-entry performance on language and non-verbal intelligence measures categorized by differing treatment approach and language background.

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Table 2.4 School-entry performance on language and non-verbal intelligence measures based on treatment group

GROUP	P-TONI	CELF -P2		WRMT-III
		RLI	ELI	
Phonological (PA1MA2)				
n = 11				
<i>M</i>	102	67.18	72.27	72.18
<i>SD</i>	8.74	12.99	16.43	0.6
Range	85-115	50-84	45-98	72-74
Morphological (MA1PA2)				
n = 9				
<i>M</i>	104.33	77.78	81.44	74.44
<i>SD</i>	8.76	8.66	9.53	2.96
Range	87-115	58-74	70-96	72-78

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Note. PTONI = Primary Test of Non-verbal Intelligence Standard Scores ( $M = 100$ ,  $SD = +/-15$ ) (Ehrler & McGhee, 2008); CELF – P2 RLI = Clinical Evaluations of Language Fundamentals Preschool-2, Receptive Language Index ( $M = 100$ ,  $SD = +/-15$ ) (Wiig et al., 2006); CELF – P2 ELI = Clinical Evaluations of Language Fundamentals Preschool-2, Expressive Language Index ( $M = 100$ ,  $SD = +/-15$ ) (Wiig et al., 2006); WRMT-III = Woodcock Reading Mastery Test ( $M = 100$ ,  $SD = +/-15$ ) (Woodcock, 2011)

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Table 2.5 School-entry performance on language and non-verbal intelligence measures based on language group

GROUP	<u>P-TONI</u>	CELF -P2		<u>WRMT-III</u>
		<u>RLI</u>	<u>ELI</u>	
Monolingual n = 11				
<i>M</i>	102.82	75.73	83.64	72.55
<i>SD</i>	7.9	9.69	8.31	1.29
Range	85-115	54-84	72-98	72-76
Bilingual n = 9				
<i>M</i>	103.33	67.33	67.56	74.11
<i>SD</i>	9.87	13.95	15.29	3.18
Range	87-115	50-83	45-96	72-78

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## **Procedure**

A cross-over design for the two intervention programs included in the experiment was employed to compare the linguistic performance scores of children at three different time points: pre, mid, and post-tests. As highlighted in Portney & Watkins (2009) research, the cross-over design permits for control of order effects by methodically changing exposure to the treatment conditions.

A research assistant was used in order to ensure that all testing was completed within the required time-frame for the study. The assistant was trained in the proper administering of the assessment tools relating to the evaluation of students and was blind to group membership.

The order of administration of the standardized assessment and experimental measures was randomized to minimize the potential biases produced by the experience of initial or final tests.

The study took place for over half an academic year, starting from May to October 2017.

## **Controls for Treatment Bias**

To regulate or control possible treatment bias, both intervention (i.e. phonological awareness + reading and morphological awareness training through oral language development) were structured and highly organized, with a clear set of direct instructions provided for each session. In addition, the timing of the treatment approaches was balanced in order to prevent possible tiring effects that can ultimately

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impact the children's performance. Particularly, each group took part in two sessions per week: one group received intervention every Monday morning and Wednesday afternoon, whereas the other group received the treatment every Tuesday afternoon and Thursday morning.

### **Reliability**

All of the standardized tests were conducted and scored as prescribed in the examiner's manuals. An independent researcher verified 25% of the gathered assessment data. Inter-rater agreement in scoring assessment measures were 99.8% (97.2% - 100%) at pre-test, 100% at mid-test and 99.7% (97.1-100%) at post-test. Discrepancies that arose were resolved through discussion until consensus was achieved.

### **Treatment Fidelity**

An established protocol was given for each training period; outlining the lesson contents and target key learning outcomes for each session. Designated instructors assigned in the two groups were asked to complete a phonological and morphological awareness teaching log for each week related to instruction. In the log, the assigned instructor was required to identify the phonological or morphological awareness skill targeted in the lesson (e.g. phoneme segmentation or word derivation), the specific activities that were utilized in the programme to tackle that target (e.g. tap along with the phoneme or word work), and the amount of time spent on each activity (e.g. 15 minutes). The assigned teacher was also briefed that a short paragraph describing the response of the children on a particular lesson, whether any participant displayed any

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difficulty on a task in comparison with their peers, was to be written in the log. Likewise, the lead researcher set up a weekly meeting to discuss any issues in the implementation of the lesson. There were four visits made to the assigned teacher in the study during PA1MA2 and MA1PA2's ten-week instruction period. These were conducted to act as an observer and take down notes of the implemented programme for the purpose of assessing treatment validity.

In addition, all minutes of the meeting with assigned instructor and research assistant were recorded and notes documented. Twenty percent out of the total number of teaching sessions administered were randomly chosen for evaluation. This would further determine the treatment integrity of the instruction. A group comprising of an independent researcher, a school principal and the grade level coordinators confirmed that each training session was conducted as planned and the activities described in the lesson plan were coordinated to advance relevant strategies for linguistic awareness. All lessons (100%) assessed by the aforementioned group were found to adhere to the set of teaching guidelines, ensuring consistency of intervention delivery.

### **Baseline measures**

The baseline results were matched between groups through an independent samples t-test, except for the variable gender where a chi-square test was utilized. The chi-square test and t-tests did not reveal significant differences in the scores of monolingual and bilingual participants on gender distribution ( $\chi^2 = .135$ ,  $p = .714$ ), age ( $t(18) = -.691$ ,  $p = .498$ ), non-verbal intelligence ( $t(18) = -.130$ ,  $p = .898$ ), reading comprehension (word and passage comprehension) ( $t(18) = -1.355$ ,  $p = .204$ ) and

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receptive language index score ( $t(18) = 1.529, p = .149$ ). There was a significant difference though in the expressive language index score between monolinguals and bilinguals which was ( $t(18) = 3, p = .008$ ).

With regard to analysis of specific literacy outcomes, results did not reveal any statistical differences between monolinguals and bilinguals on syllable segmentation ( $t(18) = -1.582, p = .131$ ), rhyme awareness ( $t(18) = -.398, p = .696$ ), alliteration awareness ( $t(18) = -.134, p = .895$ ), phoneme isolation ( $t(18) = -.749, p = .467$ ), phoneme segmentation ( $t(18) = .531, p = .603$ ), phoneme-grapheme correspondence ( $t(18) = -1.572, p = .134$ ), morphological awareness – inflection ( $t(18) = -.790, p = .460$ ), morphological awareness – derivation ( $t(18) = .441, p = .654$ ), antonyms ( $t(18) = -1.610, p = .125$ ), synonyms ( $t(18) = -1.342, p = .225$ ), word analogy ( $t(18) = -.921, p = .369$ ), and sentence comprehension ( $t(18) = -.164, p = .871$ ).

Meanwhile, baseline measures of treatment groups were made by segregating participants into those who would receive phonological awareness training first, followed by a morphological awareness approach (PA1MA2) and those who would receive intervention in reverse order (MA1PA2); and then determining whether significant differences exist between the two. Results showed no significant difference in gender distribution ( $\chi^2 = .002, p = .964$ ), age ( $t(18) = -1.98, p = .063$ ), non-verbal intelligence ( $t(18) = -.593, p = .561$ ), receptive language index score ( $t(18) = -2.091, p = .053$ ) and expressive language index score ( $t(18) = -1.479, p = .254$ ).

The same is true for the following literacy measures: syllable segmentation ( $t(18) = -1.172, p = .257$ ), rhyme awareness ( $t(18) = -1.337, p = .198$ ), phoneme segmentation

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( $t(18) = -1.892$ ,  $p = .082$ ), morphological awareness – inflection ( $t(18) = .420$ ,  $p = .673$ ), morphological knowledge – derivation ( $t(18) = -1.055$ ,  $p = .295$ ), antonyms ( $t(18) = -1.610$ ,  $p = .125$ ), synonyms ( $t(18) = -1.342$ ,  $p = .225$ ), and word analogy ( $t(18) = -.643$ ,  $p = .966$ ).

However, significant differences between the PA1MA2 and MA1PA2 groups were identified on: alliteration awareness ( $t(18) = -4.114$ ,  $p = .001$ ), phoneme isolation ( $t(18) = -3.372$ ,  $p = .003$ ), phoneme-grapheme correspondence ( $t(18) = -2.943$ ,  $p = .009$ ), and sentence comprehension ( $t(18) = -3.109$ ,  $p = .006$ ).

## Results

Data were collected at three different time points in the research. The results from the first evaluation, referred here as Time1-Pre, were taken prior to any intervention being introduced to the participants. The next data collection point occurred after the first five weeks of intervention; referred to as Time2-Mid. The results from the third assessment point were attained after the completion of the second intervention (this will be referred to as Time3-Post). Findings associated with the impact of each intervention on the children's language and literacy skills will be evident by a comparison of the first and second assessment results. Tables 2.5a and 2.5b, therefore, presents the results (means and standard deviations) for each measure administered at Time 1-Pre and Time 2-Mid, and this part of the results section presents the outcome of a series of analyses of variance contrasting the Pre and Mid data for each measure assessed on these two occasions. The second part of the results will then contrast the Time1-Pre data with the Time3-Post data to assess the impact of both interventions.

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In the first portion of the results, given that children were evaluated at two time periods, this was a repeated measures factor comprising of two levels (Time 1-Pre and Time 2-Mid). In order to gauge the impact of the two treatment approaches, an independent variable (Intervention) was incorporated that is made up of two varying levels – phonological against morphological awareness. Differing effectiveness of treatment would be determined by a significant interaction between the Intervention variable and the Time factor. To assess whether any particular influences of the intervention varied across two of the Language Groups, this variable was likewise covered in the analyses as another independent factor with two levels: Monolingual versus Bilingual with differing effects for the two groups evident in a three-way interaction. Provided that a three-way interaction occurs, two-way analyses of variance shall be utilized for each Language Group to find out if an interaction is found between Time and the Intervention factors with one of the Language groups. Hence, the findings for each of the measures were analyzed using a three-way analysis of variance ( $2 \times 2 \times 2$ ), with one repeated measures factor and two independent factors. These two will then be reported throughout the results; however, additional significant main effects will be reported where relevant to the subsequent discussion. Reports in this chapter will be reported as F-values (with df), p-values and effect sizes (partial eta squared). Graphs pertaining to the three-way interaction will be displayed to present the results visually, but significant two-way interactions between Time and Intervention factors shall also be shown to allow interpretations of findings.

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### **Comparisons of Time1-Pre versus Time2-Mid assessment data**

In this section, the results for the first intervention are presented for each of the measures in the study, starting with the phonological measures and progressing from larger units of sound (syllable and rhyme) prior to phoneme-level sounds (alliteration, phoneme isolation and segmentation), followed by the letter-sound measure and the morphological measures (inflection and derivation), and ending with the word meaning measures (antonyms, synonyms, analogies and text comprehension).

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*Table 2.6 Means, with standard deviations in brackets, for the Monolingual group on each of the study measures at the first and second assessment points*

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time 2-Mid	Time 1-Pre	Time 2-Mid
Syllable Awareness (12 items)	4.33 (2.81)	5.17 (3.06)	5.00 (2.00)	7.60 (3.78)
Rhyme Awareness (12 items)	3.67 (2.73)	5.17 (3.37)	3.60 (.89)	6.60 (2.88)
Alliteration Awareness (12 items)	3.83 (1.84)	5.17 (3.37)	7.20 (2.17)	7.00 (2.92)
Phoneme Isolation (12 items)	3.67 (3.72)	8.00 (3.52)	8.00 (1.58)	10.00 (1.0)
Phoneme Segmentation (12 items)	1.50 (1.38)	2.50 (2.59)	2.40 (2.07)	1.20 (2.17)
Letter-sound Knowledge (32 items)	4.00 (3.23)	15.33 (9.85)	8.80 (.45)	22.40 (4.67)
Morphological Inflection (10 items)	0.17 (0.41)	0.33 (0.82)	0.00 (0.00)	0.60 (0.89)
Morphological Derivation (10 items)	0.33 (0.82)	0.17 (0.41)	0.60 (0.55)	1.40 (0.89)
Antonym Production (23 items)	0.50 (.55)	1.33 (1.17)	0.80 (0.45)	1.60 (0.55)
Synonym Production (23 items)	0.00 (0.00)	0.50 (0.84)	0.20 (0.45)	0.60 (0.55)
Word Analogy (40 items)	0.33 (0.52)	2.00 (1.55)	0.60 (0.55)	2.20 (0.84)
Text Comprehension (38 items)	0.50 (0.84)	1.67 (0.82)	1.20 (1.10)	2.60 (0.55)

*Table 2.7 Means, with standard deviations in brackets, for the Bilingual group on each of the study measures at the first and second assessment points*

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time 2-Mid	Time 1-Pre	Time 2-Mid
Syllable Awareness (12 items)	5.40 (2.60)	8.00 (0.71)	7.50 (1.73)	4.00 (1.83)
Rhyme Awareness (12 items)	2.80 (1.09)	5.20 (2.49)	5.50 (2.08)	5.25 (0.50)
Alliteration Awareness (12 items)	3.20 (2.95)	6.80 (3.56)	8.50 (2.52)	10.00 (1.41)
Phoneme Isolation (12 items)	4.80 (3.83)	9.40 (1.34)	9.50 (1.92)	11.00 (1.41)
Phoneme Segmentation (12 items)	0.40 (0.89)	1.60 (1.52)	2.75 (2.63)	4.25 (2.87)
Letter-sound Knowledge (32 items)	7.40 (2.61)	20.40 (9.13)	9.25 (1.89)	26.75 (2.99)
Morphological Inflection (10 items)	0.20 (0.45)	0.80 (0.84)	0.25 (0.50)	1.00 (0.82)
Morphological Derivation (10 items)	0.20 (0.45)	0.80 (0.84)	0.50 (0.58)	1.50 (0.58)
Antonym Production (23 items)	0.80 (.45)	1.40 (1.14)	1.25 (0.50)	2.00 (0.00)
Synonym Production (23 items)	0.20 (0.45)	0.40 (0.55)	0.50 (0.56)	1.00 (0.00)
Word Analogy (40 items)	0.80 (0.45)	1.40 (1.14)	0.50 (0.58)	2.50 (1.29)
Text Comprehension (38 items)	0.20 (0.45)	2.60 (1.52)	1.75 (0.50)	3.50 (1.29)

### Syllable awareness task

The results of the three-way analysis of variance for the Syllable awareness measure indicated a significant three-way interaction ( $F_{(1,16)} = 10.26$ ,  $p = .006$ ,  $EF = .39$ ) – this can be seen in figure 2.1. Follow-up two-way analyses of variance indicated a non-significant interaction between the Time and Intervention factors for the Monolingual children ( $F_{(1,9)} = 1.74$ ,  $p = .22$ ,  $EF = .16$ ), but a significant interaction between the Time and Intervention factors for the Bilingual children ( $F_{(1,7)} = 7.80$ ,  $p = .027$ ,  $EF = .53$ ). As can be seen in figure 2.1, for the Bilingual children (right-hand side of figure), those in the Phonological intervention group showed an increase in scores on the Syllable awareness task in contrast to the decrease shown by those in the Morphological intervention group. For the Monolingual children (left-hand side of figure), increases in Syllable awareness scores occurred for both intervention groups.

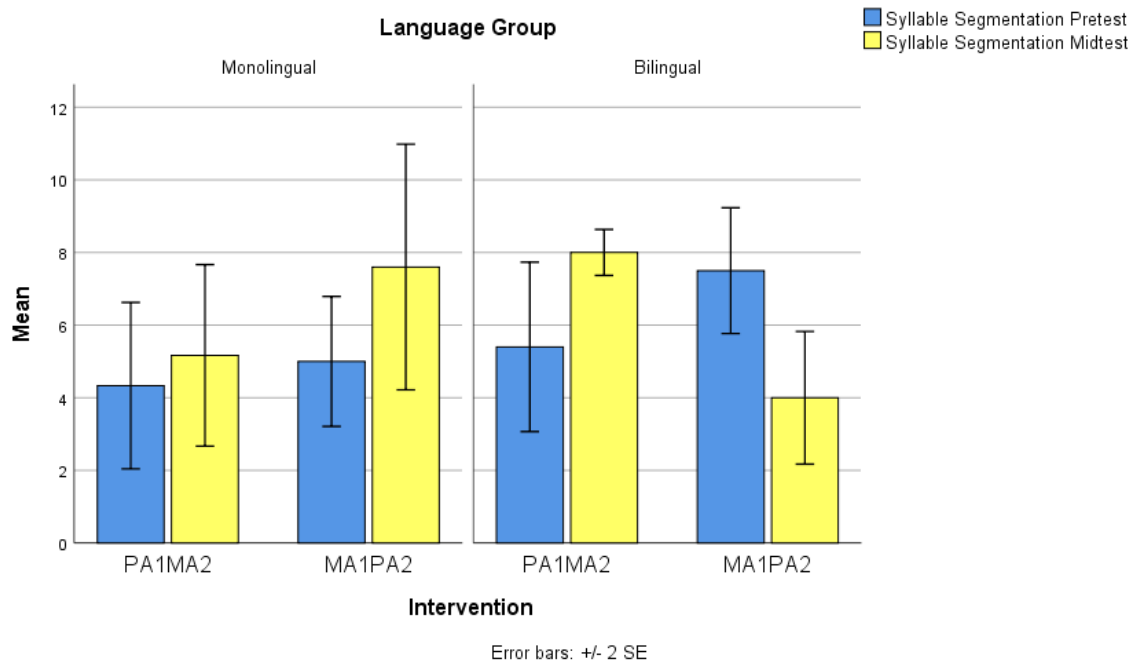


Figure 1 Syllable Segmentation Awareness Task Performance

### Rhyme awareness task

The results of the three-way analysis of variance for the Rhyme awareness measure revealed a non-significant three-way interaction ( $F_{(1,16)} = 2.83$ ,  $p = .112$ ,  $EF = .15$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .65$ ,  $EF = .01$ ). Figure 2.2 shows the results for the Rhyme awareness task. The only statistically significant effect was a main effect of Time ( $F_{(1,16)} = 7.25$ ,  $p = .016$ ,  $EF = .31$ ).

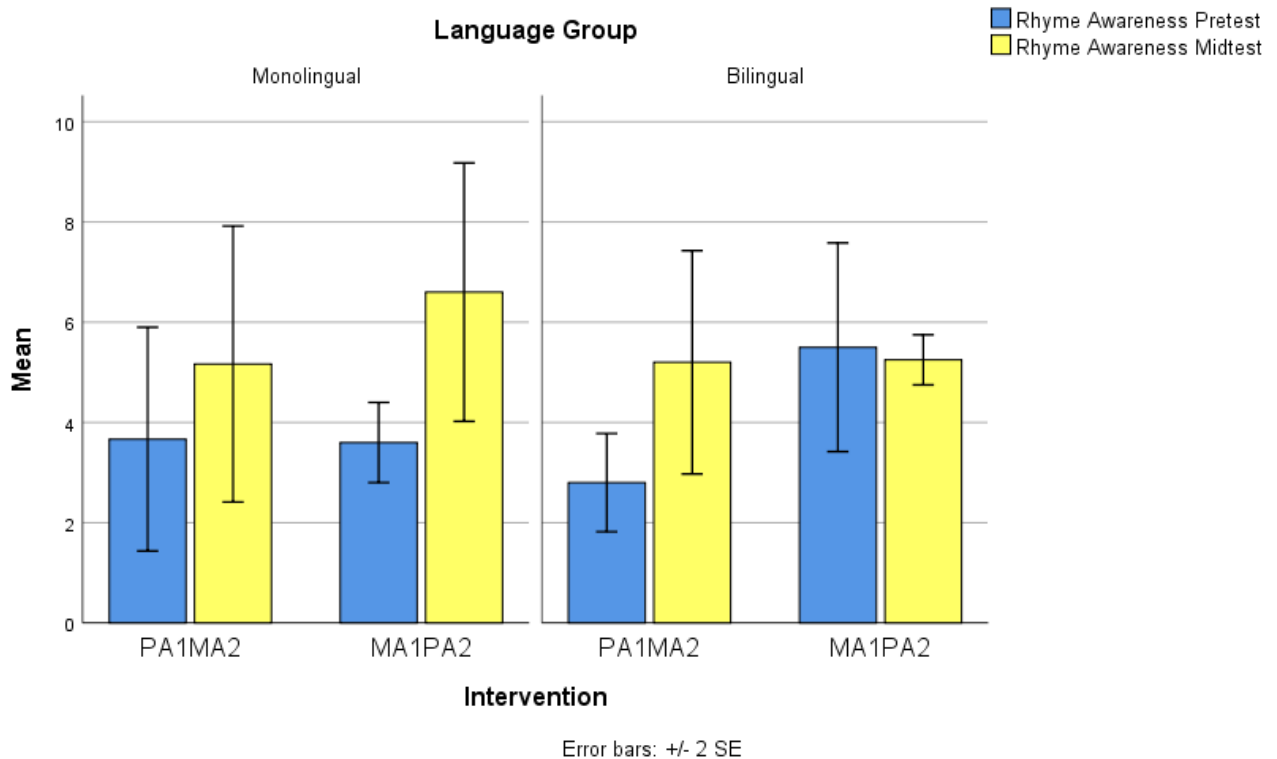


Figure 2.2 Rhyme Awareness Task Performance

### Alliteration awareness task

The results of the three-way analysis of variance for the Alliteration awareness measure showed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .83$ ,  $EF < .01$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 2.02$ ,  $p = .18$ ,  $EF = .11$ ). Figure 2.3 shows the results for the Alliteration awareness task. There were statistically significant main effects of Time ( $F_{(1,16)} = 5.93$ ,  $p = .027$ ,  $EF = .27$ ) and Intervention ( $F_{(1,16)} = 10.63$ ,  $p = .005$ ,  $EF = .40$ ) – the latter effect suggesting that those in the Morphological intervention group performed better on this task than those in the Phonological intervention group, which is most likely a chance effect of randomization.

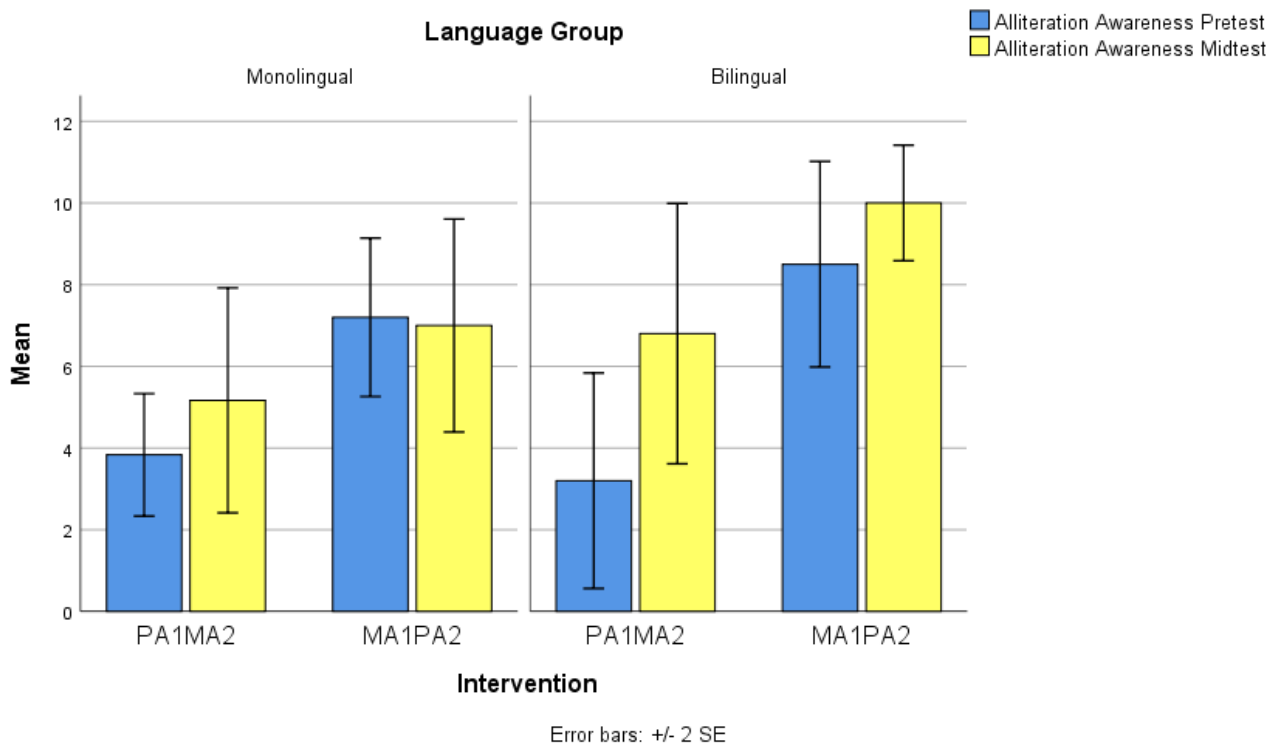


Figure 2.3 Alliteration Awareness Task Performance

### Phoneme isolation task

The results of the three-way analysis of variance for the Phoneme isolation measure indicated a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .79$ ,  $EF < .01$ ) – this can be seen in Figure 2.4. However, there was a significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 4.92$ ,  $p = .041$ ,  $EF = .24$ ) suggesting that both the Monolingual and Bilingual groups showed greater gains in the Phonological intervention than the Morphological intervention. There were statistically significant main effects of Time ( $F_{(1,16)} = 25.77$ ,  $p < .001$ ,  $EF = .62$ ) and Intervention ( $F_{(1,16)} = 7.76$ ,  $p = .013$ ,  $EF = .33$ ).

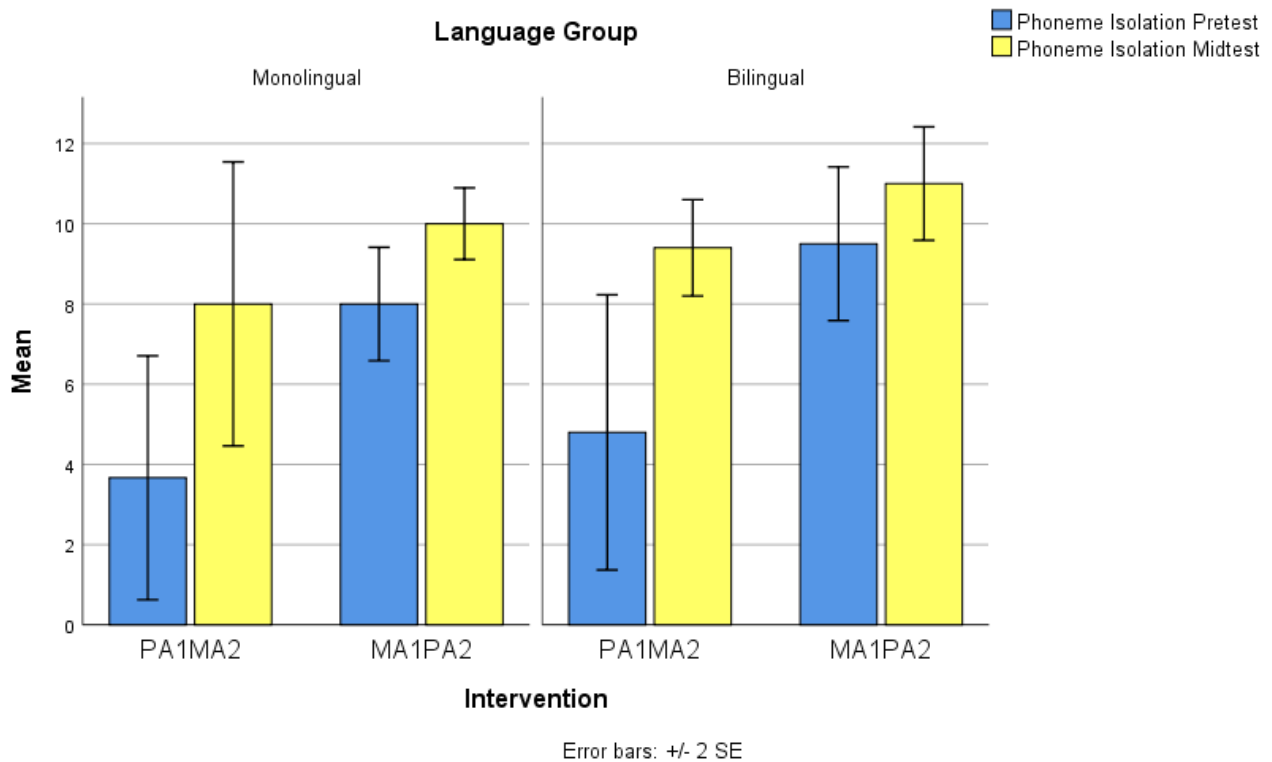


Figure 2.4 Phoneme Isolation Task

### Phoneme segmentation task

The results of the three-way analysis of variance for the Phoneme segmentation measure demonstrated a non-significant three-way interaction ( $F_{(1,16)} = 1.11$ ,  $p = .31$ ,  $EF = .07$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .44$ ,  $EF = .04$ ) – see figure 2.5.

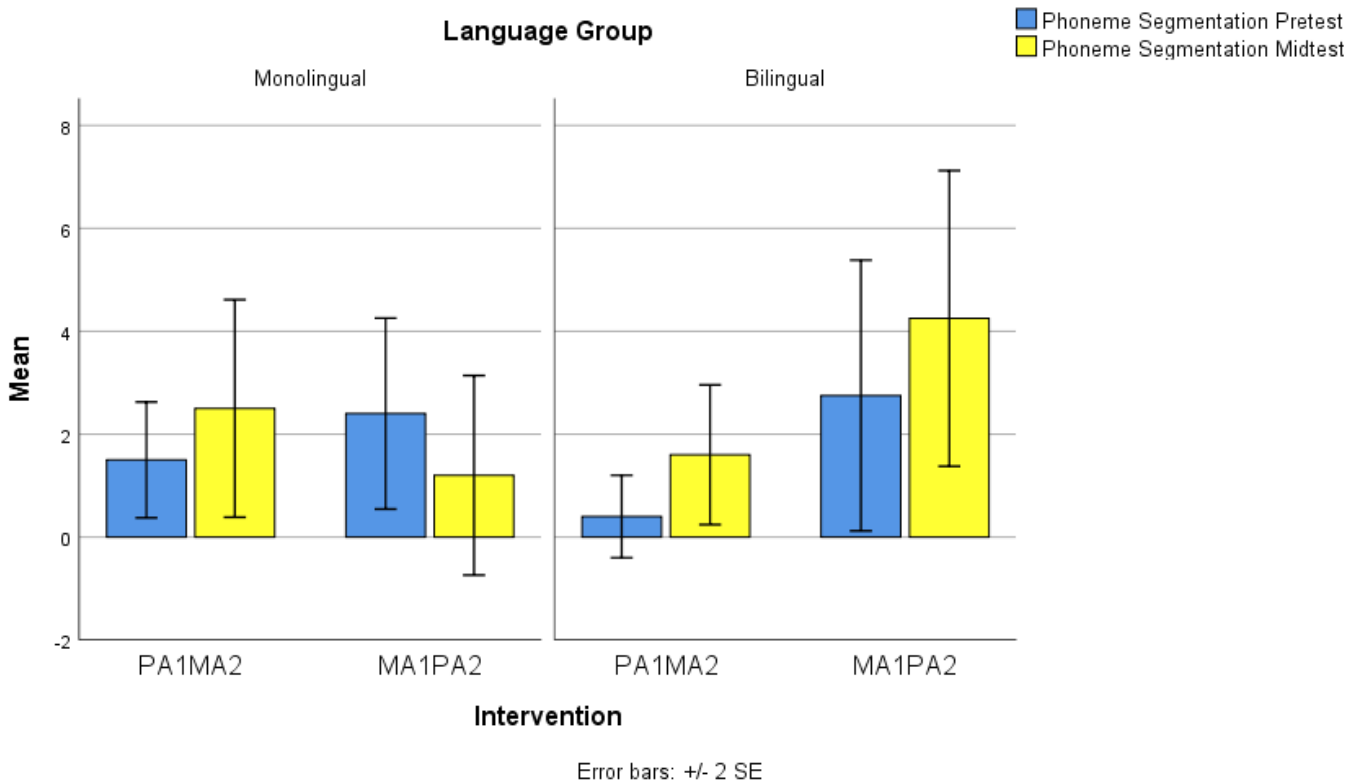


Figure 2.5 Phoneme Segmentation Task Performance

### Letter-sound task

The results of the three-way analysis of variance for the Letter-sound measure indicated a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .17$ ,  $EF = .11$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 1.69$ ,  $p = .21$ ,  $EF = .10$ ) – see figure 2.6. There was a significant main effect of Intervention ( $F_{(1,16)} = 5.21$ ,  $p = .037$ ,  $EF = .25$ ), with the Morphological group out-performing the Phonological group, but this again is likely a chance effect related to random assignment.

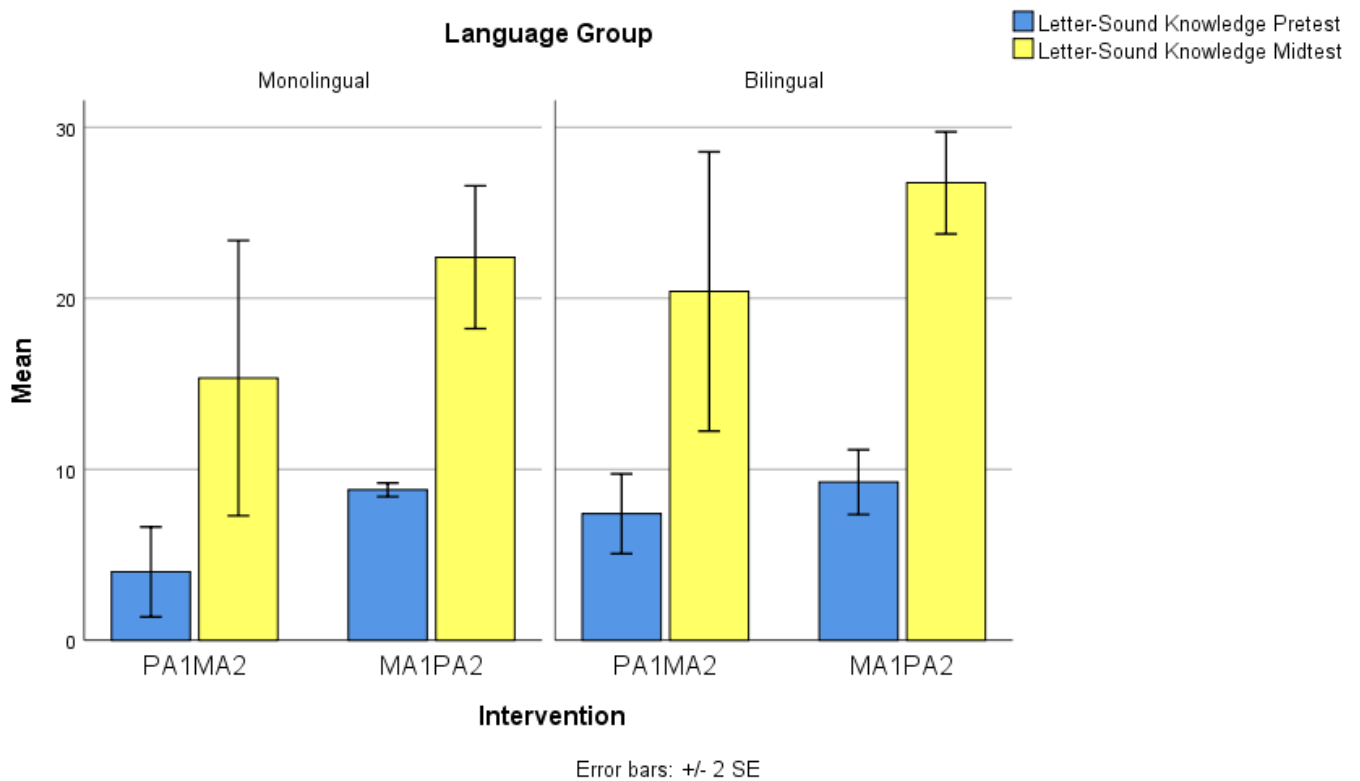


Figure 2.6 Letter-Sound Knowledge Task Performance



### **Morphological awareness inflection task**

The results of the three-way analysis of variance for the Morphological awareness inflection measure revealed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .70$ ,  $EF = .01$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .43$ ,  $EF = .04$ ) – see figure 2.7. There was a significant main effect of Time ( $F_{(1,16)} = 8.79$ ,  $p = .009$ ,  $EF = .36$ ).

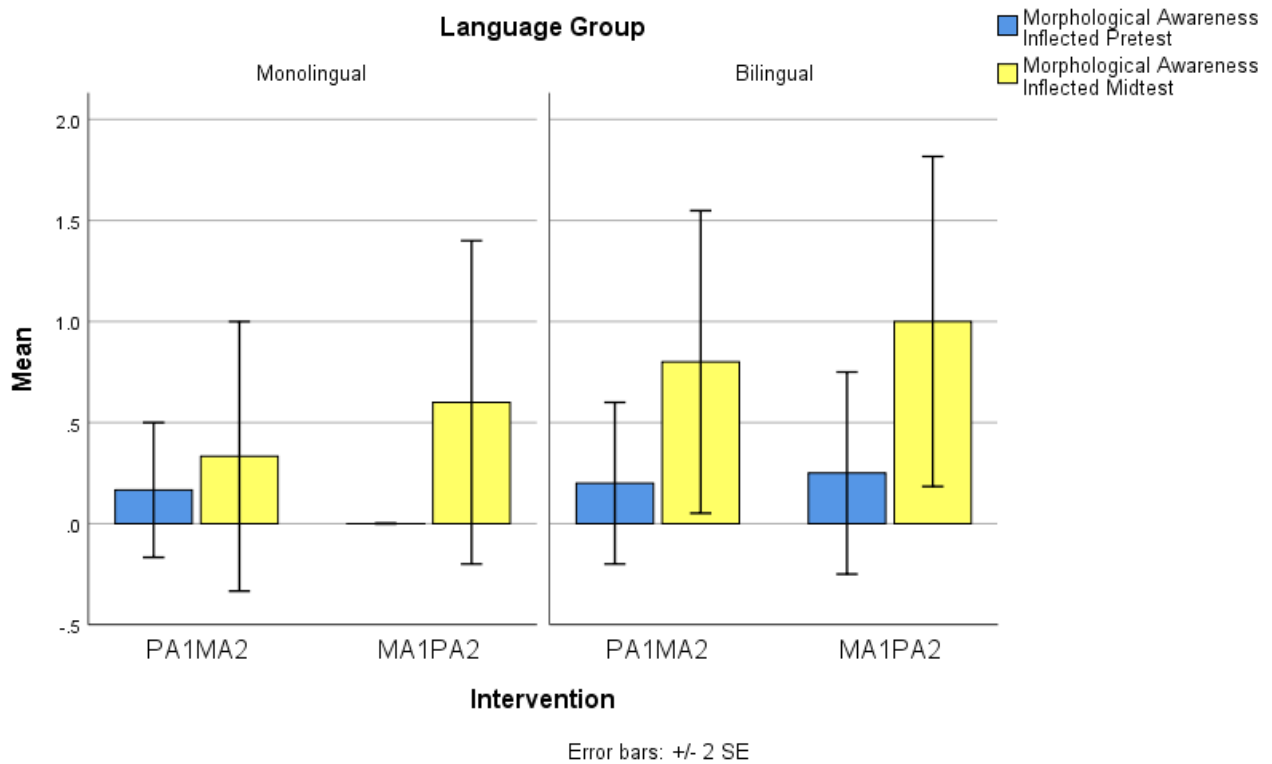


Figure 2.7 Morphological Awareness Inflection Task Performance

### ***Morphological awareness derivation task***

The results of the three-way analysis of variance for the Morphological awareness derivation measure showed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .46$ ,  $EF = .04$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 3.38$ ,  $p = .085$ ,  $EF = .17$ ) – see figure 2.8. There was a significant main effect of Time ( $F_{(1,16)} = 9.02$ ,  $p = .008$ ,  $EF = .36$ ) and of First Intervention ( $F_{(1,16)} = 7.00$ ,  $p = .018$ ,  $EF = .30$ ).

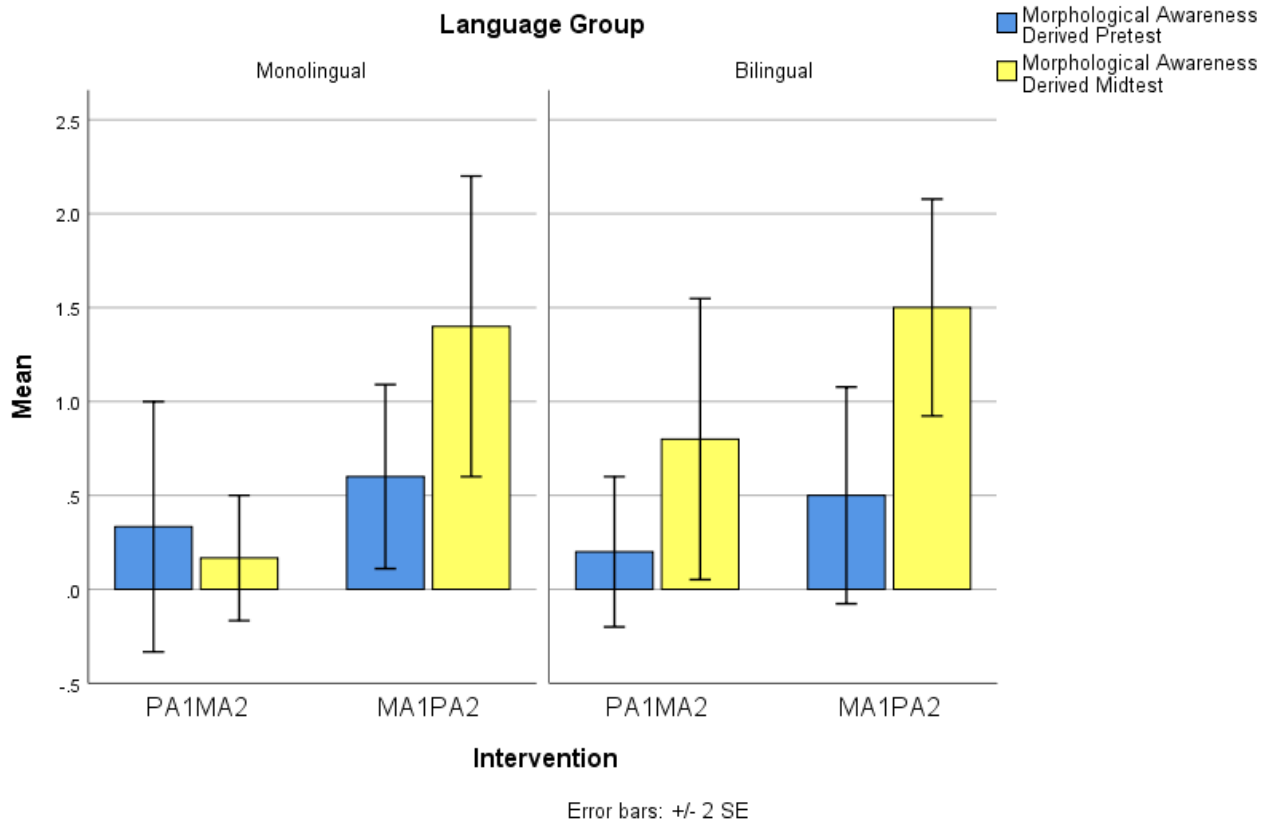


Figure 2.8 Morphological Awareness Derivation Task Awareness

### ***Antonym production task***

The results of the three-way analysis of variance for the Antonym production measure indicated a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .85$ ,  $EF < .01$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .90$ ,  $EF < .01$ ) – see figure 2.9. There was a significant main effect of Time ( $F_{(1,16)} = 9.92$ ,  $p = .006$ ,  $EF = .38$ ).

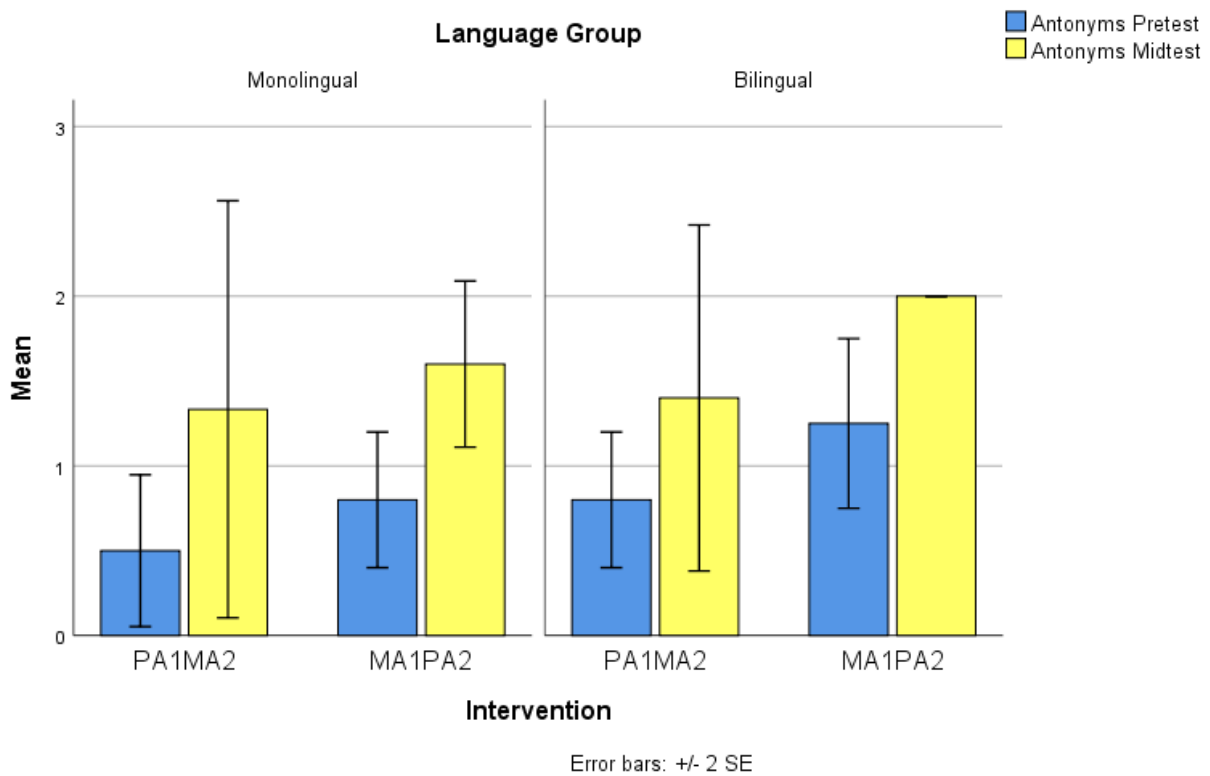


Figure 2.9 Antonym Production Task Performance

### Synonym production task

The results of the three-way analysis of variance for the Synonym production measure displayed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .55$ ,  $EF = .02$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .77$ ,  $EF < .01$ ) – see figure 2.10. There was a significant main effect of Time ( $F_{(1,16)} = 5.90$ ,  $p = .027$ ,  $EF = .27$ ).

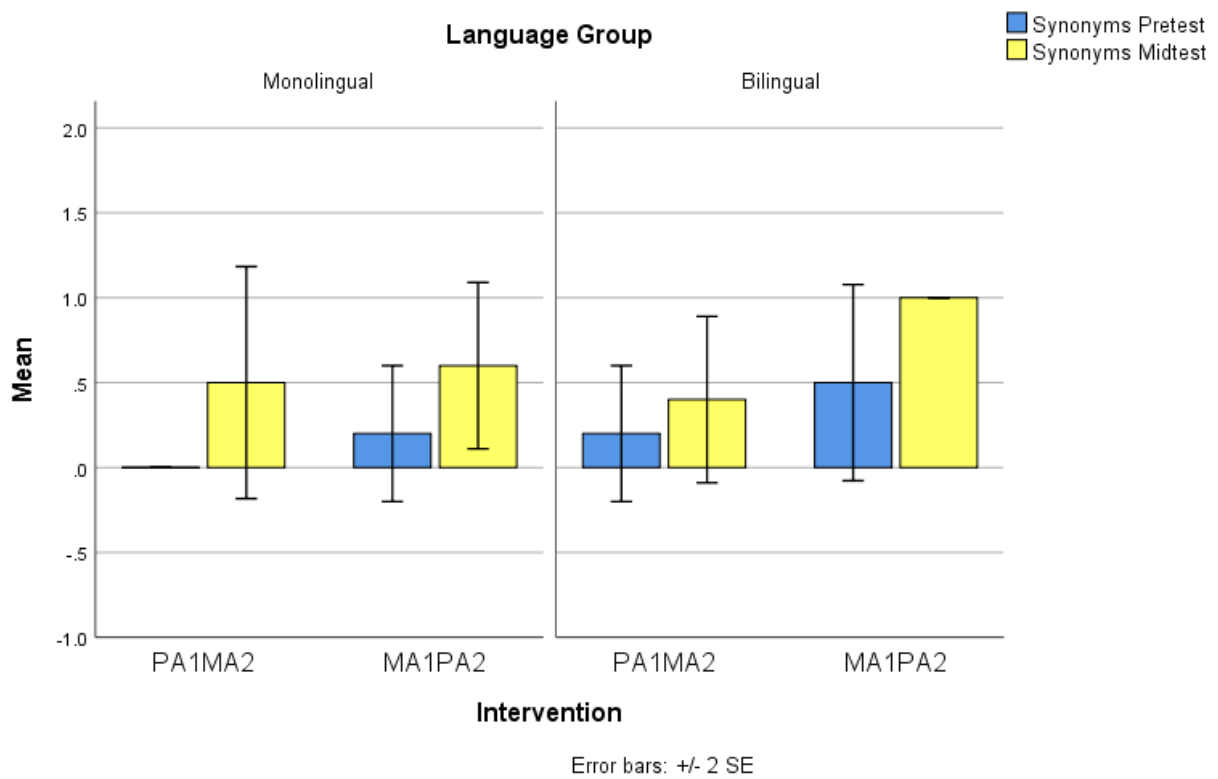


Figure 2.10 Synonym Production Task Performance

### Word analogy task

The results of the three-way analysis of variance for the Word analogy measure indicated a non-significant three-way interaction ( $F_{(1,16)} = 2.14$ ,  $p = .16$ ,  $EF = .12$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 1.77$ ,  $p = .20$ ,  $EF = .10$ ) – see figure 2.11. There was a significant main effect of Time ( $F_{(1,16)} = 34.17$ ,  $p < .001$ ,  $EF = .68$ ).

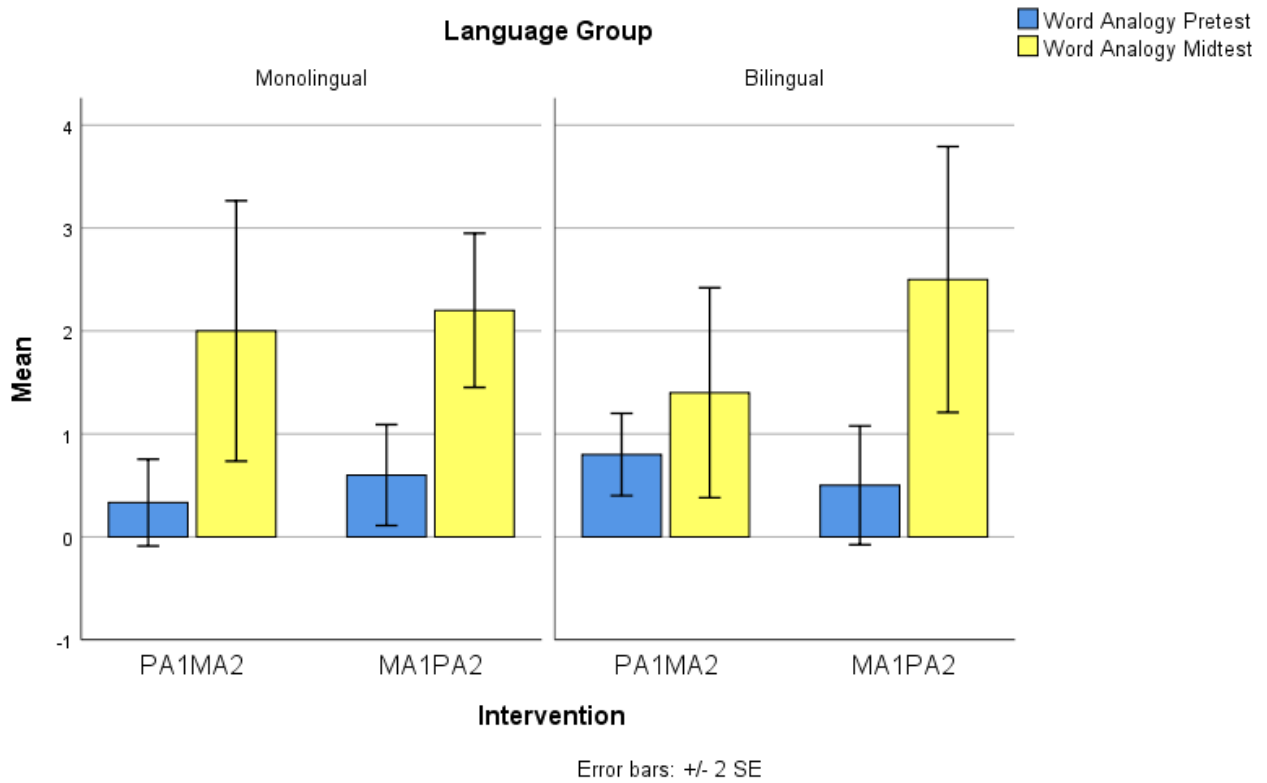


Figure 2.11 Word Analogy Task Performance

### ***Text comprehension task***

The results of the three-way analysis of variance for the Text comprehension measure indicated a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .37$ ,  $EF = .05$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .67$ ,  $EF = .01$ ) – see figure 2.12. There was a significant main effect of Time ( $F_{(1,16)} = 49.15$ ,  $p < .001$ ,  $EF = .75$ ) and of Intervention group ( $F_{(1,16)} = 8.34$ ,  $p = .011$ ,  $EF = .34$ ).

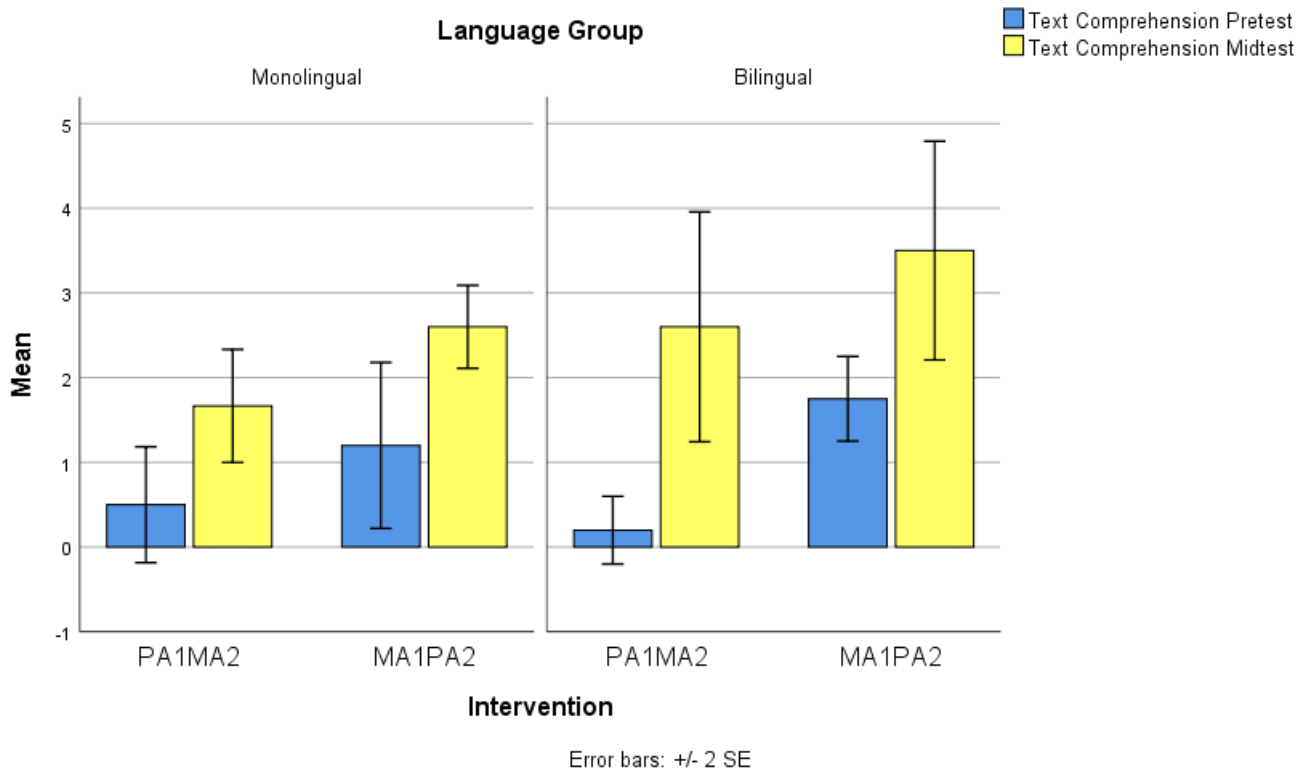


Figure 2.12 Text Comprehension Task Performance

**Comparisons of Time1-Pre versus Time3-Post assessment data**

The next part of the findings will then contrast the Time1-Pre data with the Time3-Post data to evaluate the impact of both interventions. In this particular section, the results for the next intervention are presented for each of the measures in the study, beginning with the phonological measures and advancing from larger units of sound (syllable and rhyme) prior to phoneme-level sounds (alliteration, phoneme isolation and segmentation), succeeded by the letter-sound measure and the morphological measures (inflection and derivation), and ending with the word meaning measures (antonyms, synonyms, analogies and text comprehension).

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Table 2.8 Means, with standard deviations in brackets, for the Monolingual group on each of the study measures at the first and third assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time3-Post	Time 1-Pre	Time3-Post
Syllable Awareness (12 items)	4.33 (2.81)	8.50 (2.26)	5.00 (2.00)	10.00 (1.41)
Rhyme Awareness (12 items)	3.67 (2.73)	6.00 (3.58)	3.60 (.89)	8.40 (1.34)
Alliteration Awareness (12 items)	3.83 (1.84)	5.33 (3.50)	7.20 (2.17)	8.40 (2.07)
Phoneme Isolation (12 items)	3.67 (3.72)	8.50 (4.09)	8.00 (1.58)	11.40 (0.89)
Phoneme Segmentation (12 items)	1.50 (1.38)	2.17 (1.84)	2.40 (2.07)	2.20 (0.84)
Letter-sound Knowledge (32 items)	4.00 (3.23)	20.33 (8.34)	8.80 (.45)	29.40 (1.52)
Morphological Inflection (10 items)	0.17 (0.41)	2.50 (1.52)	0.00 (0.00)	3.60 (1.34)
Morphological Derivation (10 items)	0.33 (0.82)	2.17 (1.33)	0.60 (0.55)	2.80 (1.10)
Antonym Production (23 items)	0.50 (.55)	1.50 (1.38)	0.80 (0.45)	3.00 (1.41)
Synonym Production (23 items)	0.00 (0.00)	1.33 (1.03)	0.20 (0.45)	2.0 (1.0)
Word Analogy (40 items)	0.33 (0.52)	2.17 (1.60)	0.60 (0.55)	3.40 (1.67)
Text Comprehension (38 items)	0.50 (0.84)	3.50 (2.67)	1.20 (1.10)	5.80 (1.30)



Table 2.9 Means, with standard deviations in brackets, for the Bilingual group on each of the study measures at the first and third assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time3-Post	Time 1-Pre	Time3-Post
Syllable Awareness (12 items)	5.40 (2.60)	7.80 (1.48)	7.50 (1.73)	7.75 (0.96)
Rhyme Awareness (12 items)	2.80 (1.09)	7.80 (3.42)	5.50 (2.08)	7.00 (2.45)
Alliteration Awareness (12 items)	3.20 (2.95)	8.60 (2.70)	8.50 (2.52)	10.75 (1.89)
Phoneme Isolation (12 items)	4.80 (3.83)	11.40 (0.89)	9.50 (1.92)	11.75 (0.50)
Phoneme Segmentation (12 items)	0.40 (0.89)	1.80 (0.84)	2.75 (2.63)	6.25 (3.40)
Letter-sound Knowledge (32 items)	7.40 (2.61)	24.80 (7.34)	9.25 (1.89)	30.25 (0.96)
Morphological Inflection (10 items)	0.20 (0.45)	2.60 (1.14)	0.25 (0.50)	3.00 (0.82)
Morphological Derivation (10 items)	0.20 (0.45)	2.60 (1.14)	0.50 (0.58)	2.75 (1.26)
Antonym Production (23 items)	0.80 (.45)	2.0 (0.71)	1.25 (0.50)	2.50 (1.73)
Synonym Production (23 items)	0.20 (0.45)	1.40 (0.55)	0.50 (0.56)	1.75 (0.96)
Word Analogy (40 items)	0.80 (0.45)	2.40 (1.67)	0.50 (0.58)	4.75 (0.50)
Text Comprehension (38 items)	0.20 (0.45)	4.20 (1.92)	1.75 (0.50)	4.75 (2.63)

### Syllable awareness task

The results after conducting a three-way analysis of variance for the Syllable awareness performance measure showed a non-significant three-way interaction ( $F_{(1,16)} = 2.06$ ,  $p = .17$ ,  $EF = .11$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .54$ ,  $EF = .02$ ). Figure 2.13 shows the results for the Syllable awareness measure. There were statistically significant main effects of Time ( $F_{(1,16)} = 32.27$ ,  $p < .001$ ,  $EF = .67$ ) and Language background ( $F_{(1,16)} = 9.81$ ,  $p = .006$ ,  $EF = .38$ ) – the latter effect suggesting that the Monolingual children (left-hand side of the figure) were the better group on this Syllable awareness task.

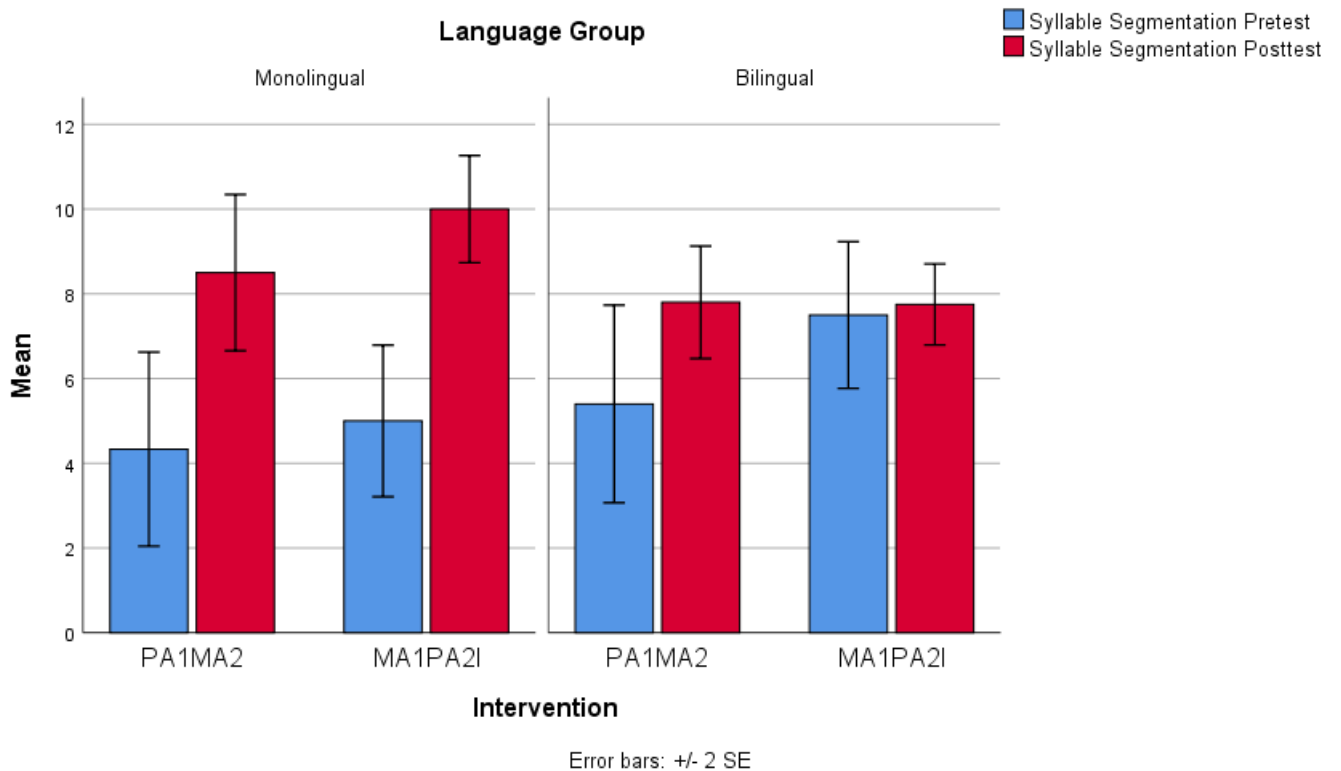


Figure 2.13 Syllable Segmentation Awareness Task Performance

### Rhyme awareness task

The results of the three-way analysis of variance for the Rhyme awareness measure indicated a significant three-way interaction ( $F_{(1,16)} = 4.87, p = .04, EF = .23$ ) which can be observed in Figure 2.14. Further evaluation using two-way analyses of variance revealed a non-significant interaction between the Time and Intervention factors for the Bilingual children ( $F_{(1,7)} = 1.72, p = .23, EF = .20$ ), but a significant interaction between Time and Intervention factors for the Monolingual children ( $F_{(1,9)} = 4.65, p = .05, EF = .34$ ). As displayed in figure 2.14, the Monolingual children (left-hand side of the figure) showed greater gains than the Bilingual group, in Rhyme awareness scores following both intervention orders.

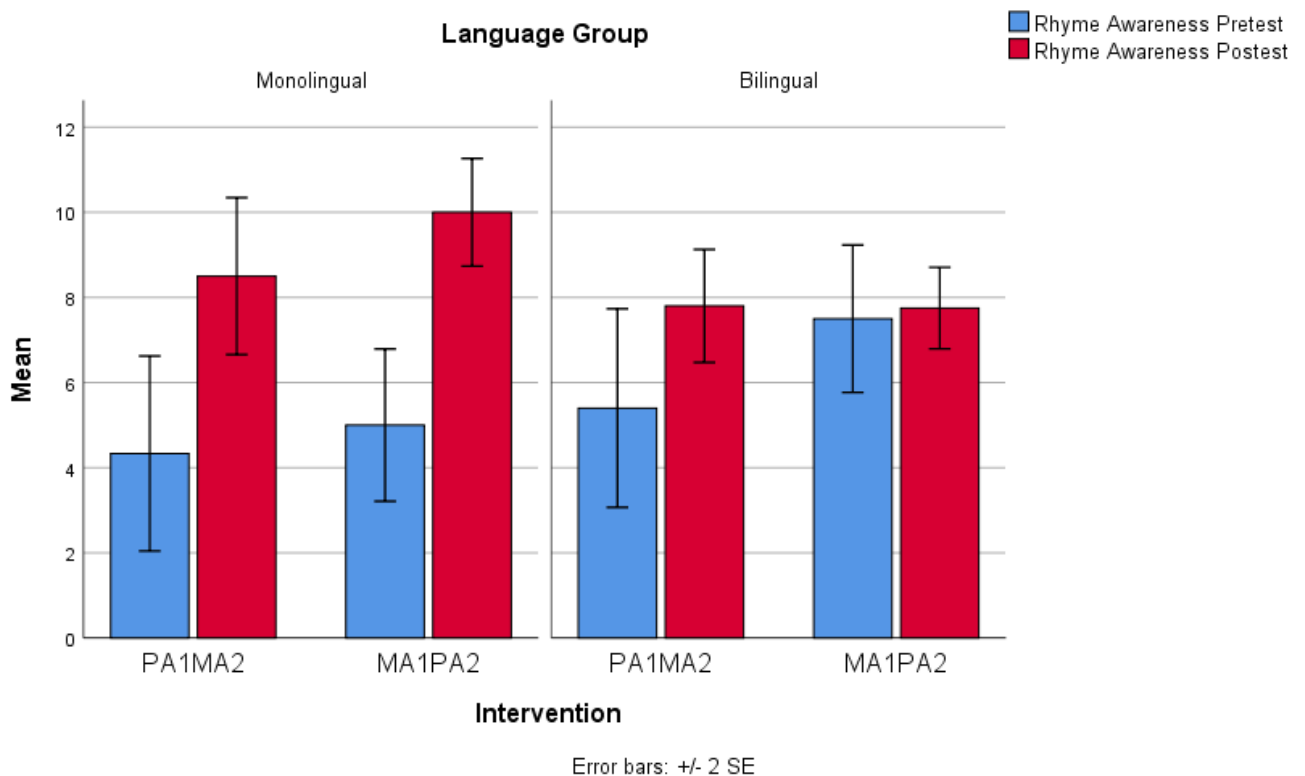


Figure 2.14 Rhyme Awareness Task Performance

### Alliteration awareness task

The outcome of the three-way analysis of variance for the Alliteration awareness measure revealed a non-significant three-way interaction ( $F_{(1,16)} = 1.32$ ,  $p = .27$ ,  $EF = .08$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .65$ ,  $EF = .01$ ). Figure 2.15 below shows the results for the Alliteration awareness task. The only statistically significant effect was a main effect of Time ( $F_{(1,16)} = 17.45$ ,  $p < .001$ ,  $EF = .52$ )

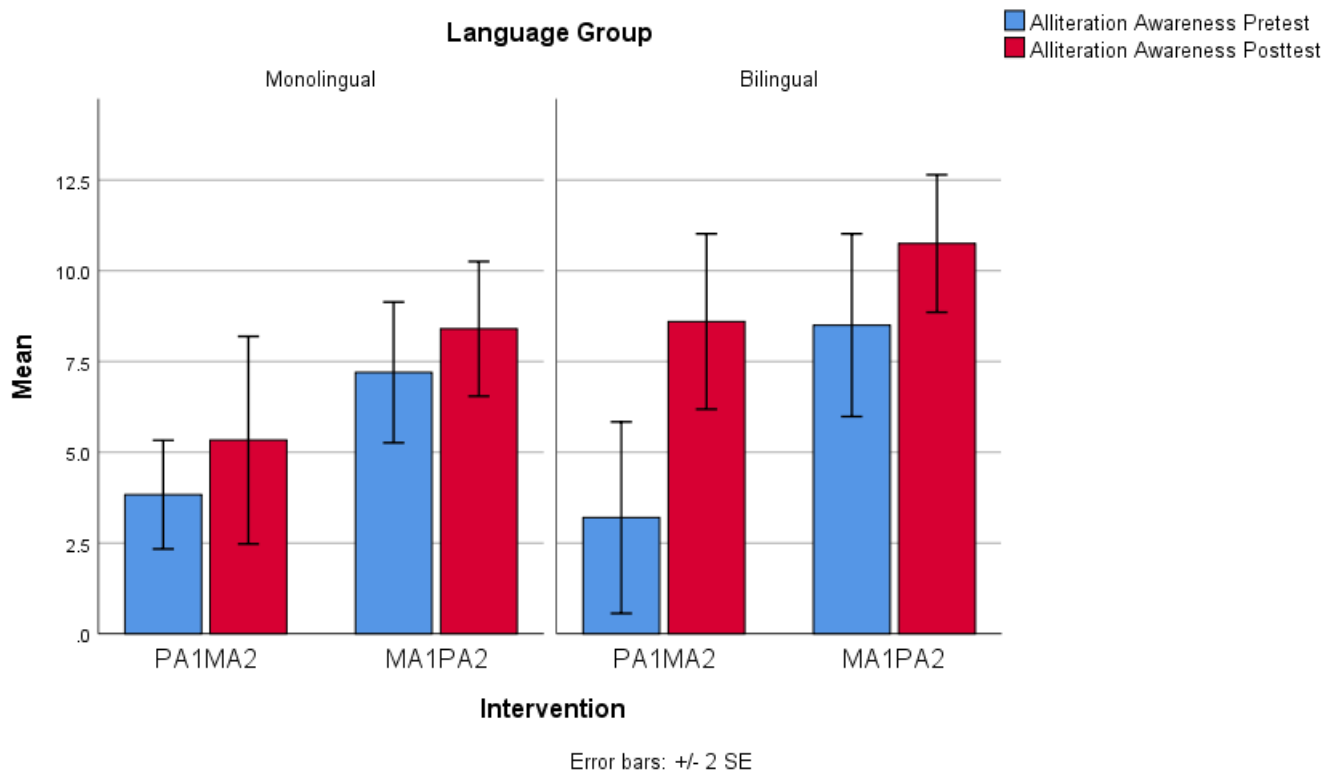


Figure 2.15 Alliteration Awareness Task Performance

### Phoneme isolation task

The findings attained after conducting a three-way analysis of variance showed a non-significant three-way interaction ( $F_{(1,16)} = 1.23$ ,  $p = .29$ ,  $EF = .07$ ) – this is shown in Figure 2.16. However, there was a significant interaction between Time and Intervention factors ( $F_{(1,16)} = 4.82$ ,  $p = .04$ ,  $EF = .23$ ). This suggested that both the Monolingual and Bilingual groups showed greater gains in phoneme isolation when the phonological intervention was administered first. There was also a statistically significant main effect of Time ( $F_{(1,16)} = 38.87$ ,  $p < .001$ ,  $EF = .81$ ).

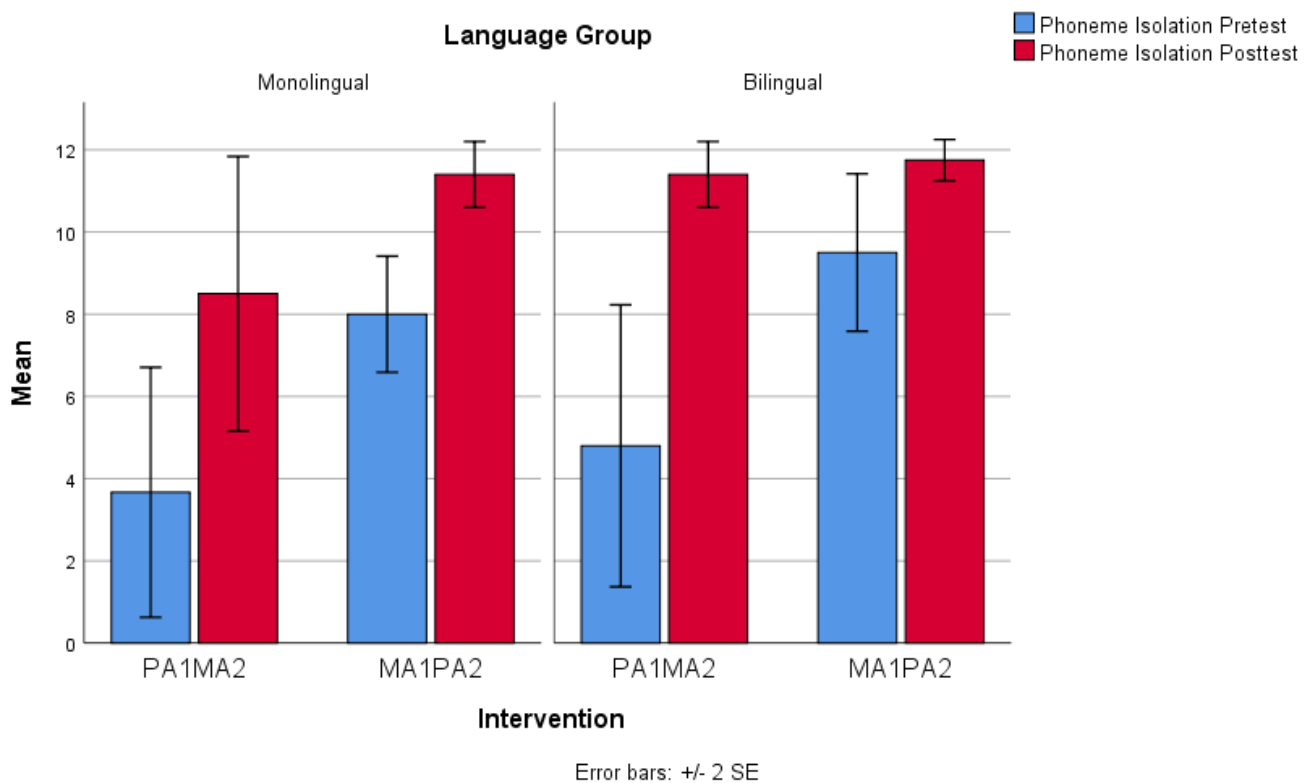


Figure 2.16 Phoneme Isolation Awareness Task Performance

### Phoneme segmentation task

The outcome of the three-way analysis of variance for the Phoneme segmentation measure indicated a non-significant three-way interaction ( $F_{(1,16)} = 1.30$ ,  $p = .27$ ,  $EF = .08$ ) and non-significant interaction between the Time and Intervention factors ( $F_{(1,16)} = 2.91$ ,  $p = .11$ ,  $EF = .15$ ) – see Figure 2.17.

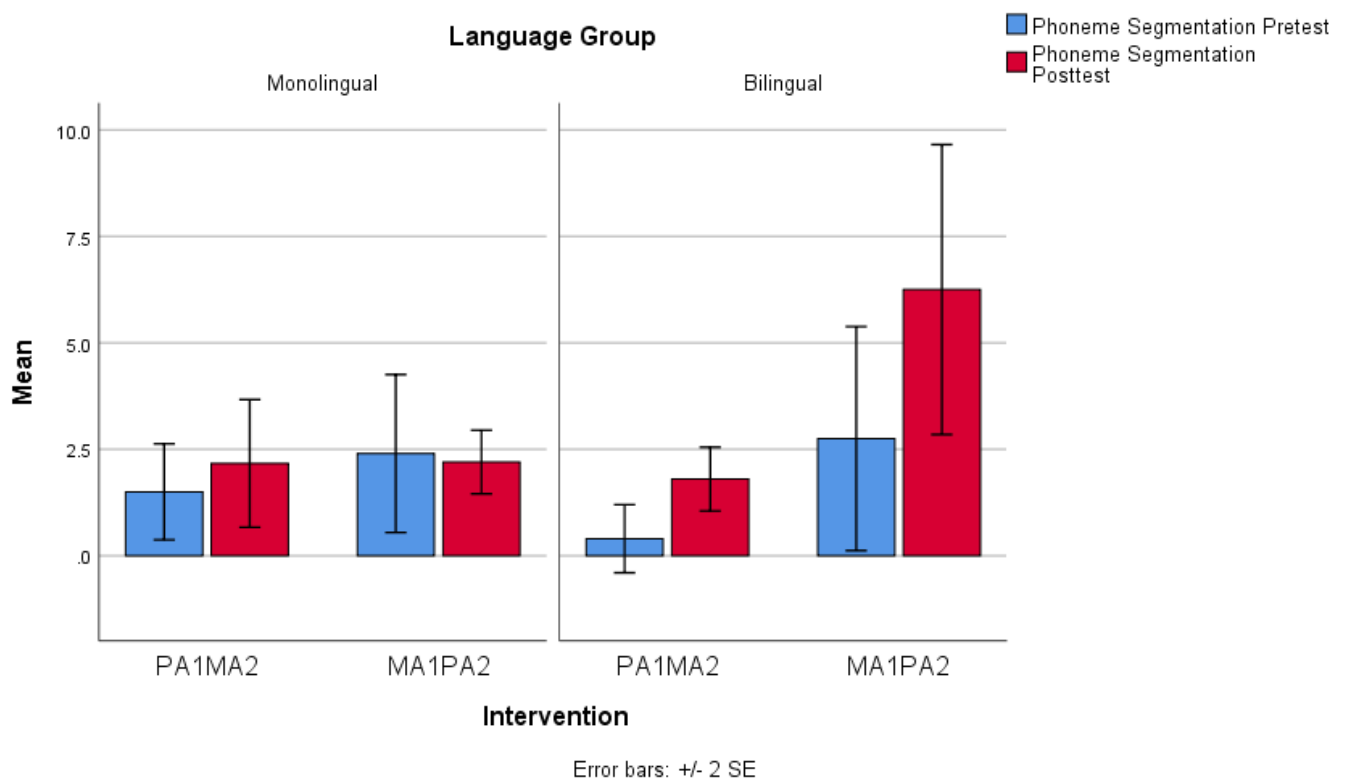


Figure 2.17 Phoneme Segmentation Awareness Task Performance

### Letter-sound task

The results of the three-way analysis of variance for the letter-sound correspondence assessment showed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .87$ ,  $EF = .002$ ) and a non-significant main effect between the Time and Intervention factors ( $F_{(1,16)} = 3.87$ ,  $p = .07$ ,  $EF = .20$ ) – see Figure 2.18. There was a significant main effect of Intervention ( $F_{(1,16)} = 8.64$ ,  $p = .010$ ,  $EF = .35$ ), with those in the Morphological treatment group out-performing the other intervention group.

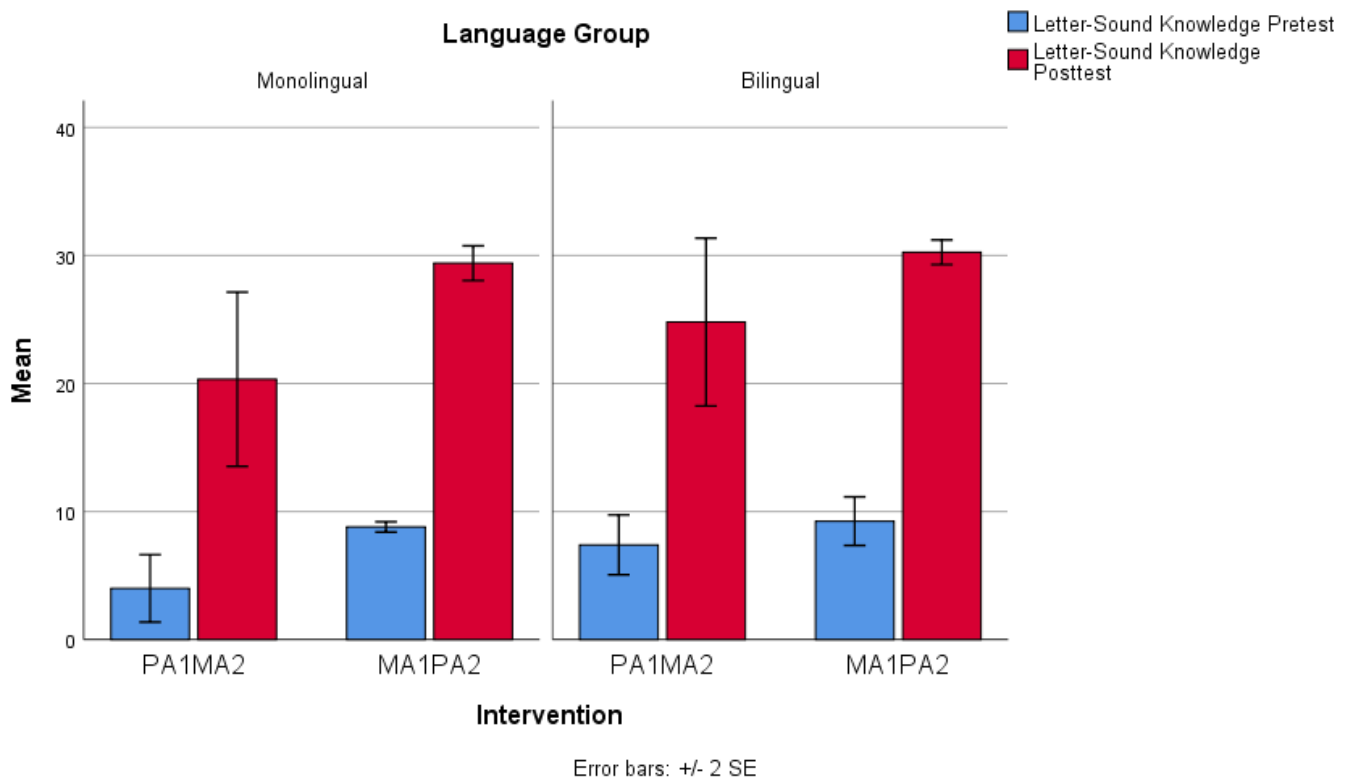


Figure 2.18 Letter-Sound Knowledge Task Performance

### **Morphological awareness inflection task**

The results of the three-way analysis of variance for the Morphological awareness inflection measure demonstrated a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .46$ ,  $EF = .04$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} = 1.80$ ,  $p = .20$ ,  $EF = .10$ ) – see Figure 2.19. There was a statistically significant main effect of Time ( $F_{(1,16)} = 84.49$ ,  $p < .001$ ,  $EF = .84$ ).

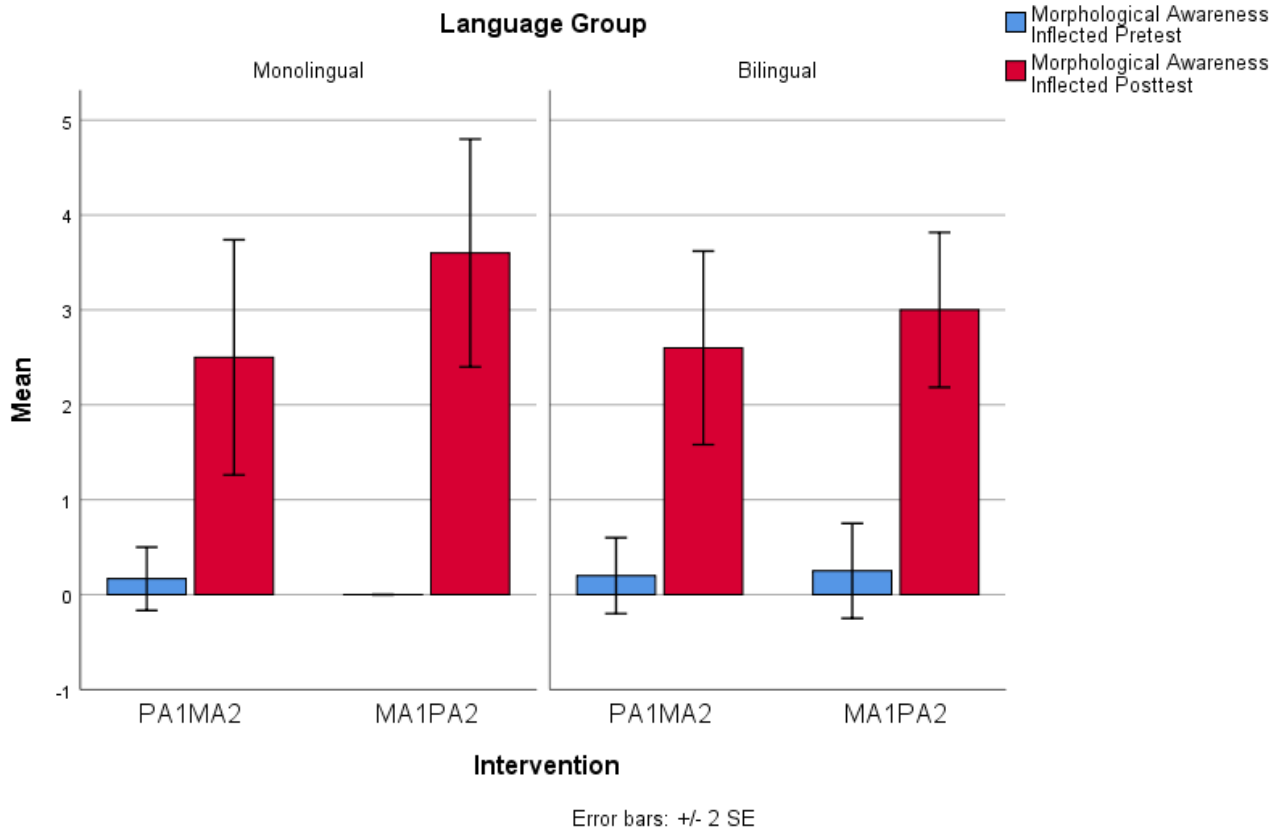


Figure 2.19 Morphological Awareness Inflection Task Performance



### **Morphological awareness derivation task**

After conducting a three-way analysis of variance for the Morphological awareness derivation task, the results revealed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .69$ ,  $EF = .010$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .87$ ,  $EF = .002$ ) – see Figure 2.20. The only significant main effect recorded was that of the Time factor ( $F_{(1,16)} = 46.77$ ,  $p < .001$ ,  $EF = .75$ ).

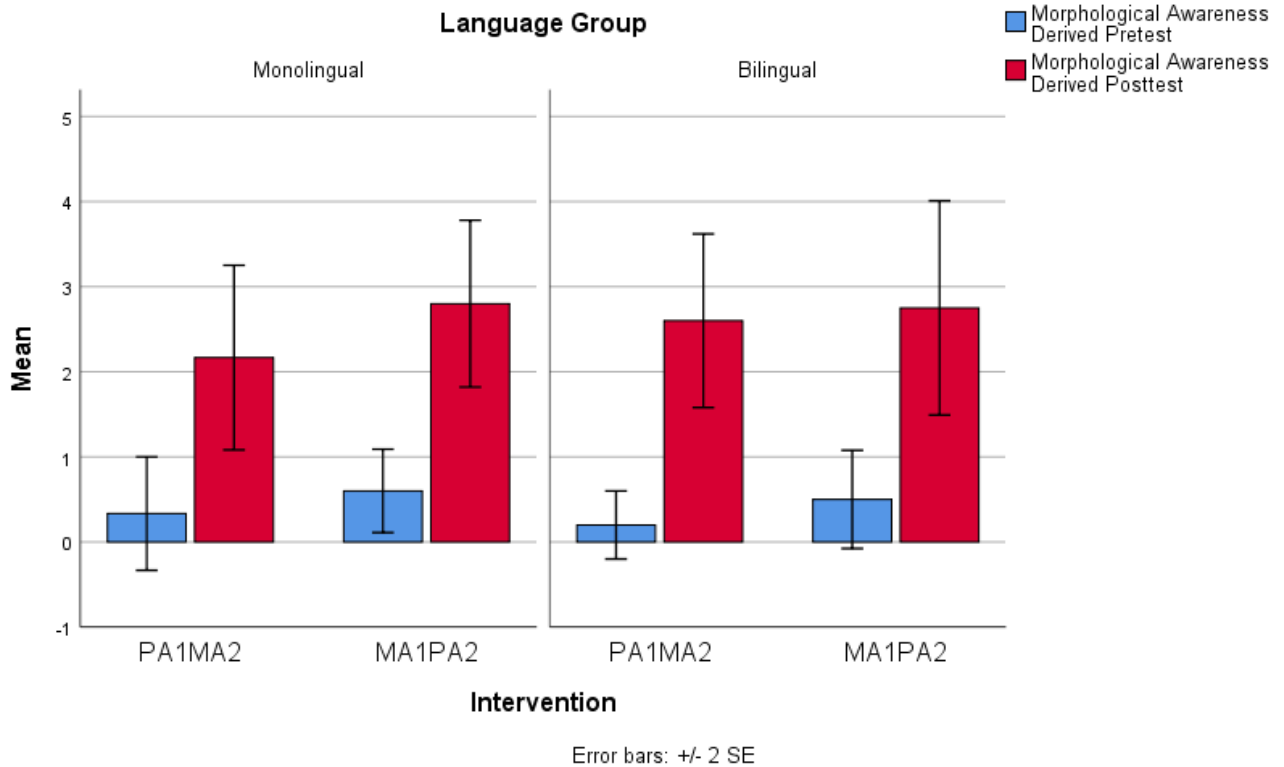


Figure 2.20 Morphological Awareness Derivation Task Performance

### ***Antonym production task***

The results of the three-way analysis of variance for the Antonym production measure displayed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .37$ ,  $EF = .05$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} = 1.01$ ,  $p = .33$ ,  $EF = .06$ ) – see Figure 2.21. There was a statistically significant main effect of Time ( $F_{(1,16)} = 20.61$ ,  $p < .001$ ,  $EF = .56$ ).

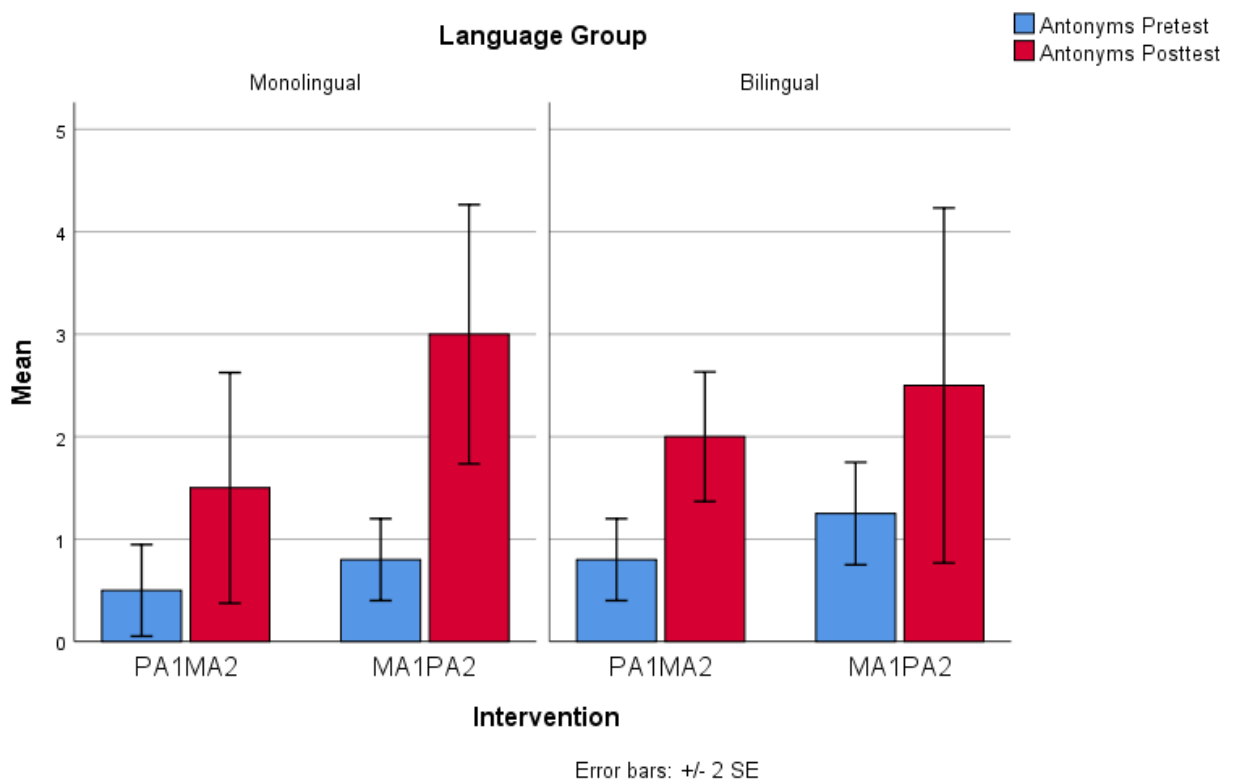


Figure 2.21 Antonym Production Task Performance

### Synonym production task

The results of the three-way analysis of variance for the Synonym production assessment revealed a non-significant three-way interaction ( $F_{(1,16)} < 1$ ,  $p = .56$ ,  $EF = .02$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .47$ ,  $EF = .03$ ) – see Figure 2.22. There was a statistically significant main effect of Time ( $F_{(1,16)} = 63.07$ ,  $p < .001$ ,  $EF = .80$ ).

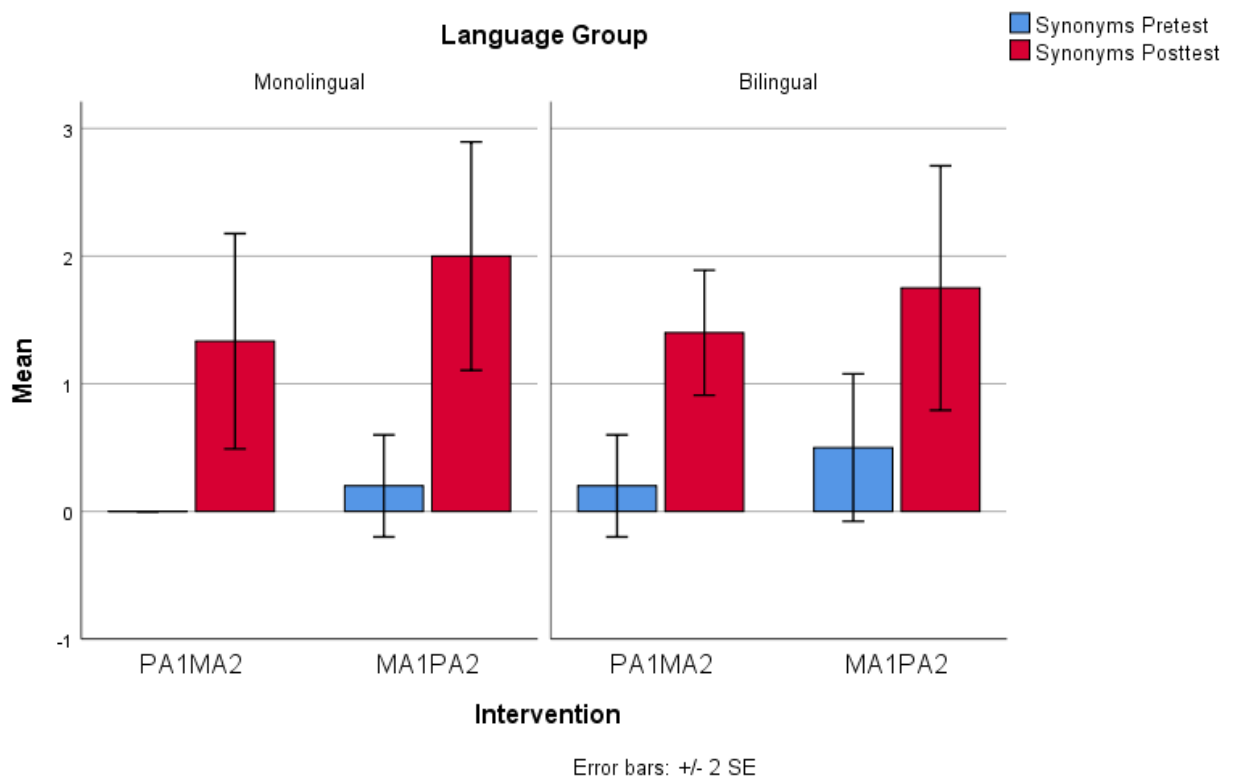


Figure 2.22 Synonym Production Task Performance

### Word analogy task

The findings of the three-way analysis of variance for the Word analogy measure yielded a non-significant three-way interaction ( $F_{(1,16)} = 2.17$ ,  $p = .16$ ,  $EF = .12$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,16)} < 1$ ,  $p = .47$ ,  $EF = .03$ ) – see Figure 2.23. There was a statistically significant main effect of Time ( $F_{(1,16)} = 63.07$ ,  $p < .001$ ,  $EF = .84$ ).

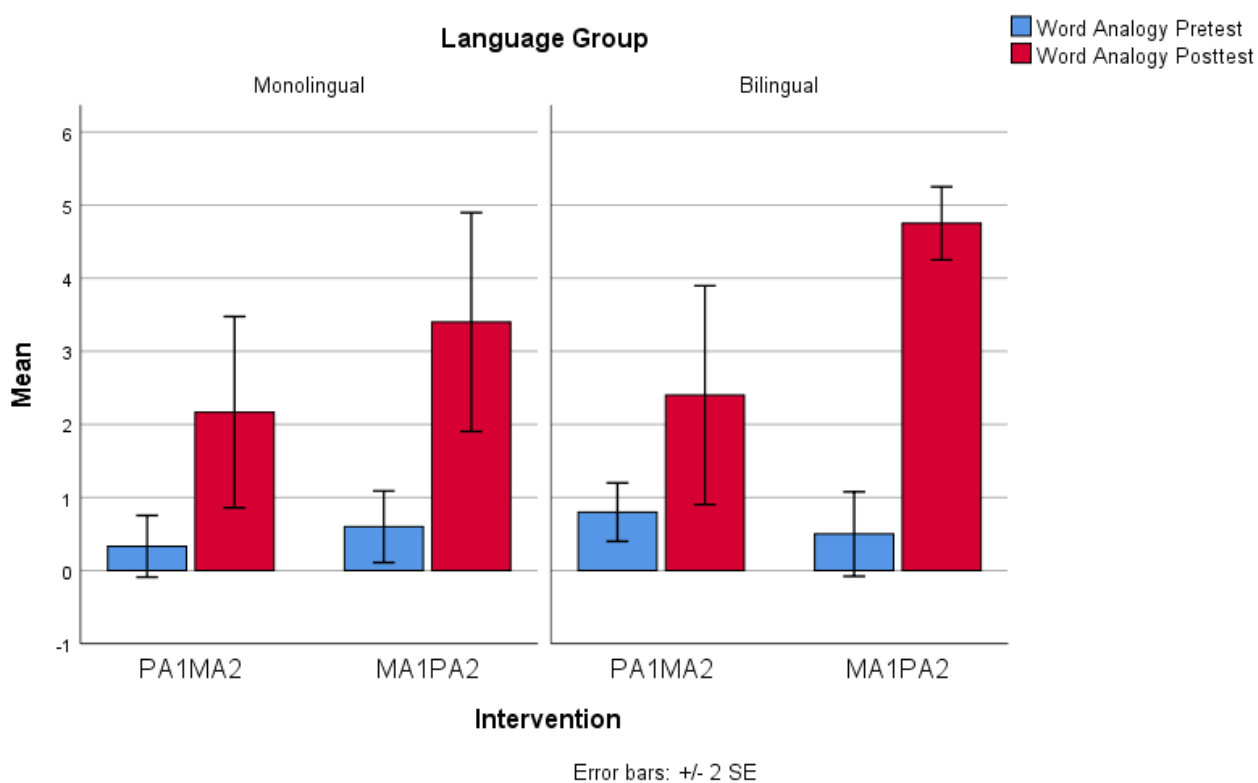


Figure 2.23 Word Analogy Task Performance

### Text comprehension task

The outcome of the three-way analysis of variance for the Text comprehension assessment revealed a non-significant three-way interaction ( $F_{(1,16)} = 1.97$ ,  $p = .18$ ,  $EF = .11$ ) and a non-significant interaction between Time and intervention factors ( $F_{(1,16)} < 1$ ,  $p = .75$ ,  $EF = .01$ ) – see Figure 2.24. There was, however, a significant main effect of Time ( $F_{(1,16)} = 62.15$ ,  $p < .001$ ,  $EF = .80$ ) and Intervention ( $F_{(1,16)} = 4.71$ ,  $p = .04$ ,  $EF = .23$ ), with the Morphological Intervention group out-performing their peers on this measure.

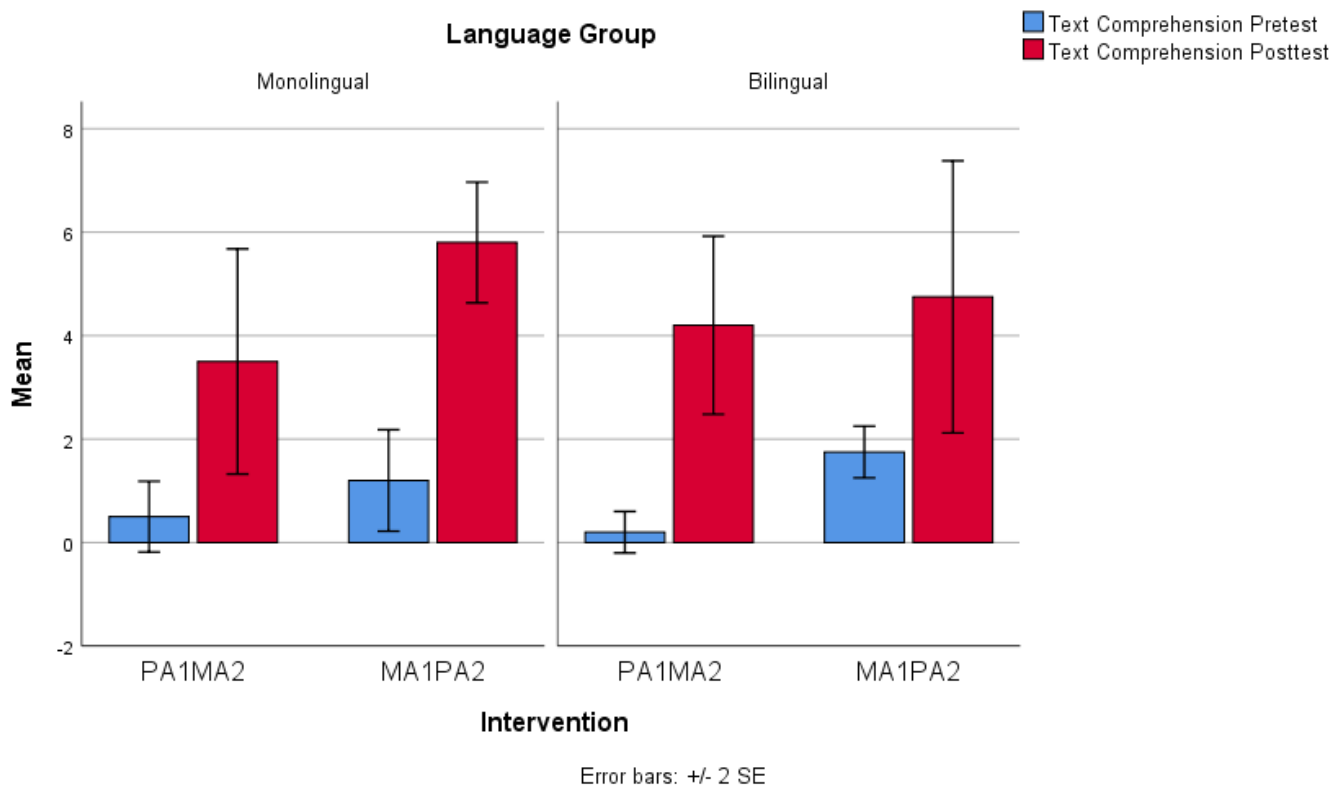


Figure 2.24 Text Comprehension Task Performance

## **Comparison Control Group**

Understanding the effect of normal language development and the effects of regular classroom instruction in Grade 1 will help with the interpretation of the results. Due to ethical reasons, control data could not be collected over the period of the study. However, data from previous research conducted by Carson et al. (2013) within the same New Zealand context can be used for comparison purposes. The 95 children in the Carson et al. study closely matched the students in the current research in terms of age and school year level. In addition, the control group in Carson et al.'s study was not previously exposed to additional reading support services nor did they receive any formal training in relation to the development of phonological awareness. Matching was made possible through close examination of assessment outcomes that were accessible for the students in the control group. Table 2.10 compares the performance on measures of verbal and non-verbal skills, upon school entry, of children serving as participants in the present study with those observed in Carson et al.'s previous research.

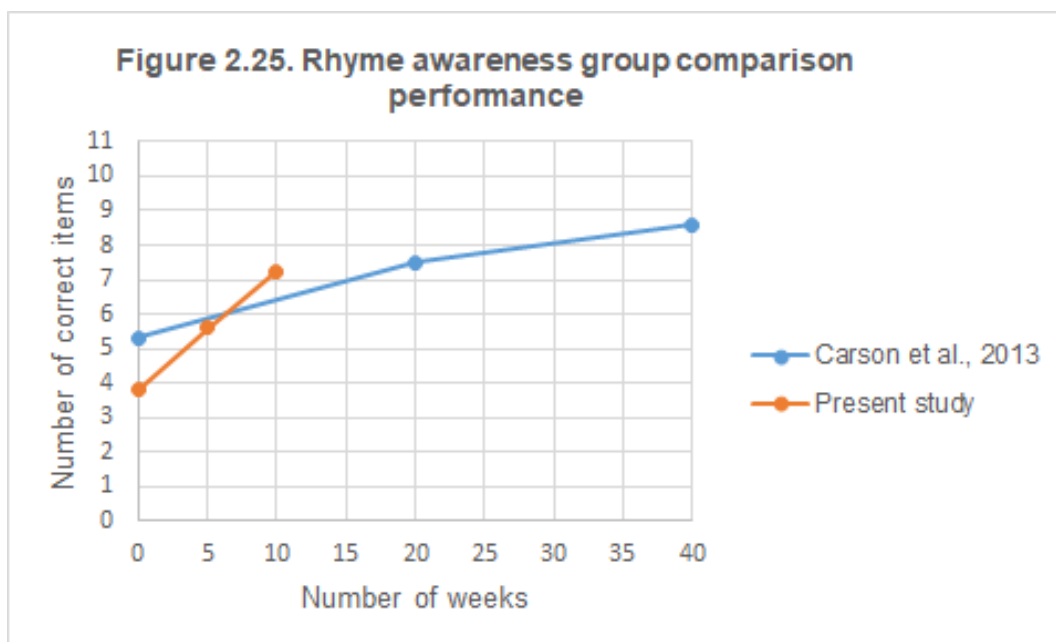
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**Table 2.10.****Comparison of Means and Standard Deviations of School-entry performance on measures of verbal and non-verbal skills**

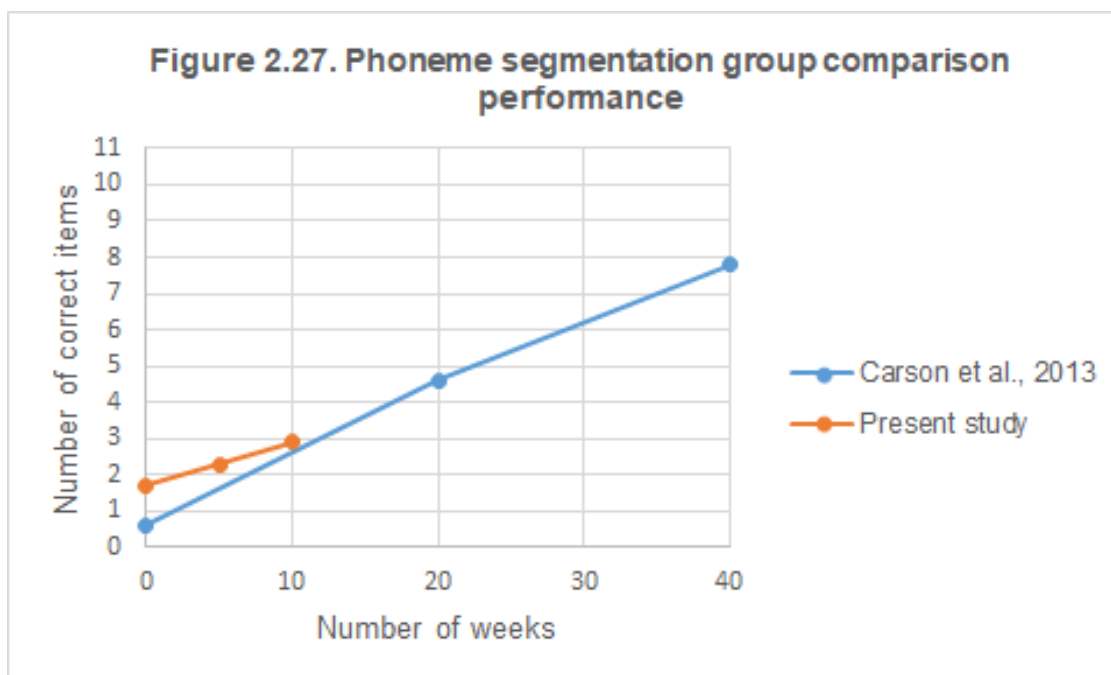
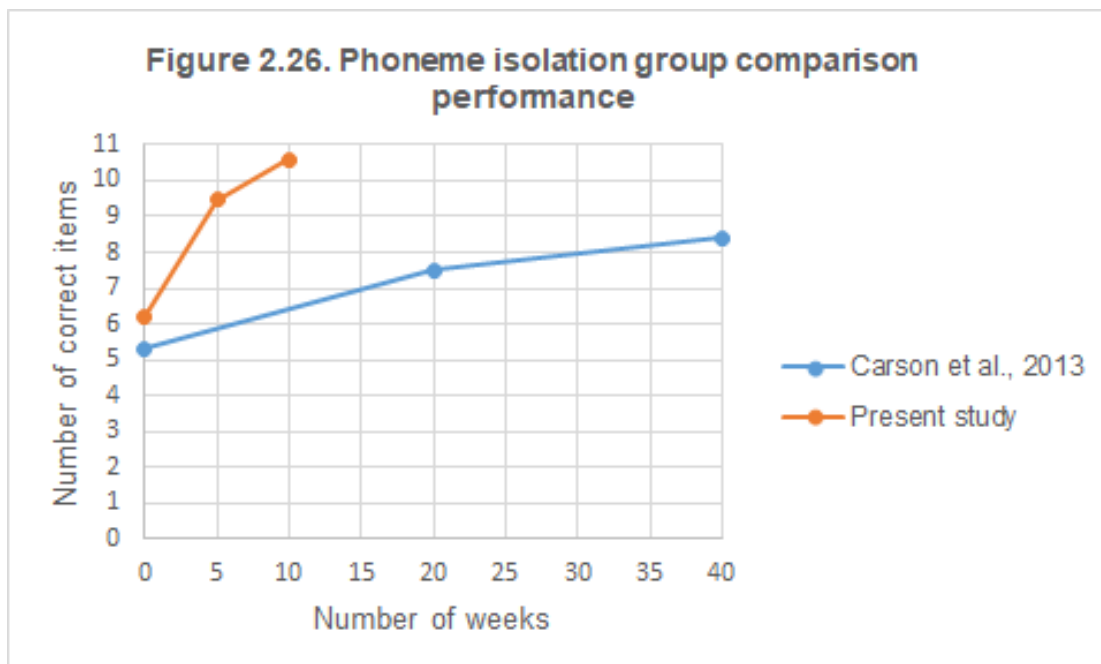
	CELF-P2		P-TONI	Phonological Awareness		
	RLI	ELI		RO	IPI	PS
Carson et al. (2013) n = 95	98.3 (10.8)	96.8 (1.1)	103.2 (7.3)	5.3 (2.5)	5.3 (3.0)	0.6 (0.9)
Current Study (2019) n = 20	71.95 (12.23)	76.4 (14.22)	103.05 (8.6)	3.8 (1.99)	6.20 (3.68)	7.1 (3.09)

*Note.* TONI = Test of Non-verbal Intelligence Standard Scores (M = 100, SD = +/-15) (Ehrler & McGhee, 2008); CELF – P2 RLI = Clinical Evaluations of Language Fundamentals Preschool-2, Receptive Language Index (M = 100, SD = +/-15) (Wiig et al., 2006); CELF – P2 ELI = Clinical Evaluations of Language Fundamentals Preschool-2, Expressive Language Index (M = 100, SD = +/-15) (Wiig et al., 2006); Portion of results derived from a computer-based phonological awareness assessment designed by Carson et al. (2013), wherein RO = rhyme oddity, IPI = initial phoneme identity and PS = phoneme segmentation.

Participants in the present study, who were provided with instructional training, were observed to display gains in scores as early as five weeks; with improvement continuously increasing toward final assessment (i.e. 10<sup>th</sup> week), compared to the slow progression shown by children in the Carson et al. (2013) study who were assigned to receive only the regular classroom literacy curriculum (i.e. whole language approach concentrating on meaning plus phonics instruction) for the entire year. Figures 2.25, 2.26 and 2.27 contrast the trajectory of phonological awareness development across time for the following measures: rhyme awareness, phoneme isolation and phoneme segmentation. Learners in the present study, representative of the group of children with specific language deficiencies who had been administered with explicit phonological awareness training, shows immediate increase in scores in the first few weeks as opposed to those students who were not placed in any form of intervention program.







## Discussion

The research investigation presented in this chapter sought to assess the effectiveness of implementing a phonological and morphological awareness intervention approach, in facilitating the advancement of reading-related skills, with a particular focus on reading comprehension in the form of enhancing word meaning and text comprehension.

Findings from the experiment, taking into consideration the New Zealand context, revealed that children exhibiting specific language weaknesses showed positive responses to the administered treatment approaches; based on significant gains in the scores on most measures assessed over the course of the study. Such findings suggest that although the consequences of language deficits have been described as being cumulative and pervasive on learning and acquisition of language, these deficiencies are pliant to change over time and improvements can be attained given appropriate intervention. A second point to note is that the present research indicated that the amount of time required to enact favorable results in at-risk populations could be shorter than found by previous researchers (for example Gillon, 2005 and Gillon & McNeill, 2009). In this thesis, children attended a maximum of 20 sessions equating to an overall total of 15 hours intervention time. The improvement of performance scores in the training program may be attributed to the weekly individual and small-group sessions administered to the learners that may have reinforced the targeted literacy and language skills in such a short time.

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The findings also suggest that short-term interventions that focus on metalinguistic awareness training, especially those that emphasize the development of phonological and morphological knowledge, can be used in conjunction with regular teaching occurring in primary schools in New Zealand. Such interventions may complement with existing practice that focus on whole language approaches or phonics instruction. This would further ensure that learners are developing the required capabilities when they approach literacy instruction.

Likewise, the present study suggests that focusing on explicit instruction among school-aged children with specific language weaknesses, through the use of interventions that target syllable-level and phoneme-level skills, may lead to a positive influence on the learners' explicit awareness of the sound structures of a language. Learners, especially those under the phonological awareness training, were able to display increases in scores on the syllable awareness, phoneme isolation and text comprehension tasks. This indicates the beneficial impact of phonological awareness training in advancing perception of large and small units of sound and gives further credence to the claim that children who struggled with literacy in the early years due to severe limitations in phonological awareness can respond favorably to specific phonological awareness instructional programs that incorporate phonological awareness activities. The improvements in the processing of phonemes indicates that even the most demanding of phonological tasks can be promoted after constant and continuous exposure to explicit instruction.

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In addition, the gains in scores observed in the text comprehension task may signify evidence that children with specific language weaknesses can efficiently use phonological cues in the reading process, if guided accordingly. The enhanced performance may also have been influenced by the teaching approach made up of working out letter-sound correspondences, blending and segmenting words in reading connected text. Since phonological awareness was merged with sound-symbol knowledge, students were not taught to simply decode sounds within words in isolation. Hence, the disconnection that traditional instructional methods promote in reading programs between grasping the strategy for learning and knowing how to derive meaning from the text are prevented. Also, the significant gains in the text comprehension task indicate that phonological awareness training may contribute to reading comprehension through its relevance in boosting efficient word reading skills. The outcome was consistent with previous research findings that have emphasized the importance of developing phonemically-structured representations in successful reading of alphabetic scripts (Metsala & Walley, 1998). Failure to enhance such representations was deemed responsible for compounding deficits in learning to read (Hulme & Snowling, 2009, Szenkovits & Ramus, 2005).

Moreover, morphological knowledge of derivations was recorded to have improved after five weeks of intervention, this time, among participants initially provided with morphological awareness training. This may be surprising because although Grade 1 students have basic knowledge of derived forms, such knowledge should be much less than their understanding of base and inflected forms (Anglin, 1993): past research

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on morphological awareness has pointed out that knowledge in inflections becomes evident earlier than that of derivations (Anglin, 1993; Carlisle, 2000; Tyler & Nagy, 1989). However, the increase in scores of students under the morphological awareness group on the word analogy derivation task may be explained by the presence of words that have high phonological transparency (i.e. base words remain intact in the derived form after the word's transformation). The number of phonologically transparent words in the word analogy inflection task was only a third as much as that of the derivation task. An example of phonological transparency evident in the word derivation task is demonstrated in the item *mess:messy::fun:\_\_\_\_\_*; where a child can easily supply the missing derived form funny because the base word 'fun' remains the same and even retains its pronunciation after the word transformation. Equally important to mention is that many of the phonologically transparent items included in the word derivation task are high frequency words leading to greater chances of familiarity (e.g. Item - *teach:teacher::work:\_\_\_\_\_* Answer: *worker*). This finding was consistent with earlier literature reporting that factors relating to word frequency, familiarity and transparency perform a significant role in gauging a reader's cognizance of morphological structure. Carlisle and Stone (2005) reported that children can instantly and accurately read derived words that are considered phonologically transparent and highly frequent; compared to those that have low frequency and undergo greater phonological shifts in transformation. The authors of the test from which the current measure was adapted (Kirby et al., 2012), attested that the morphological awareness measure was reasonably reliable for Grade 1 students (Reliability Coefficient = 0.80), and conducted regression analyses to argue for the construct validity of the word analogy measures (see Kirby et

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al., 2012). However, future studies on different aspects relating to morphological awareness to help clarify the inter-relationships between the factors discussed in this paragraph are vital. Still, the results of the current research suggest that children presenting with specific language weaknesses appear vulnerable to morphological complexities of derived words with base forms obscured by the application of phonological shifts (e.g. twelve to twelfth). This may indicate that the lack of a robust fundamental knowledge on the phonological structures of a language may be linked to learner's deficiencies in generating the target derived forms.

The lack of a significant interaction effect observed for the task requiring morphological knowledge on inflections, may be due to the more natural development of such knowledge occurring within the Year 1 students. This may have led all children showing the same level of increase in knowledge irrespective of the intervention method. It was also observed that the participants encountered difficulty with complicated inflection transformations, as they tend to overgeneralize rules applying the past tense inflection *-ed* to signify the past tense form of the word. An example would be in the item *push:pushed::lose:\_\_\_\_\_*, where all children answered '*losed*' instead of the correct word '*lost*.' Such errors indicate that learners have an implicit understanding of inflectional morphological rules despite supplying answers that are orthographically and phonologically incorrect. This latter important aspect of morphological tasks may also be influenced by phonological training – recognizing that '*losed*' was phonologically incorrect may have supported performance in this task also. Hence, as mentioned above, further research will be needed to determine the specific

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effects of such training, and how learning can be optimized with such young learners with a range of language weaknesses.

The study showed no specific effects on the letter-sound knowledge task of phonological awareness training. It was assumed that children administered with phonological awareness training would better foster mappings of sound-symbol correspondences than those training in morphological awareness. Previous research investigations in the United States, involving 358 pre-school children tested using a comprehensive battery of assessments in blending, rhyme, letter-sound knowledge, elision, and receptive vocabulary, demonstrated that letter knowledge and phonological knowledge have a bidirectional relationship (Lerner & Lonigan, 2016; Burgess & Lonigan, 1998). However, both phonological and morphological awareness groups showed improvements in letter-sound awareness. This may be attributed to the degree of activation stimulated among the children upon seeing a component letter found in morphemes they are familiar with. It is possible that learners create a visual or symbolic representation of morphemic units that can be tapped when faced with a low frequency or unfamiliar letter string. Hence, morphological training can also support the links between letters and sounds as much as phonological training.

Within the context of this study, between the two treatment approaches, the phonological awareness training resulted in immediate positive outcomes in text comprehension as opposed to the morphological awareness intervention. This does not suggest the complete disregard of teaching morphemic units, but rather the success of a phonological approach may be due to the type of reading comprehension test derived

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from the WRMT-III. This test comprised short sentences with simple words that contain conceptually straightforward ideas. The major factor in attaining success in the said task was whether students can read the individual words within the sentence. In addition, since phonological awareness instruction was complemented with letter-sound knowledge, children initially introduced to the treatment may have effectively mapped and blended graphemes symbolizing phonemes into recognizable forms. Also, use of printed texts in the teaching activities may have helped in storing individual sight words in the children's memory and the stories discussed may have supported the retention of the said connections in memory. On the contrary, the morphological awareness approach relied more on spoken narratives and a good deal of inferring figurative language through listening or graphic images unaccompanied by written text, which may have led to less use of information learnt to future literacy tasks.

Furthermore, performance evaluation conducted after the second intervention was implemented, showed that both intervention groups continued to display improvements. In particular, those initially administered with phonological awareness instruction followed by morphological awareness training further advanced participants' phoneme-level skills (phoneme isolation and alliteration awareness), even enhancing letter-sound knowledge and text comprehension as evidenced by the said learners' improved scores. The positive literacy outcome showing an interface between phonological and morphological awareness training may be explained by the idea of the English language being morphophonemic in structure; signifying that representations of words are crafted via the merging of phonological and morphological principles (Reed, 2008).

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On the other hand, those provided with morphological awareness training and later given phonological awareness instruction also experienced increases in performance scores on measures of morphology (inflection and derivation) and word-meaning (antonyms, synonyms and word analogy). This specific finding corroborates the discoveries made by Cohen-Goldberg et al. (2013) in their previous study which conclude that phonological and morphological processes are closely interrelated. The gains in morphological knowledge performance scores after the morphological awareness training group received phonological awareness instruction (second intervention) evinces the idea that substantial morphological knowledge heavily mounts on recognition of phonological units and that struggling reader's impediment with morphology is at least a portion of the expression of some form of phonological constraint (Fowler & Liberman, Shankweiler et al., 1995). Such outcomes in the study suggests that phonological awareness may have a stronger influence on success than morphological awareness for beginning readers with language deficits, as it boosts reading comprehension by allowing straightforward processing of uncomplicated English words. Although the participants observed may have identified words or characters in the given assessments by initially sounding them out, the short words involved may have allowed the ease and speed upon which individual words are recognized and recalled based on adequate background knowledge.

The outcome further indicates that in designing literacy intervention strategies for young children with language weaknesses, the establishment of adequate phonological awareness and representations through efficient letter-sound mappings may be critical

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and can be paired with activities focusing on the enhancement of meaning via morphemic awareness only if such multi-morphemic words occur with greater frequency in text and possess high phonological transparency.

The current investigation also investigated whether the language background of the students influenced performance results. Two groups of learners were compared: a monolingual language-weak and bilingual language-weak group, both studying in New Zealand. Statistical analyses revealed that no consistent significant difference between monolingual and bilingual language weak learners were evident over the first five week intervention. These results suggest that the two groups may have benefitted equally from the metalinguistic awareness intervention. However, there were instances where the bilingual language weak learners seem to outperform the monolingual language weak learners on the phoneme-based measures. One possible explanation for an advantage in the tasks may be that the bilingual learners' exposure to shared phonetic units in more varying settings (due to regular experience of another language) than their monolingual counterparts. This may be partly related to the language backgrounds of many of the participants in the bilingual language group: i.e. Tagalog, Spanish and Samoan. These languages appear to have a certain degree of phonological similarity with English, which may have led to positive cross-linguistic influences that increased their phonological awareness. Much like the English language, Samoan, Spanish, and Tagalog have a full series of voiced and voiceless bilabial stops (i.e. /p/, /b/ and /m/), the three nasals (i.e. /n/, /m/ and /ŋ/), a liquid /l/, and fricatives (i.e. /f/ and /s/) (Montanari, 2011; Westerveld, 2013). Hearing two instead of one language may possibly have

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fostered an intensification of phoneme discrimination, allowing phonological differentiation to develop precociously. However, further research is needed to determine whether these positive effects are real and whether interventions can benefit from them.

This, along with the combined intervention methods allowed them the opportunity to consolidate such knowledge better than their monolingual peers. Still, it should be noted that such close performance result between the two groups may be attributed to the New Zealand bilingual language weak learners being exposed to a more English-speaking dominant environment: English being the language of instruction utilized in their schools, as well as the main language experienced in the community around them. This implies that in such given context, interventions originally designed for a monolingual population may be employed to enhance the same targeted skills for a bilingual cohort.

### **Limitations and future directions**

Still, a level of caution needs to be exercised when endeavoring to generalize conclusions related to specific language weaknesses. First, for ethical reasons, a control group comprising of students who were untreated was not included as part of the study, Hence, it hindered proper evaluation of the effect of normal language development or of regular classroom instruction in grade 1.

The relatively small number of participants comprising the sample may limit the extent upon which the findings could be generalized. Nonetheless, the randomized cross-over design and repeated measures ANOVA were designed to address such

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limitations and enhance accuracy of evaluation. In addition, the findings of the research are consistent with previous studies that investigated phonological awareness intervention effects (Zens et al., 2009 & Carson et al., 2013) and morphological awareness training for learners in the early grades (Apel & Diehm, 2013; Ghesquière & Law, 2017; Kirk & Gillon, 2007; Ramirez et al., 2013). Despite this, validation of the outcomes of the treatment approaches described in this research would be supported by research with a larger sample size of participants, and using a design that allowed the inclusion of a control group.

Furthermore, a standardized measure of morphological awareness would be useful to differentiate individual learners' level of proficiency and provide a more reliable distinction on how varying aspects of morphological awareness are developing in relation to early literacy. Further research that clearly identifies the effectiveness of various intervention models, content areas and delivery approaches will expand our understanding of beneficial strategies and practices that will assist students optimize their potential in all areas of linguistic development.

### **Clinical and Educational Implications**

The research investigation involved the introduction of phonological awareness training that demonstrated the effectiveness of developing not only larger sound units (i.e. syllables and rhymes), but also phoneme-level skills crucial to the achievement of early literacy outcomes (Bradley & Bryant, 1983; Catts et al., 1999; Gillon, 2005; Carson et al., 2013). These data highlight the value of detailed instruction of sound structures to

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emerging readers, as it facilitates later reading and spelling among children, including those with language weaknesses (Carson et al., 2013).

The study also espouses the importance of morphological awareness and the provision of explicit morphological awareness instruction involving smallest meaningful word units (i.e. morphemes) to school-aged learners in English (Bowers et al., 2010; Carlisle, 2010; Goodwin & Ahn, 2010). The results indicate that young learners with language weaknesses, regardless of whether they are monolingual or bilingual, can show improvements both in phonological awareness and morphological knowledge. Hence, the current study argues for the instruction of morpheme and phoneme awareness to be introduced early to alleviate the detrimental effects of deficits in these areas on the development of literacy.

School-aged children who present with specific language weaknesses should be considered “highly-vulnerable” for continuing literacy complications, as their linguistic abilities create a negative impact on their reading and spelling skills. The findings from this research advocate the need for an integrated phonological and morphological awareness training, even for children aged 5 and 6 years old, in order to facilitate improved discrimination of larger sound structures (i.e., rhyme & syllable), to enhance phoneme-level skills, and to develop morphological knowledge (i.e., derivation), word analogy skills and sentence comprehension capabilities. However, practitioners should also realize that even when such students appear to attain success brought about by early intervention, the need for constant supervision, practice and provision of self-

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teaching opportunities may be vital to develop lasting strategies that will equip children to become autonomous language learners.

## **Conclusions**

This study argues that both phonological and morphological awareness can be taught to school-aged children as young as five years old and who show evidence of language weaknesses. This is made possible by explicit teaching which paves the way for advancing literacy skills of emerging readers. Such introduction of phonological awareness will lead to improved awareness in larger sound structures (syllables and rhymes), as well as develop familiarity and proficiency in identification of small sound units (phonemes). Furthermore, morphological awareness training (strengthened by phonological knowledge) should facilitate improvements in text comprehension. Both treatment approaches can be effectively delivered through high-quality supportive classroom-based instruction by a trained educator. The results of the research indicate that intervention programs delivered individually and in small groups can further outcomes in reading-related areas for children who may be deprived of experiencing academic success by their inhibiting language deficits.

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## **Chapter 3 Impact of Classroom-based Phonological and Morphological Awareness Intervention Approaches on Literacy Skills of Emerging Readers in the Philippines – A Bilingual Context**

### **Introduction and Background**

The attainment of proficiency in reading words has been cited in previous research as critical in the development of children's literacy (Coltheart, 2006; Ehri, 2005; Roman et al., 2009; Verhoeven, Reitsma & Seigel, 2011). This has become a continuous challenge for countries that promote the importance of learning English as a second language, such as the Philippines. The primary reason why this is a challenge is that there is a complex relationship between spelling and sounds in English which can impede learning. Although the English spelling system is not as irregular as some may suggest (see discussions in Moats, 2006), with only 14% of common English words classified as phonetically 'irregular' (Moats, 2000), there are still a large number of potentially complex rules in English that are context or historically based, and determined as much by morphological relationships as phonological form. For instance, an individual may need to know when to use "ck" as in lock and when to use "k" as in look. Likewise, complications arise when a phoneme such as /k/ can be represented by two different letters, "k" and "c." The latter takes on the /k/ sounds in cake, but is also used to signify the /s/ sound as in century and celebrate. The English orthography rule that the sound of "c" normally varies dependent on the following vowel sound (apart from a few exceptions) shows that there is a degree of regularity, but that the relationships are complex and rarely taught in schools explicitly. More variations in phoneme-grapheme associations can be found in words that are orthographically similar, but in fact do not rhyme (e.g. cough, plough; paid, said). Such variations are

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also present in words that are orthographically different, yet when read aloud do in fact rhyme (e.g. rays, raise; air, heir). The importance of word origins and morphological relationships can be seen in the latter examples: air comes from ‘aer’ or ‘aero’ (Latin/Greek origins), which links it to the old form of aeroplane, whereas heir (French-Latin origins) is related to heredity, but is often pronounced without the /h/ sound that would more easily link to its origins.

Prior studies made by reading specialists have shown the importance of developing phonological and morphological awareness among learners (Carlisle, 2000; Goswami, 2008; Kirby et al. 2012, Melby-Lervag, Lyster & Hulme, 2012) – and see previous chapters in this thesis. Such awareness also holds great promise among second language learners of English to enhance their competence in navigating the seemingly endless shifting sands of language learning.

### **Phonological Awareness across languages**

According to Gillon and McNeill (2014), the development of an individual’s phonological awareness is not exactly language specific. This claim was supported by earlier researchers who explained that the same mental process employed to create an understanding of a sound structure inherent in words of a particular language can be utilised by the other alphabetic language (Corneau, Cormier, Grandmaison & Lacroix, 1999). Chiappe and Segel (1999) discovered that bilingual children who were introduced to alphabetic written language in their first language (L1), and who were taught English as a second language, display related phonological awareness skills in the two languages. Additionally, data suggest that the sequence of developing

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phonological awareness is the same across alphabetic languages. Studies by Denton et al. (2000), which focused on pre-reading Spanish-speaking learners, revealed that participants were able to show early awareness of syllable, rhyme and alliteration, but only demonstrated knowledge of phoneme segmentation after being exposed to reading. Similarly, Cossu et al. (1988) showed that Italian children acquired syllable segmentation before phoneme segmentation; and Ecalle & Magnan (2002) found that young French students displayed awareness of larger sound structures (i.e., syllabic level) before smaller units of sounds (i.e., phoneme level). Comparable knowledge of phonological units across two languages have been found for speakers of English and Samoan (Hamilton & Gillon, 2006). Relying on the fact that the development of phonological awareness is linguistically universal creates an opportunity for bilingual children with specific language weaknesses to approach a target language with greater optimism, as this signifies positive transfer of metalinguistic phonological skills from one language to another.

An example where second language learners benefited from a strengthening effect of phonological intervention to improve English word reading was conducted by Quiroga et al. (2000). In this study, Spanish speaking bilingual children improved their skill in reading English words after receiving phonological awareness training for six weeks. Furthermore, it is interesting to note that there is evidence to support that in a non-alphabetic language, such as Chinese, phonological awareness is a predictor of word reading (Song et al., 2016). The research involved looking into longitudinal phonological awareness growth patterns in the Chinese language among primary

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students in Taiwan. The authors evaluated tasks that assessed the children's phoneme segmentation ability and found that a mere 13% performed above chance levels in year 1, but this figure increased to 35% by year 5. It seems that children can be taught to become conscious of the internal phonemic features of a language, even when learning an orthography that is considered non-alphabetic in nature.

Still, despite the evidence from cross-language studies indicating commonalities in certain aspects of phonological awareness across languages, its relationship with early reading development seems to vary with orthography (Everatt et al., 2010; Seymour et al., 2003). Seymour et al. (2003) observed grade 1 students' reading ability across 14 countries in Europe. The researchers discovered that phonological awareness appears to be a predictor of beginning reading in the languages investigated irrespective of the level of orthographic depth. However, the authors added that the students at the end of their first year in primary school read accurately and fluently in orthographies classified to be more transparent such as Finnish, Spanish, Italian, Greek and German: i.e., such languages have a simpler relationship between letters and sounds. In contrast, Seymour et al. (2003) stated that the Scottish participants in their research only attained 34% word reading accuracy in English over the same period. An orthography characterized by regularity in sound-symbol representations may offer greater benefits in enabling an individual to utilize phonological knowledge, particularly in spelling and reading (Liow & Poon, 1998; Mayringer & Wimmer, 2000).

Research into bilingualism and second language learning has also attempted to determine the potential for cross-language influences that may facilitate reading

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acquisition. As Odlin (2005) explained, “transfer” pertains to identifiable skills in the target language (L2) which possess or carry traceable attributes of the first language / mother tongue (L1). One crucial finding brought about by previous cross-linguistic studies is that robust skills present in one language may aid corresponding shortcomings in a second language (Bialystok, McBride-Chang & Luk, 2005). Again, from a pragmatic perspective, this implies that enhancing metalinguistic skills in one language can lead to the support of the corresponding skill in a target language. However, caution is required not to overgeneralize the relationship between the cognitive skills in L1 and those in L2, as these transfer effects may be influenced by variables such as orthographic features or structural relationships between the languages involved (Bialystok et al., 2003; Dodd, So & Lam, 2008; Kuo & Anderson, 2012). Despite the need for caution, there is still a substantial amount of evidence arguing for the transfer of phonological knowledge across languages (Adesope, Lavin, Thompson & Ungerleider, 2010; Melby-Lervag & Lervag, 2011).

### **Morphological Awareness and bilingualism**

Once young learners enter school, they immediately face an ever-increasing demand of academic tasks that require linguistic competency. For bilingual English language learning children with specific language weaknesses, school is likely to be challenging, given the hurdles they face in producing and understanding two languages in both oral and written forms. Given the fact that a multitude of linguistic factors serve as areas of deficit for such individuals, it is crucial to consider and to offer an intervention approach that targets the simultaneous improvement of both spoken and

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written modalities. One potential form of treatment that holds greater promise is the explicit teaching of morphological awareness. Previous research has shown its capacity to concurrently enhance decoding, semantics, syntax, spelling and reading comprehension (Carlisle, 2003; Apel & Diehm, 2014; Tong, Deacon & Cain, 2014).

It has been documented that children expand their vocabulary knowledge by utilizing meanings of familiar base words and affixes to the unknown words (Wolter & Green, 2013; Anglin, Miller & Wakefield, 1993). For children learning a second language, morphological awareness training may complement vocabulary development in the target language. Furthermore, as vocabulary acquisition is facilitated, reading comprehension should also be improved (Bowers & Kirby, 2010; Guo, Roehrig & Williams, 2011; Deacon, Kirby, Cain & Parilla, 2011). For example, familiarization of second language learners with words such as 'odor' (i.e., an unpleasant or distinctive scent) and 'dangerous' (i.e. state of being in danger) may assist in the inference of the new meaning of a previously unknown word 'odorous' (i.e. state of giving off a pungent smell) (Carson & Nippold, 2007; Ram, Marinellie, Benigno & McCarthy, 2013; Wolter, Carlisle, Goodwin & Wagner, 2012). Since the meanings contained in a number of morphologically-complex words may be derived from meanings of their simplest component units, conscious understanding of a word's morphological structure may aid the aforementioned children to learn new vocabulary and, in the end, comprehend novel words they face in their reading (Baumann et al., 2002; Baumann, Edwards & Kame'enu, 2003). Furthermore, morphologically complex words with meanings that are easily visualized (e.g., autumnal) seem to be readily produced in a morphological

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awareness task compared to more abstract and obscure referents (e.g., wisdom) (Wolter, 2015). The explicit instruction of morphological structure may also promote word recognition and written word pronunciation, which may be beneficial to bilingual school-aged students with language weaknesses who may be unaware that some words they come across with have the same roots because of shifts in vowels (e.g. relate, relative), modifications in production of consonants (e.g. magic, magician) and non-utterance of letters deemed silent in some contexts (e.g. sign, signal) (Wolter & Collins, 2017).

However, perhaps the most significant contribution of a morphological awareness intervention is its potential to increase student motivation, implemented through learner-facilitated problem-solving themes (Wolter & Collins, 2017) and themes of “student detectives” (Bowers et al., 2010; Goodwin et al., 2012). Such approaches have been shown to be invaluable to children, especially those with language learning difficulties who may lack executive functioning or the ability to organize, consolidate and assess one’s thought processes (Berninger & O’Malley, 2011). The same may be true for young learners of a second language – again, these methods may increase motivation to learn. Intervention that require children to utilize their executive functioning to solve problems in activities presented as a game are likely to be beneficial. Self-discovery provides a better means of sustaining student involvement compared to models that are simply centered on memorization (Hidi & Renninger, 2006). In addition to engagement, Hidi and Renninger (2006) adds that the morphological awareness approach leads to self-regulated learning. When appropriately guided, students with language learning

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deficiencies may draw their attention to unfamiliar words in texts, determine recognizable morphemic units and endeavor to derive meaning based on existing understanding or background knowledge. They then learn to check their metalinguistic decisions, which serve to scaffold language and literacy development.

The interest in the provision of morphological awareness instruction has been fueled by positive results exhibited by explicit training to recognize and manipulate small segments within words that carry meaning. Such interventions have been discovered to boost literacy development, as it facilitates learners' performance in both reading and spelling (i.e. real words and pseudo-words in English) (Carlisle & Stone, 2005; Deacon & Kirby, 2004; Nunes, Bryant & Bindman, 2006; Singson, Mahoney & Mann, 2000). Research in the relative contribution of morphological awareness to language and literacy development has also been conducted in languages other than English. Languages that are considered orthographically-complex have yielded similar findings for the efficacy of morphological awareness training in advancing reading and spelling skills of learners. These were reported in studies of students with French (Casalis & Louis-Alexandre, 2000) or Dutch (Assink, Vooijs & Knuijt, 2000) as their first language.

Other studies have focused on European languages characterized with highly transparent orthographies; for instance, Finnish and Norwegian. In a Finnish language study, authors Muller and Brady in 2001 revealed an association between morphological awareness and reading. The researchers pointed out for those in their first elementary school year, morphological awareness is a unique contributor to reading comprehension. A study on kindergarteners using Norwegian as their mother tongue

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revealed similar findings, arguing for the importance of morphological awareness instruction and its association to improved reading outcomes (Lyster, 2002). A subsequent longitudinal study highlighted the impact of morphological awareness and its long-term effects on the literacy skills of school-aged children six years after initial training (Lyster, Lervag & Hulme, 2016).

Studies conducted in Greek, considered to possess a phonologically transparent orthography (see Seymour et al., 2003), showed inflectional awareness contributing to word and non-word reading in the lower grades of primary school (Rothou & Padiliadu, 2014; Pittas & Nunes, 2014). De Freitas, Da Mota & Deacon (2018) investigated the effects of morphological awareness in relation to reading in Portuguese (another relatively transparent orthography). The authors observed 132 fourth grade Portuguese speaking children and found out that, after controlling phonological awareness and nonverbal ability, morphological awareness influences word reading accuracy, word fluency, and reading comprehension.

Not only is the morphological structure instrumental in furthering reading outcomes in a first language, but it may also play a vital role in supporting comprehension of English as a second language. Searching for correlational evidence that outlines the association between morphological awareness and reading the outcomes of English language learners, Kieffer & Lesaux (2012) conducted an investigation among grade six students who represented four major differing language groups in the United States: Spanish, Vietnamese, Filipino and Native English speakers. Analysis using multiple-group structural equation modelling applied on the

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data showed that morphological awareness contributed significantly to reading comprehension, after controlling for the effects of word reading fluency and reading vocabulary. It was noteworthy to mention that the effects were found to be similar across the four language groups, suggesting an important role for morphological awareness in influencing English reading comprehension across learners from diverse home language backgrounds. Furthermore, a study by Zhang (2016) in Singapore among fourth grade Malay-English bilinguals indicated that after conducting second language (i.e., English) morphological awareness training, significant gains in English word reading ability were evident among the participants. A more recent investigation on weak English as Foreign Language (EFL) readers in Saudi Arabia by Kahn-Horwitz and Saba (2017) revealed that English home language and knowledge of derivational morphological structure directly predicted reading comprehension levels among female high school Arabic students of low socio-economic background. In addition, the study yielded that awareness of morphological structures mediated the link between first language, phonological awareness, orthographic knowledge and EFL reading comprehension.

Variations in orthographic systems (alphabetic vs logographic) and morphological structures (morphologically transparent vs morphologically complex) may also increase our understanding of the impact of morphological awareness on reading comprehension and whether cross-linguistic transfer of morphological skills is possible. In a study of the contribution of morphological awareness to first language comprehension in a morphologically complex language (i.e. Hebrew) by Vaknin-Nusbaum (2016), 60 second

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graders and 40 third graders reading comprehension was examined. An awareness of inflections, derivations and construct formation was found to predict levels of Hebrew reading comprehension after controlling for the effect of vocabulary. The results suggest that in languages considered morphologically rich, morphological awareness has an influence on reading comprehension starting at the early stages of reading acquisition.

Research on Mandarin Chinese revealed that Chinese second grade learners use both sub-lexical (i.e. capability to employ meaning based on cues of semantic radicals within a particular compound symbol) and lexical level morphological awareness (i.e. capability to comprehend and manipulate single characters / morphemes constituting Chinese compound words) in word reading (Tong, Tong & McBride-Chang, 2017). In addition, their meta-analyses of data from 64 research investigations indicated that morphological awareness showed good correlations with reading levels both in English and in Chinese, with influences most evident on measures of reading comprehension.

### **The Present Study**

Although previous research investigations have reported the significance of developing phonological and morphological awareness in helping children attain literacy, many such studies have focused on native speakers of English. No study to date, especially in the Philippines, has evaluated which between the two metalinguistic skills (i.e., phonological and morphological awareness) would facilitate immediate literacy improvement, particularly among typically-developing learners and language weak students who were introduced to the English language first than their supposedly

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mother tongue. Thus, the primary purpose of the current research was to identify whether a phonological or morphological awareness intervention would lead to immediate observable gains in phonological awareness, morphological knowledge and reading comprehension scores of grade 1 students in the Philippines.

A subsequent question of interest in the study was to assess whether a 15-hour treatment approach, spanning ten (10) consecutive weeks, would advance metalinguistic and reading comprehension skills of year 1 students experiencing difficulties in learning the English language within a bilingual context.

In the current research, the same intervention methods and the same criteria for selecting language weak children outlined in Chapter 2 were used. Children referred by their teachers as having specific language weaknesses showed a range of language weaknesses. For example, they were reported to have shortcomings in using copula forms (i.e., a word linking the subject to its complement such as “She’s sad” or “The boy’s naughty”).

### **Research Questions**

- (9) Will the phonological awareness or morphological awareness intervention approach implemented in the classroom result in a significant difference in the language assessment scores, including word meaning and text comprehension, after five weeks among typically-developing bilinguals and bilingual language weak year 1 students in the Philippines?
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- (10) Will the phonological awareness and/or morphological awareness intervention result in significantly higher word meaning and text comprehension levels after ten weeks?
- (11) Is there a significant difference in the outcomes of typically-developing bilinguals and bilingual language weak year 1 students?

## **Methods**

### **Participants**

A total of thirty-two school-aged children were recruited in the research after meeting the inclusion criteria and upon approval from the Educational Research Human Ethics Committee of the University of Canterbury. However, this was reduced to 31 children after one child's parents decided to remove their child from the study after the first two weeks of data collection. Therefore, thirty-one students completed the program. The mean age of students involved in the research was six years and three months ( $SD = .274$ ) and comprised of fifteen children with specific language weaknesses and sixteen typically-developing bilingual language learners. The participants observed in the Philippines were Filipino children capable of using two languages (i.e. Filipino and English). They were all born and raised in the Philippines, and both parents were Filipinos. The Filipino children who participated in the research study were exposed to the English language first before learning the Filipino language (i.e. Tagalog). Although the participants are able to communicate in English and Filipino, there is stronger preference in using English rather than Tagalog. They use English as the language of communication with teachers, friends and family. Formal exposure to Filipino would

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most often be during class time, when it is taught as a special subject in school: these students were not experiencing a bilingual curriculum, as all teaching instruction was conducted in English except for the Filipino language special subject. However, these children will have needed to communicate in Tagalog in the local community where they live and will have extended experiences of Tagalog as part of media and cultural events (such as during church or social gatherings).

The learners who took part in the study were from twelve large classes with an average of 20 to 25 students from three schools within the National Capital Region, Metro Manila, Philippines. The participants attend private institutions with family income classified in the middle to upper income class based on the 2015 (Family Income Expenditure Survey conducted by the government agency Philippine Statistics Authority).

Out of the total sample, fifteen were girls and seventeen were boys. The participants were further placed into two groups, with roughly half of each group of students randomly assigned to Group A – PA1MA2 (i.e., learners who started with phonological awareness training followed by a morphological awareness approach) and the remaining students placed in Group B – MA1PA2 (i.e., students who were introduced to a morphological awareness instruction followed by a phonological awareness intervention).

School administrators, teachers, parents and students were given information sheets and research consent forms to confirm participation in the program. It was ensured that drop-in sessions prior the implementation of the experiment were

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scheduled by the researcher to discuss the, overview, background, aims, procedures and timeline of the research. The sessions also served as an opportunity to answer any queries related to the study. The researcher ensured that standards set by the University of Canterbury's Educational Research Human Ethics Committee were observed and maintained throughout the implementation and duration of the investigation.

The assessments given to the participants were conducted in a quiet area of the classroom within school hours. It was also ensured that none of the participating students were enrolled in any other intervention that targets the improvement of language or reading difficulties.

In order to be classified as typically-developing, children needed to attain a score within or above the average range on the succeeding standardized language assessments:

- Clinical Evaluation of Language Fundamentals – Preschool (CELF-P2; Wiig et al., 2006): Receptive or Expressive Language Index Score is within or above the composite score of 85-115
  - Preschool and Primary Inventory of Phonological Awareness (PIPA ; Dodd Crosbie, MacIntosh, Teitzel & Ozanne, 2000): A standard score of 7-13 (considered the average range) in four out of six subset skills relating to phonological awareness
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- Primary Test of Non-verbal Intelligence (PTONI; Ehrler & McGee, 2008): A score from 85-115 is regarded as within average range

Meanwhile, in order to be characterized as a child with specific language weakness, the succeeding criteria for inclusion needs to be met:

- Cognitive ability is considered normal based on school and clinical reports
- Sight, hearing and neurological disorders are not present (as reported in school records)
- Articulation is reported to be within normal limits, as evidenced by typical oral structure and function
- Non-verbal intelligence score is within the range of 85-115 based on the Primary Test of Non-verbal Intelligence (PTONI; Ehrler & McGee, 2008)
- Receptive or Expressive Language Index Score based on the second edition of Clinical Evaluation of Language Fundamentals – Preschool (CELF-P2; Wiig et al., 2006) is below the norm average of 85
- Scores in three out of six subset skill measures relating to phonological awareness are below the standard norm average as evaluated in the Preschool and Primary Inventory of Phonological Awareness (PIPA ; Dodd Crosbie, MacIntosh, Teitzel & Ozanne, 2000)

Based on actual practice, a child whose assessed performance is at least one standard deviation below the mean is regarded to have impaired language skills

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(Tomblin, Freese & Record, 1992). Hence, a cut off was set in this study which is at least one standard deviation below the mean average. Following selection, the participants were randomly assigned in either Group A (PA1MA2) or Group B (MA1PA2).

### **Assessment Measures**

All assessment measures, as well as administrative guidelines reported in the previous chapter (Chapter 2), were adopted in the research investigation discussed in this current chapter.

#### ***Nonverbal Reasoning***

The author used the Primary Test of Nonverbal Intelligence (PTONI) to evaluate the reasoning abilities of the school-aged children. The format of the test requires the participants to observe a series of images printed in the picture book and to identify which item does not belong to the group by pointing at it. The test lasts from five to fifteen minutes and requires minimal instructions. The test-retest reliability was recorded to be excellent (0.94).

#### ***General Language Ability***

In order to evaluate the participants' overall language performance, as well as communication skills in varying contexts, the author utilized the Clinical Evaluation of Language Fundamentals (CELF-P2; Wiig et al., 2006). It is a standardized measure that helps to identify the presence of a language disorder and to describe the nature of it. This test further assists in evaluating a learners' language strengths and

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communication needs, as it provides description of the students' language deficiencies. A score within the range of 85-115 means that the person's language development is within normal limits. The test-retest reliability correlation coefficients range from adequate (.76) to excellent (.91). On the other hand, internal consistency was measured ranging from 0.82 to 0.96 across the sub-tests.

### ***Reading Comprehension***

Children involved as participants in the study were given the Woodcock Reading Mastery Test – 3<sup>rd</sup> edition (WRMT-III; Woodcock, 2011). The assessment measures students' understanding of word meanings by assessing antonyms, synonyms and word analogies. In the context of this research, word meaning measures will be used to refer to performance on these tasks.

The exam further tests another core component of reading - passage comprehension. The said section of the test gauges the capability of a child to examine a short passage, varying from one to three sentences, and provide the missing word that suitably fits the sentence's context. In this study, text comprehension was the referent used to more clearly explain the task. A test-retest reliability ranged from 0.83 to .88

### ***Phonological Awareness***

The standardized measure used in the research to identify children with poor phonological awareness was the Preschool and Primary Inventory of Phonological Awareness (PIPA ; Dodd, Crosbie, MacIntosh, Teitzel & Ozanne, 2000). The PIPA

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measures abilities in identifying initial letter sounds, isolating individual sounds, naming letters and their corresponding sounds, segmenting syllables, distinguishing number of sounds within words and detecting rhyming words. As an example, in one measure such as the phoneme segmentation task, the examiner would show child a picture, and would say the word referring to the image. The child would then be given counters to show how many sounds are found within the word. Each of the aforementioned subset test in the PIPA takes 4-5 minutes to administer, with the whole test completed within 25 to 30 minutes. The test-retest reliability correlation coefficients ranged from 0.78 to 0.96 across the six sub-tests.

### ***Morphological Awareness Task***

The measurement of morphological awareness was adapted from Kirk et al.'s (2012) study that used word analogy to assess children's ability to recognize and to decompose the smallest meaningful units in the language. The test requires students to provide the missing inflected or derived word in a series. The expected answer is one that appropriately fills in the blank space. For example, in a particular inflectional morpheme item, the learner is given the words "push : pushed; jump : \_\_\_\_\_." The student is expected to supply the word "jumped" which contains the morpheme '- ed.' Test-retest reliability were 0.72 and .077 respectively for test of morphological knowledge in inflection and derivation.

Table 3.1 provides a summary of the mean student performance results in various assessment measures, classified by treatment group (i.e. PA1MA2 vs MA1PA2) administered. Meanwhile Table 3.2 outlines mean student performance

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results categorized by language ability (i.e. typically-developing bilingual English language learners vs Bilingual English language learners with specific language weaknesses). It may be seen from the aforementioned table that a receptive-expressive gap exists for typically-developing bilinguals. The lower expressive language index score may be attributed to typically-developing bilinguals having less opportunities for contact and interaction with English-speaking individuals apart from family context and educational institution settings. This aligns to the findings of Gibson et al.'s (2014) research, which indicated that the extent of language exposure is associated with the size of the expressive-receptive language gap existing in bilingual children. Hence, the data suggested that participants still follow a typical course of development, but at a slower pace, but the discrepancy between expressive and receptive language skills was not observed atypical enough to be considered a deviant language development.

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Table 3.1 School-entry performance on language and non-verbal intelligence measures based on treatment group

GROUP	P-TONI	CELF -P2		WRMT-III
		RLI	ELI	
Phonological (PA1MA2)				
n = 16				
<i>M</i>	97.75	76.75	69.81	85.63
<i>SD</i>	8.81	18.11	14.75	11.63
Range	85-111	50-103	53-104	69-104
Morphological (MA1PA2)				
n = 15				
<i>M</i>	103.27	82.47	73.8	87.93
<i>SD</i>	8.66	16.01	18.32	16.02
Range	85-115	60-106	45-104	69-115

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Note. PTONI = Primary Test of Non-verbal Intelligence Standard Scores ( $M = 100$ ,  $SD = +/-15$ ) (Ehrler & McGhee, 2008); CELF – P2 RLI = Clinical Evaluations of Language Fundamentals Preschool-2, Receptive Language Index ( $M = 100$ ,  $SD = +/-15$ ) (Wiig et al., 2006); CELF – P2 ELI = Clinical Evaluations of Language Fundamentals Preschool-2, Expressive Language Index ( $M = 100$ ,  $SD = +/-15$ ) (Wiig et al., 2006); WRMT-III = Woodcock Reading Mastery Test ( $M = 100$ ,  $SD = +/-15$ ) (Woodcock, 2011)

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Table 3.2 School-entry performance on language and non-verbal intelligence measures based on language ability

GROUP	<u>P-TONI</u>	<u>CELF -P2</u>		<u>WRMT-III</u>
		<u>RLI</u>	<u>ELI</u>	
Bilingual Language Weak n = 15				
<i>M</i>	100.2	64.07	59.87	74.07
<i>SD</i>	9.03	8.86	10.04	5.3
Range	85-115	50-79	45-85	63-83
Typically-developing Bilingual n = 16				
<i>M</i>	100.63	94	82.88	98.63
<i>SD</i>	9.33	6.95	13.09	6.32
Range	85-115	85-106	66-104	89-115

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## Procedure

Two groups of participants were selected to take part in the research. The first group were bilingual English language learners observed to follow expected language development based on results of the standardized language assessment. The other group were also bilingual English language learners, but were characterized to possess specific language weaknesses after meeting the set of inclusion criteria.

Given the time required altogether for the pre-test standardized assessments, roughly half of each group of children were randomly assigned in Group A (PA1MA2) and the remaining half in Group B (MA1PA2). In the first treatment condition (i.e. Group A – PA1MA2), the participants were first administered a total of 7.5 hours of phonological awareness through individual and small group sessions lasting 45 minutes each for five weeks. The individual and group sessions were conducted once a week each in a quiet area of the classroom within school hours. After five weeks, an assessment using the described language measures mentioned earlier was used to evaluate gains in students' performance. Then, a morphological awareness training commenced with the same number of treatment sessions and the same allocated time duration periods as that of phonological awareness training. Meanwhile, in treatment condition B (Group B – MA1PA2), the participants involved received the reverse order of the intervention over the same time frame. The particular crossover design used did not have a control group for ethical reasons.

Both interventions shared the same length of duration, and the two treatment groups commenced their specific intervention in the same week. There was a two-week wash out period (i.e., a period when an intervention was not implemented to

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eliminate possible carry-over effects of previous treatment) applied after implementation of five weeks of training.

All the standardized language assessments were administered in groups of two or three by the author and trained research assistants who are certified special education teachers in the Philippines. A certified speech language pathologist provided counsel and support. Individuals comprising the research team were blind to the membership of each group and were not involved in the assignment of learners to certain treatment approach. The members of the research group served as liaison officers and carried out tests in selected schools. In this research, the arrangement and implementation of the standardized assessment and informal measure (i.e., morphological awareness test) were all administered in random order.

Drop-in sessions involving the primary researcher, research assistants, parents, teachers and school administrators were scheduled to clarify research objectives, discuss teaching content, outline procedures, streamline lesson delivery, answer existing queries and identify areas of improvement. The joint sessions and discussions were also done continuously with the research team to ensure consistency and reliability of the treatment approach. An associate supervisor from the University of the Philippines-Diliman likewise monitored the progress of the study.

The results obtained from various standardized assessments were scored based on the examiner's manual included in the testing kits. The study took place from November 2017 to April 2018, with a two-week washout period that was aligned with the school holiday break at the end of the fifth week for students.

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## **Treatment Approaches**

The two instructional training programs were designed to have equal period of duration. The learners in Groups A and B were given an individual and group training session both lasting 45 minutes each session for a total of 900 minutes or 15 hours for ten weeks.

Uniformity in treatment delivery was maintained through the preparation and production of a user guide that delineates activities for both interventions used in the study. In addition, an introduction week was implemented to help establish rapport with the learners. During this period, individual and group discussions were implemented and children were given a class schedule based on arrangements conducted with the participating schools. The schedule of intervention was varied to control the impact of time effects on children's performance. After the intervention, a final week was allocated for synthesis and consolidation of lessons covered.

## **Phonological Awareness Training**

In this research treatment approach, children were given explicit instruction with the aim of intensifying their foundation on the sound structures that make up a language; hence, learners were taught syllabic and phonemic awareness, letter-sound knowledge and articulatory awareness were also emphasized. Meanwhile, the development of the participant's vocabulary was made possible through direct instruction where they had the opportunity to interact with stories from books that connect to their pre-existing knowledge. The phonological awareness training which incorporates reading intervention was an adaptation of that used in Bowyer-Crane et al.'s (2008) study. The current approach is similar as it integrates printed literature through the use of books; with lessons on phoneme-grapheme knowledge, rhyming,

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blending and segmenting. However, the present phonological awareness training is shorter in duration, as group and individual sessions were only conducted once a week due to limited approved contact hours set by participating schools. This was in contrast to the twenty-week intervention program by Bowyer-Crane et al. (2008) that lasted longer and that required students to attend sessions four times a week.

### **Morphological Awareness Training**

Similar to the phonological awareness treatment approach, the morphological awareness consists of two 45-minute lessons delivered every week for a total of 15 hours. The said program was a modified version combining Bowyer-Crane et al.'s (2008) and Clarke et al.'s (2010) intervention approaches that aimed to increase students' ability to recognize, decompose and manipulate morphemic structures through spoken narratives that require them to predict subsequent events, supply missing information, infer underlying meaning and participate in the discovery of meaning. The learners were constantly reminded to listen 'proactively' and to remember key information vital in the completion of learning targets and attainment of reading comprehension. Expansion of vocabulary was ensured by introducing 'words of the day' that were conveyed in lessons using the multi-context learning approach devised by Beck et al. in 2002. The said method ensures learning of new words through the employment of visual and physical mnemonics, drawings, concept diagrams and verbal reasoning.

Strengthening of verbal skills was supported through vocabulary enrichment, expressive language development, listening skill enhancement and spoken narrative ability advancement. Activities embedded in each session required learners to sequence and discuss events, describe events and places mentioned in the stories,

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give a personality profile of main subjects in the narratives and provide comments about their relationship with other characters. The participants were given the chance to monitor their own responses, as well as those of their peers.

The program was implemented by the primary researcher with emphasis on simultaneous strengthening of specific language areas that include unlocking word meanings, familiarizing with structure of words and spelling patterns found in words. The main emphasis was to get students acquainted with commonly occurring orthographic patterns that would enable them to make generalization of their learning to a multitude of words. For instance, a particular task in the intervention required sorting words that show orthographic change to the root word by adding the suffix –y (i.e. sun to sunny; bubble to bubbly and rock to rocky). Despite having the same suffix ending, the way the base word was spelled changed. In the first example, the final consonant was repeated to keep the vowel short. Only the last word ‘rock’ retained its original base word.

Moreover, participants were encouraged to put newly learned vocabulary into sentences to promote semantic awareness. They were likewise challenged to come up with new words from a set of given affixes.

Both individual and group sessions follow a generalized format which include:

- Introduction and review of previous lesson
  - Teaching of new vocabulary
  - Speaking, listening and inferencing tasks
  - Plenary (i.e. reflection on what was learned and achieved)
-

## **Treatment Fidelity**

The same measures implemented in the New Zealand study were adopted in the Philippine study to ensure fidelity of treatment.

Furthermore, twenty percent of the total number of sessions implemented were randomly selected for assessment in order to determine treatment integrity of the training approach. An independent researcher, together with participating school administrators and coordinators, confirmed that the treatment sessions were done as intended and that it contained activities aptly described in the research design which aimed to promote relevant strategies for linguistic awareness. Direct observations of intervention sessions were randomly and continually conducted to ensure consistency and accuracy of training to the research design. Weekly meetings with the research team were conducted to identify any issues encountered and safeguard experiment against any protocol deviations.

## **Data Analyses of the Philippine Cohort**

### **Baseline Measures**

A baseline assessment was conducted to ensure that participants in the research met the inclusion criteria of the study. A series of independent samples t-test were conducted to compare baseline students' performance between the two groups of participants (Group A - PA1MA2 and Group B – MA1PA2). The variable gender was an exception as it was analysed using a Chi-square test.

The baseline results revealed that there is no significant difference between typically-developing children and those presented with specific language weaknesses in gender ( $\chi^2 = .313, p = .576$ ), age ( $t(29) = -.133, p = .892$ ) and non-verbal intelligence ( $t(29) = -.189, p = .898$ ). With regard to the language assessment

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measures, no significant difference between typically-developing and children with specific language weaknesses were recorded in syllable segmentation ( $t(29) = .383$ ,  $p = .704$ ), phoneme isolation ( $t(29) = -.785$ ,  $p = .439$ ) and synonyms ( $t(29) = -.967$ ,  $p = .341$ ). However, there were significant differences between the groups in reading comprehension ( $t(29) = -11.679$ ,  $p < .001$ ), receptive language index ( $t(29) = -10.505$ ,  $p < .001$ ), expressive language index ( $t(29) = .199$ ,  $p < .001$ ), rhyme awareness ( $t(29) = -3.194$ ,  $p = .003$ ), alliteration awareness ( $t(29) = -2.437$ ,  $p = .021$ ), phoneme segmentation ( $t(29) = -3.046$ ,  $p = .005$ ), phoneme-grapheme correspondence ( $t(29) = -2.325$ ,  $p = .027$ ), morphological awareness – inflections ( $t(29) = -2.557$ ,  $p = .016$ ), morphological awareness – derivations ( $t(29) = -3.895$ ,  $p = .001$ ), antonyms ( $t(29) = -5.934$ ,  $p < .001$ ), word analogy ( $t(29) = -2.462$ ,  $p = .020$ ) and text comprehension ( $t(29) = -5.364$ ,  $p < .001$ ).

Baseline results comparison of students in the two treatment conditions (i.e. Group A - PA1MA2 and Group B – MA1PA2) showed that there were no significant differences in gender ( $\chi^2 = .027$ ,  $p = .870$ ), and age ( $t(29) = -.366$ ,  $p = .717$ ). Statistically significant differences were not found on non-verbal intelligence ( $t(29) = -1.757$ ,  $p = .090$ ), receptive language index ( $t(29) = -.929$ ,  $p = .361$ ), expressive language index ( $t(29) = .344$ ,  $p = .512$ ), rhyme awareness ( $t(29) = -1.039$ ,  $p = .307$ ), phoneme segmentation ( $t(29) = -.641$ ,  $p = .527$ ), phoneme-grapheme correspondence ( $t(29) = -1.389$ ,  $p = .175$ ), morphological awareness – inflections ( $t(29) = -1.475$ ,  $p = .151$ ), morphological awareness – derivations ( $t(29) = -1.012$ ,  $p = .320$ ), antonyms ( $t(29) = 1.284$ ,  $p = .209$ ), synonyms ( $t(29) = -1.034$ ,  $p = .310$ ), word analogy ( $t(29) = -1.760$ ,  $p = .089$ ) and sentence comprehension ( $t(29) = -1.71$ ,  $p = .098$ ). However, statistically significant differences were observed on syllable

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segmentation ( $t(29) = -2.542, p = .017$ ), alliteration awareness ( $t(29) = -3.557, p = .001$ ), and phoneme isolation ( $t(29) = -2.536, p = .017$ ).

In addition, comparison of learners with specific language weaknesses assigned in different treatment groups (i.e. Group A - PA1MA2 and Group B – MA1PA2) showed that non-verbal intelligence was within normal limits based on the ranges reported in the manual of the standardized measure PTONI (Ehrler & McGee, 2008). It also revealed that participants in treatment condition A (PA1MA2) and treatment condition B (MA1PA2) were not significantly different from each other on measures of receptive language index ( $t(13) = -1.495, p = .159$ ), expressive language index ( $t(13) = .556, p = .588$ ), syllable segmentation ( $t(13) = -1.819, p = .092$ ), rhyme awareness ( $t(13) = -.233, p = .820$ ), alliteration awareness ( $t(13) = -2.115, p = .054$ ), phoneme segmentation ( $t(13) = -.654, p = .524$ ), phoneme-grapheme correspondence ( $t(13) = -.505, p = .622$ ), morphological awareness – inflections ( $t(13) = -.258, p = .800$ ), morphological awareness – derivations ( $t(13) = 1.205, p = .250$ ), antonyms ( $t(13) = -1.369, p = .194$ ), word analogy ( $t(13) = -1.225, p = .242$ ) and text comprehension ( $t(13) = -1.359, p = .197$ ). Only the phoneme isolation measure resulted in a significant difference between the two language weak groups ( $t(13) = -2.792, p = .015$ ). Scores on the synonyms measure were zero for both groups.

## Results

Assessment data were collected at three main points in the study. Results from the first assessment (referred to as Time1-Pre) were obtained prior to any intervention; results from the second assessment were obtained after the first five week intervention (referred to as Time2-Mid); and the results from the third

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assessment were obtained after the completion of the second intervention (this will be referred to as Time3-Post). Findings related to the influence of each intervention on the children's language and literacy skills will be evident by a comparison of the first and second assessment results. Tables 3.3 and 3.4, therefore, presents the results (means and standard deviations) for each measure administered at Time1-Pre and Time2-Mid, and this first part of the results section presents the results of a series of analyses of variance contrasting the Pre and Mid data for each of the measures assessed on these two occasions. The second part of the results will then contrast the Time1-Pre data with the Time3-Post data to assess the impact of both interventions.

For this first part of the results, given that each child performed the assessments at both time points, this was a repeated measures factor with two levels (Time1-Pre and Time2-Mid). To assess the effects of the two interventions, an independent factor (First Intervention) was also included that comprised two levels: Phonological versus Morphological. Differential influences of the intervention would be identified by a significant interaction between the Intervention factor and the Time factor. To assess whether any specific influences of the intervention varied across the two Language Groups, this was also included in the analyses as an independent factor with two levels: language weak versus language typical – with different effects for these two groups being evident in a three-way interaction. Given a significant three-way interaction, two-way analyses of variance will be performed for each Language Group to determine if there is an interaction between Time and Intervention factors for only one Language Group. Therefore, the results for each measure were analysed using three-way (2x2x2) analyses of variance, with one

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repeated measures factor and two independent factors. The main results of interest were the three-way interaction between the three factors and the two-way interaction between the Time and Intervention factors. Therefore, these are the two that will be reported throughout the results – though additional significant main effects will be reported where relevant to the subsequent discussion. Results will be reported as F-values (with df), p-values and effect sizes (partial eta squared). Graphs for the three-way interaction will be reported throughout in order to present the findings visually, but significant two-way interactions between the Time and Intervention factors will also be presented to allow interpretations of findings.

### **Comparisons of Time1-Pre versus Time2-Mid assessment data**

In this particular section, the results for the first intervention are shown for each of the measures in the study, beginning with the phonological measures and advancing from syllable and rhyme (the large units of sounds) before alliteration, phoneme isolation and segmentation (considered smallest or phoneme-level of sounds). Then letter-sound measure follows next together with the morphological measures (inflection and derivation), and concluding with the word meaning measures (antonyms, synonyms, analogies and text comprehension).

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Table 3.3 Means, with standard deviations in brackets, for the Bilingual group with specific language weaknesses on each of the study measures at the first and second assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time 2-Mid	Time 1-Pre	Time 2-Mid
Syllable Awareness (12 items)	6.63 (1.77)	8.25 (1.98)	8.57 (2.37)	9.86 (1.46)
Rhyme Awareness (12 items)	4.13 (2.03)	6.63 (2.97)	4.43 (2.99)	5.14 (2.41)
Alliteration Awareness (12 items)	4.0 (2.27)	8.38 (2.67)	6.57 (2.44)	7.57 (2.70)
Phoneme Isolation (12 items)	7.88 (2.17)	10.88 (1.13)	10.43 (1.13)	11.29 (0.76)
Phoneme Segmentation (12 items)	1.13 (1.25)	2.25 (1.49)	1.57 (1.40)	2.14 (2.80)
Letter-sound Knowledge (32 items)	19.63 (5.58)	26.75 (4.27)	21.0 (4.87)	26.71 (4.68)
Morphological Inflection (10 items)	0.50 (0.54)	2.13 (1.55)	0.57 (0.54)	2.57 (1.99)
Morphological Derivation (10 items)	1.38 (1.60)	2.13 (0.99)	0.57 (0.79)	3.14 (1.22)
Antonym Production (23 items)	0.63 (0.92)	2.00 (1.20)	1.29 (0.95)	2.86 (1.35)
Synonym Production (23 items)	0.00 (0.00)	1.00 (1.07)	0.00 (0.00)	1.14 (1.46)
Word Analogy (40 items)	0.00 (0.00)	4.25 (1.49)	1.29 (2.98)	6.57 (4.54)
Text Comprehension (38 items)	0.50 (0.76)	3.75 (2.71)	1.14 (1.07)	6.14 (3.98)

Table 3.4 Means, with standard deviations in brackets, for the Typically-developing bilinguals on each of the study measures at the first and second assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time 2-Mid	Time 1-Pre	Time 2-Mid
Syllable Awareness (12 items)	6.50 (1.85)	9.63 (1.41)	8.00 (1.69)	10.50 (1.07)
Rhyme Awareness (12 items)	6.50 (3.51)	9.38 (3.16)	8.25 (2.12)	10.13 (1.36)
Alliteration Awareness (12 items)	5.75 (2.66)	10.63 (0.92)	6.57 (2.44)	11.13 (0.84)
Phoneme Isolation (12 items)	9.13 (2.70)	11.75 (0.46)	10.25 (1.67)	11.88 (.35)
Phoneme Segmentation (12 items)	3.13 (2.17)	4.88 (2.80)	3.50 (2.33)	6.00 (2.73)
Letter-sound Knowledge (32 items)	22.75 (6.84)	29.75 (2.87)	26.5 (2.33)	31.13 (1.25)
Morphological Inflection (10 items)	1.13 (1.25)	4.75 (1.04)	2.50 (2.20)	5.63 (1.06)
Morphological Derivation (10 items)	2.13 (1.55)	4.62 (1.77)	4.00 (1.07)	5.25 (0.89)
Antonym Production (23 items)	3.25 (1.17)	4.63 (2.77)	4.13 (1.81)	8.75 (1.28)
Synonym Production (23 items)	0.00 (0.00)	2.75 (1.39)	0.13 (0.35)	3.13 (1.36)
Word Analogy (40 items)	2.00 (2.83)	11.63 (1.69)	4.38 (3.96)	13.25 (0.89)
Text Comprehension (38 items)	4.00 (3.30)	9.75 (3.69)	7.00 (2.62)	13.5 (1.20)



### **Syllable awareness task**

The results of the statistical analyses using repeated measures ANOVA for the Syllable awareness measure, which compared pre-intervention scores with student performances after five weeks of treatment, showed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .82$ ,  $EF = .002$ ). It also revealed a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .45$ ,  $EF = .02$ ), but a significant interaction between Time and Language ability ( $F_{(1,27)} = 4.56$ ,  $p = .04$ ,  $EF = .15$ ). The latter interaction suggests that Typically-developing bilinguals showed more of an effect of the intervention than the language weak. Figure 3.1 displays the results for the Syllable awareness task.

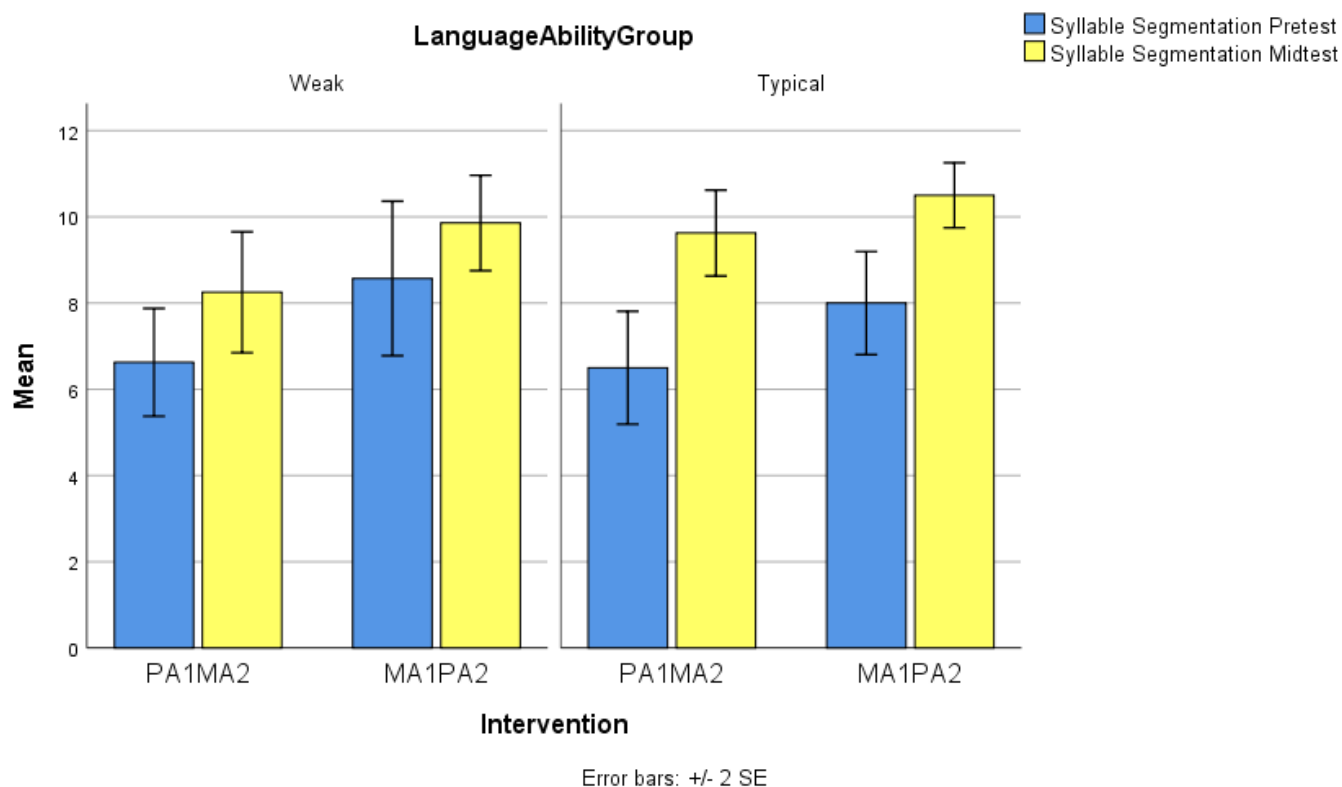


Figure 3.1 Syllable Awareness Task Performance

### Rhyme awareness task

The outcome of the three-way analysis of variance for the Rhyme awareness measure showed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .64$ ,  $EF = .01$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} = 2.79$ ,  $p = .11$ ,  $EF = .09$ ). Figure 3.2 shows the results for the Rhyme awareness task. The only statistically significant effect was a main effect of Time ( $F_{(1,27)} = 22.78$ ,  $p < .001$ ,  $EF = .46$ ).

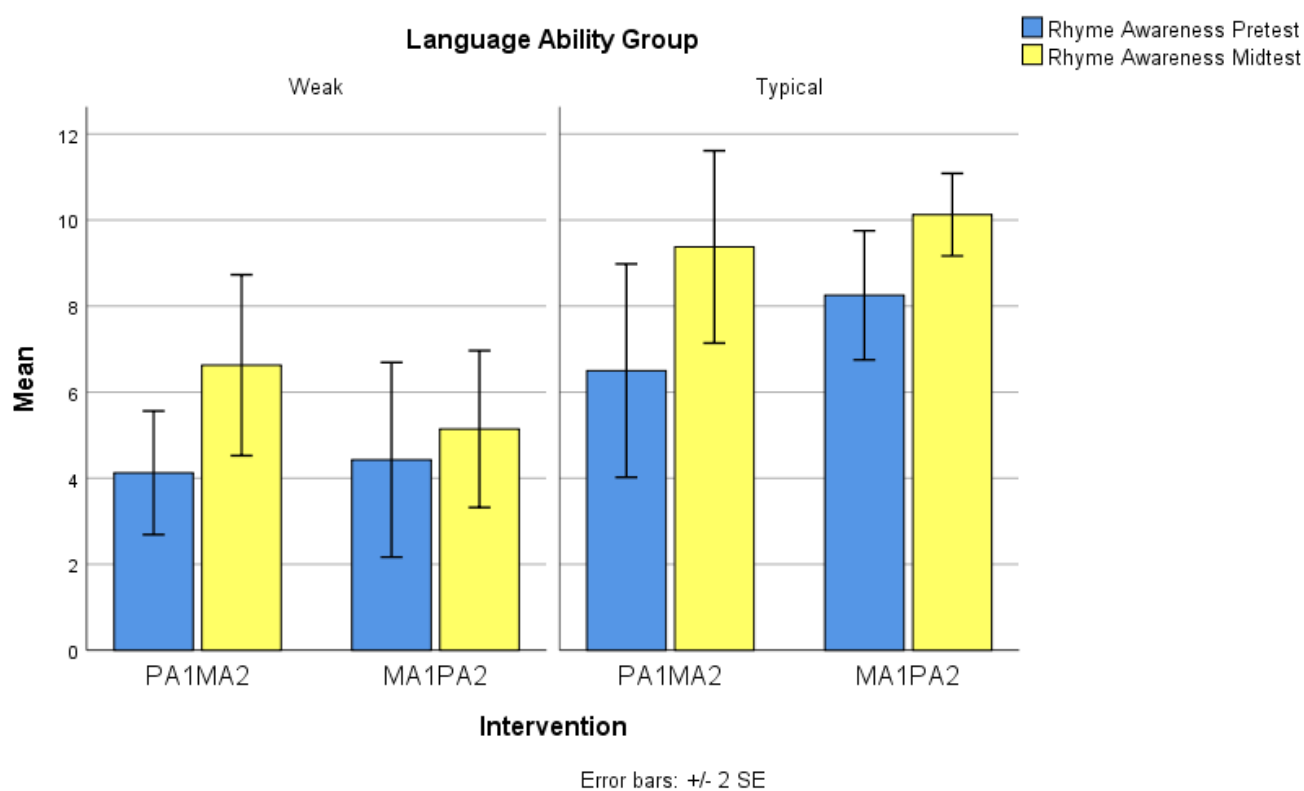


Figure 3.2 Rhyme Awareness Task Performance

### Alliteration awareness task

The findings of the three-way analysis of variance for the Alliteration awareness measure revealed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .64$ ,  $EF < .001$ ) – this can be observed in Figure 3.3. However, there was a significant interaction between the Time and Intervention factors ( $F_{(1,27)} = 12.72$ ,  $p = .001$ ,  $EF = .32$ ) indicating that both the Bilingual language weak and the Typically-developing bilinguals showed greater gains in the Phonological intervention than the Morphological intervention. There were statistically significant main effects of Time ( $F_{(1,27)} = 38.55$ ,  $p < .001$ ,  $EF = .59$ ) and First Intervention ( $F_{(1,27)} = 6.15$ ,  $p = .02$ ,  $EF = .19$ )

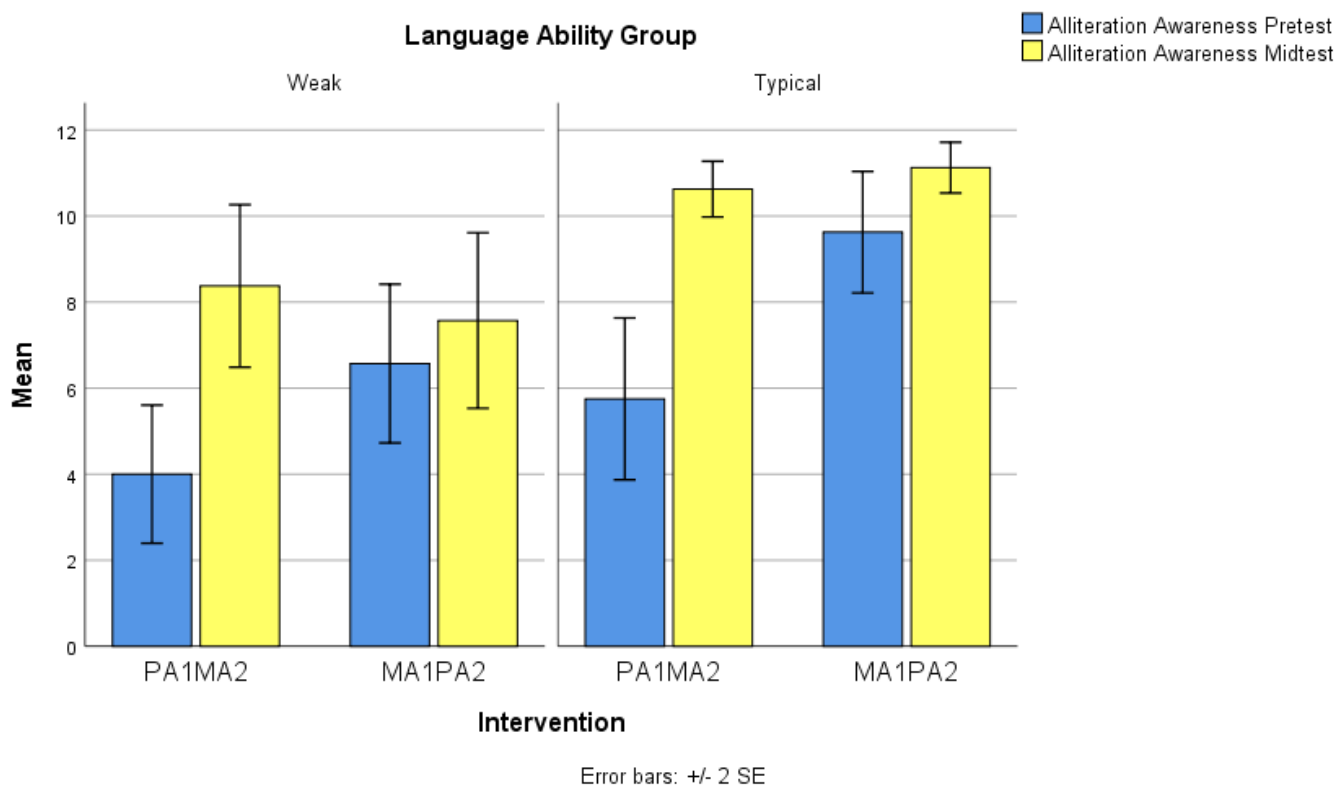


Figure 3.3 Alliteration Awareness Task Performance

### Phoneme isolation task

The results of the three-way analysis of variance for the Phoneme isolation measure revealed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .38$ ,  $EF = .03$ ). However, there was a significant interaction between the Time and Intervention factors ( $F_{(1,27)} = 6.09$ ,  $p = .02$ ,  $EF = .18$ ) – as seen in Figure 3.4 below. The finding suggests that greater improvements were demonstrated by both the Bilingual language weak and the Typically-developing bilingual groups administered initially with Phonological awareness intervention compared to those who started with the Morphological awareness intervention. Likewise, there were statistically significant main effects of Time ( $F_{(1,27)} = 40.50$ ,  $p < .001$ ,  $EF = .60$ ) and Intervention ( $F_{(1,27)} = 5.56$ ,  $p = .03$ ,  $EF = .17$ ).

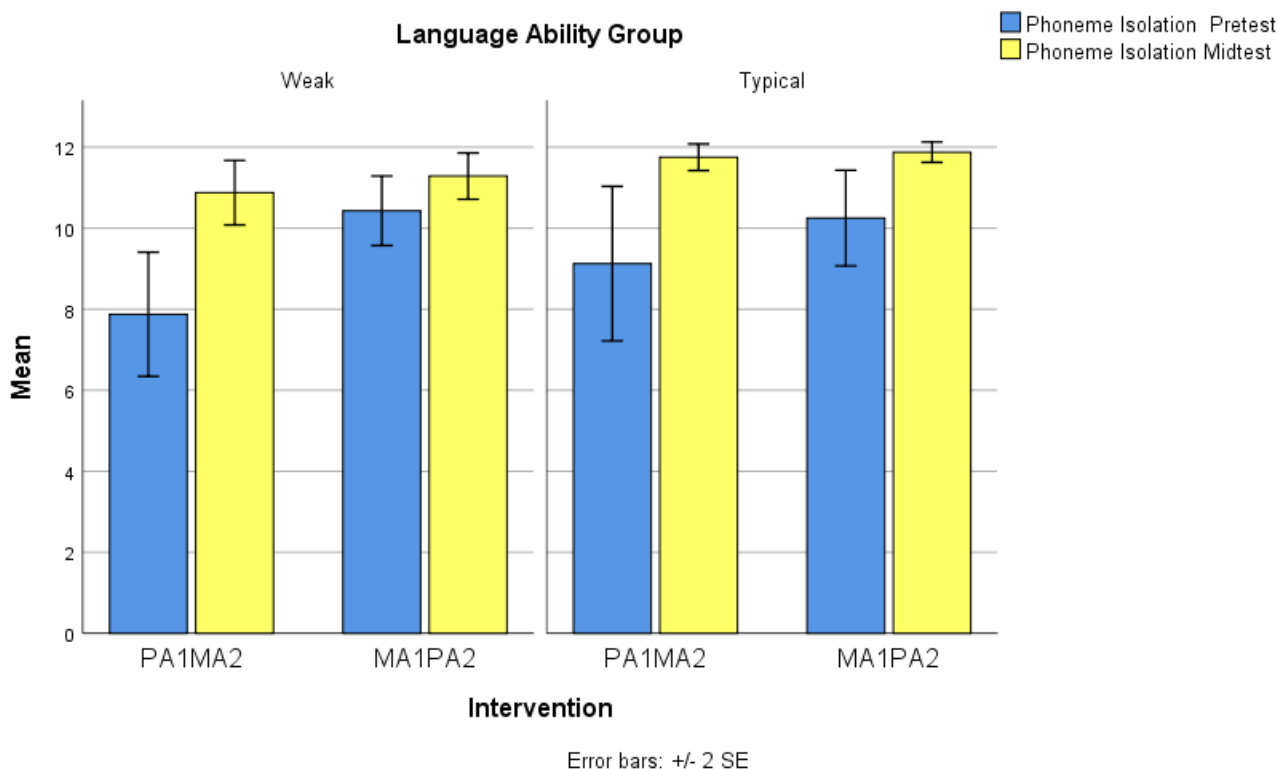


Figure 3.4 Phoneme Isolation Task Performance

### Phoneme segmentation task

Learners' ability to clearly separate each sound within a word were analysed using three-way analysis of variance. Phoneme segmentation measure indicated a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .50$ ,  $EF = .02$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .92$ ,  $EF < .001$ ). The only statistically significant effect was a main effect of Time ( $F_{(1,27)} = 9.91$ ,  $p = .004$ ,  $EF = .27$ ) – see Figure 3.5.

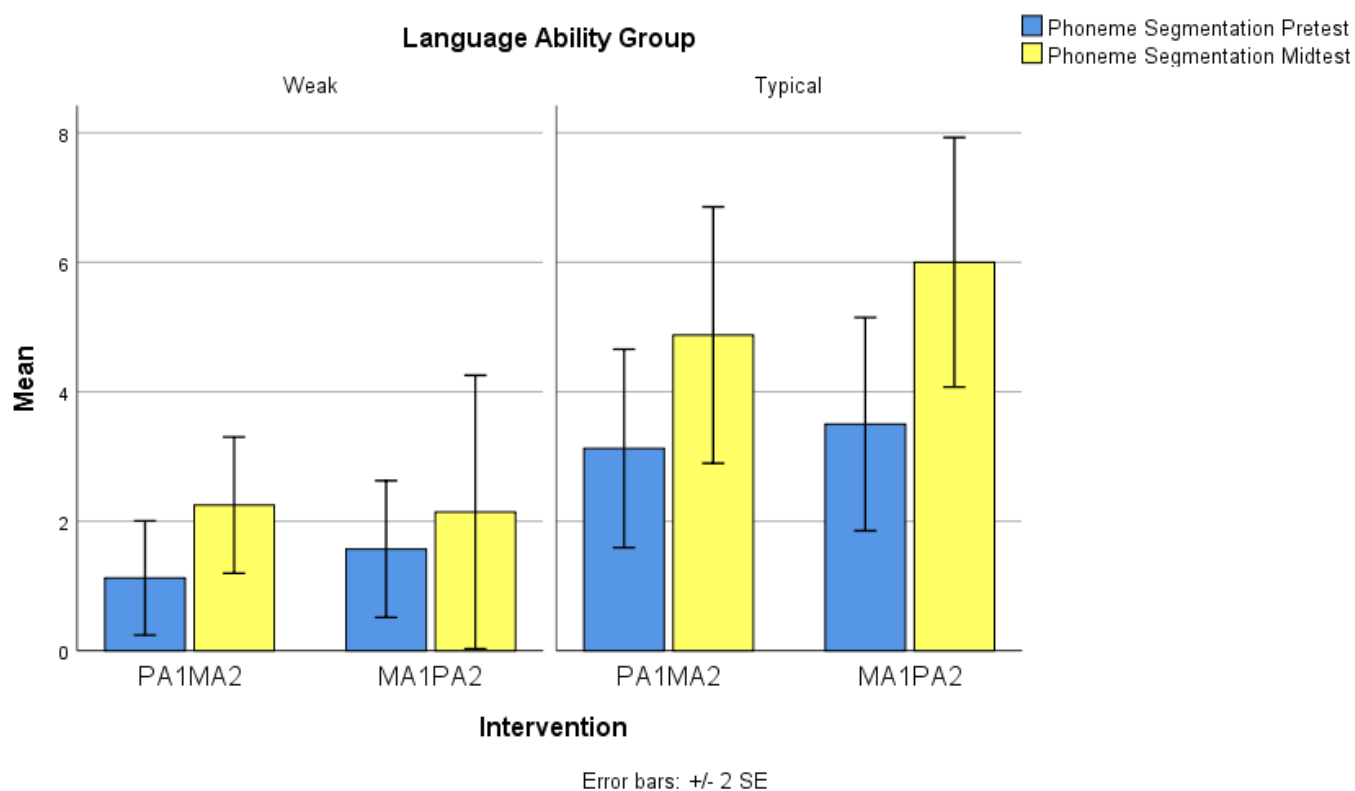


Figure 3.5 Phoneme Segmentation Task Performance

### Letter-sound task

Findings of the three-way analysis of variance for the Letter name and sound matching task indicated a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .78$ ,  $EF = .003$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} = 1.23$ ,  $p = .28$ ,  $EF = .04$ ) – see Figure 3.6. The only statistically significant effect was the main effect of Time ( $F_{(1,27)} = 51.14$ ,  $p < .001$ ,  $EF = .65$ ).

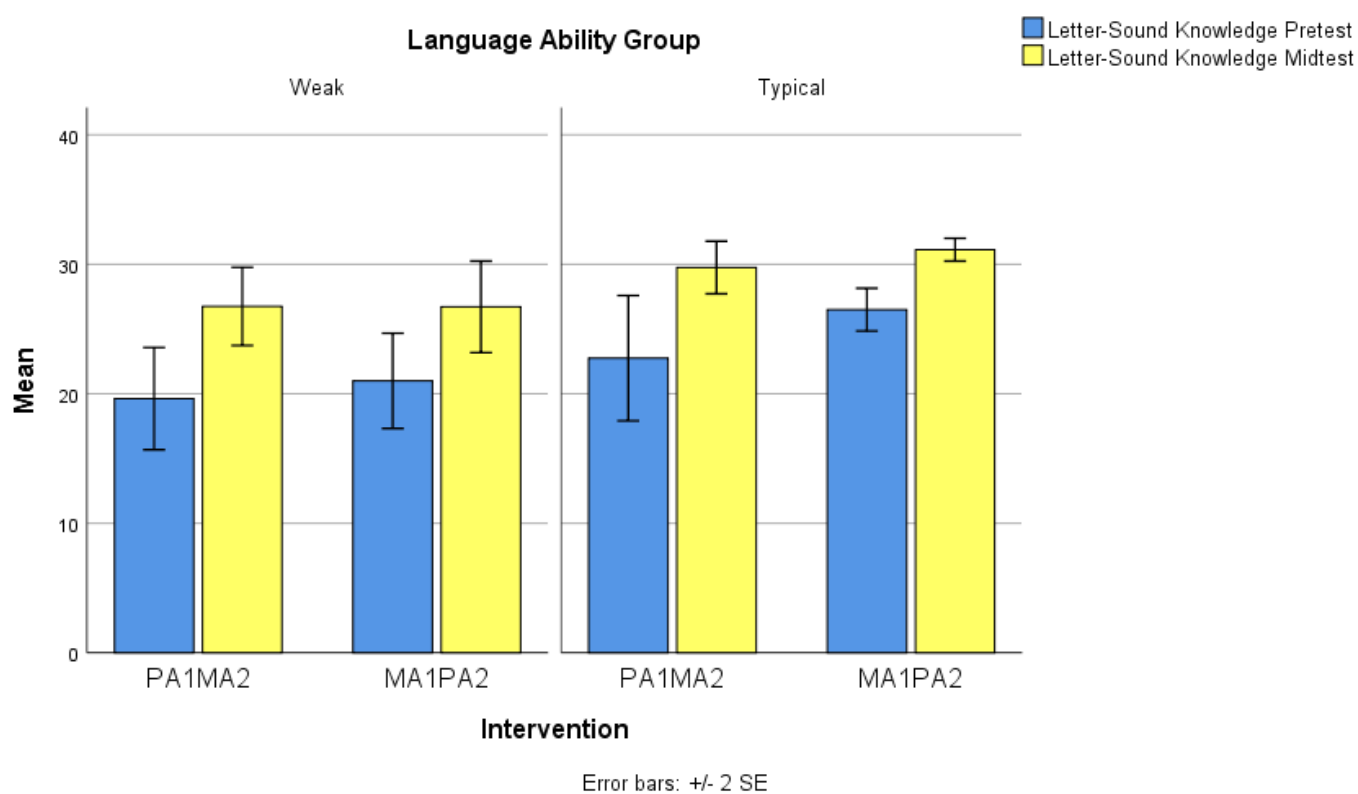


Figure 3.6 Letter-Sound Knowledge Task Performance



### **Morphological awareness derivation task**

The results of the three-way analysis of variance for the Morphological awareness derivation measure revealed a significant three-way interaction ( $F_{(1,27)} = 7.84, p = .01, EF = .23$ ) – this can be seen in Figure 3.8. Follow-up analyses of variance indicated a non-significant interaction between the Time and Intervention factors for Typically-developing bilinguals ( $F_{(1,14)} = 2.78, p = .12, EF = .17$ ), but a significant interaction between the Time and Intervention Factors for the Bilingual language weak children ( $F_{(1,13)} = 5.16, p = .04, EF = .28$ ). As shown in Figure 3.8, for the Bilingual language weak students (left-hand side of figure), an increase in scores occurred for both interventions, but those experiencing the Morphological awareness intervention showed much greater improvements.

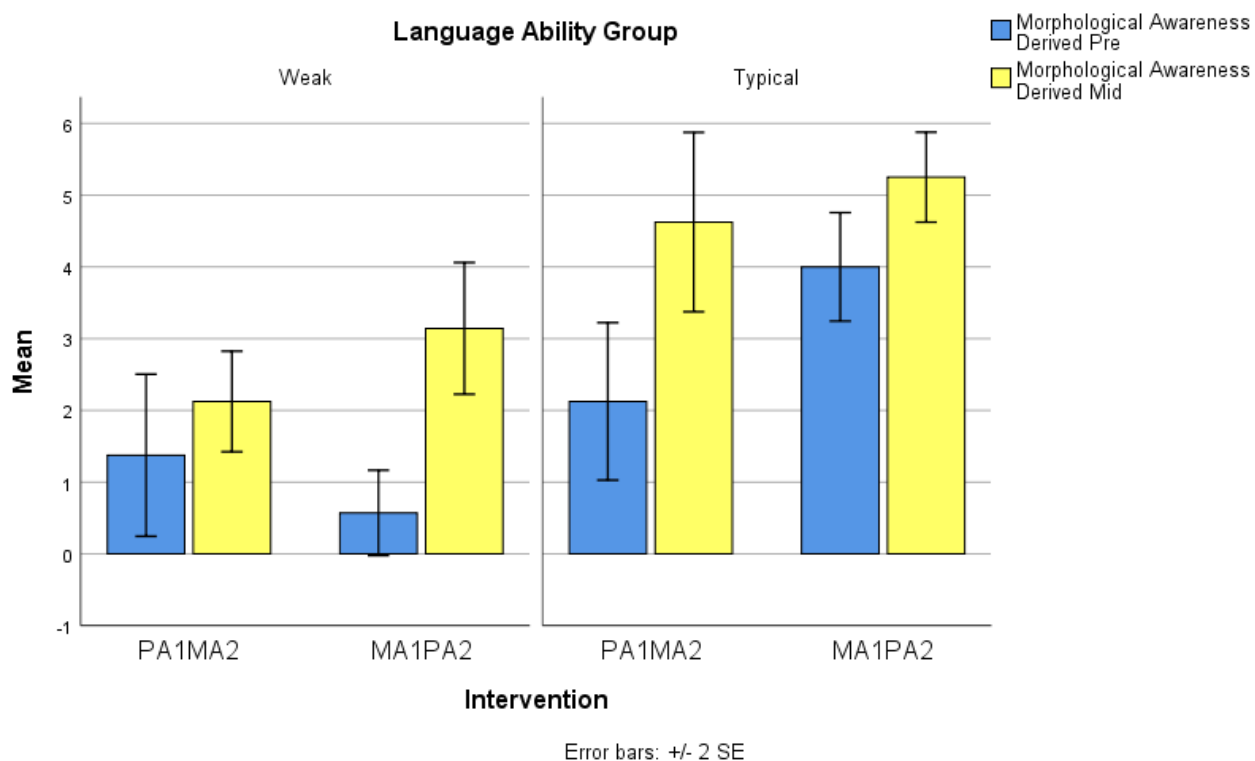


Figure 3.8 Morphological Awareness Derivation Task Performance



### ***Antonym production task***

The findings of the three-way analysis of variance for the Antonym production measure demonstrated a significant three-way interaction ( $F_{(1,27)} = 6.29$ ,  $p = .018$ ,  $EF = .19$ ). Further analyses suggest a non-significant interaction between the Time and Intervention factors for Bilingual language weak learners ( $F_{(1,13)} < 1$ ,  $p = .79$ ,  $EF = .006$ ), but a significant interaction between Time and Intervention factors for Typically-developing bilinguals ( $F_{(1,14)} = 11.43$ ,  $p = .004$ ,  $EF = .45$ ). As depicted in Figure 3.9, for the Typically-developing bilingual children (right-hand side of figure), increases in Antonym production scores transpired in both interventions, but those experiencing the Morphological awareness intervention showed much greater gains.

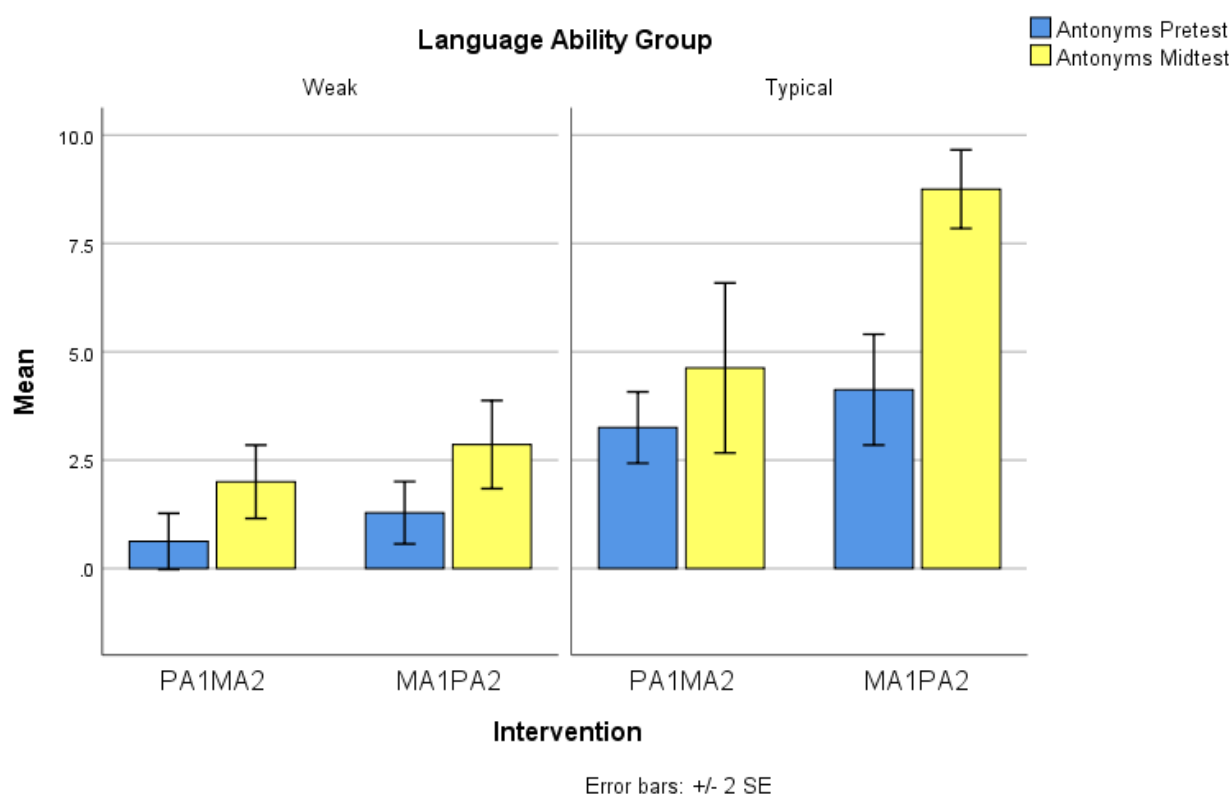


Figure 3.9 Antonym Production Task Performance

### Synonym production task

Evaluating results using a three-way analysis of variance for the Synonym production measure indicated a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .91$ ,  $EF < .001$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .69$ ,  $EF = .01$ ) – see Figure 3.10. Still, there was a significant interaction between Time and Language ability ( $F_{(1,27)} = 14.03$ ,  $p = .001$ ,  $EF = .34$ ) suggesting that the Typically-developing bilinguals showed greater gains following intervention than the Bilingual language weak students.

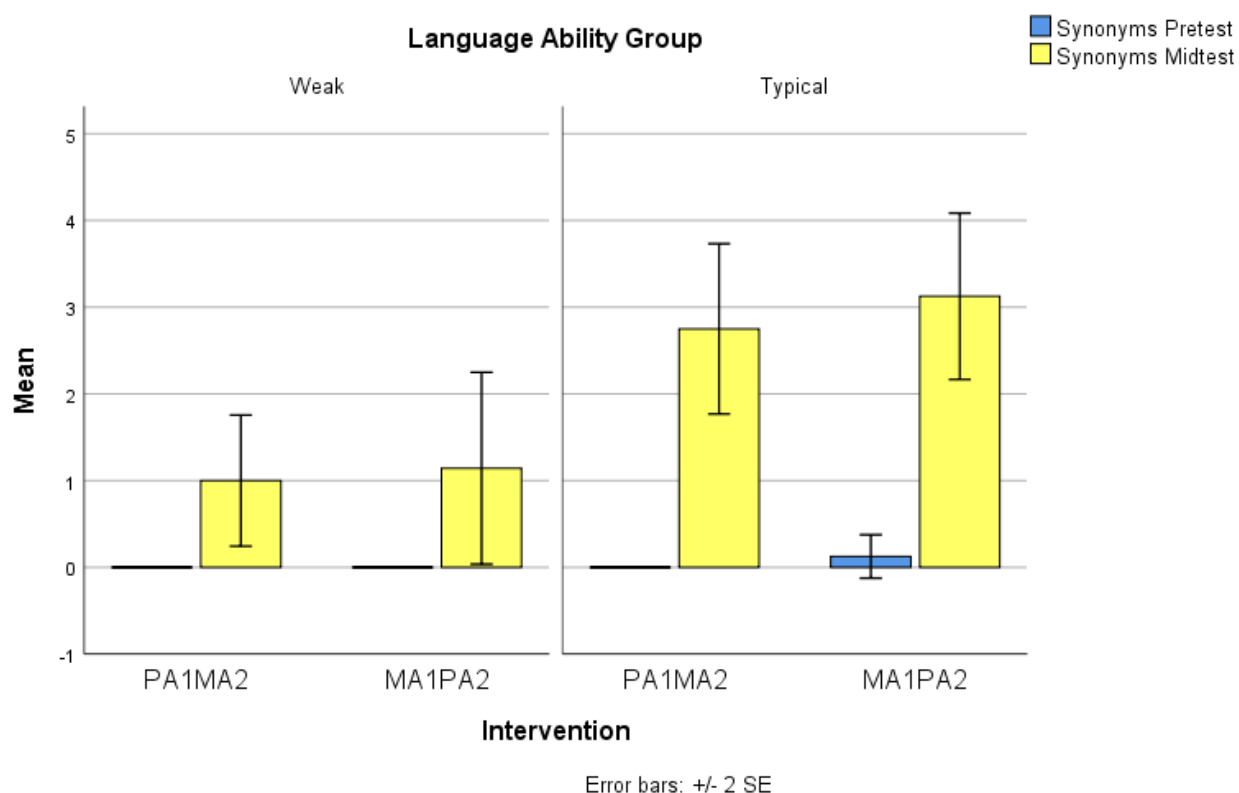


Figure 3.10 Synonym Production Task Performance

### Word analogy task

The findings of the three-way analysis of variance for the Word analogy measure yielded a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .44$ ,  $EF = .02$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .90$ ,  $EF = .001$ ) – see Figure 3.11. There was a significant interaction effect, however, recorded between Time and Language ability ( $F_{(1,27)} = 16.65$ ,  $p < .001$ ,  $EF = .37$ ). Again, the Typically-developing bilingual learners showed larger gains than their Bilingual language weak peers.

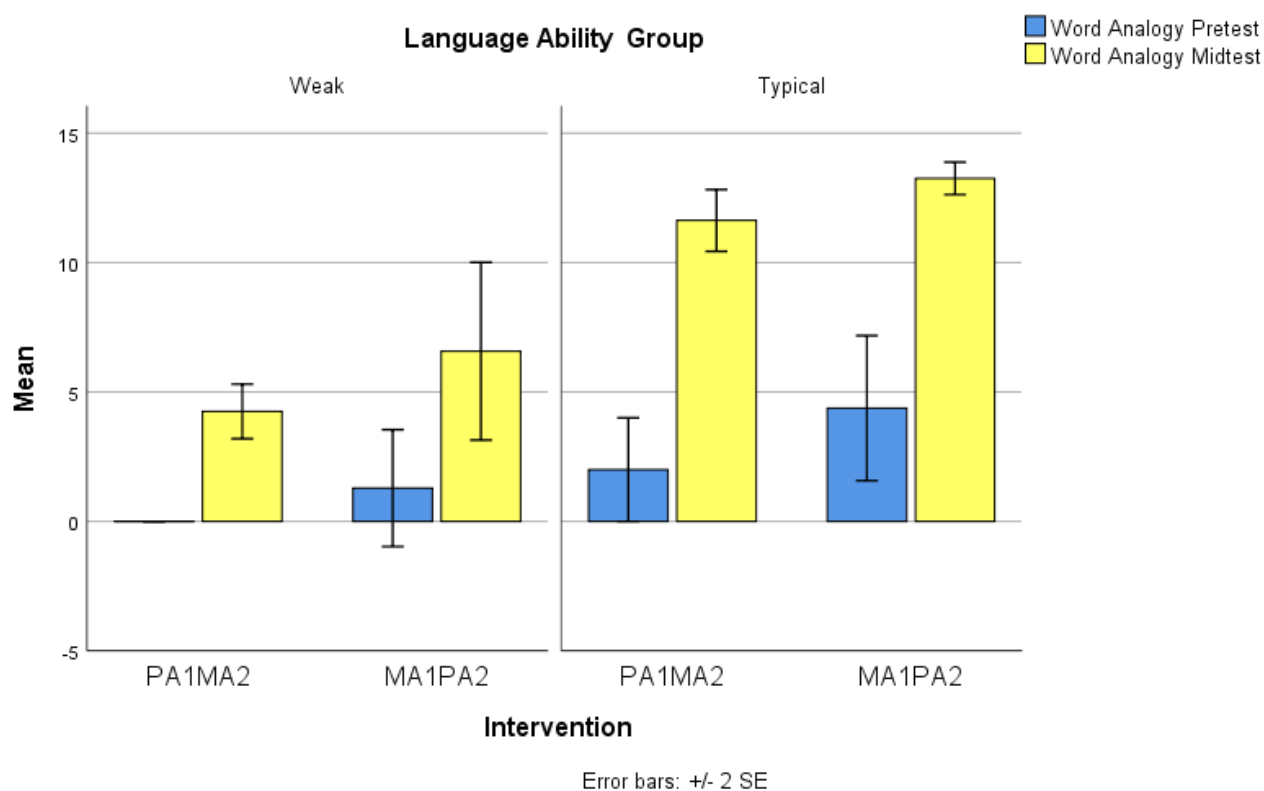


Figure 3.11 Word Analogy Task Performance

### **Text comprehension task**

The outcome of the three-way analysis of variance for the Text comprehension measure indicated a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .59$ ,  $EF = .011$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} = 1.88$ ,  $p = .18$ ,  $EF = .07$ ). However, a significant interaction effect between Time and Language ability was obtained ( $F_{(1,27)} = 4.82$ ,  $p = .03$ ,  $EF = .15$ ). As can be seen in Figure 3.12, the Typically-developing bilingual group showed greater gains in scores on the Text comprehension measure across both intervention methods.

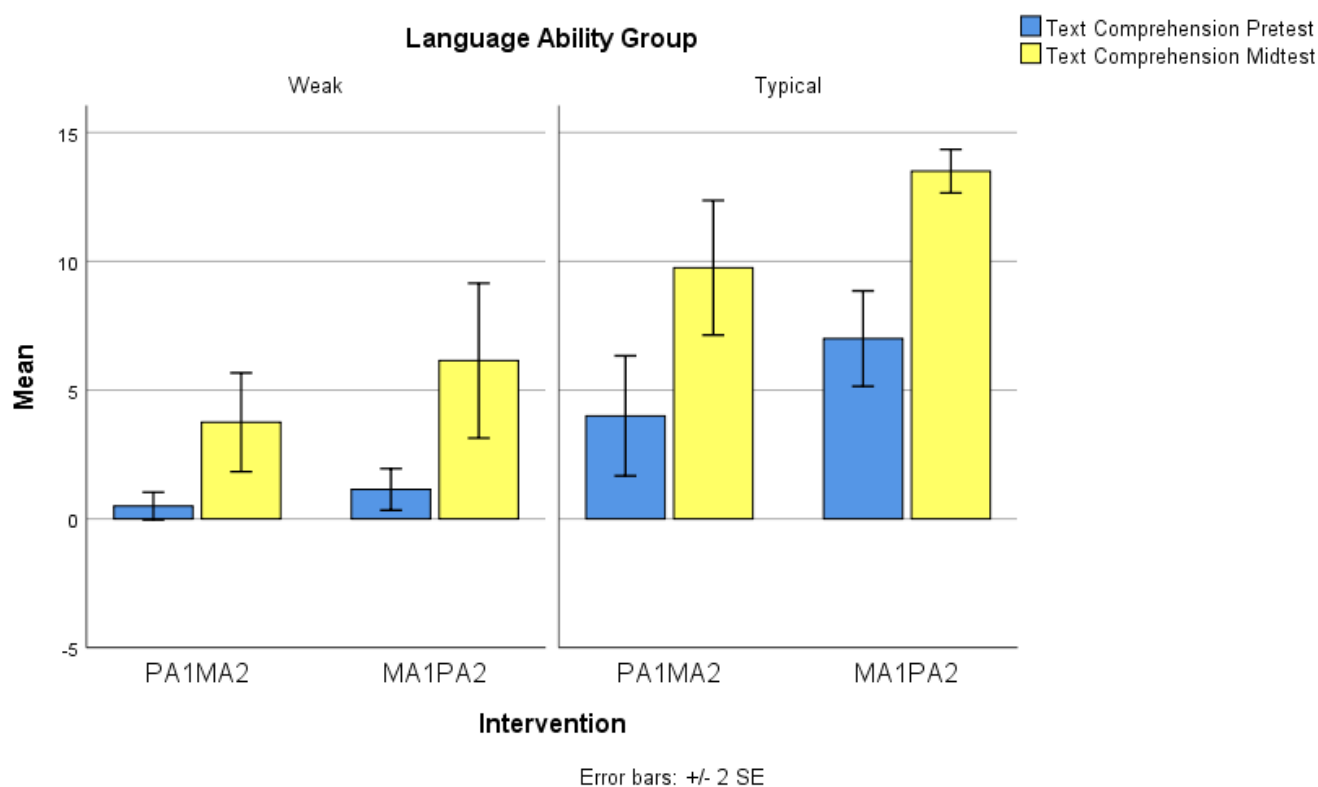


Figure 3.12 Text Comprehension Task Performance

### **Comparisons of Time1-Pre versus Time3-Post assessment data**

The next part of the findings contrasts the Time 1- Pre performance scores with the Time 3 – Post data to evaluate the influence of both interventions. The results for the second intervention are shown for each of the measures in the study. It begins with the phonological measures; advancing from syllable and rhyme (the large units of sounds) before proceeding to alliteration, phoneme isolation and segmentation (considered smallest or phoneme-level of sounds) measures. Then letter-sound measure follows next together with the morphological measures (inflection and derivation), and ending with the word meaning measures (antonyms, synonyms, analogies and text comprehension).

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Table 3.5 . Means, with standard deviations in brackets, for the Bilingual group with specific language weaknesses on each of the study measures at the first and third assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time3-Post	Time 1-Pre	Time3-Post
Syllable Awareness (12 items)	6.63 (1.77)	9.13 (2.23)	8.57 (2.00)	10.50 (1.27)
Rhyme Awareness (12 items)	4.13 (2.03)	8.13 (2.03)	4.43 (2.99)	8.29 (2.43)
Alliteration Awareness (12 items)	4.00 (2.27)	7.88 (2.99)	6.57 (2.44)	9.0 (2.31)
Phoneme Isolation (12 items)	7.88 (2.17)	11.50 (1.07)	10.43 (1.13)	11.71 (0.49)
Phoneme Segmentation (12 items)	1.13 (1.25)	5.38 (2.77)	1.57 (1.40)	5.86 (2.91)
Letter-sound Knowledge (32 items)	19.63 (5.58)	28.25 (2.71)	21.0 (4.87)	27.86 (2.12)
Morphological Inflection(10 items)	0.50 (0.54)	2.38 (2.13)	0.57 (0.54)	3.43 (1.99)
Morphological Derivation (10 items)	1.38 (1.60)	3.88 (1.13)	0.57 (0.79)	4.14 (1.22)
Antonym Production (23 items)	0.63 (0.92)	4.25 (2.12)	1.29 (0.95)	4.43 (1.72)
Synonym Production (23 items)	0.00 (0.00)	2.88 (2.10)	0.00 (0.00)	2.57 (2.15)
Word Analogy (40 items)	0.00 (0.00)	4.63 (2.45)	1.29 (2.98)	7.29 (4.42)
Text Comprehension (38 items)	0.50 (0.76)	4.63 (2.13)	1.14 (1.07)	6.57 (3.87)

Table 3.6 Means, with standard deviations in brackets, for the Typically-developing bilinguals on each of the study measures at the first and third assessment points

Assessment Measures	Phonological First Intervention		Morphological First Intervention	
	Time 1-Pre	Time3-Post	Time 1-Pre	Time3-Post
Syllable Awareness (12 items)	6.50 (1.85)	9.75 (1.67)	8.00 (1.69)	11.50 (0.76)
Rhyme Awareness (12 items)	6.50 (3.51)	9.88 (3.14)	8.25 (2.12)	11.38 (0.74)
Alliteration Awareness (12 items)	5.75 (2.66)	10.25 (1.28)	9.63 (1.99)	11.25 (1.17)
Phoneme Isolation (12 items)	9.13 (2.70)	11.88 (0.35)	10.25 (1.67)	11.88 (0.35)
Phoneme Segmentation (12 items)	3.13 (2.17)	8.75 (1.83)	3.50 (2.33)	8.88 (1.36)
Letter-sound Knowledge (32 items)	22.75 (6.84)	30.88 (0.99)	26.50 (2.33)	31.25 (0.71)
Morphological Inflection (10 items)	1.13 (1.25)	4.88 (1.13)	2.50 (2.20)	6.38 (1.30)
Morphological Derivation (10 items)	2.13 (1.55)	6.00 (1.20)	4.00 (1.07)	6.50 (1.51)
Antonym Production (23 items)	3.25 (1.17)	5.63 (1.19)	4.13 (1.81)	7.75 (1.28)
Synonym Production (23 items)	0.00 (0.00)	4.88 (0.99)	0.13 (0.35)	6.38 (1.06)
Word Analogy (40 items)	2.00 (2.83)	11.00 (3.38)	4.38 (3.96)	13.25 (2.12)
Text Comprehension (38 items)	4.00 (3.30)	11.25 (4.30)	7.00 (2.62)	12.88 (2.75)

### Syllable awareness task

The outcome of the three-way analysis of variance for the Syllable awareness measure, which compared pre-intervention scores with post-intervention ones, showed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .56$ ,  $EF = .013$ ). It also yielded a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .85$ ,  $EF = .001$ ). The only significant effect was a main effect of Time ( $F_{(1,27)} = 79.03$ ,  $p < .001$ ,  $EF = .75$ ). Figure 3.13 illustrates the results of the Syllable awareness measure.

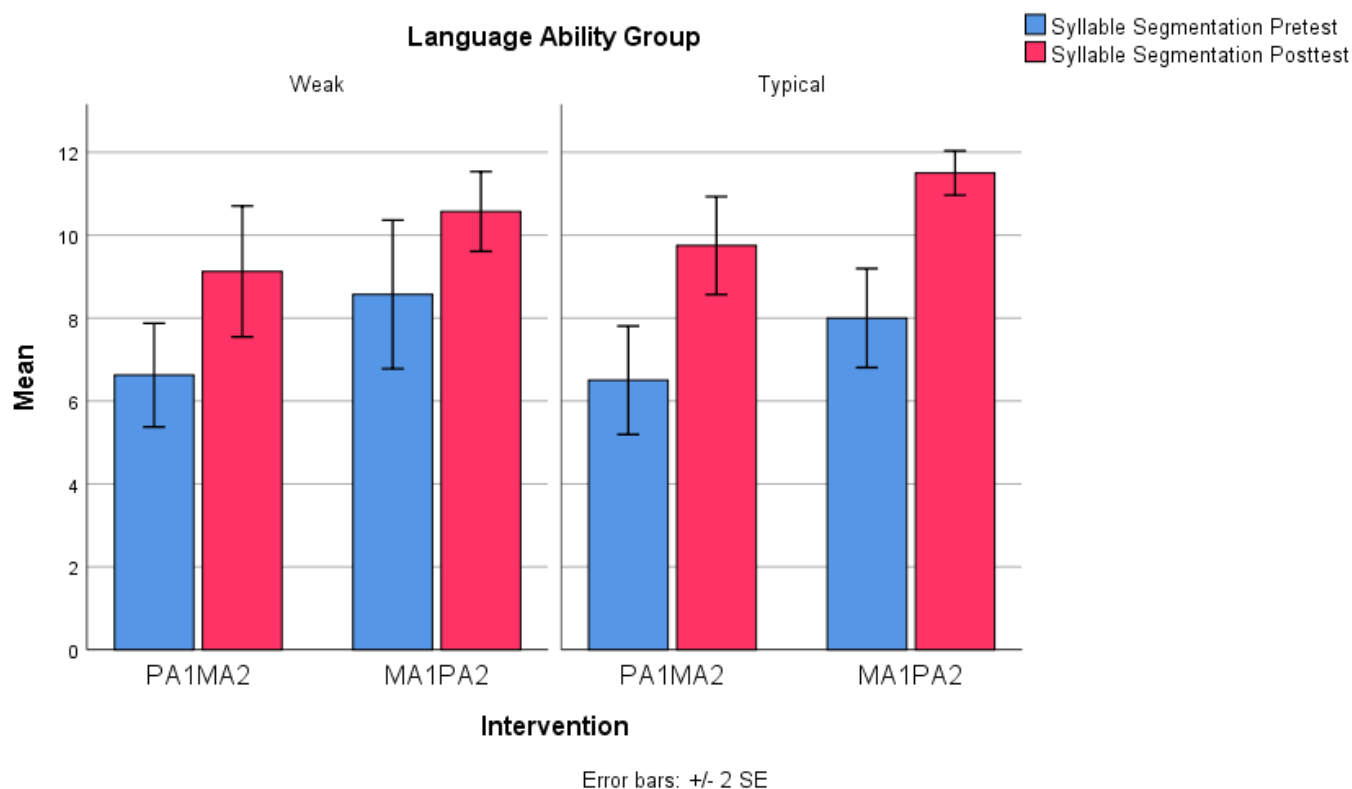


Figure 3.13 Syllable Segmentation Awareness Task Performance



### Rhyme awareness task

The results of the three-way analysis of variance for the Rhyme awareness task revealed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .96$ ,  $EF < 1$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .84$ ,  $EF = .002$ ). Figure 3.14 displays the findings for the Rhyme awareness task. There were statistically significant main effects of Time ( $F_{(1,27)} = 59.18$ ,  $p < .001$ ,  $EF = .69$ ) and Language ability ( $F_{(1,27)} = 12.89$ ,  $p < .001$ ,  $EF = .32$ ).

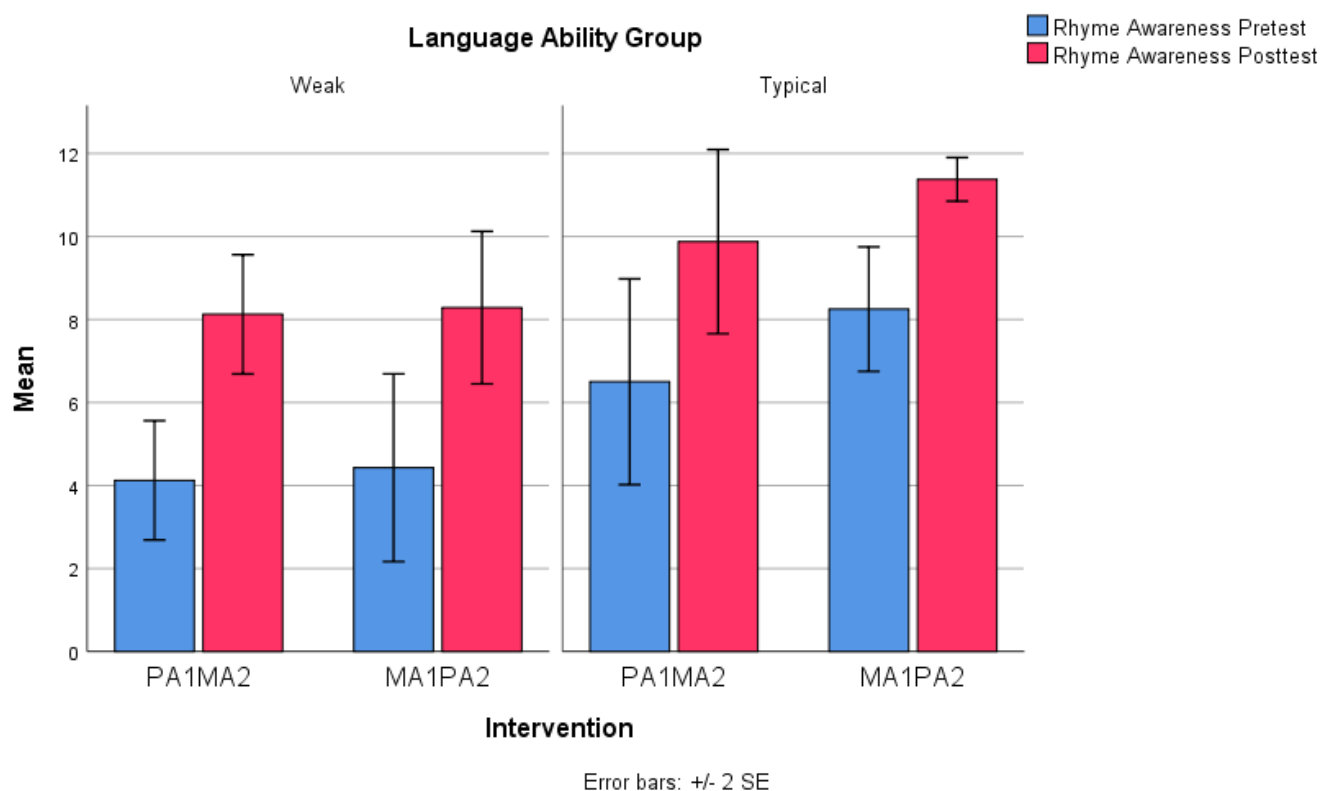


Figure 3.14 Rhyme Awareness Task Performance

### Alliteration awareness task

The outcome of the three-way analysis of variance for the Alliteration awareness measure showed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .47$ ,  $EF = .02$ ). Nonetheless, there was a significant two-way interaction between Time and Intervention ( $F_{(1,27)} = 4.86$ ,  $p = .04$ ,  $EF = .15$ ) suggesting that for both Bilingual language weak and Typically-developing bilinguals, those initially introduced with the Phonological awareness intervention displayed greater overall gains. In addition, there were statistically significant main effects of Time ( $F_{(1,27)} = 40.18$ ,  $p < .001$ ,  $EF = .60$ ) and Intervention ( $F_{(1,27)} = 11.63$ ,  $p = .002$ ,  $EF = .30$ ).

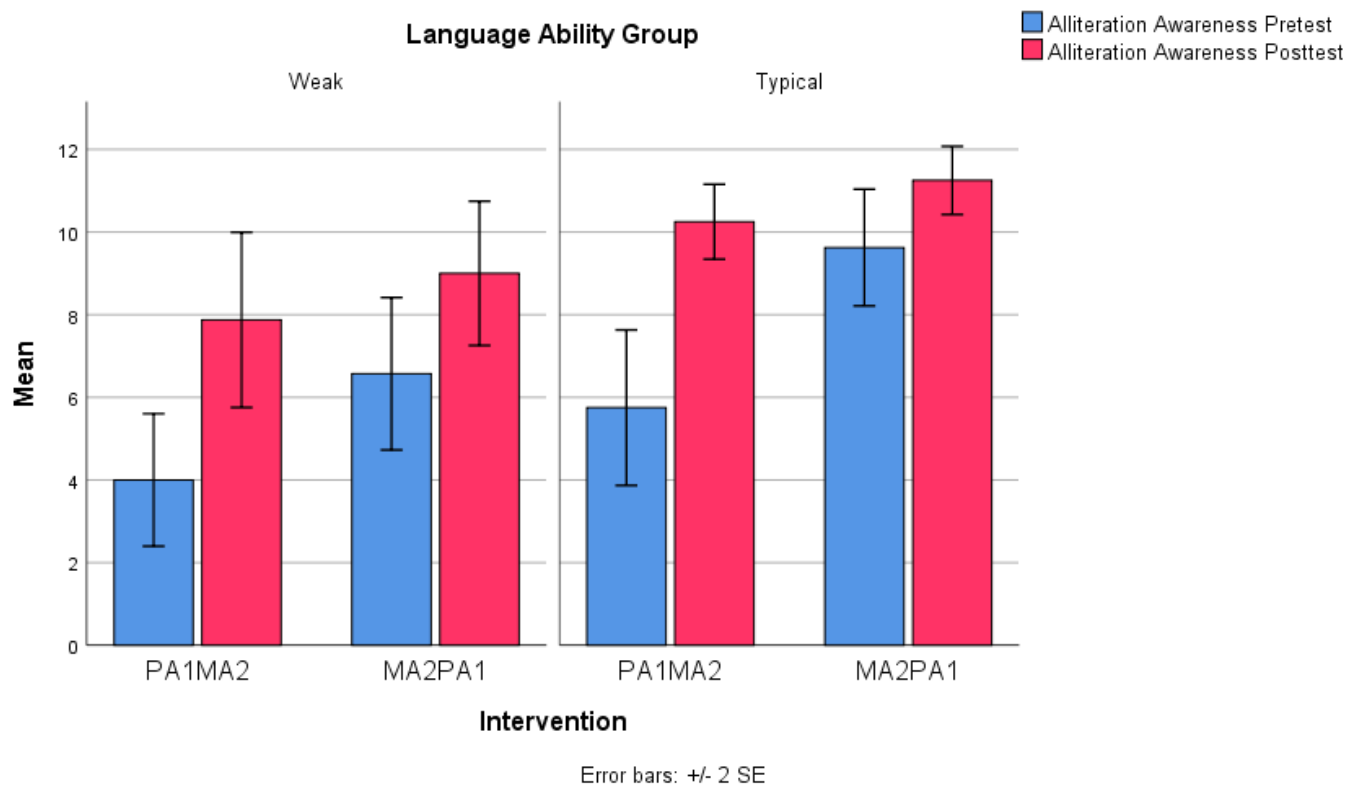


Figure 3.15 Alliteration Awareness Task Performance

### Phoneme Isolation task

The results of the statistical analyses using repeated measures ANOVA for the Phoneme isolation task revealed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .37$ ,  $EF = .03$ ), but a significant interaction between Time and Intervention factors ( $F_{(1,27)} = 6.90$ ,  $p = .01$ ,  $EF = .20$ ) – see Figure 3.16. The findings suggest greater gains for the language weak and the Typically-developing bilinguals who experienced the Phonological awareness intervention first. There were likewise statistically significant main effects of Time ( $F_{(1,27)} = 49.58$ ,  $p < .001$ ,  $EF = .65$ ) and Second Intervention ( $F_{(1,27)} = 5.14$ ,  $p = .03$ ,  $EF = .16$ ).

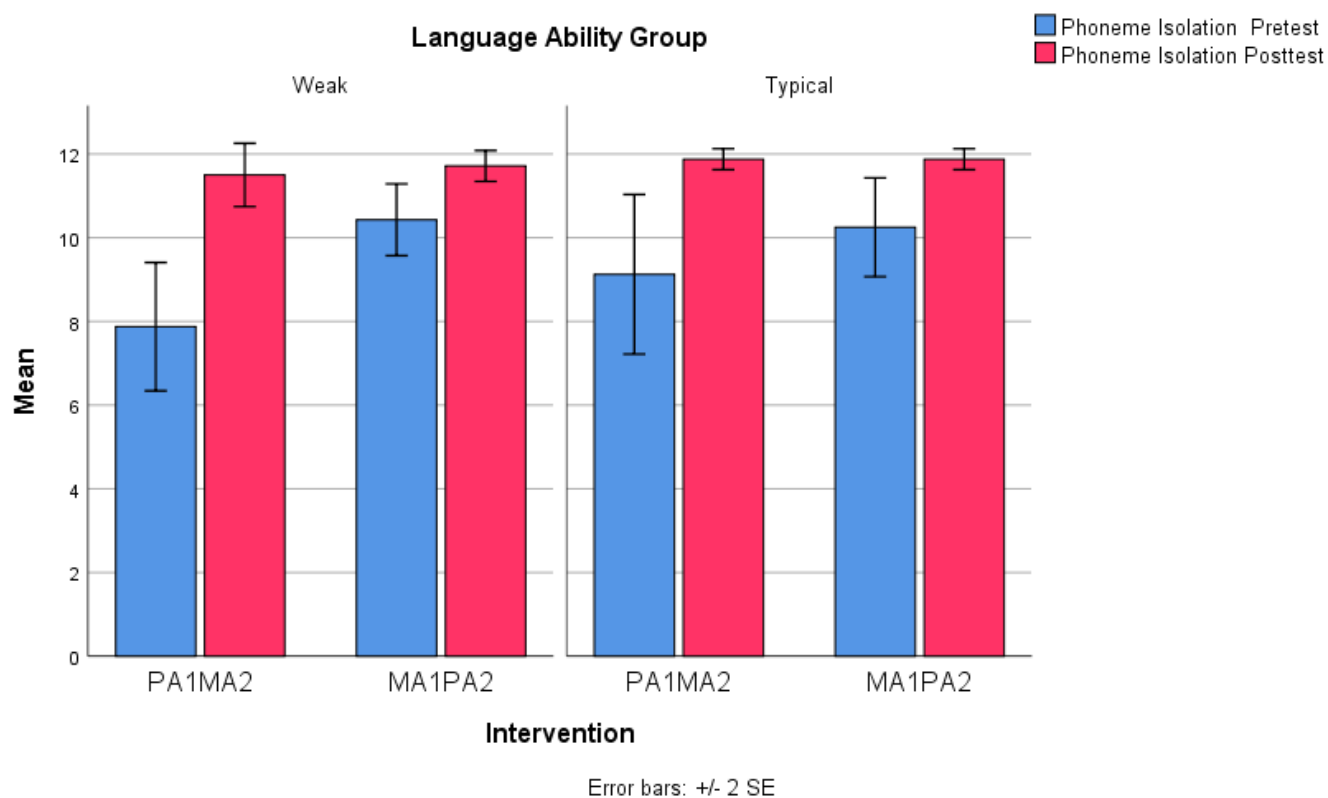


Figure 3.16 Phoneme Isolation Task Performance

### Phoneme segmentation task

The output of the three-way analysis of variance for the Phoneme segmentation measure displayed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .90$ ,  $EF = .001$ ) and a non-significant interaction between Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .92$ ,  $EF < .001$ ). – see Figure 3.17.

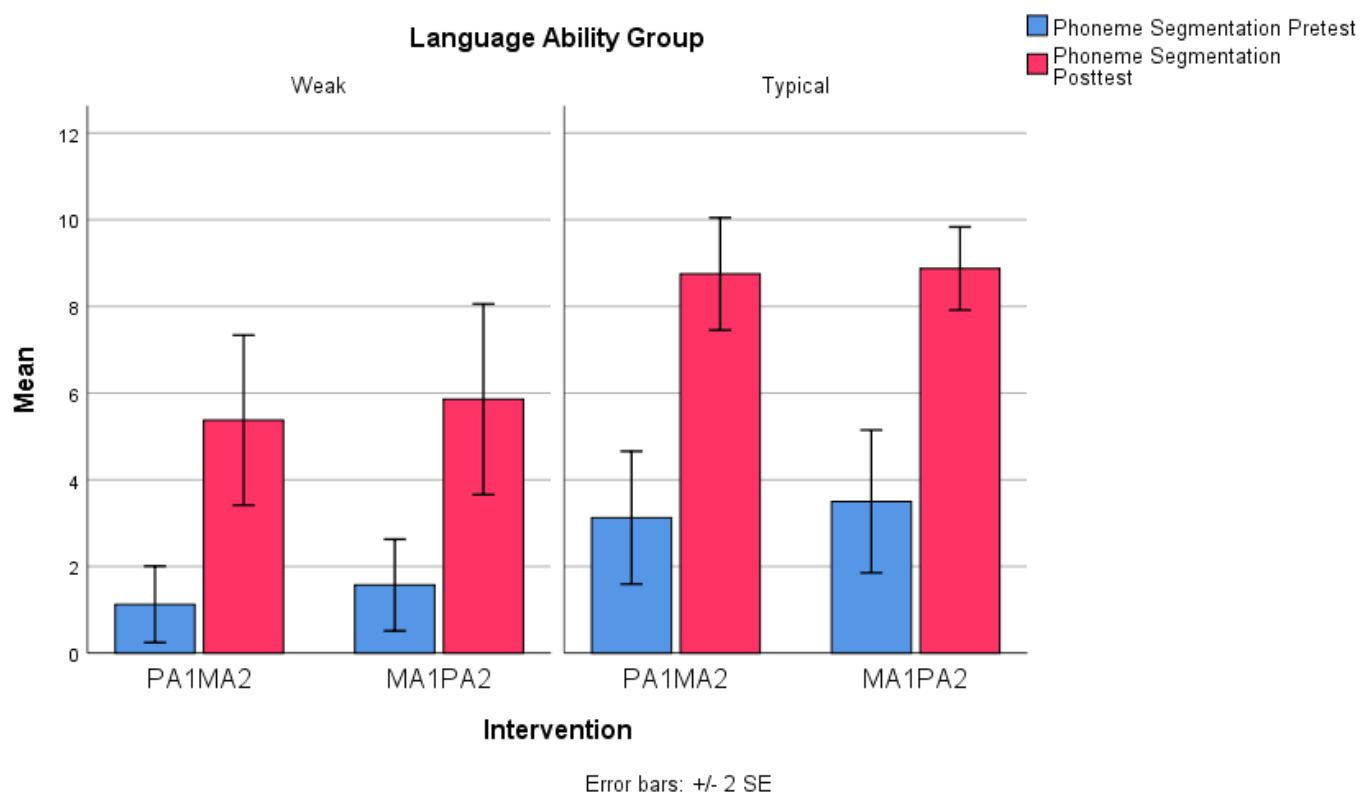


Figure 3.17 Phoneme Segmentation Task Performance

### Letter-sound task

Evaluating results of the three-way analysis of variance for the Letter-sound task indicated a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .62$ ,  $EF = .009$ ) and a non-significant three-way interaction between the Time and Intervention factors ( $F_{(1,27)} = 2.65$ ,  $p = .12$ ,  $EF = .09$ ). Figure 3.18 shows the results for the Letter-sound matching task. The only statistically significant main effect was a main effect of Time ( $F_{(1,27)} = 80.46$ ,  $p < .001$ ,  $EF = .75$ ).

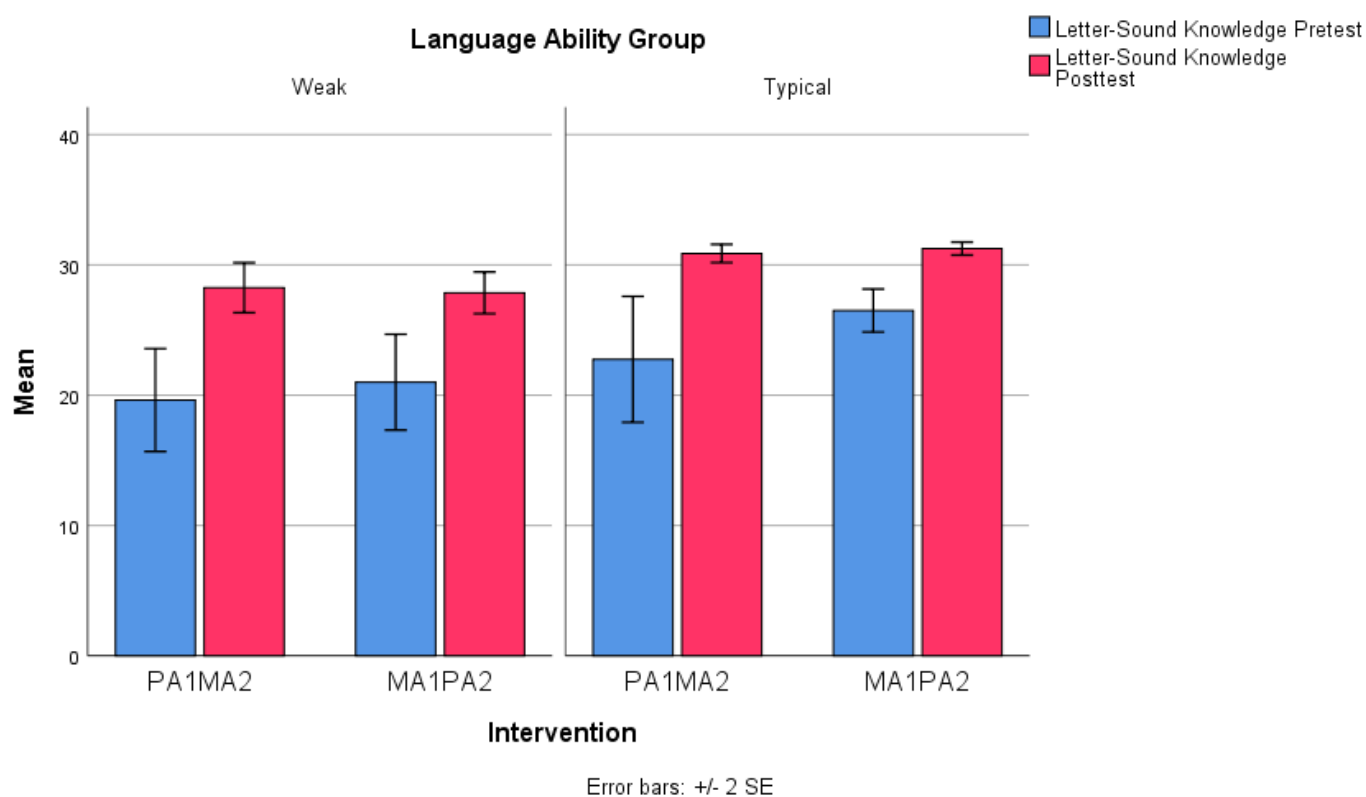


Figure 3.18 Letter-Sound Knowledge Task Performance

### **Morphological awareness inflection task**

The outcome of a three-way analysis of variance for the Morphological awareness inflection measure revealed a non-significant three-way interaction ( $F_{(1,27)} < 1$ ,  $p = .60$ ,  $EF = .01$ ) and a non-significant interaction between Time and Intervention Factors ( $F_{(1,27)} < 1$ ,  $p = .50$ ,  $EF = .02$ ) – see Figure 3.19. There was a significant factor of Time ( $F_{(1,27)} = 58.49$ ,  $p < .001$ ,  $EF = .68$ ) and of Intervention ( $F_{(1,27)} = 7.33$ ,  $p = .01$ ,  $EF = .21$ ).

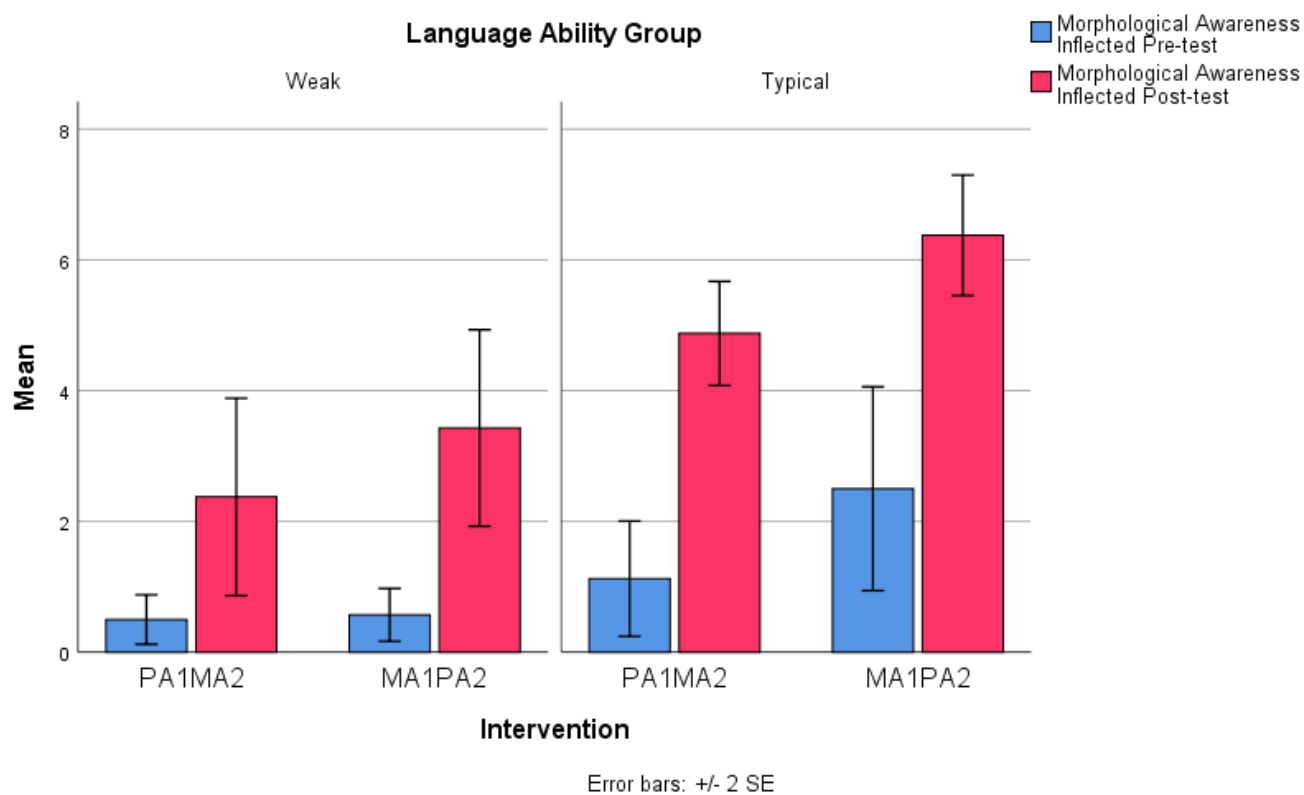


Figure 3.19 Morphological Awareness Inflection Task Performance

### **Morphological awareness derivation task**

Assessing the results of the three-way analysis of variance for the Morphological awareness derivation measure indicated a significant three-way interaction ( $F_{(1,27)} = 5.33$ ,  $p = .03$ ,  $EF = .17$ ) – this can be seen in Figure 3.20. Further analyses of variance revealed a non-significant interaction between the Time and Intervention factors for Bilingual language weak learners ( $F_{(1,13)} = 2.35$ ,  $p = .15$ ,  $EF = .15$ ), but a significant interaction between the Time and Intervention factors for the Typically-developing bilingual learners ( $F_{(1,14)} = 4.72$ ,  $p = .05$ ,  $EF = .25$ ). As can be observed in Figure 3.20, for the Typically-developing bilingual learners (right-hand side of the figure), those administered first with Phonological treatment showed greater gains in scores on Morphological awareness of derivations.

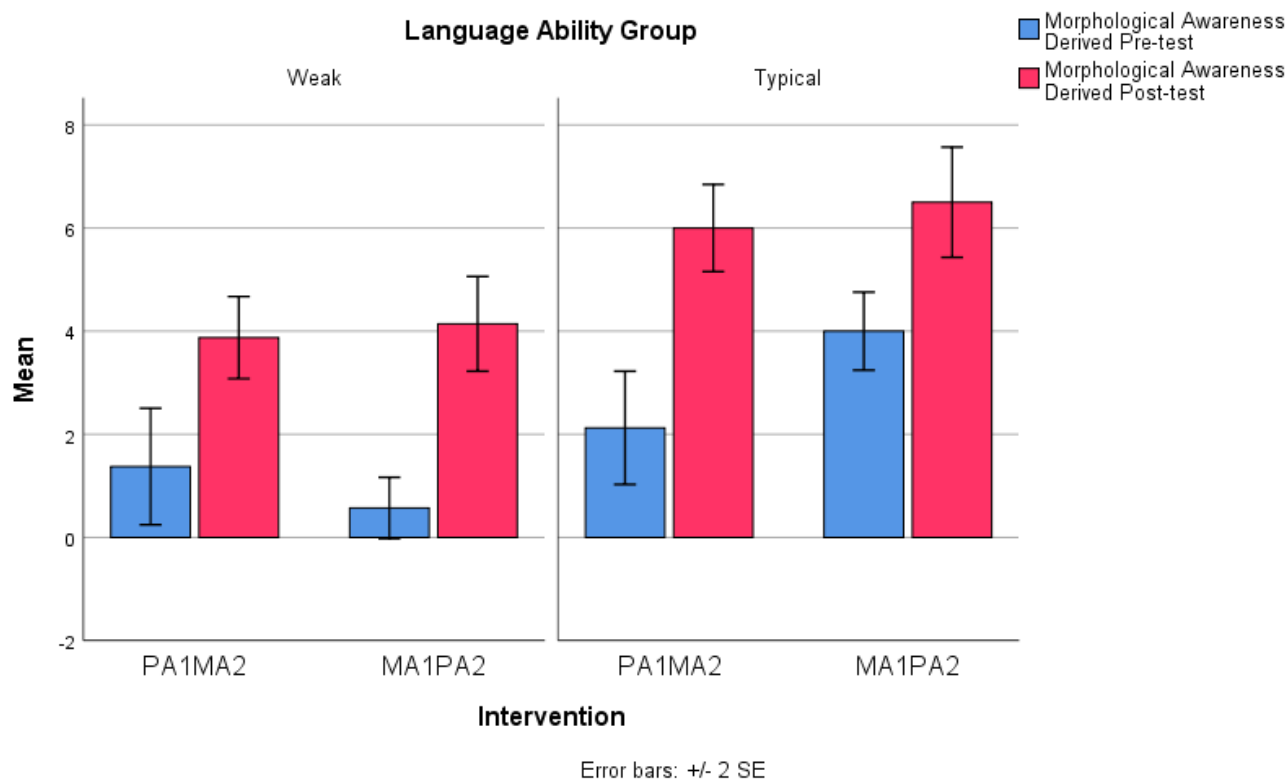


Figure 3.20 Morphological Awareness Derivation Task Performance

### ***Antonym production task***

The findings of the three-way analysis of variance for the Antonym production measure demonstrated a non-significant interaction ( $F_{(1,27)} = 2.16$ ,  $p = .15$ ,  $EF = .07$ ) and a non-significant interaction between the Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .52$ ,  $EF = .015$ ) – see Figure 3.21. There was a significant effect of Time ( $F_{(1,27)} = 117.26$ ,  $p < .001$ ,  $EF = .81$ ) and of Intervention ( $F_{(1,27)} = 4.93$ ,  $p = .03$ ,  $EF = .15$ ).

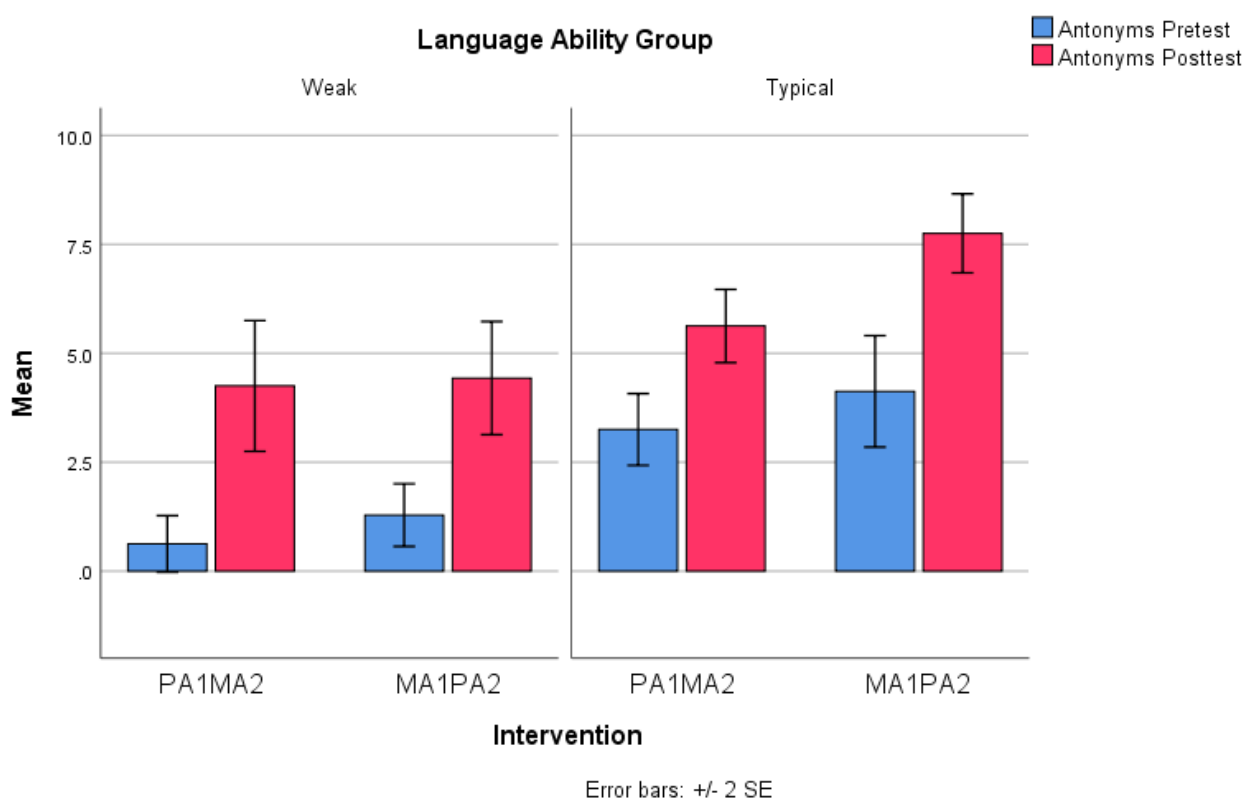


Figure 3.21 Antonym Production Task Performance



### **Synonym production task**

The outcome of the three-way analysis of variance for the Synonym production measure indicated a non-significant interaction ( $F_{(1,27)} = 1.96$ ,  $p = .17$ ,  $EF = .07$ ) and a non-significant interaction between Time and Intervention Factors ( $F_{(1,27)} < 1$ ,  $p = .38$ ,  $EF = .03$ ) – see Figure 3.22. There was, however, a significant interaction effect between Time and Language ability ( $F_{(1,27)} = 22.43$ ,  $p < .001$ ,  $EF = .45$ ). This indicates that Typically-developing bilingual learners showed greater increase in scores on the Synonym production task compared to the Bilingual language weak learners.

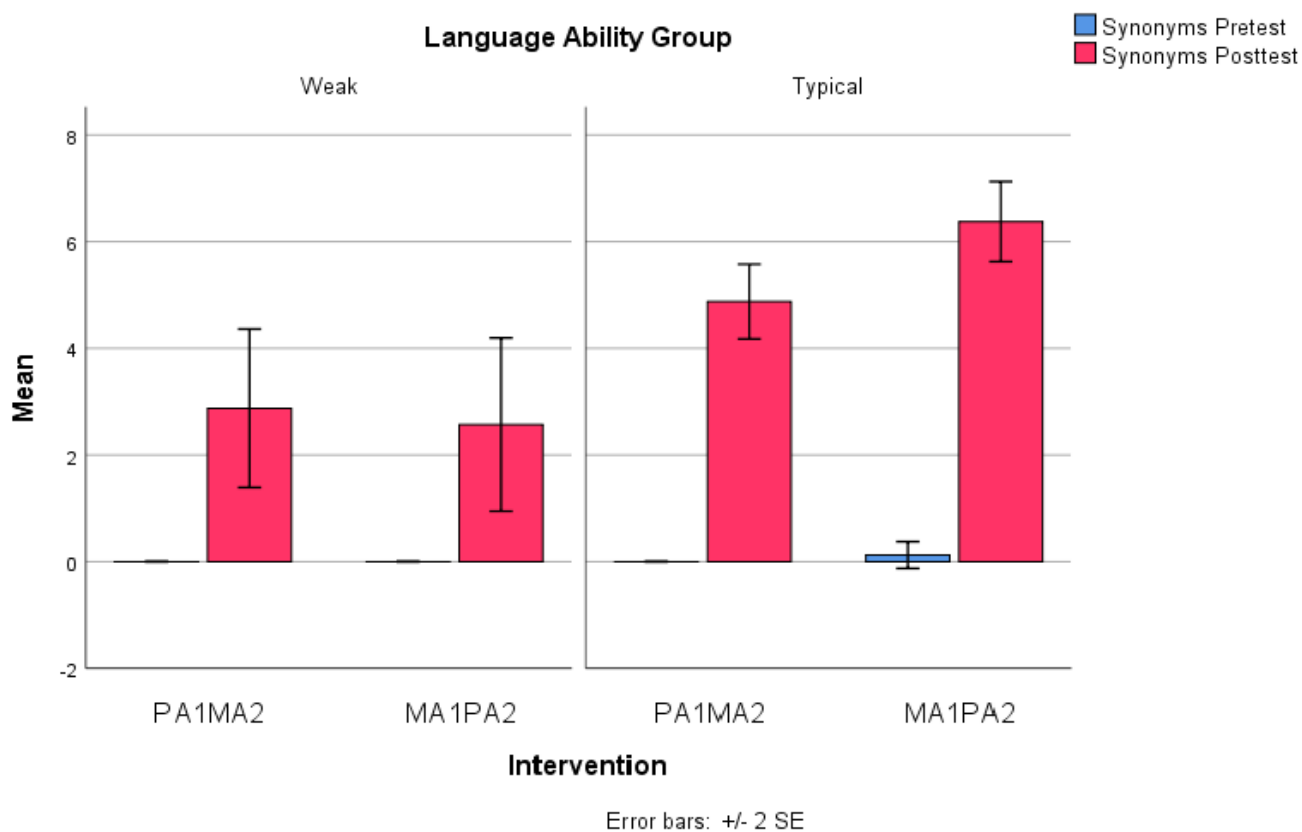


Figure 3.22 Synonym Production Task Performance

### Word analogy task

The results attained on the Word analogy measure after a three-way analysis of variance showed a non-significant three-way interaction ( $F_{(1,27)} < .001$ ,  $p = .58$ ,  $EF = .01$ ) and a non-significant two-way interaction between Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .65$ ,  $EF = .008$ ) – see Figure 3.23. There was a significant interaction effect between Time and Language ability ( $F_{(1,27)} = 7.16$ ,  $p = .01$ ,  $EF = .011$ ). This suggests that the Typically-developing bilingual learners showed greater gains than their Bilingual weak peers in the Word analogy measure.

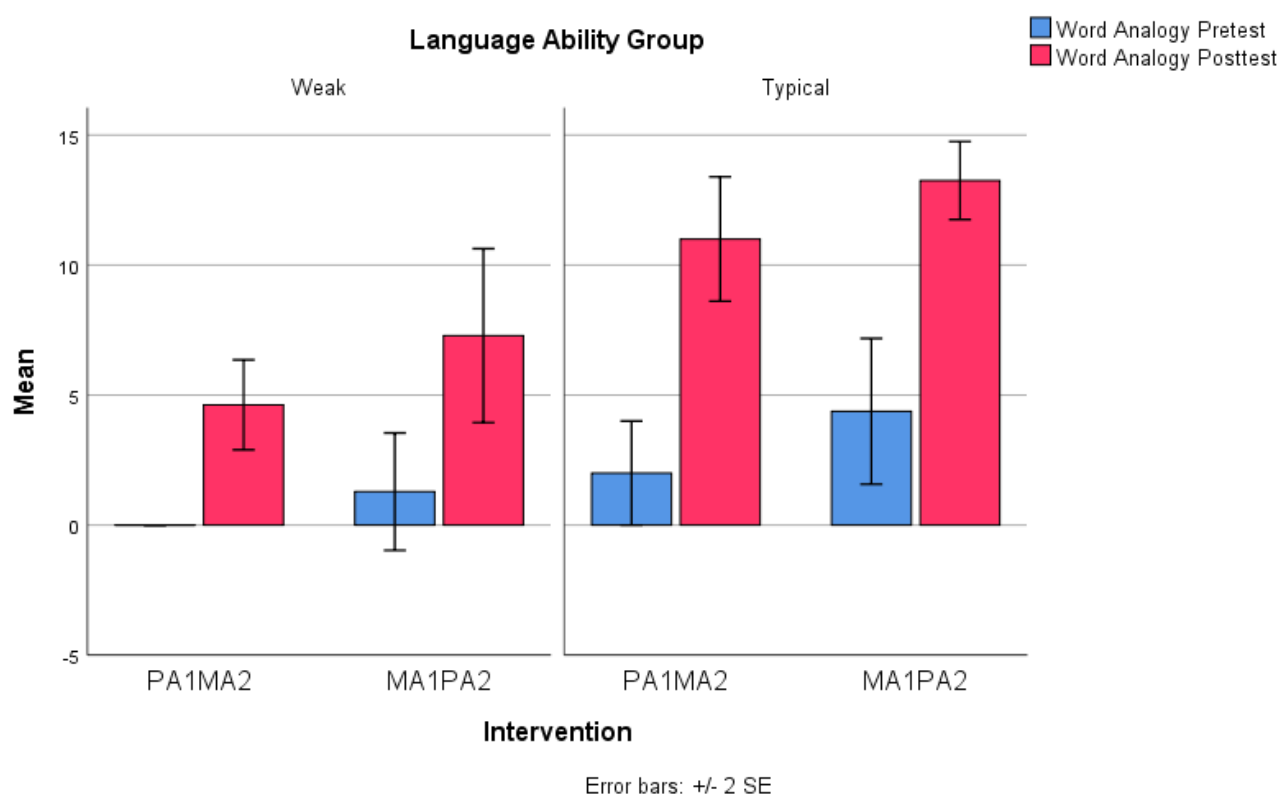


Figure 3.23 Word Analogy Task Performance

### **Text comprehension task**

Results of a repeated measures ANOVA for the text comprehension measure suggest a non-significant three-way interaction ( $F_{(1,27)} = 2.65$ ,  $p = .12$ ,  $EF = .09$ ) and a non-significant two-way interaction between Time and Intervention factors ( $F_{(1,27)} < 1$ ,  $p = .97$ ,  $EF < .001$ ). However, a significant interaction effect between Time and Language ability ( $F_{(1,27)} = 4.72$ ,  $p = .04$ ,  $EF = .15$ ) was obtained. This indicates that Typically-developing bilingual learners showed greater gains than their Bilingual weak peers in the Text comprehension measure. This can be seen in Figure 3.24 below.

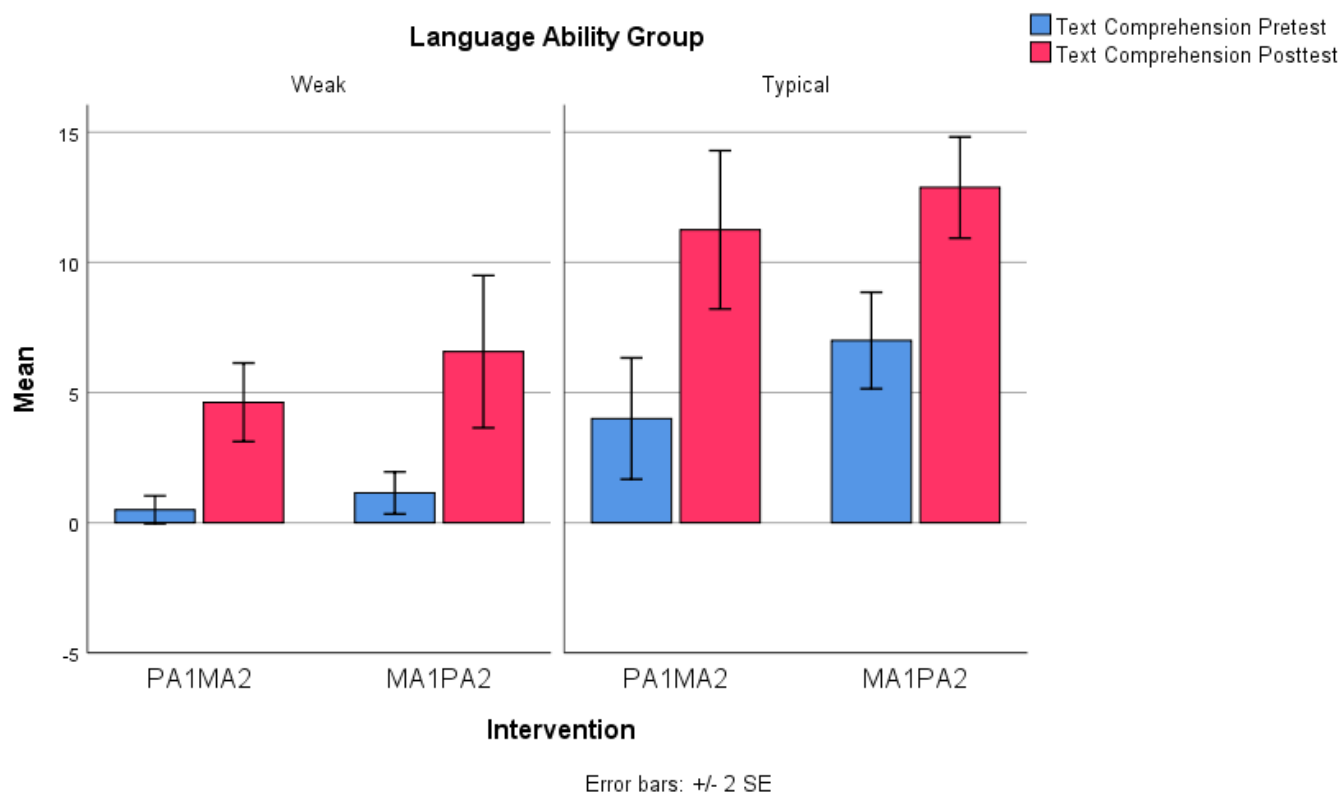


Figure 3.24 Text Comprehension Task Performance

## Discussion

The study discussed in this particular chapter examined the impact of literacy interventions in enhancing reading comprehension through the development of phonological and morphological awareness skills among typically and atypically-developing bilinguals in the Philippines.

The findings indicated that bilingual school-aged children with specific language deficiencies performed worse than their typically-developing age-matched peers on measures typically associated with later reading success. The group's low level of performance on these assessment measures may not be simply due to second language experience, since these children would have been exposed to English from a very young age. Additionally, difficulties were not concentrated to a fixed area, but expanded across a number of measures related to early literacy as well as weaknesses in varying measures of language understanding. The group was also weaker than the typically-developing bilingual learners in letter-sound knowledge that may be considered to rely to some extent on phonological processing abilities. Nevertheless, the current research demonstrated that the administration of an integrated phonological awareness intervention among bilingual language weak children can lead to improvements in phoneme-level awareness. This was evident in the atypical bilingual children's significant increase in scores on measures of alliteration awareness and phoneme isolation. This suggests that, overtime, negative effects of specific language deficits may be reduced by the delivery of a highly structured program that facilitates phonological awareness. This may then lead to greater growth of early reading proficiency. The

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effectiveness of implementing phonological training activities among children with language difficulties in fostering awareness in a language's sound components are consistent with earlier studies by Gillon (2000), van Kleeck, Gillam and McFadden (1998), Warrick, Rubin and Rowe-Walsh (1993), and Webster et al. (1997).

The study likewise indicated that the establishment of phoneme-level skills among bilingual language weak children may be promoted by brief, specific and direct instruction that emphasizes phoneme identification, phoneme segmentation, phoneme manipulation, phoneme isolation and phoneme integration. It is also possible that the students' enhanced performance in the various phoneme-related tasks may have been supported by activities that incorporated an understanding of letter-sound correspondence, which should allow learners to create associations between speech and print. Overall, the outcome of the research suggested that Year 1 pupils provided with phonological awareness instruction showed progress on phoneme awareness tasks that approximated to near typically-developing bilingual students' levels in only five weeks. Such accelerated growth may be a result of constant delivery of combined small-group and individual instruction among the bilingual language weak participants. Moreover, additional improvements were continuously observed not only in alliteration awareness and phoneme isolation tasks, but also in rhyme awareness measures after ten weeks. This indicates the robust effect on early literacy among bilingual language weak learners brought about by a combined form of metalinguistic awareness instruction (see Chapter 6 for further discussions).

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With regard to the impact of the morphological awareness intervention among the bilingual language weak learners, statistically significant effects in morphological knowledge of derivations task were recorded among students initially administered with explicit morphological awareness instruction. Such findings were surprising considering that morphological development theories highlight that knowledge pertaining to morphological derivations takes a longer time to acquire. This is because the formation of derivatives or creation of new words taken from existing ones by adding affixes (e.g. *dis-* or *-ful*) to produce a different word class is determined by context. The rules governing word derivations mean that learners often need to decide on the suitable form on a case by case basis. This would result in learners memorizing every acceptable word combination to form each derivative item. This may be particularly difficult for children with language deficiencies and limited semantic knowledge brought about by deficits in semantic organization (Sheng & McGregor, 2010). One possible explanation for this slightly surprising effects would be that several items included in the morphological awareness measure were found to take patterns that demonstrate regularities that do not pose constrain on the suffix choice of bilingual language weak participants in the formation of derivatives (e.g. *paint:painter::bake\_\_\_\_\_*; *teach:teacher::work:\_\_\_\_\_*; and *anger:angry::sun:\_\_\_\_\_*). In addition, the morphological awareness intervention incorporates teaching learners to organize affixes (e.g. *un-* and *dis-* means 'not' implying something negative or *-ful* means 'full of' or 'a lot of' implying something positive in essence) and even words into categories (e.g. *jump* is an action word) which may have allowed children to develop a useful and efficient word retrieval strategy.

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Bilingual children presenting with specific language deficits generally displayed lower performance scores on oral morphological awareness measures compared to normally-developing bilingual children that may suggest an overall shortcoming in their ability to adeptly regulate and manipulate properties of meaningful language units. Despite the potential difficulties faced by such children with morphological tasks, gains in scores on morphological measures were recorded for bilingual children with language weaknesses. Hence, appropriate intervention has the potential to be associated with gains in such skills, and it may be that a longer period of intervention would have effectively consolidated the acquisition of morphological skills targeted in the study. However, overall findings argue for morphological awareness to be an aspect of language development that is challenging and which may require more intensive remediation for the desired acquisition of skill to be achieved.

In contrast to the language weak students, the results indicated that typically-developing learners experienced immediate gains in phonological, morphological, word meaning and text comprehension measures. The performance outputs obtained for phonological awareness, linguistic proficiency and reading comprehension were consistent with the norms for monolingual English native speakers, suggesting that the typically-developing bilingual participants were performing like native speakers of English. This may be consistent with the level of English language exposure these children experience in the Philippines including phonics instruction in kindergarten as part of their early literacy learning (during drop in sessions, parents of the participating

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children revealed that their children had been provided with phonics prior to the implementation of the current study).

Such outcomes may also have been reinforced by a combined one-on-one training and small group method of instruction. Small group interactions were observed to encourage more opportunities for children to provide random responses that trigger active participation from the rest of the members in the group. It even allowed modelling of correct responses by the other students, highlighting observational learning moments for children. The small group discussion activities that focused on dialogues with students to use introduced words in appropriate and known contexts, may likewise have supported scaffolding and further enrichment of language through vocabulary expansion. The activities also encouraged them to approximate the target language by encouraging them to express themselves and explore acceptable usage of words in varying contexts. Meanwhile, the one-on-one teaching provided direct instruction on areas of improvement. It even granted proper monitoring of individual progress throughout the intervention period. Immediate feedback pertaining to acquisition of language skills that include correct use and explicit strategy implementation were provided.

Finally, the advancement of the Filipino participants approximating near native levels in the assessment measures may be brought about by being raised by more educated parents who may model correct language use and provide early training, through formal (e.g. enrolment in additional language classes) or informal (e.g. encouraging appropriate English word use) means, that in turn facilitate wider

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vocabulary skills and understanding of meaning. These may further lead to effective discrimination of sounds within words, deeper cognizance of meaning of words that would likely advance morphological awareness and improve levels of reading comprehension. The influence of home environment is supported by the ecological systems theory conceptualized by Urie Bronfenbrenner in 1986. Bronfenbrenner's theory espouses that learners move within enmeshed multiple ecological systems that interact and exert influence in their lives; categorized from the most immediate environment (i.e. the home and community environment) to the broadest (i.e. time-related contexts such as changes in child's circumstances). This simply means that the child's immediate context, such as the family, directly impacts the child's literacy development. In addition, the family investment model (Conger & Donnellan, 2007) elucidates a similar idea that students' immediate family provides access to a variety of human and social resources to nurture a more conducive learning environment.

### **Limitations and Future Directions**

Although the present study showed promising results, the outcomes were taken from a small sample size ( $n = 31$ ). Hence, validation of the programs' effectiveness may be achieved by replicating the study using a larger sample size, and a non-intervention control group. Also, the current study focused solely on Grade 1 six-year old learners coming from a high socio-economic background. A previous study by Lyster (2002) mentioned socio-economic status (SES) as a predictor of variability in reading words. Thus, it would be interesting to observe whether bilingual children from a range of socio-economic backgrounds benefit differently from similar metalinguistic training programs

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to those used in the study. It would equally be interesting to observe gains from such intervention methods across a range of bilingual contexts or different languages (maybe those with more regular grapheme-phoneme conversion rules or more complex morphological structures). Additionally, investigations looking at different types of language deficits – those with receptive versus expressive deficits or those with word-finding versus sentence understanding problems. This may help expand knowledge on the impact of bilingualism in different contexts and utilize such awareness in deepening understanding of second language learning and/or acquisition.

Data collection and analyses in the study were restricted to recording responses relating to words read or expressed orally. Future studies might include assessments of spelling in order to determine if the intervention methods can support a mastery of relevant orthographic patterns. This may be particularly interesting when considering morphologically complex words and how they are represented in print. It may be that an awareness of morphology would be equally if not more advantageous than phonological awareness in such circumstances.

The treatment approach administered to the participants was set at two 45-minute sessions per week for ten weeks. It may be more beneficial; however, to expand the coverage period from ten weeks to twenty weeks and increase contact frequency to five 30-minute sessions a week. This may provide an even more intense and focused stimulation to reading-related skills brought about by repeated exposures not only on decoding, but also deriving meaning to words. The reinforcement of semantic and phonological cues may likewise deepen and broaden word learning for students with

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language deficits. The teaching of semantic cues may incorporate description of physical attributes of subjects, provision of item function and the particular word's category. For instance, the teacher may say: "This is a computer; it is something you use to send important documents; it's a device." On the other hand, a teacher capitalizing on the instruction of phonological cues may include highlighting the first syllable or initial sound, segmenting the number of syllables by clapping out the word, or associating a given word using rhymes (e.g. "The word is fawn; it sounds like your classmate's name Shawn!"). The integration would cement learners' newly acquired language skills, as opportunities for honing metalinguistic skills further are set in place; which may lead to continuous growth.

In addition, reliable standardized measures that test various morphological awareness skills and provide normative values at different age levels may prove beneficial for comparative analysis. Standardized measures can offer guidance to researchers, educators, clinicians and therapists in devising efficient, strategic and effective teaching plans by comparisons with expected levels of performance. Such information can guide the design of an innovative school curricula that accommodates the inclusion of evidence-based intervention approaches, which guarantees age-appropriate and context-appropriate lessons for bilinguals with different types of language deficits (i.e. receptive versus expressive deficits).

### **Clinical and Educational Implications**

The outcome of this research investigation may provide instructional guidance and improve practice in the Philippines. The Philippines patterns its educational system

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on the United States. Part of its Language Arts curriculum is to teach weekly list of words deemed as commonly encountered or read by students at particular grade levels. However, the words are often isolated in context and the linguistic properties of words are rarely taken into account. The findings of this study argue for the curricula to be modified to include words based on regularities in their linguistic structures so that they can undergo changes observable to struggling learners. This means that transparency of relationships in learned words (e.g. teach in teacher) are explicitly discussed. As children become competent in identifying phonological and morphological aspects of words, the level of difficulty of the words used as examples can be gradually increased to teach words with less transparent changes such as “twelve” to “twelfth” or “wide” to “width.”

The findings that typically-developing readers advance faster in morphological awareness knowledge indicate that they can detect patterns easily, as opposed to language weak students who may require essential and sufficient instruction in morphological structure of words to attain the same level of proficiency. Thus, considerations to include morphological awareness intervention as part of the early childhood curriculum may demonstrate far-reaching benefits for learners with persistent language deficiencies.

## **Conclusions**

The investigation presented in this chapter was one of the few intervention studies on bilingualism that sought to address the relative effectiveness of adopting

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phonological and morphological awareness training to improve word knowledge and sentence comprehension in a bilingual context.

The findings demonstrated that instruction leading to improved awareness in both phonological and morphological knowledge can be possible for school-aged bilingual English language learners. The integration of a short and focused phonological treatment approach at the start of the academic year offers opportunities for both normally-developing and at-risk learners. Such targeted interventions can be used to attain reinforced syllable and phoneme-level awareness skills relevant as a decoding strategy to identify and read words (Catts & Kamhi, 2012; Gillon, 2004). This, in turn, becomes crucial as it facilitates later reading success (Anthony & Lonigan, 2004; Muter, Hulme, Snowling & Stevenson, 2004), since an understanding of the sound structures in language lays the foundation for attaining the ability to read (National Reading Panel, 2008) by ensuring the emergence of early literacy (Whitehurst & Lonigan, 1998).

The results of the research likewise offers evidence of the potent compensatory aspect of morphological awareness in the advancement of reading comprehension skills among developing bilingual children. Such morphological awareness training can lead to improved word meaning and text comprehension outcomes for bilingual students. Instruction in recognizing the smallest meaningful units of words can support an understanding of text at word, phrase and sentence levels (Goodwin & Ahn, 2010). Additionally, it implies that a morphological treatment approach can be used in teaching practices even in the early grades of learning.

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The study equally highlights the importance of not simply teaching students to learn how to read, but to ultimately develop reading for meaning, as it offers a proactive response to child intervention; moving away from what Greenwood et al. (2011) describes as a “wait to fail” approach.

Although there is yet no panacea that has been found to meet the literacy requirements of every individual in the classroom, the results presented in this chapter deliver evidence for educators interested in raising academic achievement by enhancing literacy-related skills of learners experiencing specific language difficulties from a bilingual background. Such interventions have the potential to lead to long-term self-sufficient learners and academic success across the school curriculum.

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## **Chapter 4 A Follow-up Study Evaluating the Impact of Phonological and Morphological Awareness Intervention Programs on School-aged Children with Specific Language Weaknesses**

### **Introduction and Background**

Evidence from previous research and meta-analyses has demonstrated the effectiveness of reading intervention to foster children's reading skills in the short-term (Bus & Van Ijzendoorn, 1999; Carson et al., 2013; Ehri, Nunes, Stahl & Willows, 2001; Suggate, 2010; Swanson, Hoskyn & Lee, 1999; Zens et al., 2009). Such findings solidify the importance of providing intensive, early and targeted interventions to disadvantaged learners in need of literacy support. For example, Carson et al. (2013) discovered that providing a short and highly-intensive phonological awareness development training to at-risk Year 1 primary students led to enhanced phonemic awareness relevant for word recognition. Similarly, Zens et al. (2009) found that children diagnosed with specific language impairment improved performance outcomes not only in phonological awareness measures, but also in tests assessing semantic skills after receiving an accumulated 24-hours worth of reading intervention.

Despite such confirmation that short intervention approaches lead to post-intervention improvements in reading proficiency there is a need to show that these positive impacts can be maintained over the long-term. Such research also informs decisions about the best reading intervention approaches. Monitoring long-term effects may lead to better insights on the influence intervention features such as content, teacher-student ratio and length of intervention on the success of the program. Monitoring children's long-term progress is also critical to assess whether children are

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integrating and employing the acquired skills in reading. Definitive answers regarding whether transfer to wider reading skills have been attained can only be provided by the examination of follow up data.

The findings discussed in Chapter 2, from a study that focused on the administration of a short intervention program for struggling Grade 1 students in New Zealand, indicated that children with specific language weaknesses made significant gains in phonological awareness at the phoneme level. In the same vein, word analogy and sentence comprehension test scores increased significantly following a morphological awareness treatment approach that aimed to enhance reading comprehension skills. The data reported in this chapter extends the information about these instructional intervention approaches by examining the treatment effects five weeks following the completion of the phonological awareness and morphological awareness treatment program.

### **Research Questions**

In line with past investigations, it was expected that the interventions would display positive short-term effect sizes that slowly decline during follow-up. Likewise, given the accessible information depicting subtle differences on impact of long-term effects, the succeeding research questions were devised:

- (12) Will the assessment scores of Year 1 students in New Zealand, experiencing both phonological and morphological awareness training result in statistically significant improvement five weeks post completion of the program?
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- (13) Are there statistically significant differences in the assessment scores of monolingual versus bilingual year 1 children with specific learning weaknesses, five weeks after the conclusion of the instructional training programs?

## **Methods**

### **Participants**

This follow up study involved twenty (20) participants presenting with specific language weaknesses who met the inclusion criteria and who received phonological and morphological awareness instructional training support as described in Chapter 2. These children were re-evaluated five weeks after the completion of the intervention program. Chapter 2 provides a more detailed description of the children enrolled in the research. Consistent with the intervention period, no participants received any form of intervention or supplementary instructional training post-intervention and up to the assessment point described in this chapter.

### **Procedures**

All of the participants were re-evaluated on the measures described in the second chapter of this doctoral thesis. All the tests were carried out by the author with the help of a research assistant who is a certified speech language therapist. The measures were given individually to each child, in a quiet area in the classroom during school hours. The order of administering the different assessment measures was random, and learners were examined at different times during the day to prevent any influence caused by the effects of timing on their performance scores. The Primary Test of Non-verbal Intelligence (PTONI), designed to gauge students' reasoning abilities (Ehrler &

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McGee, 2008), and the Clinical Evaluation of Language Fundamentals – Preschool 2<sup>nd</sup> edition (CELF-P2), created to measure language expression and language comprehension (Wiig et al., 2006), were not re-assessed during the follow-up evaluation.

### **Assessment Measures**

The standardized language and reading comprehension tests, as well as an informal morphological awareness test, were administered to the participants with specific language weaknesses five weeks after the completion of the intervention. A thorough description of each assessment measure is provided in Chapter 2 of this thesis. The tests used were:

#### ***Standardized Assessment Measures***

- Preschool and Primary Inventory of Phonological Awareness (PIPA ; Dodd, Crosbie, MacIntosh, Teitzel & Ozanne, 2000)
- Woodcock Reading Mastery Test III (WRMT-III; Woodcock, 2011)

#### ***Informal Morphological Awareness Measure***

- Inflectional and Derivational Morphological Awareness Word Analogy Task (Kirby et al., 2012)

### **Reliability and Treatment Fidelity**

In order to ensure the integrity of procedures, all assessments were recorded. The first author conducted and scored all the assessment measures. The standardized

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tests were all administered and marked as suggested in the examiner's manual. An independent assessor and researcher marked a quarter (25%) of the total assessment data on aspects of supervision, documentation and evaluation. Inter-rater consensus (100%) was achieved on levels of supervision and administration of the standardized assessments and experimental measure. Meanwhile, inter-rater agreement on scoring was 98.6% and documentation was 99.5%. Discrepancies concerning inter-rater agreement were eliminated through re-checking of the data and discussions about scoring. The author verified all data before entry and errors were corrected.

## **Results**

Data were collected at two different time periods in the research. The results from the first evaluation, referred here as Time1-Pre, were taken prior to any intervention being introduced to the participants. The next data assessed were obtained five weeks after Time 3-Post which served as the follow up period to monitor children's maintenance of language and literacy skills. In this study, this was referred to as Time 4-Follow up. In order to assess the impact of both interventions on the children's language and literacy skills upon follow-up, a repeated measures ANOVA was used to contrast data from two time points: Time 1-Pre and Time 4-Follow up – these were the two levels of the repeated measures factor in the analyses. This factor was contrasted across two of the Language Groups, which was an independent factor with two levels: Monolingual versus Bilingual. Hence, the findings for each of the measures were analyzed using a two-way analysis of variance (2x2), with one repeated measures factor and one independent factor. The two-way interaction will be reported throughout

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the results; however, additional significant main effects will be reported where relevant to the subsequent discussion. Reports in this chapter will be reported as F-values (with df), p-values and effect sizes (partial eta squared). Graphs pertaining the two-way interaction will be displayed to present the results visually to allow interpretations of findings.

### **Comparison of Time 1-Pre versus Time 4-Follow up assessment data**

In this particular section, the results of the first intervention are displayed for each of the measures in the research, starting with the phonological measures and progressing from larger units of sound (syllable and rhyme) prior to phoneme-level sounds (alliteration, phoneme isolation and phoneme segmentation). This is followed by the letter-sound knowledge measure and the morphological awareness measures (inflection and derivation), ending with the word meaning measures (antonyms, synonyms, word analogies and text comprehension). The results for each group are presented in Table 4.1.

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Table 4.1 Means, with standard deviations in brackets, for the Monolingual group and Bilingual group on each of the study measures at the first and fourth assessment points

Assessment Measures	Monolingual Weak Group		Bilingual Weak Group	
	Time 1-Pre	Time 4-FollowUp	Time 1-Pre	Time 4-FollowUp
Syllable Awareness (12 items)	4.64 (2.38)	10.82 (1.72)	6.33 (2.40)	10.78 (1.48)
Rhyme Awareness (12 items)	3.64 (2.01)	9.18 (1.99)	4.00 (2.06)	8.89 (2.76)
Alliteration Awareness (12 items)	5.36 (2.58)	8.00 (3.80)	5.56 (3.81)	10.33 (1.73)
Phoneme Isolation (12 items)	5.64 (3.61)	10.18 (2.86)	6.89 (3.86)	11.67 (0.71)
Phoneme Segmentation (12 items)	1.91 (1.70)	3.36 (1.36)	1.44 (2.13)	5.89 (2.32)
Letter-sound Knowledge (32 items)	6.18 (3.40)	26.36 (6.73)	8.22 (2.39)	30.44 (1.74)
Morphological Inflection (10 items)	0.09 (0.30)	3.91 (2.02)	0.22 (0.44)	4.33 (1.41)
Morphological Derivation (10 items)	0.45 (0.69)	3.36 (1.57)	0.33 (0.50)	3.89 (1.97)
Antonym Production (23 items)	0.64 (0.51)	3.82 (1.60)	1.00 (0.50)	3.44 (1.42)
Synonym Production (23 items)	0.09 (0.30)	2.91 (1.47)	0.33 (0.50)	2.67 (1.32)
Word Analogy (40 items)	0.45 (0.52)	3.64 (2.16)	0.67 (0.50)	4.11 (2.03)
Text Comprehension (38 items)	0.82 (0.98)	6.36 (2.66)	0.89 (0.93)	6.00 (6.20)

### Syllable Awareness Task

The results of the repeated measures ANOVA for the Syllable awareness measure, which compared pre-intervention scores with student performance scores at the follow up period, showed a non-significant two-way interaction between Time and Language Background factors ( $F_{(1,18)} = 2.14$ ,  $p = .16$ ,  $EF = .11$ ). The only statistically significant effect was a main effect of Time ( $F_{(1,18)} = 79.94$ ,  $p < .001$ ,  $EF = .82$ ). Figure 4.1 shows the results for the Syllable awareness task.

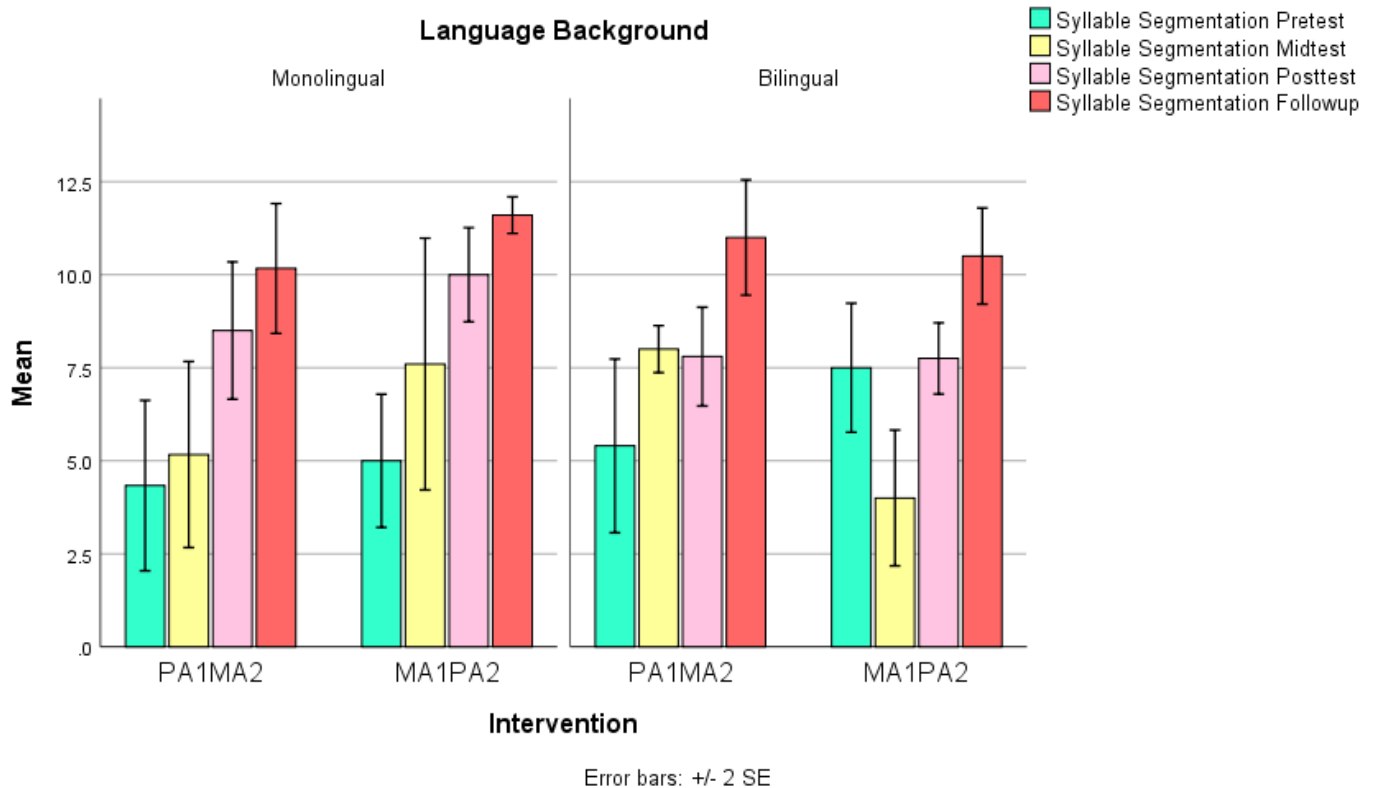


Figure 4.1 Syllable Awareness Task Performance

### Rhyme Awareness Task

As with the syllable segmentation assessment, the repeated measures ANOVA conducted on the rhyme awareness test scores showed no significant interaction between Time and Language Background ( $F_{(1,18)} < 1$ ,  $p = .61$ ,  $EF = .02$ ). The factor Time was the only variable which registered a statistically significant main effect ( $F_{(1,18)} = 67.55$ ,  $p < .001$ ,  $EF = .79$ ). Figure 4.2 displays the students' performance outcome for the Rhyme awareness task.

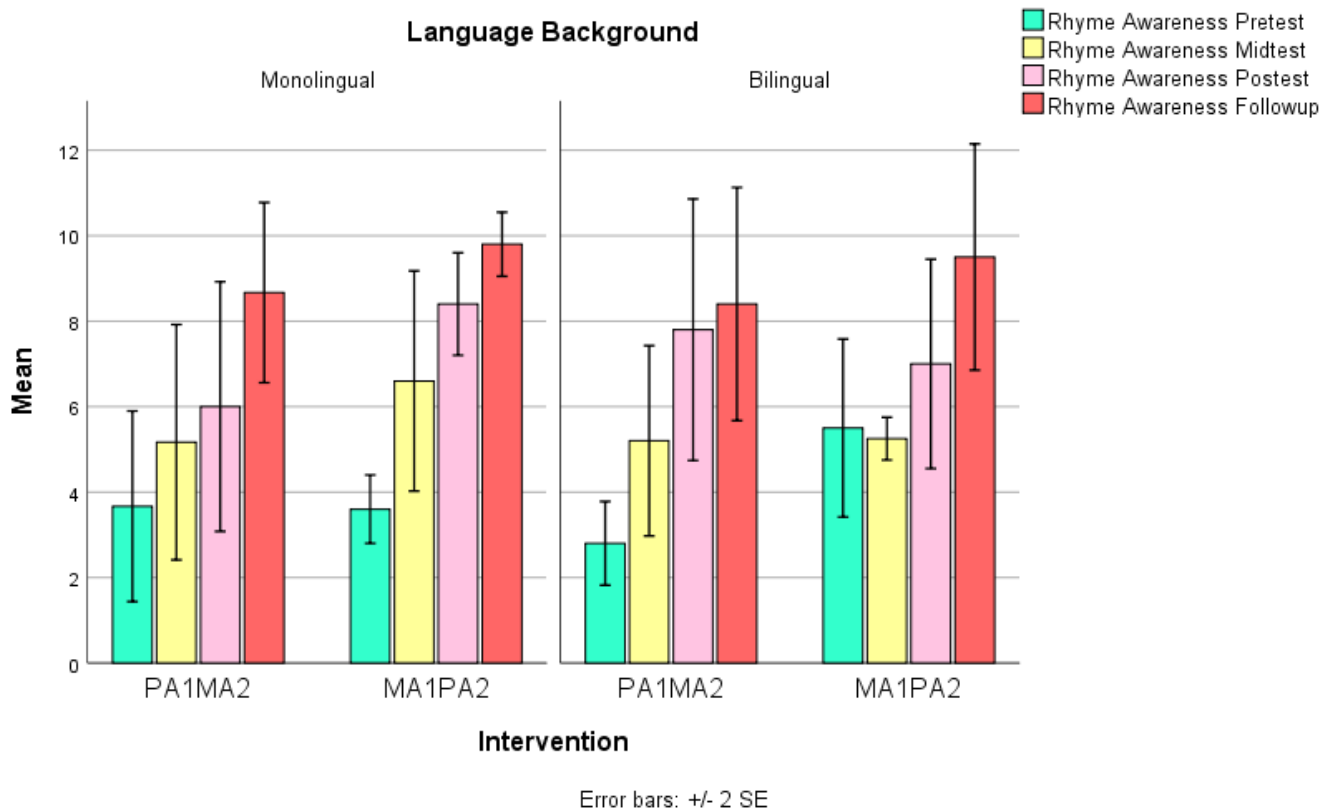


Figure 4.2 Rhyme Awareness Task Performance

### Alliteration Awareness Task

The results of the two-way analyses of variance for the Alliteration awareness measure indicated a non-significant two-way interaction between Time and Language Background ( $F_{(1,18)} = 2.37, p = .14, EF = .12$ ) - see Figure 4.3 below. Furthermore, there was a statistically significant main effect of Time factor ( $F_{(1,18)} = 28.46, p < .001, EF = .61$ ).

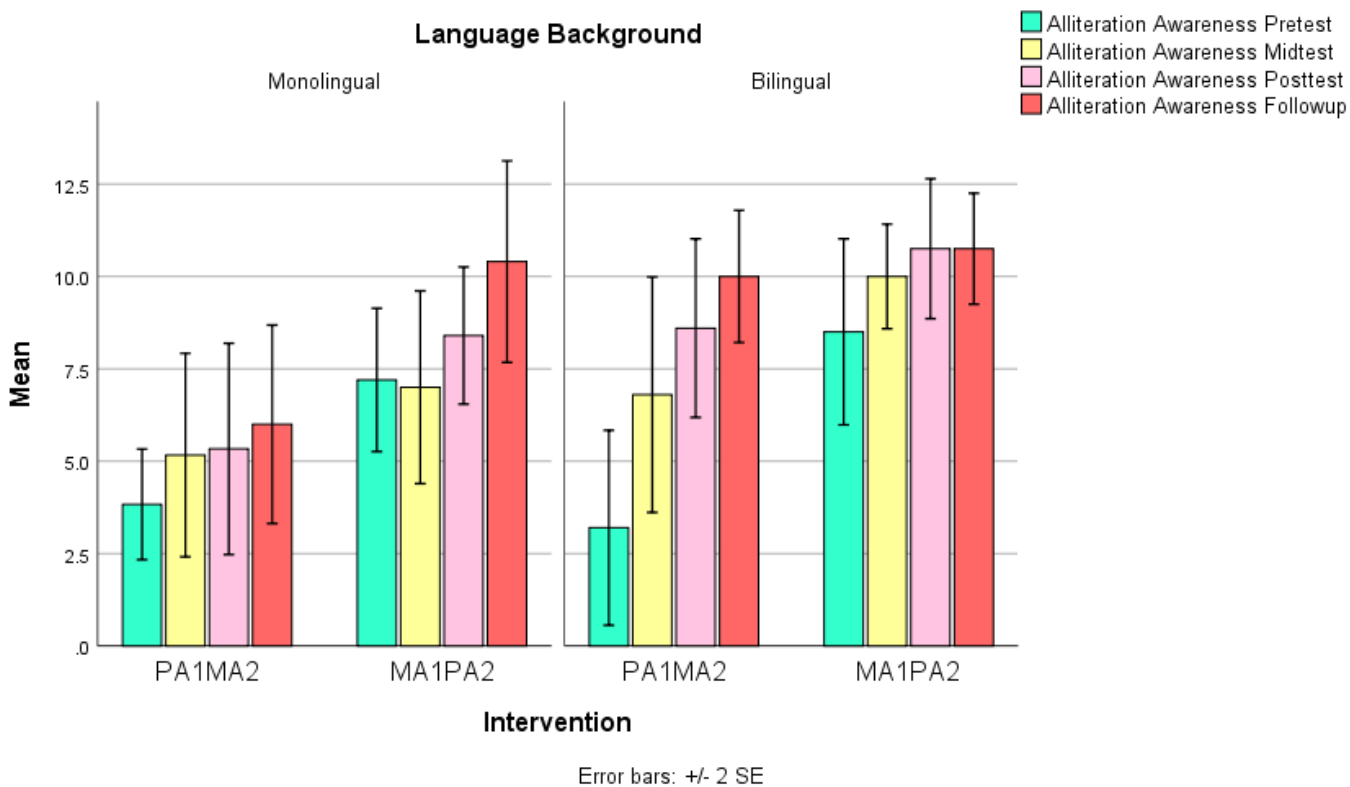


Figure 4.3 Alliteration Awareness Task Performance



### Phoneme Isolation Task

Analyzing test results of the period prior to the introduction of any treatment approach and five weeks after the completion of the program on children's ability in identifying initial sound in words revealed a non-significant two-way interaction between Time and Language background ( $F_{(1,18)} < 1$ ,  $p = .87$ ,  $EF = .002$ ) - this can be observed in Figure 4.4 below. In addition, there was a statistically significant main effect of the factor Time ( $F_{(1,118)} = 47.72$ ,  $p < .001$ ,  $EF = .73$ ).

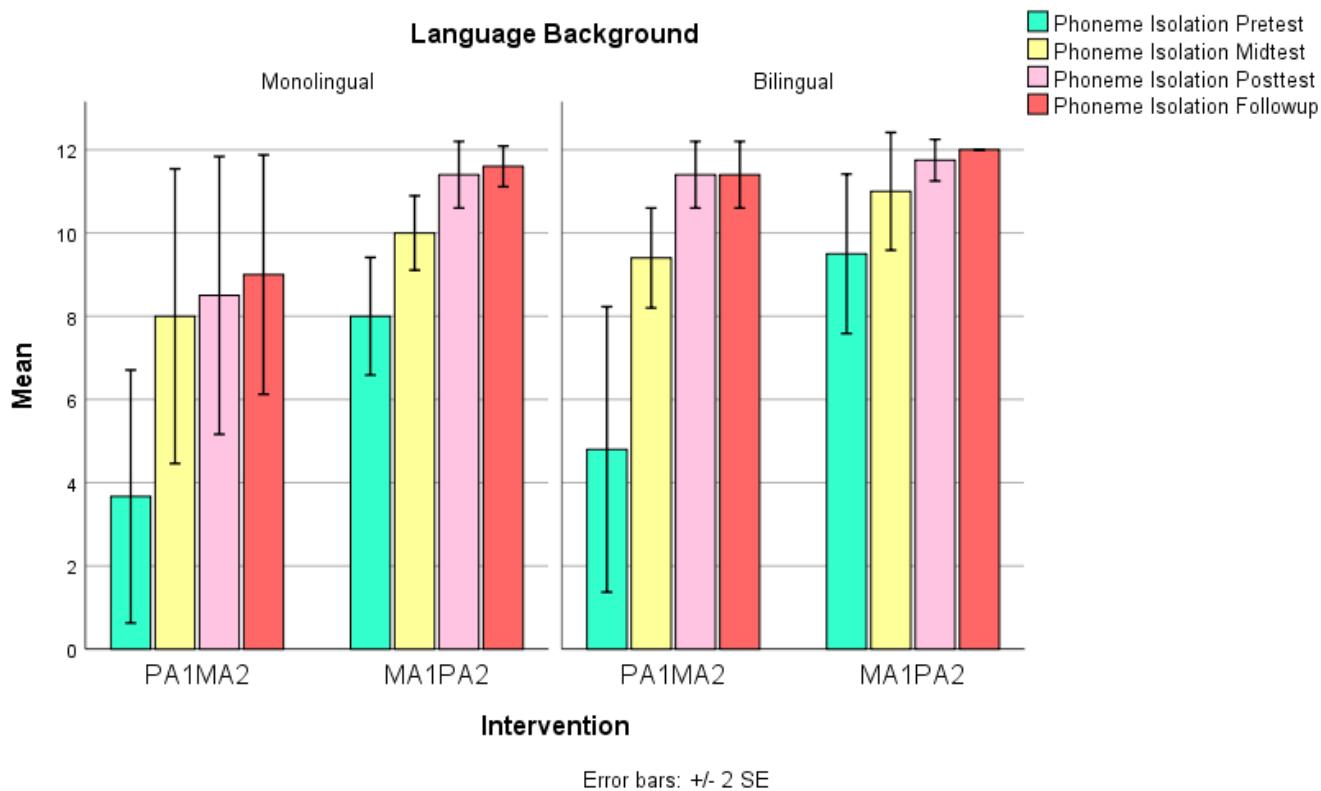


Figure 4.4 Phoneme Isolation Task Performance

### Phoneme Segmentation Task

Learners' ability to clearly separate each sound within a word was analyzed using a two-way analysis of variance. The phoneme segmentation measure indicated a significant two-way interaction between Time and Language background ( $F_{(1,18)} = 7.59$ ,  $p = .013$ ,  $EF = .30$ ) was recorded – see Figure 4.5. The effect suggests that the Bilingual language weak group showed larger improvements than their Monolingual peers on this particular measure. Likewise, a significant main effect of the factor Time ( $F_{(1,18)} = 29.54$ ,  $p < .001$ ,  $EF = .62$ ) was observed.

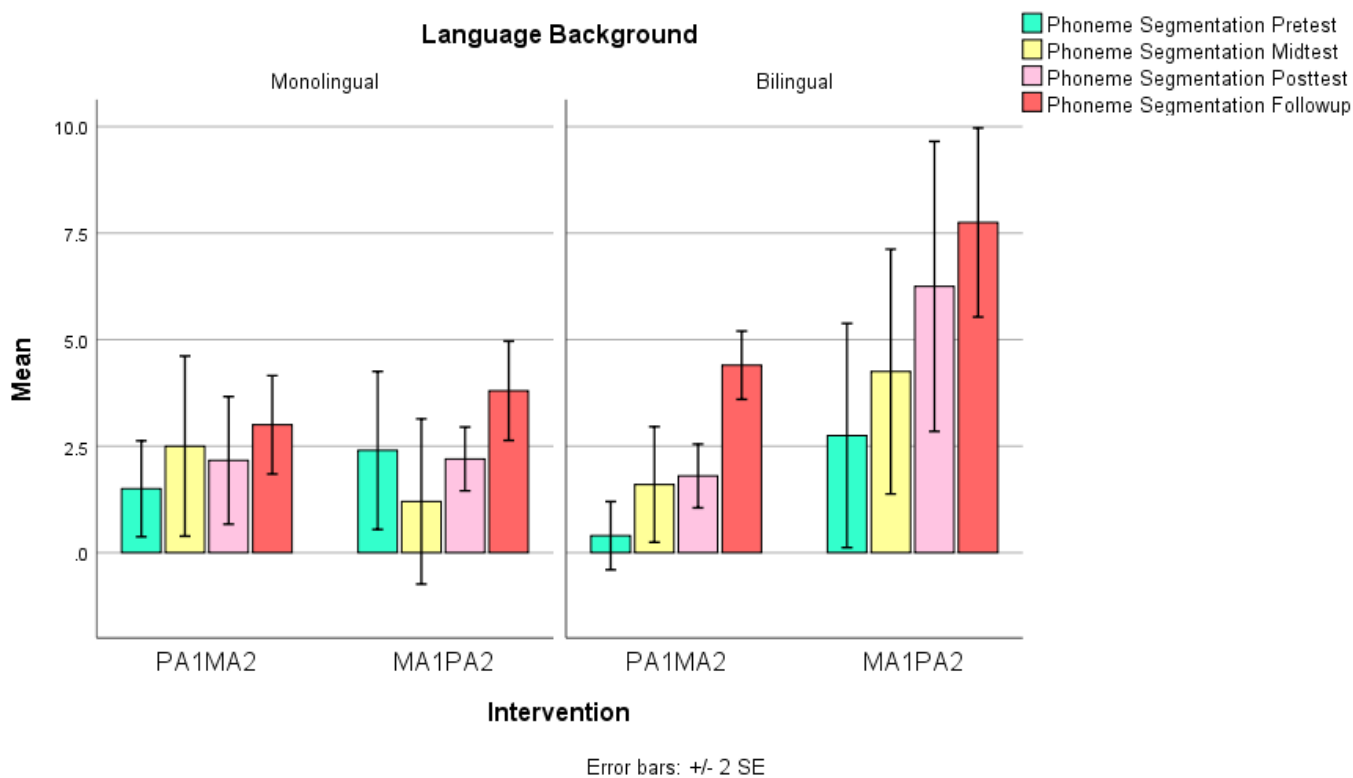


Figure 4.5 Phoneme Segmentation Task Performance

### Letter-sound Task

Letter and sound matching which evaluates student's ability to recognize, name and produce sound/s associated to alphabetic letters, clusters and digraphs was likewise assessed through a repeated measures ANOVA. Findings indicated a non-significant two-way interaction between Time and Language background ( $F_{(1,18)} = 1.79$ ,  $p = .20$ ,  $EF = .09$ ). The only statistically significant effect was the main effect of Time ( $F_{(1,18)} = 773.25$ ,  $p < .001$ ,  $EF = .98$ ). Figure 4.6 displays the students' performance outcome for the Letter-sound task.

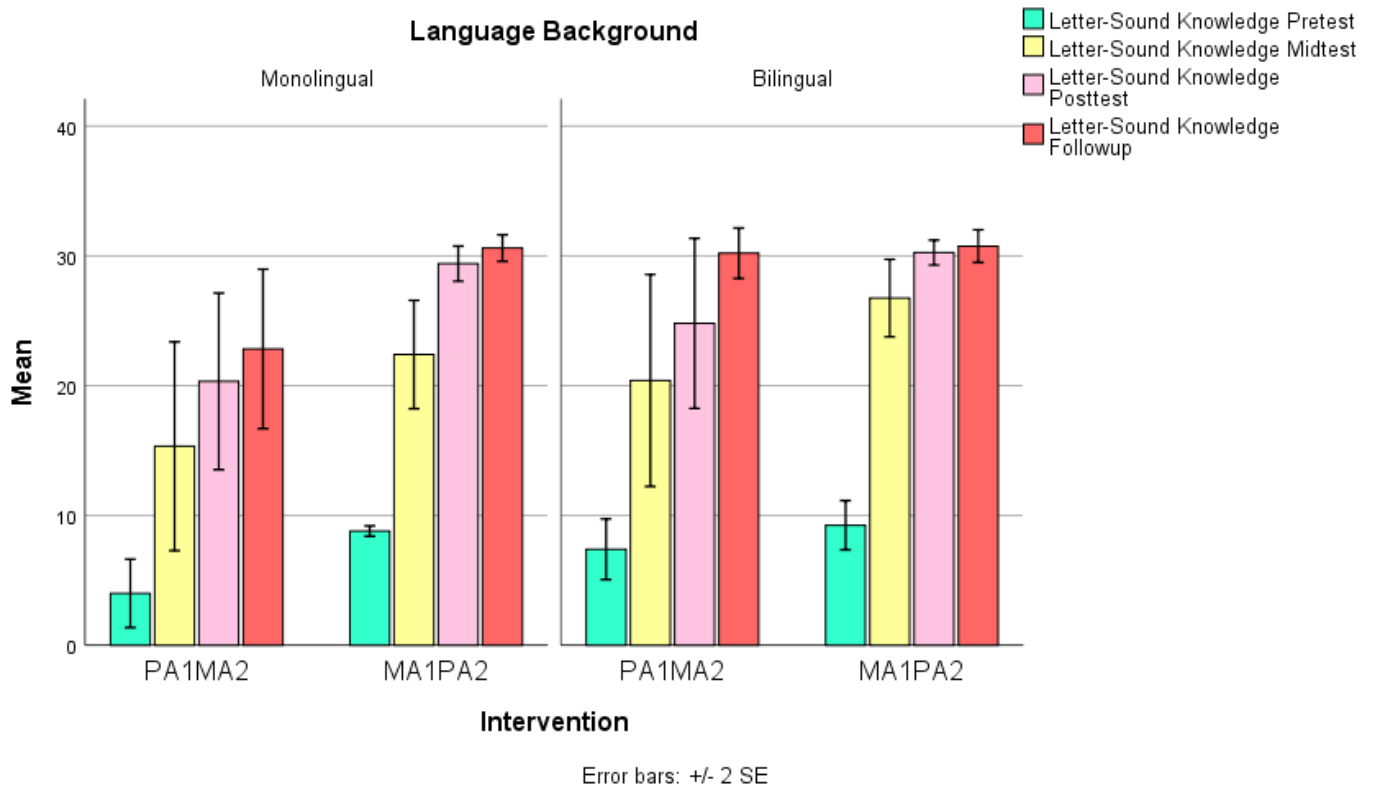


Figure 4.6 Letter-Sound Task Performance

### Morphological Awareness Inflection Task

A 2x2 analysis of variance conducted on the pre-test scores and performance scores during the follow-up period for the morphological awareness inflection measure revealed a non-significant two-way interaction between Time and Language background ( $F_{(1,18)} < 1, p = .73, EF = .01$ ) – this is displayed in Figure 4.7 below. There was, however, a statistically significant main effect of Time factor ( $F_{(1,18)} = 89.60, p < .001, EF = .83$ ).

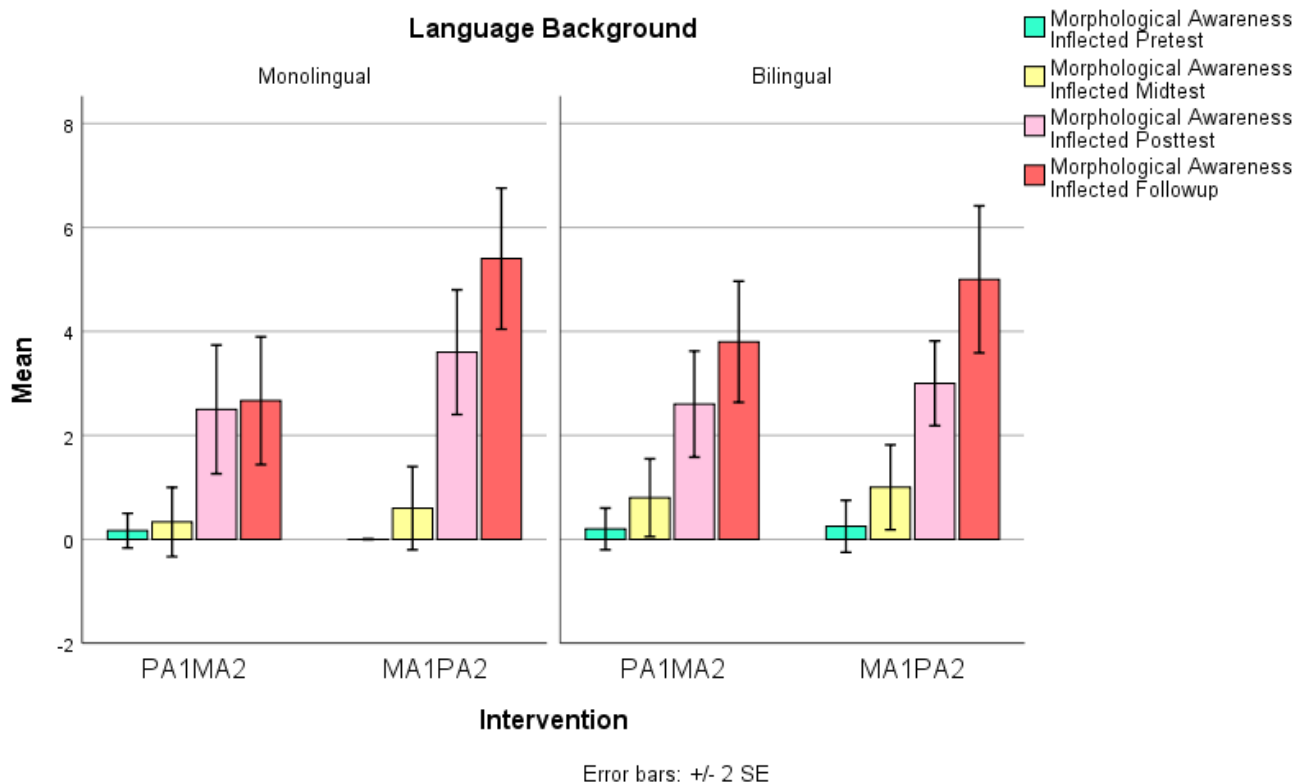


Figure 4.7 Morphological Awareness Inflection Task Performance

### Morphological Awareness Derivation Task

The results of the analysis of variance for the Morphological awareness derivation measure revealed a non-significant two-way interaction between Time and Language Background factors ( $F_{(1,18)} < 1$ ,  $p = .40$ ,  $EF = .04$ ) which is shown in Figure 4.8. Nonetheless, there was a statistically significant main effect of Time ( $F_{(1,18)} = 75.79$ ,  $p < .001$ ,  $EF = .81$ ).

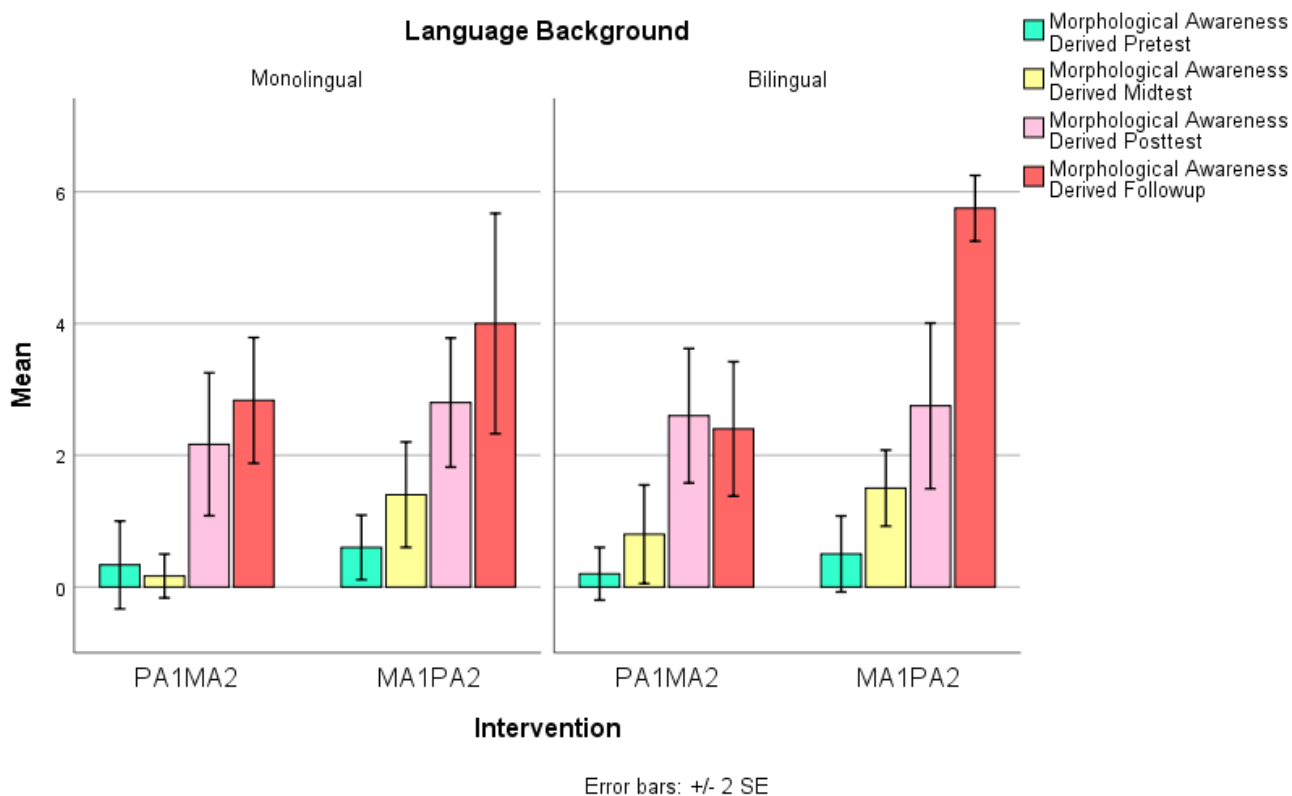


Figure 4.8 Morphological Awareness Derivation Task Performance

### Antonym Production Task

The results of the two-way analysis of variance for the Antonym production measure demonstrated a non-significant interaction between the Time and Language background factors ( $F_{(1,18)} = 1.22, p = .29, EF = .06$ ) – see figure 4.9. There was a significant effect of Time ( $F_{(1,18)} = 70.76, p < .001, EF = .80$ ).

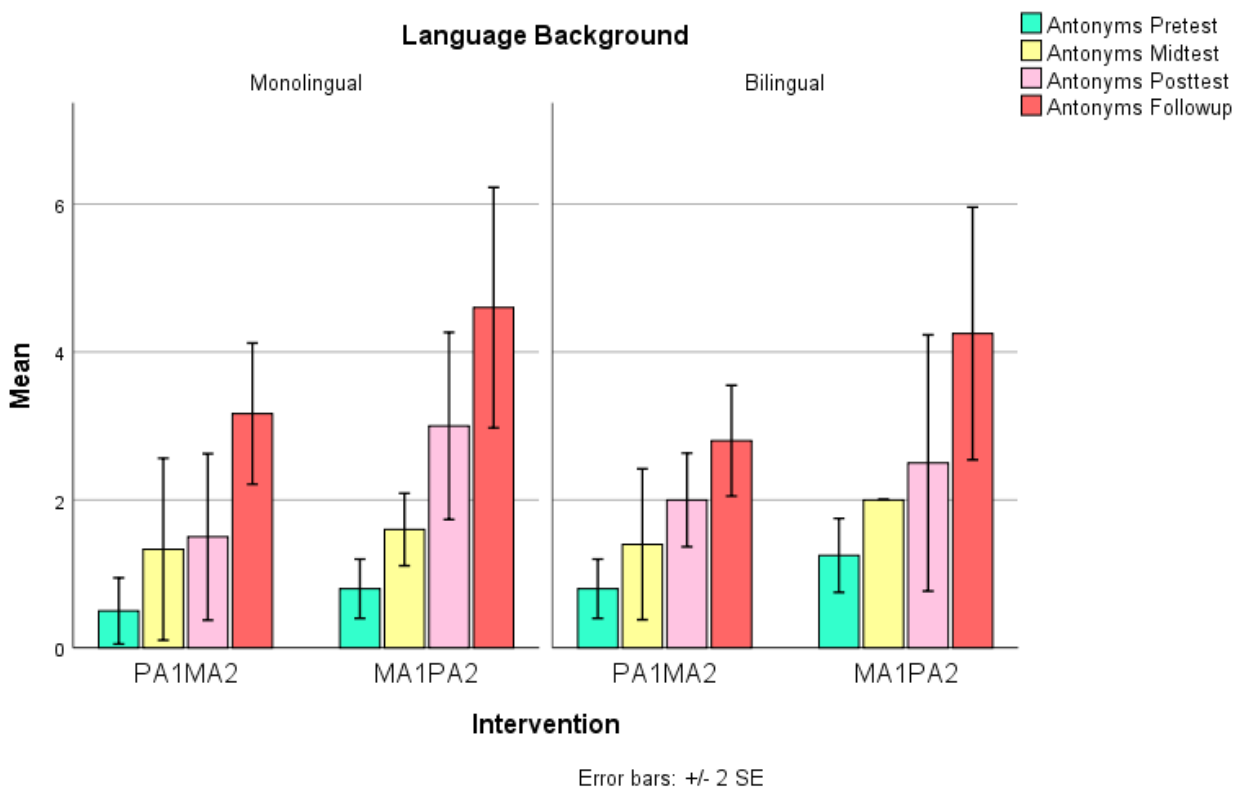


Figure 4.9 Antonym Production Task Performance

### Synonym Production Task

The two-way analysis of variance for the Synonym production measure yielded a non-significant interaction between the Time and Language background factors ( $F_{(1,18)} < 1$ ,  $p = .40$ ,  $EF = .04$ ) – see figure 4.10. There was a significant effect of Time ( $F_{(1,18)} = 85.56$ ,  $p < .001$ ,  $EF = .83$ ).

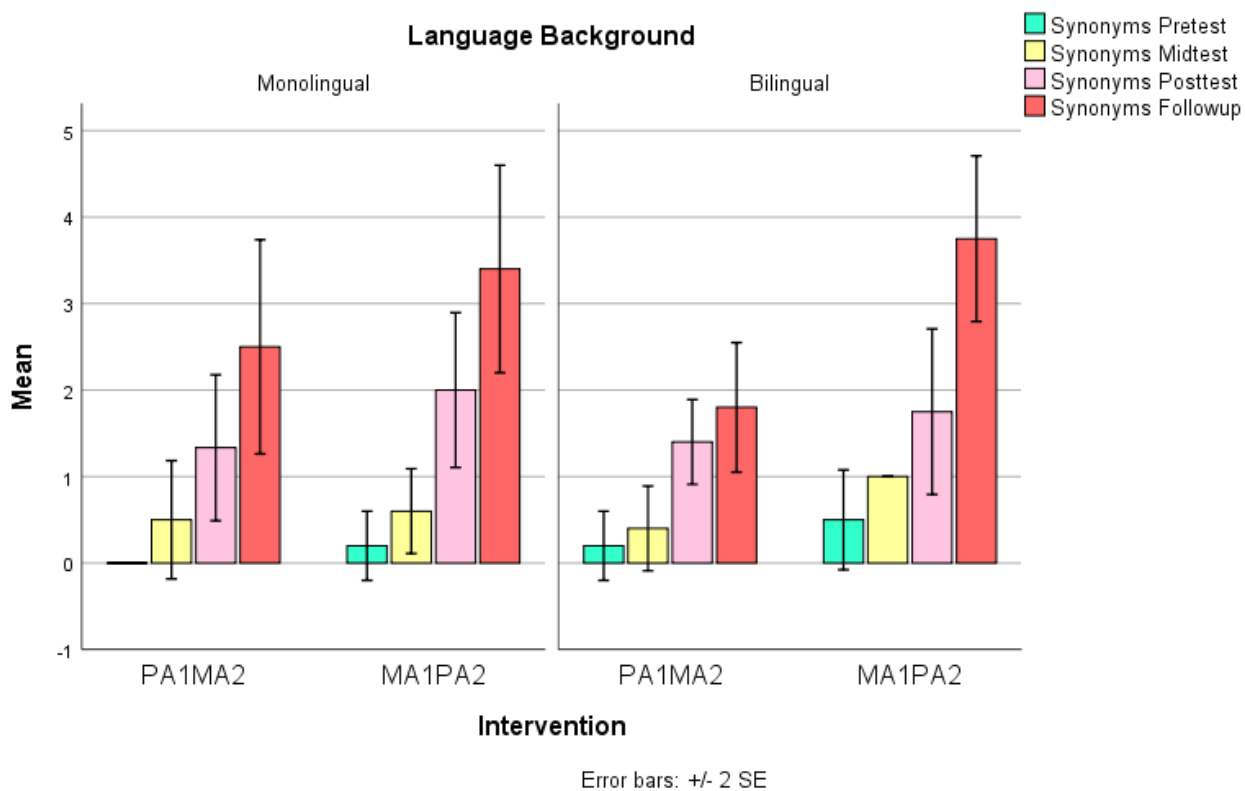


Figure 4.10 Synonym Production Task Performance

### Word Analogy Task

The results obtained on the word analogy measure after a two-way analysis of variance showed a non-significant two-way interaction between the Time and Language background factors ( $F_{(1,18)} < 1$ ,  $p = .77$ ,  $EF = .005$ ) – see figure 4.11. There was a significant main effect of Time ( $F_{(1,18)} = 57.65$ ,  $p < .001$ ,  $EF = .76$ ).

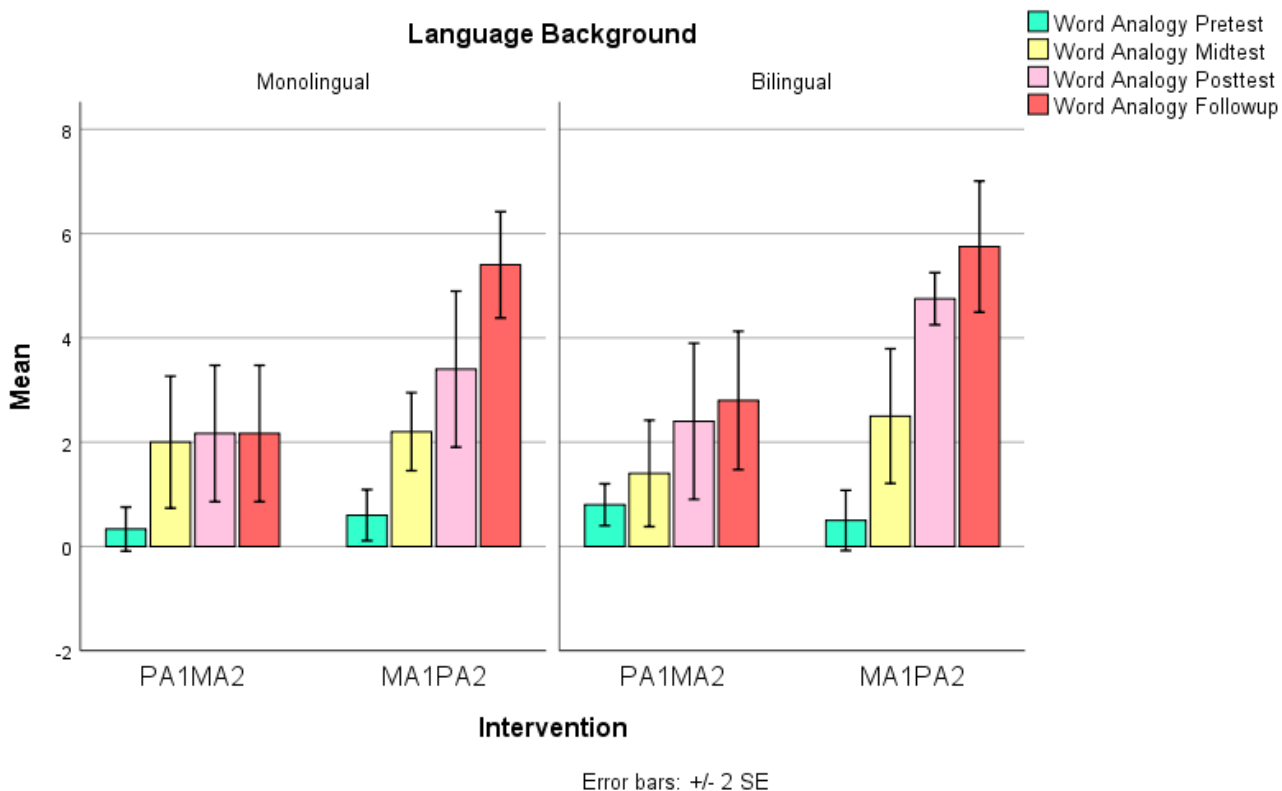


Figure 4.11 Word Analogy Task Performance



### Text Comprehension Task

Results of a repeated measures ANOVA for the assessment measure text comprehension yielded a non-significant two-way interaction between Time and Language background factors ( $F_{(1,18)} < 1$ ,  $p = .64$ ,  $EF = .013$ ). There was, however, a significant main effect of Time ( $F_{(1,18)} = 137.45$ ,  $p < .001$ ,  $EF = .88$ ). Figure 4.12 displays the students' performance outcome for the Text comprehension task.

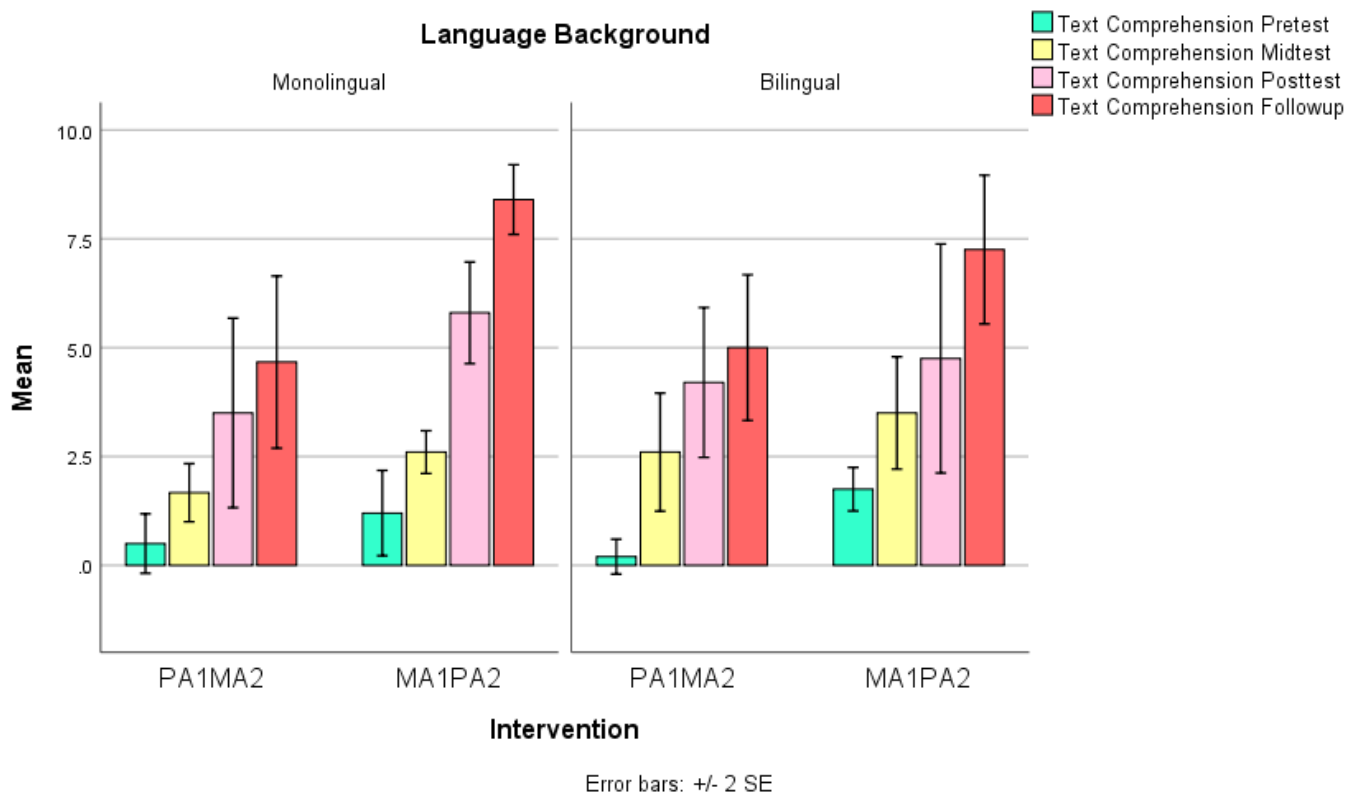


Figure 4.12 Text Comprehension Task Performance

## Discussion

The purpose of the current investigation was to evaluate the impact of phonological and morphological awareness training on the performance of Year 1 students with language weaknesses five weeks after the completion of the intervention programs. In short, it seeks to determine whether these interventions lead to long-term gains that may signify reinforcement and deepening of learning.

The evaluation of New Zealand Year 1 students' assessment scores revealed that children with specific language weaknesses showed maintenance of acquired language and literacy skill performance scores. There was no evidence of reverting back to pre-intervention levels more than a month after the intervention was completed. It showed that students experiencing language learning difficulties may retain significant information which could be applied in tasks that are deemed demanding in terms of encoding, recalling and processing perspectives. This is in contrast to previous reports that described children with language deficiencies as having reduced attentional capacity and restricted mental energy needed to optimally perform in a given task (see Alloway & Archibald, 2008; Mainela-Arnold & Evans, 2005; Windsor et al., 2008). Perhaps the participants in this particular study were able to capitalize on the particular aspects of phonological awareness intervention that helped in creating word associations from previously known words; which allowed students to comprehend and hear similar sound patterns found inside words. Evaluation of results are encouraging as they suggest that there is a form of retention of concepts that last until follow-up for at-risk learners: explicit phonological awareness interventions may foster lasting effects among children with language weaknesses. And the same may be true for improved

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morphological knowledge following the morphological awareness instruction. The findings suggest that given appropriate training, children with specific language weaknesses can extract regularities from language and build word familiarity associations pivotal for lexical growth.

The aforementioned findings contradict those of Suggate, Schaughency, & Reece (2013) suggesting that the impact of early interventions tend to wash out over time. The diminishing of effects in such previous studies may be due to several factors; one of which is the inadequacy of participants to sustain their enthusiasm in the program after some time (Rushton, 1995). According to Rushton (1995), ensuring the active participation of children requires educators to provide meaningful learning experiences that emphasize basic skill acquisition within context. Another possible contributing factor for the disappearance of initial gains would be the lack of parental involvement (Halpern, 1990). Halpern (1990) observed that intervention training which include parents from the outset of the program's implementation tend to persist in the long term, for parents take on an active role in the child's education process by extending teaching experience out of the classroom walls. Parents who are attuned to their children's education allow the establishment of a more positive learning experience by bridging those competencies that had been learned at school to that which is supported in the home.

A third possible contributing aspect to the attenuation of intervention effects is the absence of the program's continuity carried through into school (Farran, 1990). Effects of early intervention fail to optimize potential benefits because the process of transition

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is not properly managed. Intervention programs may ensure the attainment of program's continuity by maintaining effective assessment and establishing efficient systems that allow constant monitoring of student progress. Hence, continuity becomes evident when there exists appropriate aligning of curriculum and intervention approach that permit suitable progression in the participant's learning (Rumbold, 1990). In the research, undertaken as part of this PhD thesis, school administrators disclosed during a follow-up session that they had developed a means of evaluating the progress of students who had joined the training program. It was revealed that the school administrators instructed their Year 1 teachers to monitor the students' involvement in the study by testing their knowledge in phoneme identification, phoneme isolation, phoneme blending and letter-sound matching skills. These were done using informal assessment measures designed by the local school examiner. The teachers mentioned that all tests were moderated by the grade level coordinators and reported to the principal. Records of test scores were tallied and observation notes were made to systematically provide an overview of the learners' progress, in relation to the intervention training provided to them by the researcher. Outcomes of the formative tests were shown during the meeting which provided an overview of steady improvement. The teachers were likewise directed by the school administrators to provide interactive learning activities on phonemic awareness twice a week after the completion of the research study and to write a summative report to be sent to the parents of the children; which detailed what specific learning outcomes were achieved and suggested related engagement activities on how particular skill areas can be supported at home. These aforementioned

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practices set by the schools may have contributed to the maintenance of gains among the New Zealand language weak children.

In a similar vein, the results of the analyses seem to indicate that even after follow-up, New Zealand monolingual and bilingual school-aged participants with specific language deficits show similar levels of development in language and literacy-related skills; except maybe in terms of the phoneme segmentation measure. The New Zealand bilingual language weak students performed better on the said sub-test of phonological awareness than their monolingual counterparts. Such may be explained by two possible reasons. One is that for many of the bilinguals (i.e., Spanish-English, Filipino-English and Samoan-English bilinguals), the sound structures of their home language are more similar to the English language. The concept surrounding the consonant-vowel alternation may have provided greater familiarity for the participants, as the set of languages may be favorable to the discovery of well-established patterns in phonological structures compared to languages with differing actual sound patterns. The explicit instruction in perceiving sound components in a language, coupled with the amount of time afforded to the bilingual language weak learners, may have synthesized their metalinguistic knowledge about the languages involved. Additionally, the home languages of the bilingual weak learners may prove to be an advantage. For instance, the simple phonetic structure inherent in the Spanish language (de Manrique & Signorini, 1994), Filipino language (Schachter & Reid, 2008) and Samoan language (Hengeveld & Leufkens, 2015), may have facilitated the access to phoneme

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segmentation proficiency in English. The structures of the said languages may have paved a viable cross-linguistic transfer into the students' reading of the English words.

The administered phonological intervention approach further enhanced both the New Zealand monolingual and bilingual language weak learners' awareness of larger sound units, as evidenced by higher gain scores in syllable segmentation and rhyme awareness for more than a month after the post-intervention assessment. The same positive outcome could be said for phoneme level skills, for performance scores in measures such as alliteration awareness and phoneme isolation proficiency were recorded to have also increased during the follow up assessment. This finding provides strong support for the idea that children presenting with specific language weaknesses may attain consolidation and strengthening of learning. Their capability to perceive and process speech information may be furthered by working around a structured form of learning devised to assist in reducing and storing information pertaining to "regularities" or consistent patterns fundamental in language input across varying levels. Hence, under certain conditions (i.e., highly supportive and intensive intervention approaches), learners with specific language deficiencies may develop language competence which is pivotal to word decoding and later text comprehension, as a result of acquiring adaptive strategies derived from explicit instruction.

Given the evidence that larger sound units such as syllable and rhyme awareness could be improved above chance levels and be maintained upon follow-up assessment, previous researchers such as Gillon (2002) and Justice (2006) suggested not to focus too much time on teaching larger components of sound; as they could be

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advanced without intensive training. Knowledge in phonemic awareness was deemed a priority by researchers and conveyed that such could be developed even without early training in rhyme and syllable awareness (Byrne & Fielding-Barnsley, 1991; Gillon, 2000; Ukrainetz, Cooney, Dyer, Kysar & Harris, 2000). On the contrary, for children with specific language impairments, capitalizing on the awareness of larger sound units may be deemed critical to stimulate multi-syllabic word reading fluency and link to morphemic knowledge that may later result in independent reading. For example, the explicit instruction for children with language deficits on syllable units may help students to attend to patterns found in the English words and train them for familiar configurations in letter-sound associations that provide hints on vowel sounds, leading to more accurate decoding (e.g., the vowel amidst or followed by one or more consonants is generally pronounced short - put or best; while vowels not closed by consonants usually are pronounced long – be or so). Although exceptions to such patterns may be found in common words, children can be taught to read them by sight (e.g., do and to). This development of accuracy and fluency in decoding via instruction of syllable types was previously cited in research to assist comprehension (Doignon-Camus & Zagar, 2013; McKenna, 2008; Snow, Burns, & Griffin, 1998). Also, instruction on syllable awareness may be shifted to teaching how to chunk letter groups or combinations of letters that frequently occur. This would enable language weak learners to map them easily to create phonological representations that become readily available. The automation may later be produced driven by increasing sensitivity for these types of learners to orthographic redundancy. Teachers could explicitly introduce students to high-frequency prefixes (e.g., *re-*, *dis-*, *non-*, *un-*) and suffixes (e.g., *-ed*, -

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*ing, -ly, -er, -est*). Another means to allow students' sufficient practice to develop fluency is the 'peel off' strategy, where students are directed to read smaller words they could recognize or word parts they can easily figure out. One activity based on 'peel off' reading requires students to underline affixes in a word (e.g. unkind, redo, careless, unfaithful).

Likewise, the fact that both larger and smaller components of sound are being developed at the same time for New Zealand school-aged learners with specific language deficits indicate that learners obtain phonological responsiveness abilities in co-occurring or overlapping stages rather than discrete phases. This is consistent with the previous studies highlighting difference in complexity of mental performance (Anthony et al., 2003; Lonigan et al., 2000; Stanovich, 2000). The seemingly parallel growth in different aspects of phonological awareness seem to suggest that learners do not need to focus on mastering one level of phonological ability (e.g. syllable segmentation) before developing abilities at another level (e.g. phoneme isolation). This further suggests that when creating activities for children with specific language deficiencies, teachers can design tasks that target varying relevant aspects of phonological awareness.

In summary, the present research investigated a follow-up evaluation on the impact of early literacy interventions among children presenting with specific language weaknesses. It was demonstrated that lasting effects in the context of early intervention are possible for children presenting with language deficits. This further elevates the importance of introducing interventions in addressing literacy challenges among

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emergent readers. Still, knowledge base of long-term effects require more studies with longer follow-up of student functioning after cessation of intervention. In so doing, a better understanding of children's exposure history in relation to the applied intervention approaches may be gleaned. The results of this particular investigation indicate that the adoption of targeted intervention that incorporate various techniques highlighting pattern-based derivation from the English language may not only supplement an already existing comprehensive reading program, but may develop further the metalinguistic abilities of children with known language deficiencies, who in the end are hoped to find enjoyment in effective independent reading by becoming code breakers of meaning.

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## **Chapter 5 Assessing Literacy Intervention Impact – A Cross-country Comparison of New Zealand and the Philippines**

### **Introduction and Background**

With the ever increasing complexity of challenges faced by society in the advent of the information age, education remains a pivotal driver in a nation's constant renewal, and one factor in securing the maintenance of success for a community. Such adaptation and success for a whole community is fostered by the education sector guaranteeing equal access to educational opportunities for every individual, irrespective of social or economic background. Given that literacy may be one of the foundations of educational success, ensuring that literacy equality is sustained continues to test not only resource-lean countries, but also well-developed states. In New Zealand, for instance, the latest 2016 survey report of Progress in International Reading Literacy Study (PIRLS) indicated that children face increasing challenges in learning to read. The wide distribution of scores pertaining to reading-related skills, including a relatively lengthy "tail" of weak performers, continues to be evident in the New Zealand results. Meanwhile, in the Philippines, although literacy rates have been reported to be high (within the 80% to 90%, range particularly for those in aged 10 years and older: Christina & Vinogradova, 2017), such rates were documented to be higher for women than for men (Philippine Statistics Authority, 2011). In addition, the recorded statistics in the Philippines fail to convert into global competitiveness, as it is reflective only of decoding abilities (sans comprehension) of enrolled students and school leavers, and is not inclusive of high school dropout rates, which congregate in particular sectors of the population. Owada et al. (2019), in their study of determinants of functional literacy

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variability among school-aged children in the Philippines, noted that the pace of progress in the country to deal with disparities in the national literacy rates has been sluggish. These researchers recommended the introduction of targeted and integrated interventions in schools.

This particular chapter discusses further the findings presented in previous chapters in this thesis (i.e., Chapter 2 and Chapter 3), and provides comparison of results across the two countries in which the research was performed. These analyses aim to identify similarities in the data collected in New Zealand and in the Philippines, as well as to determine whether there was evidence for specific impacts of the interventions focused on a particular country/educational context.

### **The Present Study**

The analyses presented in this chapter provide a cross-country comparison that examines data from a research-based model of literacy support incorporating explicit instructional training of metalinguistic awareness at the classroom level. Implementation of the treatment approaches in each country was complicated by language use, as well as differing educational policies. Keeping these differences in mind is vital when interpreting the outcomes of the interventions. On the other hand, similarities in effects may suggest that these differences have less of an impact than the intervention methods. Results will be presented as descriptive statistics, along with graphical presentation of changes in performance over the course of the study and across the two countries.

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## Research Questions

The analyses aim to investigate the following research questions:

- (14) Are there differences in task performance of bilingual language-weak learners across the two countries?
- (15) Do the intervention approaches demonstrate similar or different gains among the language-weak bilinguals across the two countries?

## Methods

### Data Source

The focus of this chapter was on the data produced by the language-weak bilinguals identified in the two countries' contexts. There were 9 language-weak students in the New Zealand cohort and 15 language-weak bilingual students in the Philippines. Although both groups of learners were in their first formal year in primary school, the participants in New Zealand were younger than those in the Philippines due to literacy instruction of children in New Zealand primary schools beginning at age five compared to the age of six in the Philippines. A complete description of the participants was provided and discussed in Chapters 2 and 3 of this thesis.

### Procedures

In both country cases, students were evaluated at baseline (Time 1 – Pre), mid-point (Time 2 – Mid) and end-point (Time 3 – Post) on literacy-related skills using standardized and informal assessment measures (these are again described in detail in Chapters 2 and 3). At baseline, all students were represented in the pre-test data. However, half of the total number of participants were represented in the mid-test data

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for the phonological intervention (i.e., 8 for the Philippines and 5 for New Zealand), and the rest were represented for the morphological awareness intervention (i.e., 7 for the Philippines and 4 for New Zealand). After mid-point, a cross-over of interventions was implemented. This means that in the end-test, the phonological awareness intervention data were represented by 7 participants from the Philippines and 4 for New Zealand; while the morphological awareness intervention data were comprised of performance scores from 8 participants in the Philippines and 5 from New Zealand.

In order to look at the effects of a specific intervention, comparisons of pre-test and mid-test for those taking an intervention first, and mid-test and end-test for those taking an intervention second were made. Differences in scores were calculated for each student and the scores were combined to produce one analysis with all 15 participants for the Philippines and all 9 participants for New Zealand. Afterwards, a two-way ANOVA was used to make a comparison on the mean differences between the two groups of bilingual language weak learners, with country and intervention as the independent subject factors. The two-way ANOVA allowed the comparison of the different intervention effects across the two countries and provided a means of determining the main effect of country in relation to task performance. Meanwhile, procedures for administering the assessments and prior ethical approval details can be found in Chapters 2 and 3 of this thesis.

## **Results**

The present analyses focused on the data from assessments of bilingual language weak students either in New Zealand or in the Philippines. Assessments were

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conducted before any form of intervention occurred or the baseline (Time1- Pre), after the first five weeks of the intervention (Time 2 – Mid), and after ten weeks of intervention (Time 3 – Post). Growth in performance on the assessment measures across the three time points would be evidence for the benefit of such interventions, with differences between the country groups indicative of the potential influences of factors related to group composition (culture, language or education system).

In the results displayed for the New Zealand data in the succeeding section, Time 1 – Pre represented all 9 participants assessed. At Time 2 – Mid, only 5 completed the phonological interventions first. The remaining 4 completed the phonological intervention second. The same approach was applied for the morphology interventions. At Time 2 – Mid, 4 students had completed the morphology intervention and the rest of the students (5 participants) completed the morphology intervention second.

For the Philippine data, Time 1 – Pre was represented by all of the 15 participants. At Time 2 – Mid, 8 participants were assessed following the phonological intervention. The rest (7 participants) completed the phonological intervention second. On the other hand, for the morphology interventions, Time 1 – Pre included all the 15 participants. At Time 2 – Mid, 7 participants completed the morphological instruction first and the remaining 8 students went through the morphological intervention second.

Findings related to the influence of each intervention on the learner's language and literacy skills became evident by a comparison of the obtained combined scores of participants in either New Zealand or the Philippines, which were derived from the

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difference in scores. This score difference was calculated during comparisons made between pre-test and mid-test performance outcomes for learners given an intervention first, and mid-test and end-test for students administered with an intervention second. The combined data was then analyzed using a two-way ANOVA; in order to produce a single analysis for participants in New Zealand and in the Philippines.

In this section, the performance outcomes were presented using descriptive statistics for each measure used in the study. Comparison of skills between the two bilingual language weak groups assessed using two-way ANOVA were illustrated using summary tables and graphs to present the findings visually. This results section contrasted the scores in each country context to assess the impact of the two interventions. The results were shown beginning with the phonological measures that primarily feature larger components of sound such as syllable and rhyme, then proceeds to the phoneme-level units of sound (alliteration, phoneme isolation and segmentation). Afterwards, knowledge in letter-sounds are displayed, succeeded by the morphological measures (inflection and derivation). The section then concludes with the presentation of findings taken from word meaning measures (antonyms, synonyms, analogies and text comprehension).

Tables 5.1 and 5.2 below display the means and standard deviations assessed at three time points for the bilingual language weak students in the two country contexts. Meanwhile, Tables 5.3 and 5.4 below display the means and standard deviations for the calculated difference between score before and after the intervention

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indicating the effects of specific intervention for the bilingual language weak students in their respective countries.

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Table 5.1 Means and Standard Deviations of Pre-test, Mid-test and Post-test Scores of Year 1 Bilingual Weak Learners on Tasks, by Intervention

Phonological Awareness Intervention	New Zealand Intervention Group			Philippine Intervention Group		
	n = 9	n = 5	n = 4	n = 15	n = 8	n = 7
	Time 1 - Pre	Time 2 - Mid	Time 3 - Post	Time 1 - Pre	Time 2 - Mid	Time 3 - Post
Syllable Awareness	6.33 (2.40)	8.0 (0.71)	8.0 (.70)	7.53 (2.23)	8.25 (1.98)	10.50 (1.27)
Rhyme Awareness	4.00 (2.06)	5.20 (2.49)	7.00 (2.44)	4.27 (2.43)	6.63 (2.97)	8.29 (2.43)
Alliteration Awareness	5.56 (3.81)	6.80 (3.56)	10.75 (1.89)	5.20 (2.62)	8.38 (2.67)	9.00 (2.31)
Phoneme Isolation	6.87 (3.86)	9.40 (1.34)	11.75 (0.50)	9.06 (2.15)	10.88 (1.13)	11.71 (0.49)
Phoneme Segmentation	1.44 (2.12)	1.60 (1.51)	6.25 (3.40)	1.33 (1.29)	2.25 (1.49)	5.86 (2.90)
Letter-sound Knowledge	8.22 (2.39)	20.40 (9.12)	30.25 (0.96)	20.27 (5.20)	26.75 (4.27)	28.00 (2.17)
Morphological Inflection	0.22 (0.44)	0.80(0.84)	3.00 (0.82)	0.53 (0.52)	2.13 (1.55)	3.40 (1.99)
Morphological Derivation	0.33 (0.50)	0.80 (0.84)	2.70 (1.25)	1.00 (1.30)	2.13 (0.99)	4.00 (1.22)
Antonym Production	1.00 (0.50)	1.40 (1.14)	2.50 (1.73)	0.93 (0.96)	2.0 (1.19)	4.40 (1.72)
Synonym Production	0.33 (0.50)	0.40 (0.55)	1.75 (0.95)	0 (0)	1.0 (1.07)	2.57 (2.15)
Word Analogy	0.67 (0.50)	1.40 (1.14)	4.50 (0.50)	0.60 (2.06)	2.27 (1.49)	7.25 (4.42)
Text Comprehension	0.89 (0.93)	2.60 (1.52)	4.75 (2.63)	0.80 (0.94)	3.75 (2.71)	6.50 (3.10)

Table 5.2 Means and Standard Deviations of Pre-test, Mid-test and Post-test Test Scores of Year 1 Bilingual Weak Learners on Tasks, by Intervention

Morphological Awareness Intervention	New Zealand Intervention Group			Philippine Intervention Group		
	n = 9	n = 4	n = 5	n = 15	n = 7	n = 8
	Time 1 - Pre	Time 2 - Mid	Time 3 - Post	Time 1 - Pre	Time 2 - Mid	Time 3 - Post
Syllable Awareness	7.50 (1.73)	4.0 (1.83)	7.75 (0.96)	8.57 (2.37)	9.86 (1.46)	10.5 (1.27)
Rhyme Awareness	5.50 (2.08)	5.25 (0.50)	7.0 (2.45)	4.43 (2.99)	5.14 (2.41)	8.29 (2.43)
Alliteration Awareness	8.50 (2.52)	10.0 (1.41)	10.75 (1.89)	6.57 (2.44)	7.57 (2.70)	9.0 (2.31)
Phoneme Isolation	9.50 (1.92)	11.0 (1.41)	11.75 (0.50)	10.43 (1.13)	11.29 (0.76)	11.71 (0.49)
Phoneme Segmentation	2.75 (2.63)	4.25 (2.87)	6.25 (3.40)	1.57 (1.40)	2.14 (2.80)	5.86 (2.91)
Letter-sound Knowledge	9.25 (1.89)	26.75 (2.99)	30.25 (0.96)	21.0 (4.87)	26.71 (4.68)	27.86 (2.12)
Morphological Inflection	0.25 (0.50)	1.0 (0.82)	3.0 (0.82)	0.57 (0.54)	2.57 (1.99)	3.43 (1.99)
Morphological Derivation	0.50 (0.58)	1.50 (0.58)	2.75 (1.26)	0.57(0.79)	3.14 (1.22)	4.14 (1.22)
Antonym Production	1.25 (0.50)	2.0 (0)	2.50 (1.73)	1.29 (0.95)	2.86 (1.35)	4.43 (1.72)
Synonym Production	0.50 (0.56)	1.0 (0)	1.75 (0.96)	0 (0)	1.14 (1.46)	2.57(2.15)
Word Analogy	0.50 (0.58)	2.50 (1.29)	4.75 (0.50)	1.29 (2.98)	6.57 (4.54)	7.29 (4.42)
Text Comprehension	1.75 (0.50)	3.50 (1.29)	4.75 (2.63)	1.14 (1.07)	6.14 (3.98)	6.57 (3.87)

Table 5.3 Effects of Interventions among Year 1 Bilingual Language Weak Learners on Tasks

<i>Phonological Awareness Intervention</i>	<i>New Zealand Intervention Group</i>		<i>Philippine Intervention Group</i>	
	n = 9		n = 15	
Tasks	$\bar{x}$	s	$\bar{x}$	s
Syllable Awareness	3.11	2.47	1.20	1.86
Rhyme Awareness	2.11	2.85	2.8	2.00
Alliteration Awareness	2.33	3.16	3.00	3.32
Phoneme Isolation	2.89	3.33	1.80	1.66
Phoneme Segmentation	1.56	3.54	2.33	2.72
Letter-sound Knowledge	8.78	7.24	4.33	4.89
Morphological Inflection	1.22	0.97	1.27	1.79
Morphological Derivation	0.89	1.17	0.87	1.46
Antonym Production	0.56	1.33	1.47	1.41
Synonym Production	0.44	0.88	1.20	1.32
Word Analogy	1.33	1.41	2.60	2.35
Text Comprehension	1.89	2.37	1.93	2.34

Table 5.4 Effects of Interventions among Year 1 Bilingual Language Weak Learners on Tasks

<i>Morphological Awareness Intervention</i>	<i>New Zealand Intervention Group</i>		<i>Philippine Intervention Group</i>	
	n = 9		n = 15	
Tasks	$\bar{x}$	s	$\bar{x}$	s
Syllable Awareness	-1.67	3.00	1.07	1.49
Rhyme Awareness	1.33	2.29	1.13	2.13
Alliteration Awareness	1.67	1.58	0.20	1.74
Phoneme Isolation	1.78	1.39	0.73	0.96
Phoneme Segmentation	0.78	2.33	1.93	3.35
Letter-sound Knowledge	10.22	7.21	3.47	4.36
Morphological Inflection	1.33	1.00	1.07	1.83
Morphological Derivation	1.44	1.24	2.13	1.06
Antonym Production	0.67	1.12	1.93	1.34
Synonym Production	0.78	0.83	1.53	1.89
Word Analogy	1.44	1.59	2.67	4.10
Text Comprehension	1.67	1.00	2.80	3.65

### Syllable awareness task

A two-way analysis of variance for the Syllable awareness measure yielded a significant interaction effect ( $F_{(1, 44)} = 13.33$ ,  $p < .01$ ,  $EF = .23$ ), suggesting that the difference between the two intervention approaches was larger for the New Zealand group than those in the Philippines. A statistically significant main effect for the Intervention factor ( $F_{(1, 44)} = 14.91$ ,  $p < .001$ ,  $EF = .25$ ) was also recorded, indicating that the mean change score was significantly higher for those participants in the phonological awareness approach ( $M = 1.92$ ,  $SD = 2.26$ ) than those in the morphological awareness approach ( $M = .04$ ,  $SD = 2.51$ ). However, the main effect of Country was non-significant ( $F_{(1, 44)} = .42$ ,  $p = .521$ ,  $EF = .009$ ). Figure 5.1 illustrates the effect of interaction of the Syllable awareness measure across the two countries.

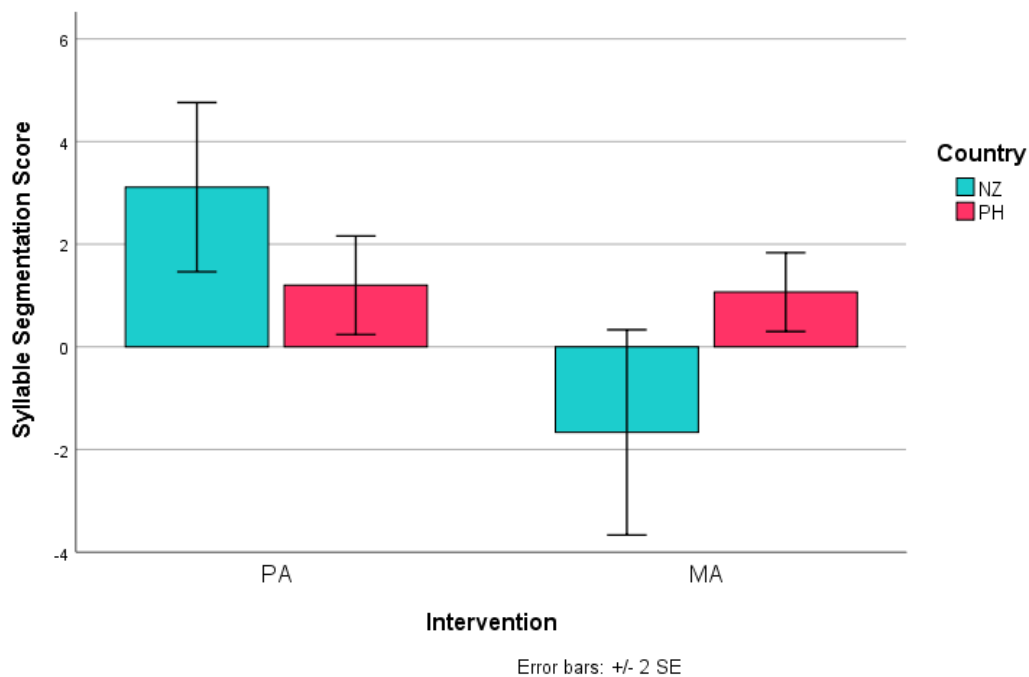


Figure 5.1 Effects of Intervention on Syllable Awareness by Country

### **Rhyme awareness task**

The two-way ANOVA for the Rhyme awareness task scores indicated a non-significant interaction ( $F_{(1, 44)} = .43, p = .52, EF = .01$ ). There was also no significant main effect of the Intervention ( $F_{(1, 44)} = 3.26, p = .08, EF = .07$ ) nor Country ( $F_{(1, 44)} = .13, p = .72, EF = .003$ ) - see Figure 5.2. However, the Intervention effect was approaching significance, which may suggest a possible trend for the phonological intervention to produce greater improvements than the morphological intervention in both country contexts.

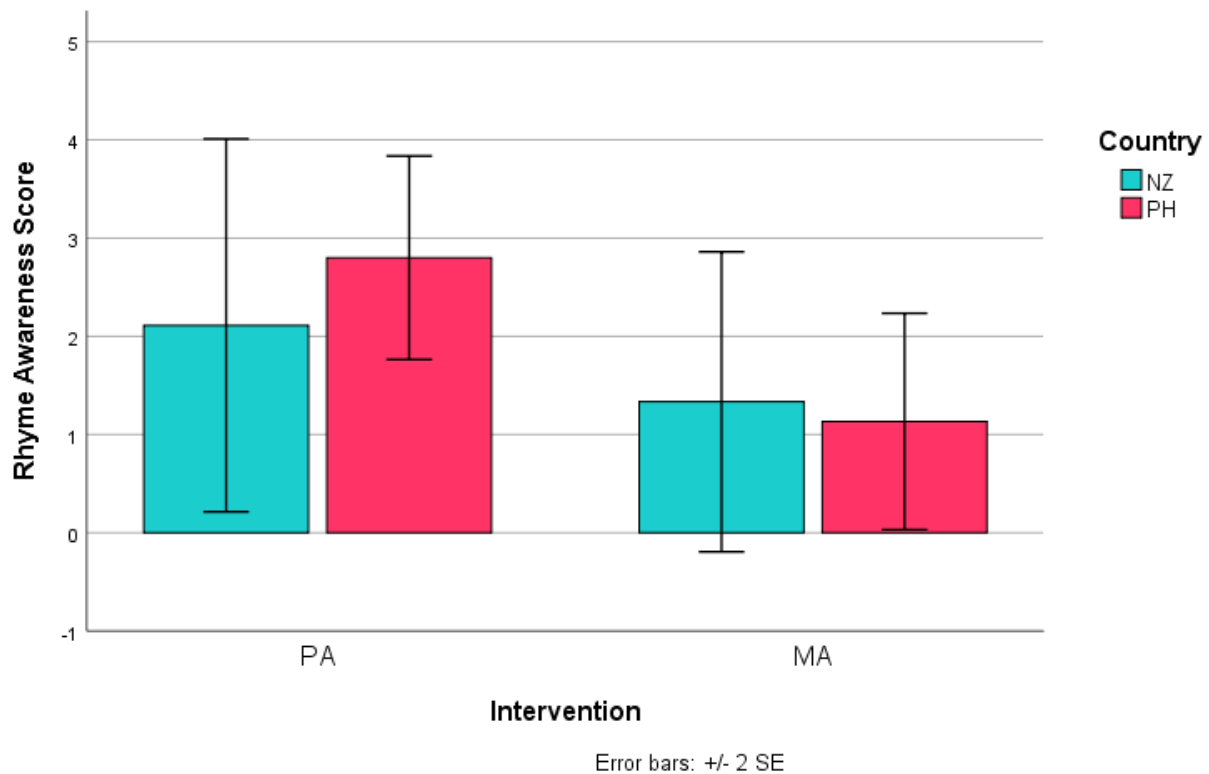


Figure 5.2 Effect of Intervention on Rhyme Awareness by Country

### Alliteration awareness task

A two-way ANOVA conducted on the Alliteration awareness measure yielded no significant interaction effect between Intervention and Country ( $F_{(1, 44)} = 1.9$ ,  $p = .18$ ,  $EF = .041$ ). Likewise, no significant difference was recorded on the variable Country  $F_{(1, 44)} = .27$ ,  $p = .61$ ,  $EF = .006$ ). However, a statistically significant difference on the main effect of Intervention was recorded ( $F_{(1, 44)} = 5.02$ ,  $p < .05$ ,  $EF = .10$ ), indicating that the mean change score was significantly higher in the phonological awareness approach ( $M = 2.75$ ,  $SD = 3.20$ ) than in the morphological awareness approach ( $M = .75$ ,  $SD = 1.8$ ) Figure 5.3 illustrates the learners' performance for the Alliteration awareness measure.

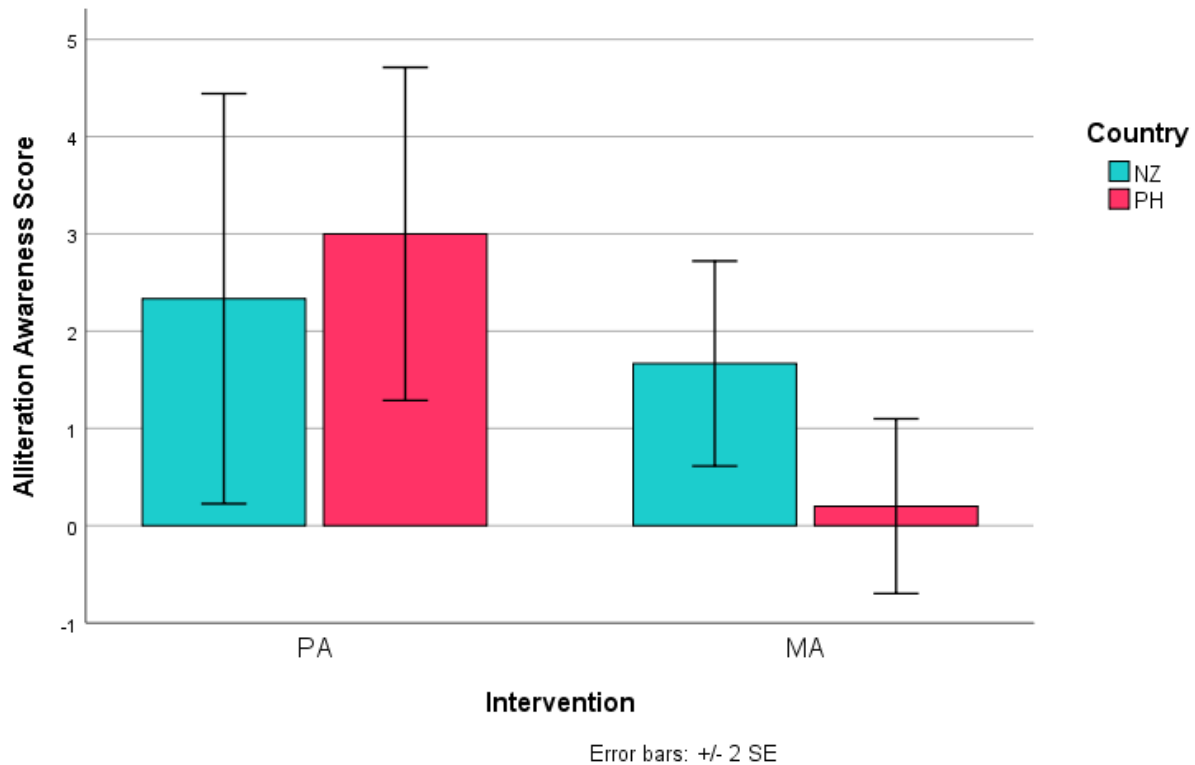


Figure 5.3 Effect of Intervention on Alliteration Awareness by Country

### Phoneme isolation task

The two-way ANOVA for the Phoneme isolation measure revealed a non-significant interaction ( $F_{(1, 44)} = .002$ ,  $p = .97$ ,  $EF = .000$ ). There was a near statistical significant effect of Country ( $F_{(1, 44)} = 3.62$ ,  $p = .06$ ,  $EF = .08$ ), and a significant effect of Intervention ( $F_{(1, 44)} = 3.76$ ,  $p = .05$ ,  $EF = .08$ ). This suggests that phonological awareness' influence may provide a greater influence than the morphological awareness approach – see Figure 5.4. The near-significant effect of Country suggested that there was a trend for the New Zealand cohort to benefit slightly more from both interventions compared to those in the Philippines.

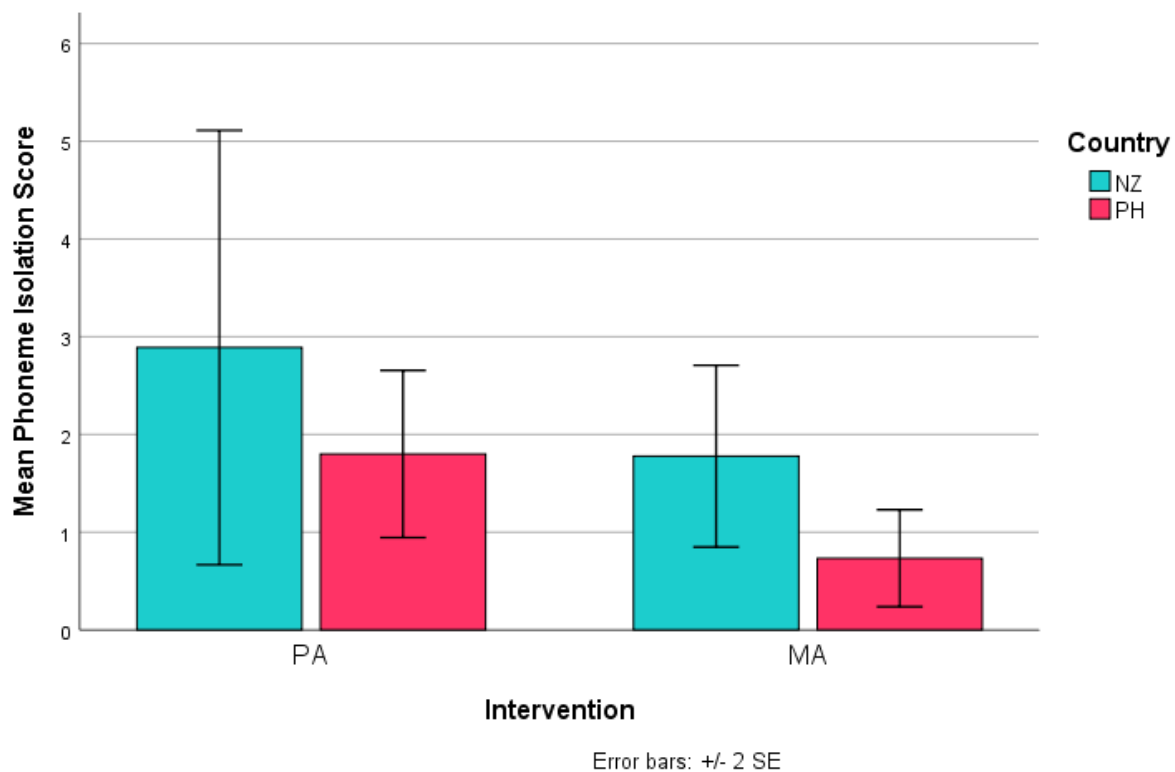


Figure 5.4 Effect of Intervention on Phoneme Isolation by Country



### ***Phoneme segmentation task***

The results of the analysis of Phoneme segmentation measure revealed a non-significant two-way interaction ( $F_{(1, 44)} = .04$ ,  $p = .84$ ,  $EF = .001$ ). There were also non-significant main effects of Intervention ( $F_{(1, 44)} = .43$ ,  $p = .52$ ,  $EF = .010$ ) and Country factors ( $F_{(1, 44)} = 1.15$ ,  $p = .29$ ,  $EF = .025$ ). See Figure 5.5 for the illustration of performance scores of participants for the Phoneme segmentation task.

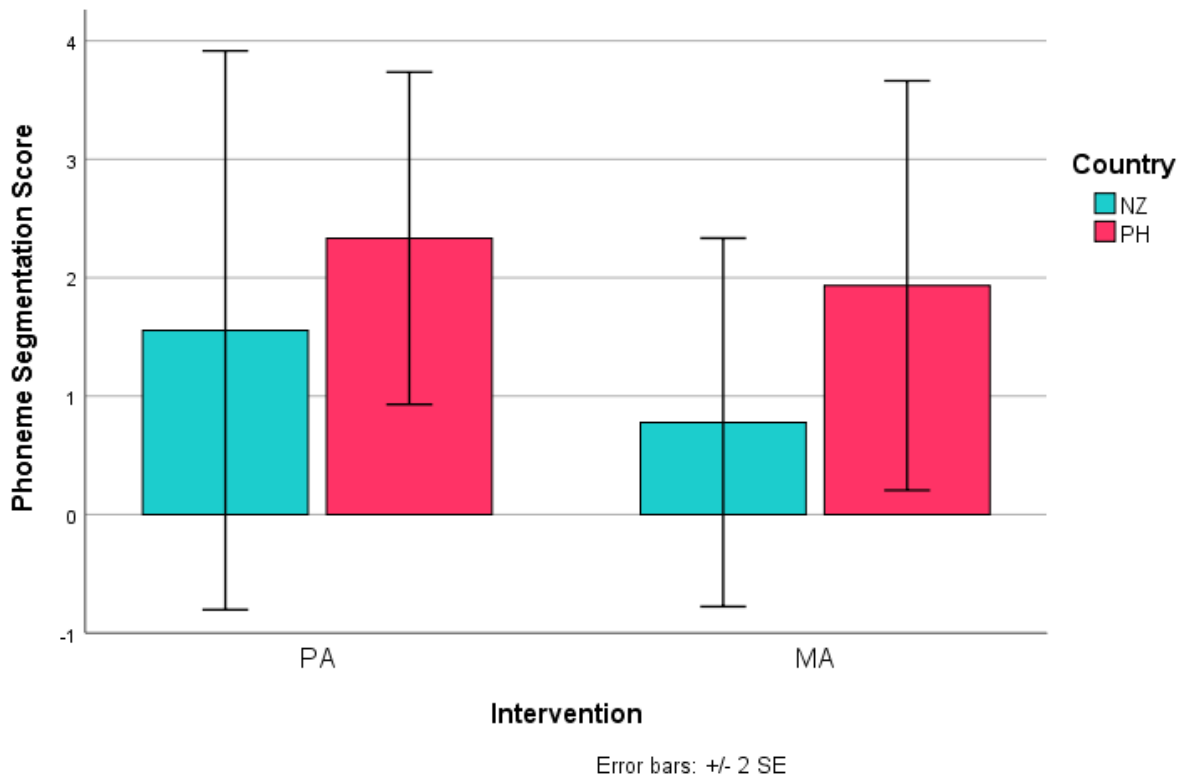


Figure 5.5 Effect of Intervention on Phoneme Segmentation by Country

### Letter-sound task

The results of the two-way ANOVA for the Letter-sound measure indicated a non-statistically significant interaction effect between Country and Intervention factors ( $F_{(1, 44)} = .46$ ,  $p = .50$ ,  $EF = .01$ ). There was also no significant difference on main effects of the Intervention factor ( $F_{(1, 44)} = .03$ ,  $p = .87$ ,  $EF = .001$ ). However, a significant main effect for the Country factor was recorded ( $F_{(1, 44)} = 10.81$ ,  $p = .002$ ,  $EF = .20$ ), indicating that bilingual language weak in New Zealand showed greater gains across the two interventions compared to the bilingual language weak in the Philippines - see Figure 5.6.

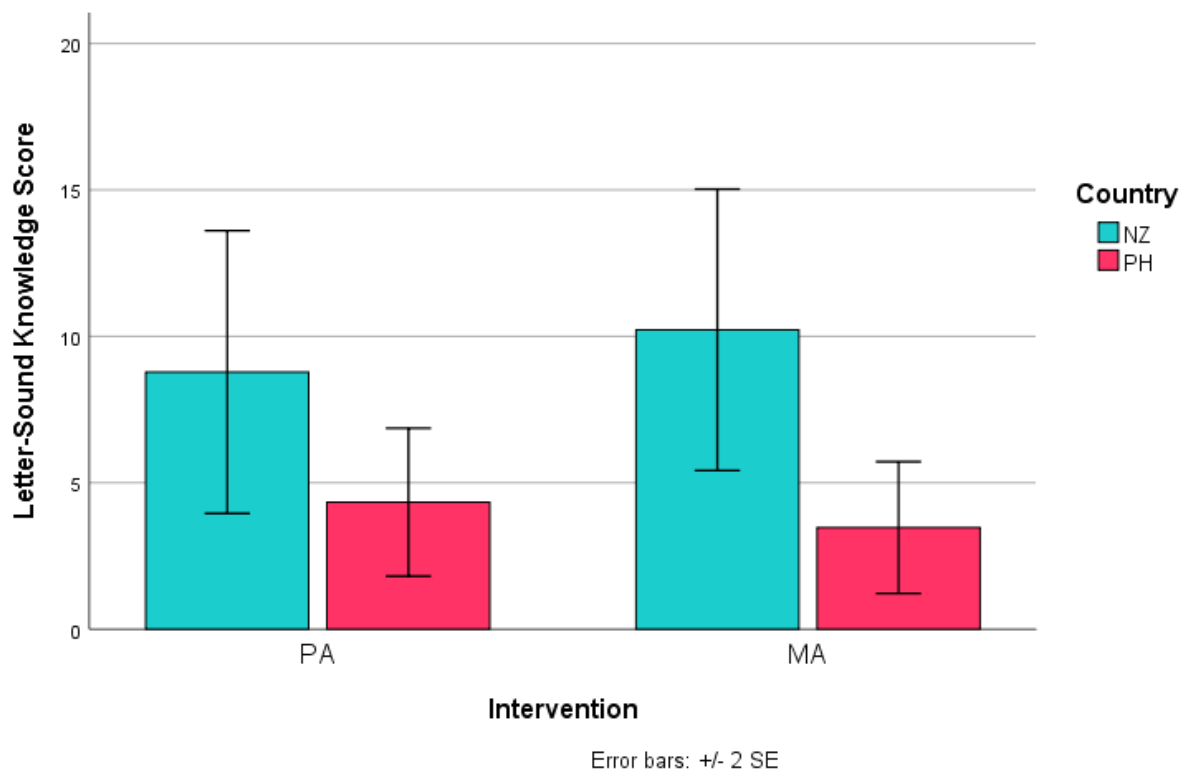
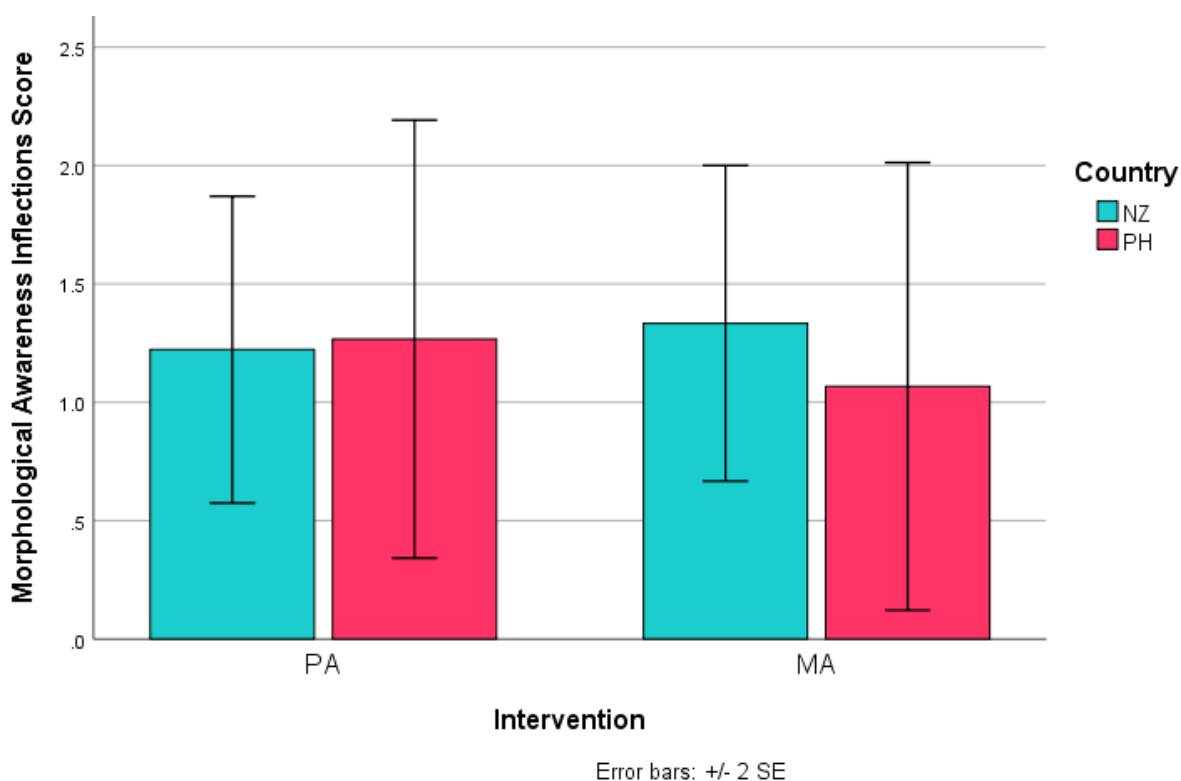


Figure 5.6 Effect of Intervention on Letter-Sound Knowledge by Country

### **Morphological awareness inflection task**

Findings from the two-way ANOVA for the Morphological awareness inflection measure revealed a non-significant interaction effect between Country and Intervention factors ( $F_{(1, 44)} = .112$ ,  $p = .74$ ,  $EF = .003$ ). There were also no statistically significant main effects of Intervention ( $F_{(1, 44)} = .009$ ,  $p = .92$ ,  $EF = .000$ ) and Country ( $F_{(1, 44)} = .06$ ,  $p = .81$ ,  $EF = .001$ ) – see Figure 5.7.

Figure 5.7 Effect of Intervention on Morphological Awareness - Inflections by Country



### **Morphological awareness derivation task**

The two-way ANOVA for the Morphological awareness derivation task, revealed a non-significant interaction effect between Country and Intervention factors ( $F_{(1, 44)} = .91, p = .35, EF = .02$ ). In addition, there was also no significant main effect of Country ( $F_{(1, 44)} = .8, p = .38, EF = .02$ ). There was, however, a statistically significant main effect of Intervention ( $F_{(1, 44)} = 5.99, p = .02, EF = .12$ ). This indicates that participants who received the morphological awareness intervention performed better than those experiencing the phonological awareness instruction. Figure 5.8 displays the effect of intervention based on the performance scores of participants for the Morphological awareness derivation task.

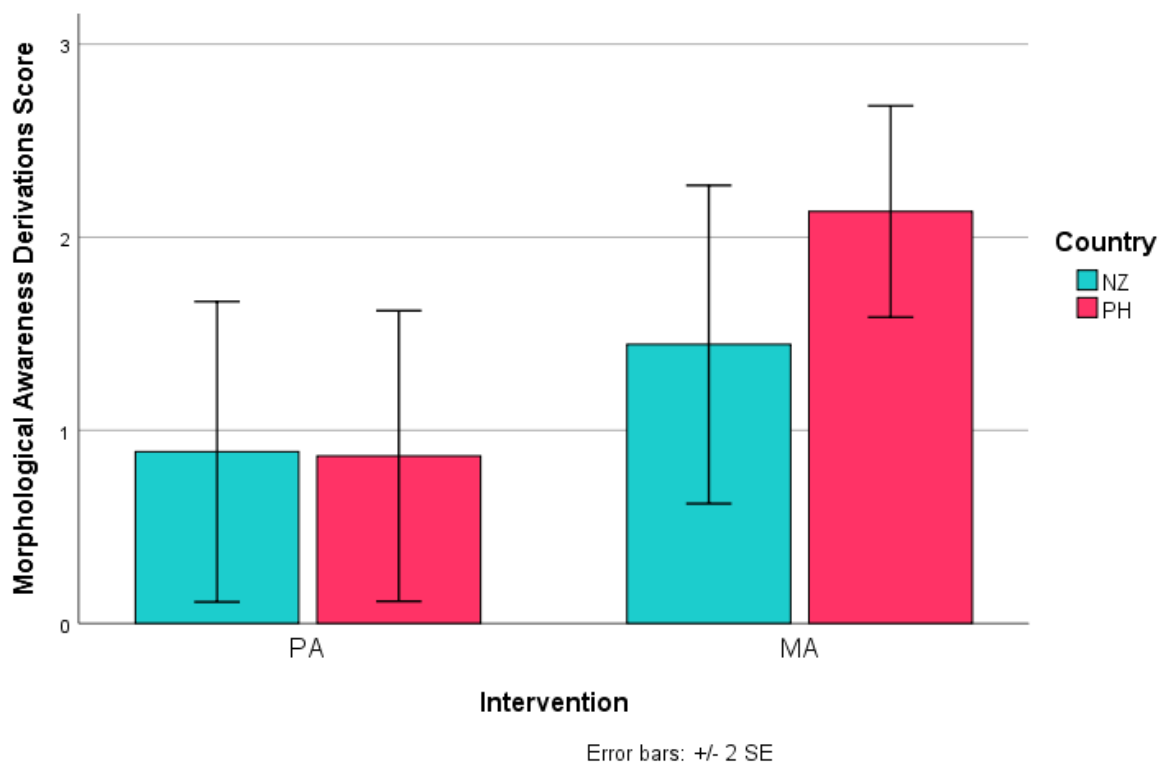


Figure 5.8 Effect of Intervention on Morphological Awareness - Derivations by Country

### ***Antonym production task***

A two-way analysis of variance for the Antonym production measure yielded a statistically non-significant interaction effect between Country and Intervention factors ( $F_{(1, 44)} = .20$ ,  $p = .65$ ,  $EF = .005$ ). Likewise, there was no significant main effect of Intervention ( $F_{(1, 44)} = .54$ ,  $p = .47$ ,  $EF = .01$ ). Nevertheless, a significant main effect of Country was identified ( $F_{(1, 44)} = 7.63$ ,  $p = .01$ ,  $EF = .15$ ). This suggests that bilingual language weak in the Philippines showed greater gains on the Antonym production task compared to those bilingual language weak in New Zealand - see Figure 5.9.

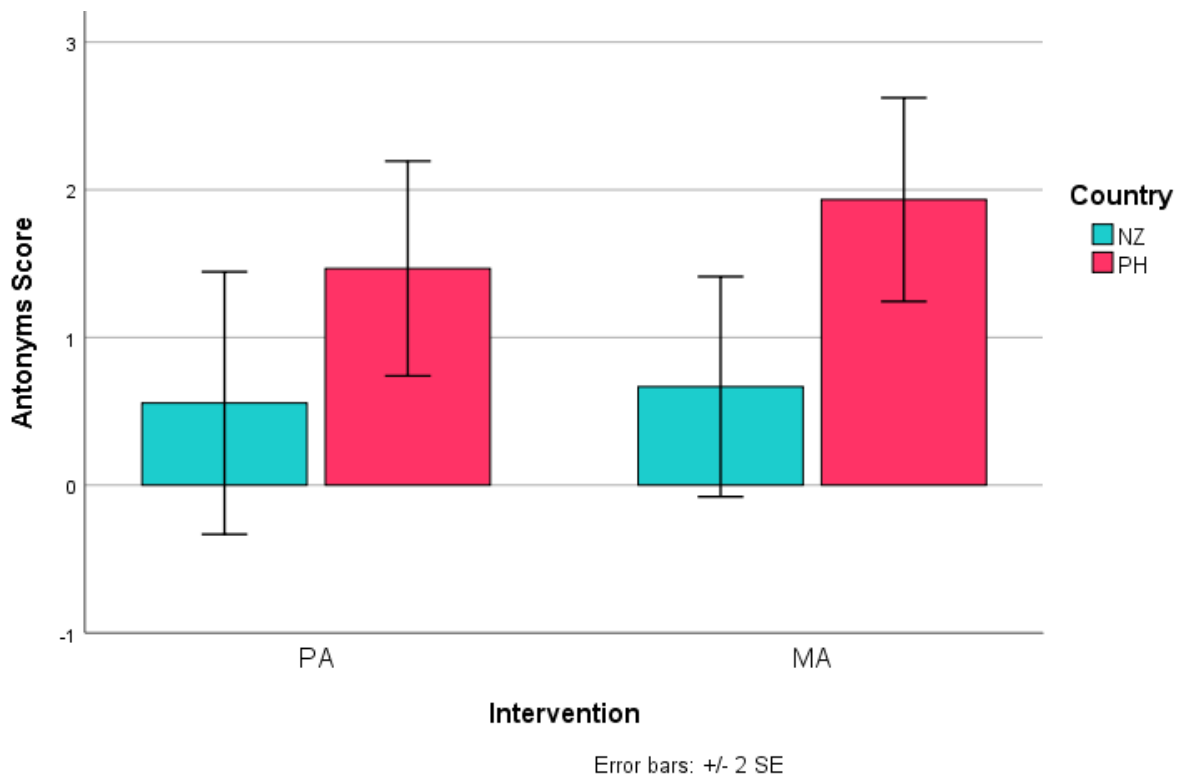


Figure 5.9 Effect of Intervention on Antonym Production by Country

### **Synonym production task**

Results of the two-way ANOVA for the Synonym production measure indicated no significant interaction effect between Intervention and Country variables ( $F_{(1, 44)} = 0$ ,  $p = 1$ ,  $EF = 0$ ). There were also no statistically significant main effects of Intervention ( $F_{(1, 44)} = .64$ ,  $p = .43$ ,  $EF = .01$ ) and Country ( $F_{(1, 44)} = 3.29$ ,  $p = .08$ ,  $EF = .07$ ). Figure 5.10 below displays the effects of intervention on for the Synonym production measure by country context.

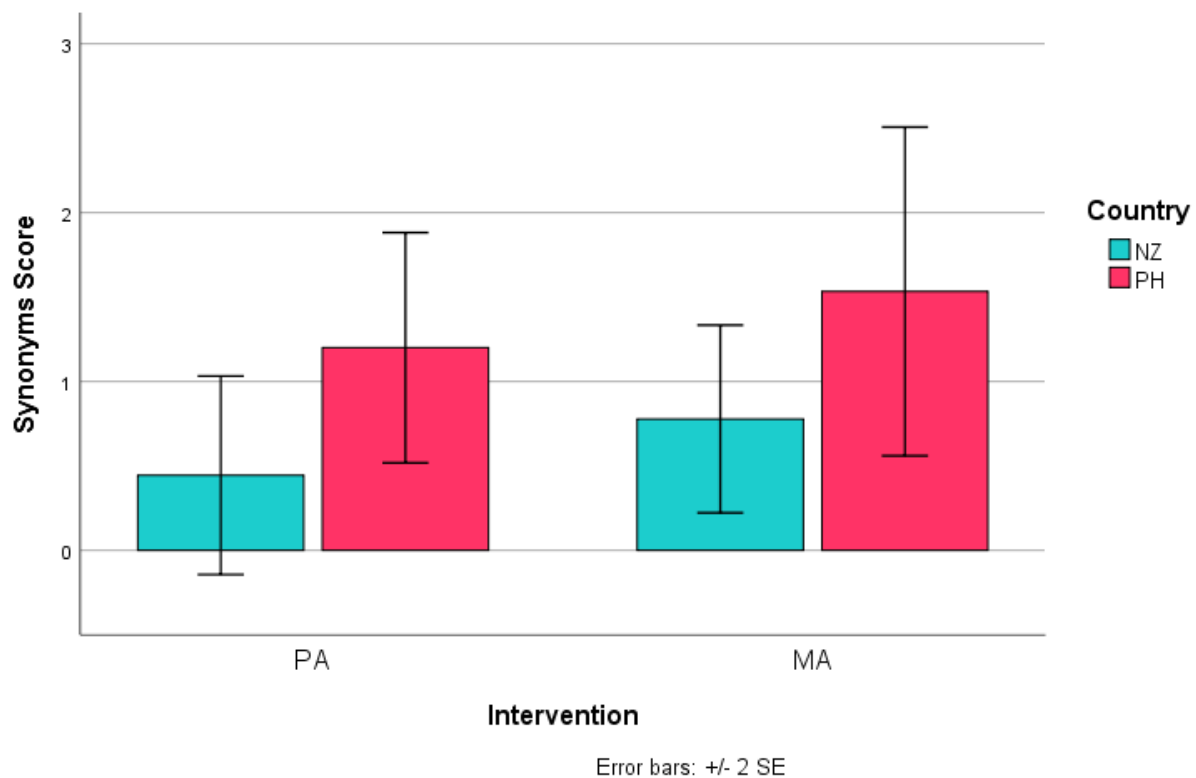


Figure 5.10 Effect of Intervention on Synonym Production by Country

### Word analogy task

The two-way analysis of variance on the Word analogy measure produced a non-significant interaction between Intervention and Country factors ( $F_{(1, 44)} = .001$ ,  $p = .98$ ,  $EF = .00$ ). In addition, there were no significant difference on main effects of Intervention ( $F_{(1, 44)} = .01$ ,  $p = .92$ ,  $EF = .00$ ) and Country ( $F_{(1, 44)} = 2.20$ ,  $p = .15$ ,  $EF = .05$ ) – see Figure 5.11.

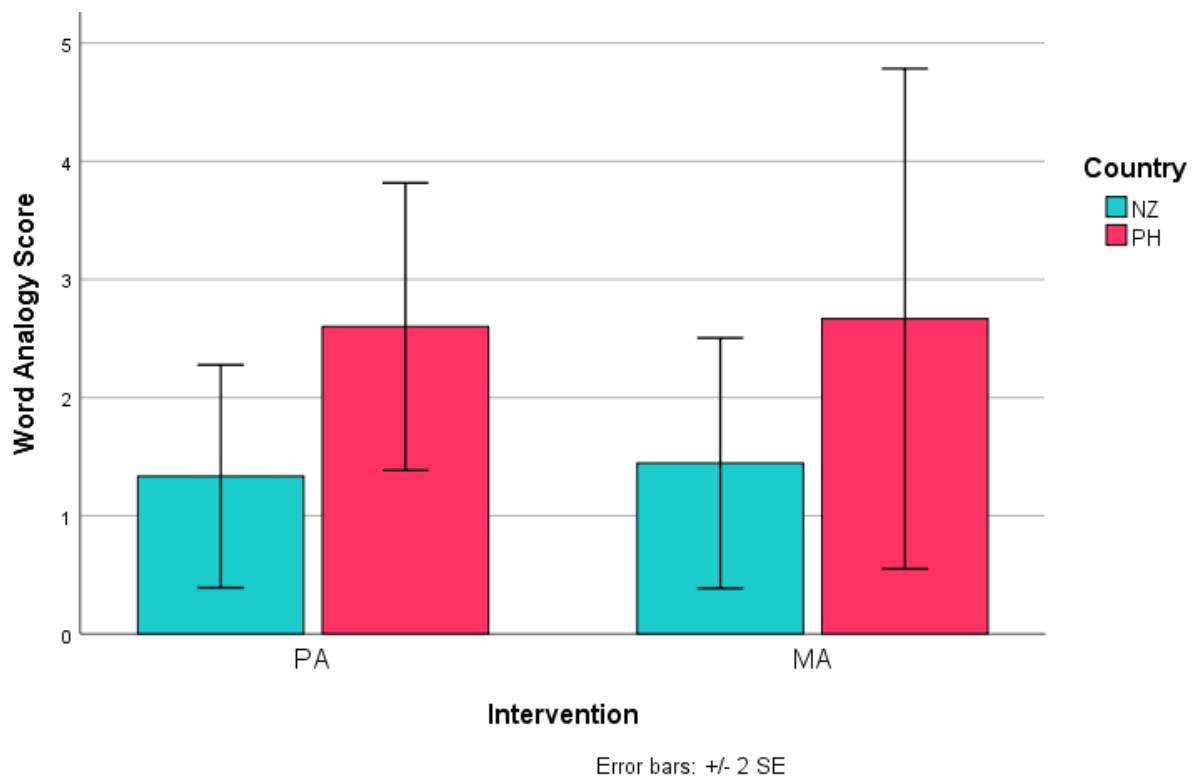


Figure 5.11 Effect of Intervention on Word Analogy by Country

### ***Text comprehension task***

The 2x2 analyses of variance for the Text comprehension measure indicated non-significant interaction effect between the independent factors Country and Intervention ( $F_{(1, 44)} = .46, p = .50, EF = .01$ ) There were also no significant main effects of Intervention ( $F_{(1, 44)} = .16, p = .69, EF = .004$ ) and Country ( $F_{(1, 44)} = .54, p = .47, EF = .012$ ). This is illustrated in Figure 5.12.

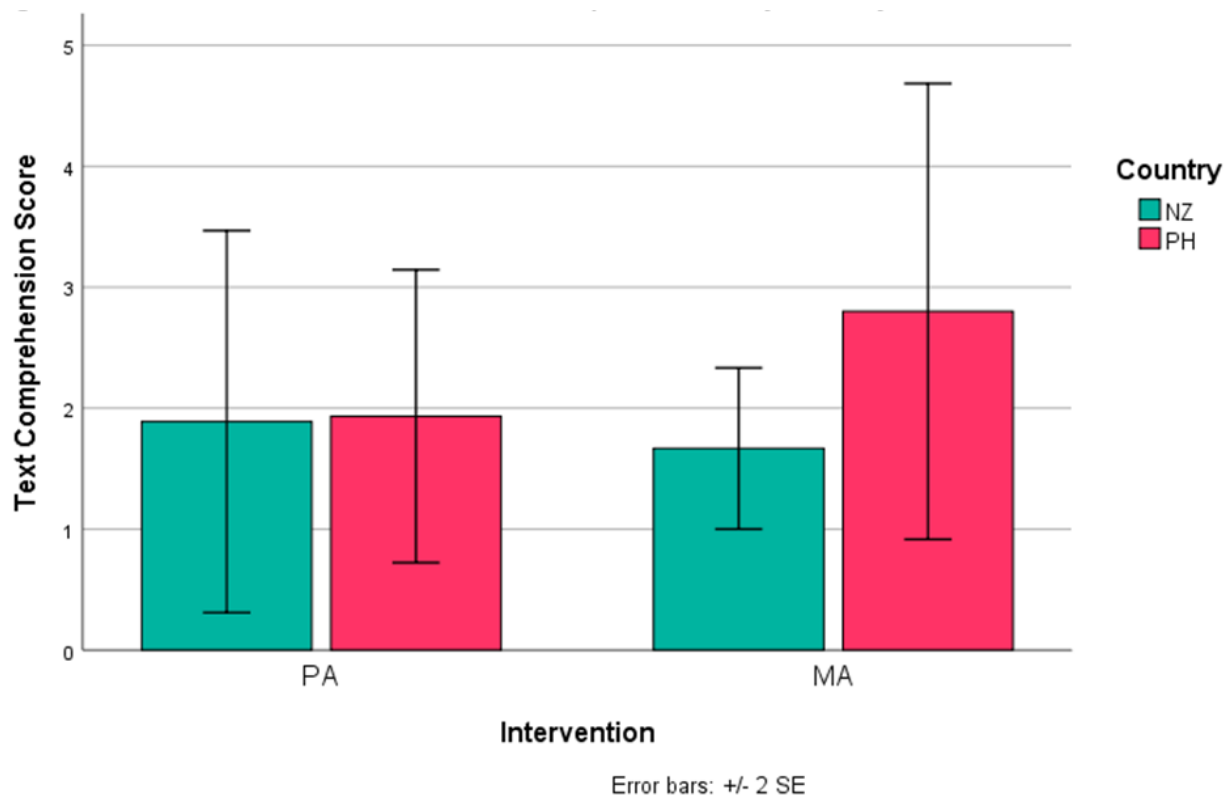


Figure 5.12 Effect of Intervention on Text Comprehension by Country



## Discussion

The particular analyses reported in this chapter focused on comparisons of the effects of the phonological versus morphological instructional training across the two country contexts (New Zealand versus the Philippines). The aim was to determine whether gains in performance on the equivalent assessments differed across these separate educational, language and cultural contexts.

The results of the investigation seem to suggest that regardless of context, explicit instruction at the classroom-level, which concentrates on targeting phonological skills, proved more successful in facilitating improvements of young learners' language skills. The advancement of syllable segmentation, alliteration awareness and phoneme isolation performance scores suggests that such phonological awareness training has the potential to foster phonemic awareness, which has the potential to support literacy acquisition by helping children understand the association between speech and print. As discussed before, the research literature indicates that a perception among learners at an early stage of acquisition that words can be segmented into smaller constituent sounds is an essential foundation to effective word recognition proficiency and later literacy outcomes (Bus and Van Ijzendoorn, 1999; Ehri et al., 2001). Such research suggests that the significance of phonological awareness, which appears universal in learning to read, lies in its role of allowing the isolation of speech segments (e.g., syllables or phonemes) and mapping those oral referents to specific graphic representation (Hu & Catts, 1998).

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Also, the lack of statistically significant interaction effects (for all performance measures except Syllable awareness analysis) between Intervention and Country seem to suggest that any gains produced by the two intervention approaches are not too dissimilar across the two country contexts. Hence, if a phonological awareness intervention produced more gains than the morphological awareness intervention, then it is true across both countries.

It is further worth noting that the evaluation of results concerning follow-up assessment scores of bilingual language weak students in New Zealand, and in comparison of these with the assessment scores of typically-developing bilingual students in the Philippines, who were given 10 weeks of intervention, revealed interesting information (see Chapter 3 results for comparison). For instance, the syllable awareness task performance scores after the follow-up assessment of New Zealand bilingual language weak students were similar to those attained by older typically-developing bilinguals in the Philippines. In addition, the same results were recorded for phoneme isolation and alliteration awareness tasks, where New Zealand bilingual language weak students garnered scores that are akin to the typically-developing bilingual levels reported in the Philippine research data. This indicates that the perception range in the sound structures of a language seems to be most responsive to the effect of amount of intensive input. It then gives the impression that attaining the appropriate use of English language phonological awareness finiteness rests on the degree of exposure to the said language. It is surmised that although typically-developing bilingual children in the Philippines may have been older and started

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phonics training early via direct formal instruction, the New Zealand bilingual language weak learners seem to “catch-up” with typically-developing bilinguals in the Philippines; as the former experienced consistent amounts of practice in phonological storage, retrieval and analysis via the phonological awareness intervention administered twice every week for 10 weeks.

Meanwhile, a surprising outcome in this particular investigation was that the bilingual language weak children in New Zealand garnered higher scores in the letter-sound knowledge performance task; as they were more accurate in the pronunciation of the sound a particular symbol conveyed. It was assumed by the researcher that since the bilingual language weak participants in the Philippines had earlier phonics training, such children would perform better on the said measure than their New Zealand counterpart. However, the Philippine bilingual language weak cohort were observed to display common errors in pronouncing /s/ and /f/. A possible reason was that those who committed errors in sounding out the /f/ sound tend to produce /f/ with an added schwa sound /ə/ at the end. This may have been an influence of syllable saliency surrounding the nature of Tagalog, it being a syllable-timed rather than a stress-timed language (Schachter, 1990). On the other hand, error also occurred in the pronunciation of /s/ which may be associated with the palatized allophone [sʲ] in Tagalog. Such a palatized sound requires raising the front of the tongue toward the hard palate. The [sʲ] sounds like an intermediate between the /s/ phoneme and the digraph /sh/ (Schachter & Otanes, 1972). The aforementioned shortcomings in letter-sound matching by the Filipino bilingual language weak learners may also be explained by the fact that certain

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speech sounds such as /s/ or /f/ were recorded in previous research to be difficult to pronounce by young children and mastered later than other letters (McBride-Chang, 2016).

Moreover, it was observed that bilingual weak language participants under the morphological awareness approach received higher gains in the morphological knowledge - word derivation measure. This may be attributed to the inclusion of several high-frequency words (i.e., common words children encounter regularly in reading) in the test that could be recognized immediately by sight due to considerable familiarity. An example in the measure would be the item *paint:painter::bake:\_\_\_\_\_*; where a student can straightforwardly provide the derived word *baker* because of the base word *bake*. Since learners in the morphological awareness intervention group were trained to look and inspect a word, it became easy for them to immediately and accurately provide the answer.

Additionally, bilingual language weak learners in the Philippines were able to demonstrate evidence of improved Antonym knowledge. The result was higher performance scores in the said measure compared to the New Zealand bilingual language weak group. This may be attributed to the preference of the Filipino bilingual language weak children investigated in this study to a contrast-based learning style. This was observed during actual teaching activities where learners would most often prefer that concepts be explained using opposite categories or from contrastive information. For instance, during a particular lesson with the participants, the children were able to distinguish different meanings of novel adjectives when semantic opposites

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were provided (e.g. Give me the enormous doll, not the tiny one). The idea that young learners favor contrastive contexts as bootstraps in the acquisition of the meanings of relational words in general was supported by a previous investigation conducted by researchers Murphy and Jones (2008).

The overall similarities in effects observed across the two countries studied (New Zealand and the Philippines), may suggest that differences in culture, language use and differing educational policies have less of an impact than the intervention method. Studies investigating the impact of literacy interventions among bilinguals across country contexts are relatively small; and further impact research on this topic, including rigorous designs is needed for conclusions to be confirmed. Furthermore, succeeding investigations should concentrate not only on identifying potential treatment approaches that work, but also identify contributing factors leading to such cross-country differences that could possibly be improved (e.g. teaching practices, duration of programs, sequence of treatment, etc.). Such generalized best practice recommendations should help to minimize prevailing gaps in literacy skills worldwide. Cross-country data also offer relevant opportunities to broaden and deepen our awareness of literacy, specifically what might lead to the displayed similarity in literacy-related skill processes across languages in various nations around the globe. This type of research represents an interesting and promising avenue for future research.

Given such limitations, the current study was able to provide relevant evidence demonstrating similar effects of explicit intervention programs to the language and literacy skills of Year 1 bilingual language weak students coming from two differing

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country contexts. Such cross-country research, that highlight varying bilingual language weak children's English language exposure, signify phonological awareness to be one of the universal and fundamental ingredient in literacy acquisition that guarantees scholastic achievement.

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## Chapter 6 General Discussion

### Introduction

The investigation reported in this particular thesis explored treatment approaches that could be merged effectively into the regular classroom environment. Since interventions have been found to be a potent means of improving children's reading skills (Bus & van Ijzendoorn, 1999; Ehri, Nunes, Stahl & Willows, 2001; Suggate, 2010; 2016; Swanson, Hoskyn & Lee, 1999), this study assessed the impact of two recognized forms of instructional training that previous research has indicated can contribute to reading successes of emerging readers – phonological and morphological awareness. As a robust precursor and prognostic indicator of early literacy, phonological awareness has been extensively examined among children under highly-controlled research conditions (Carroll & Snowling, 2004; Ehri et al., 2001; Gillon 2000, 2005; Gillon & McNeill, 2009). Emerging studies incorporating phonological awareness in classroom interventions also showed promising results (Carson et al., 2013; Tyler et al., 2014). On the other hand, morphological awareness has been currently gaining considerable interest too, as it promotes skilful identification of underlying morphemic units that directly activate lexical representations of words in the mind. Researchers mentioned the compensatory strategy morphemic knowledge affords individuals presented with learning difficulties (Elbro & Arnbak, 1996) and its ability to explain unique variance in reading-related skills, particularly in measures of word recognition, reading comprehension and spelling, and language, such as measures of vocabulary development (Carlisle, 2003; Carlisle & Fleming, 2003; McCutchen, Logan & Biangardi-Orpe, 2009). It is because of these reasons that both phonological and morphological

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awareness have been deemed significant in improving literacy outcomes of students characterized with language and literacy deficits (Bowers, Kirby, & Deacon, 2010; Carlisle, 2010; Goodwin & Ahn, 2010; Goodwin, Lipsky & Ahn, 2012; Hulme, 2012; Munro, Lee & Baker, 2008; Reed, 2008; Ritter, Park, Saxon, & Colson, 2013; Segers & Verhoeven, 2004; Tyler, Osterhouse, Wickam, McNutt, & Shao, 2014; Wake et al., 2013). Thus, knowing how to channel and utilize the benefits provided by the said treatment approaches, which provides the opportunity of synthesizing and applying these to actual classroom curricula, will be invaluable in supporting endeavours to reduce underachievement in reading acquisition, including among those with language weaknesses. Such initiatives can translate to citizen empowerment and ultimately lead to economic development.

In order to inform such work towards better practice and intervention, particularly for bilingual children with language-related difficulties, four studies were conducted to:

- 1.) identify whether phonological and/or morphological awareness, administered in a short period of time, leads to immediate reading outcomes (see Chapter 2 and Chapter 3);
- 2.) determine whether a significant difference exist between monolingual and bilingual participants on measures of literacy/language skills after intervention (see Chapter 2);
- 3.) assess whether differences between typically and atypically-developing bilingual English language user occur in measures of literacy/language following the treatment approaches (see Chapter 3);
- 4.) gauge whether gains in literacy skills related to the interventions are maintained over the long-term (See Chapter 4); and
- 5.) compare

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and contrast the potential effects of the intervention methods across two distinct country contexts (see Chapter 5).

This specific chapter provides a general discussion of the investigations conducted. The succeeding sections of this chapter enumerate implications for advancing classroom teaching and reading practices, outline the study limitations and specify the future directions for further research.

### **Impact of Classroom-Based Literacy Interventions**

Considering the results of the experiments conducted in this thesis, the overall findings support the view that interventions can be implemented early for young school-aged children with language delays. Such interventions would then be expected to foster foundations associated with literacy development. The provision of intervention services to learners experiencing language deficiencies may also mitigate the risk of experiencing persistent literacy difficulties, as it veers away from the traditional practice of allowing children to demonstrate prolonged periods of struggling with reading before any form of mediation is implemented. The practice of incorporating appropriate intervention instruction in the first year of school, as implemented in this study, is supported by similar arguments made by Tunmer and Chapman (2015) who also highlight the significance of early intervention as a mechanism for promoting long-term reading success. Tunmer and Chapman (2015) likewise mentioned that secondary outcomes of systematic intervention studies in the form of the creation of a positive learner self-concept, which can equip learners with an essential competence to surmount literacy challenges. In the research undertaken as part of this thesis, it was

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observed that children were more interactive and eager to participate in the literacy tasks during each intervention session, and to display their ability to decode and comprehend words to their peers. Such finding present relevant implications, for once children with language weaknesses realize relative triumphs in their literacy journey, the more likely they would remain in school and less likely to experience burn out or entirely drop out of class (Finn, 1989).

Moreover, the implementation of early intervention, as demonstrated in this particular thesis, paved the way for the enhancement of language and literacy skills among students with persevering language deficits. This outcome strengthens the claim that language weaknesses can be countered by a systematic treatment approach and that advancement in literacy-related skills can be supported among learners despite low-level language abilities. Hence, children's poor reading outcomes impacted by shortcomings in language proficiency can be effectively managed by a responsive instructional program. Additionally, the capability of the interventions to generate immediate results in a limited amount of time may prove essential for children to learn the skills required to interact with their peers and eventually adapt to the academic challenges posed by the school environment. This result was contrary to the recommended 20 hours of structured phonological awareness instruction by Gillon (2000). However, the attained adequate levels of improvement recorded in the current study may have been realized with the help of a combined small-group and one-on-one instructional training which entailed close monitoring of students' progress. The

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possibility that combined small-group and one-on-one instruction can produce more immediate gains is worthy of further research.

The data obtained in this investigation further indicate the facilitative effect of short-term interventions that have the potential to provide an accelerated form of learning (see also Billard et al., 2010; Cunningham & Stanovich, 1997). It is interesting to mention that the inquiry conducted in this study revealed that bilingual language weak learners, growing up with extensive exposure in an English language environment, progress in much the same way as their monolingual equivalents. This indicates that classroom-based intervention approaches and activities may be applicable to both groups of struggling learners despite the existing diversity of linguistic backgrounds. The result confirmed previous finding made by Carlo et al. (2004) who found no significant difference in treatment effects between “language minority learners” (the author’s term) and their monolingual English-speaking peers. Such findings suggest that delivery can be simplified by avoiding the need to separate varying groups of learners, and by targeting the same learning outcomes.

### **Usefulness of Phonological and Morphological Interventions**

The administration of phonological awareness training in young children with specific language weaknesses, as conducted in this study, was observed to improve participants’ literacy skills through the facilitation of phonemic awareness (e.g. phoneme isolation) and text comprehension. This suggests that children, perceived to have persistent literacy difficulties, have the potential to overcome their disadvantage by means of explicit training on sound structure awareness. The finding of this

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investigation, which included outcome measures of reading, supports previous studies by Carson, Gillon & Boustead (2013) and Zens (2009).

The thesis data also revealed that phonological awareness intervention accounted for improved phoneme-level skills of bilingual language weak children across two countries differing in methods of literacy instruction and culture. Such outcomes highlight the relative potency of phonological awareness in the promotion of learning to read in English despite cultural and instructional intricacies.

Previous cross-linguistic research investigation highlighted the influence of first language in the development of phonological awareness in the second language (Liow & Poon, 1998). The said authors showed evidence that exposure to a shallow alphabetic script (i.e., Bahasa Indonesia) resulted in high scores on spelling tasks involving real English words and pseudowords that necessitate knowledge of phonemic awareness. Given that an individual's first language has the capacity to effect the development of phonological awareness in the second language (English), it may likewise be possible that the development of phonological awareness in the second language (English) may support the development of phonological awareness or even foster reading skills of a child in his/her first language; especially when there are cross-language phonetic similarities between the two languages/orthographies. For instance in the case of Tagalog, which shares a Latin-based alphabetic orthography with English. Also, there are existing phonological parallels with the English consonant inventory. Both languages have full series of voiced and voiceless labials (i.e., /p/, /b/, /m/ and /w/); alveolar/dental (i.e., /t/, /d/, /s/ and /n/) and velar stops (i.e., /k/, /g/ and /ŋ/) (Montanari,

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2011). Montanari (2011) also noted that English and Tagalog demonstrate at least three nasals (i.e., /m/, /n/ and /ŋ/), share two glides (i.e., /w/ and /j/) and the liquid /l/. There are even similarities in the fricatives /f/ and /s/. Nevertheless, further research on possible transfer effects between Tagalog and English is needed to establish the potential for these commonalities to show cross-language influences. In addition, direct comparison of children from differing linguistic backgrounds, taking into consideration those with a first language possessing either shallow or deep orthographies, are imperative in order to shed light on such aspects of early cross-language reading development.

The evaluation of student performance scores on phonological awareness measures seem to indicate a reciprocal relationship between reading and phonological awareness. At the outset of literacy learning, phonological awareness seems to show an impact on reading as the participants appear to consolidate their knowledge of sound structures, as well as aspects of texts, while they read. Children can be observed to sound out the letters, and may comment about how certain words sound the same. Similar observations were made by the researcher in the current study when children were noticed to utilize their understanding of letters to decipher words and to remark on how to vocalize them, demonstrating their ability to draw upon their phonological knowledge (i.e., ability to recognize sound patterns of words which comprise rhyming structures and phoneme manipulation within words). Reciprocity between these skills can be displayed when gains in phonemic awareness knowledge supports the reading of words, and as gains in reading occur, further gains in phoneme manipulation are

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evident, which later stimulate additional gains in reading. However, phonological awareness is not the only skill developing over this period. For example, during evaluation periods, the older Filipino bilingual language weak participants were noticed to read the words “jumped”, “helped”, “baker”, “teacher” and “painter” fluently, which may be consistent with the development of more sight-word processing. The seemingly developmental shift from effortful reliance on phonology to recognize words via skilled sight word reading corroborates previous findings from research conducted by Ehri (2007). This may be supported by the morphological processing skills used as part of the training procedures used in the current study; though the exact influences of whole-word and morphological lexical access processes have yet to be determined.

Additionally, it was revealed that during word meaning measures requiring lexical access, the participants were quick to detect and decompose morphemic sub-units of orthographically transparent words evident in the item “longer:long::taller\_\_\_\_\_”. This seem to be an indication of what Beyersmann et al. (2015) referred to as embedded stem activation mechanism. This is a particularly automatized means of word segmentation which may be reliant on children’s use of schema or pre-existing knowledge of free-standing words to recognize them enclosed within a word context. Since the participants may have been introduced to morphologically simple words such as ‘teach’ or ‘work’ in their previous reading experience, they would rapidly map these newly captured orthographic forms with the predated lexical representations.

The study further evinced that the administration of morphological awareness training among children with specific language deficits allowed learners to see patterns

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for syllables or pattern conventions in print. This suggests that the aforementioned learners may have been able to detect boundaries between syllables due to highly occurring letter sequences found in words. Thus, in activities, the children were able to identify the regular past tense form of the verb “-ed”, progressive form of the verb “-ing”, derived agentive nominal “-er” and commonly occurring affixes (e.g., “un-”, “dis-”, “re-”, “multi-”, “-ful”, and “-less”). There was even a specific one-on-one intervention session wherein students were recorded to have been able to identify boundaries that exist in the words “dishonor” and “dishwasher.” However, in the actual morphological awareness tasks, all children provided incorrect answers, such as responding “sayed”, for the past tense form of the word “said”. This indicates that children with specific language deficits may also struggle in producing appropriate past tense forms of irregular verbs when they share common and specific phonological features that are characteristic of other potentially existing inflectional suffix. In this case, the verb “say” shared phonological features with other verbs “pay” and “stay” in that they have similar rhyme patterns. It is surmised that the presence of these related features would lead to the incorrect spoken output due to the over-generalization of the morphological rule. Hence, the answer provided would sound like “paid” or “stayed”. This over-generalization error could be due to weaknesses in the cognitive mechanisms responsible for analyzing semantic and syntactic properties of words (e.g. the inability to inhibit a response based on a rule frequently occurring within a task) or to lack of links between different morphological forms of the same word (e.g. the link between say and said is fuzzy in some way) or even to an exposure to specific instances of words within different semantic/morphological contexts (e.g. a lack of exposure to the relationship

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between say and said across a range of discourses). However, such errors strengthen the claim that morphological and phonological processing are intimately related in the production of inflected words in the English language.

It is noteworthy to add that the outcome of administering two consecutive intervention approaches among the participants resulted in higher gains not only in phonological and word meaning measures, but most especially to morphological and text comprehension measures. Thus, the findings seem to suggest that explicit instruction regarding the interface between phonological and morphological awareness may ultimately increase improvements in these skill areas. A possible explanation would be that bound morphemes are characterized by phonological variations: i.e., a morphemic form (such as making a noun into a plural) can vary in its phonological form between words, which can also mean variations in its written form. For instance, people produce the plural of the word “glass” with ‘es’ (glasses), but produce the plural form of “bat” with ‘s’ (bats). In another example, the plural of some words ending with a final ‘f’ (such as “wolf”) would end with ‘ves’ (wolves). Variations focusing on morphophonologic features of words are likewise shown by various pronunciations of the past tense ‘ed’ morpheme. Individuals produce a voiceless /t/ in cases where the root verb ends with a voiceless phoneme (e.g., slashed, talked, glanced), but employ a voiced /d/ when the root verb ends with a voiced phoneme (e.g., swayed, hurried, chewed). Hence, incorporating a focus on systematic patterns found in morphophonological groupings may prove beneficial for maximizing treatment gains in children encountering specific

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language deficits, which can be exploited in the future to improve current intervention methods.

The gains in morphological awareness scores, especially from the Filipino bilingual language weak cohort, may likewise be influenced not only by age, but also by the manifestation of similar word formation rules learnt when studying the linguistic features of the Filipino language as a special subject in school. Tagalog, much like the English language, involves critical awareness in inflection, derivation and lexical compounding rules. Numerous adjectives in Tagalog are formed with the addition of “ma” to a root word. For instance in the word “matalino” (ma+talino), “ma” is added to the root word “talino” (talented) which results to a new word meaning ‘clever’. Other examples of the significance of morphemic knowledge would be in inflections such as in the word “uminom” (drank) which resulted from a combination of “um” (an infix for a perfected aspect) and “inom” to drink. Derivations and compounding are also pervasive in the language. An example of derivation in Tagalog would be found in the word “libingan” (cemetery), which is comprised of the verb “libing” (bury) + “an” (indicates a location associated with the root word). On the other hand, examples of lexical compounding are evident in words such as “abot-tanaw” (near or within seeing distance) and “anak-araw” (albino). The former is made by combining the words “abot” (reach or grasp) and “tanaw” (sight), while the latter is formed by merging “anak” (child) and “araw” (sun) into one whole word.

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## Implications

### *Advancing classroom teaching and reading practices*

The findings in the study present significant implications for interventions targeting specific language weaknesses. Children presenting with such language deficits appear to display grammatical shortcomings or error patterns suggesting a lack of appreciation of the distribution of morphophonological forms found in the English language. The current data suggest that a more focused/explicit intervention approach to evaluating variations in morphophonological forms would be useful for children presenting with language deficits. In particular, shifting attention to how verb and nominal changes influence morphophonological groupings may be worthwhile. This may entail outlining treatment guidelines that directly emphasize morphophonological configurations in the English language. An example would be giving exercises focusing on phonologically similar (i.e., the words have the same rime both in the stem and the inflected forms) irregular verbs and grouping them based on a common underlying set of patterns, such as in the words creep-crept, keep-kept and weep-wept that could be bound within a context of a certain intervention procedure. This may positively impact past tense production among children with language deficits. Another arrangement that may be implemented would be presenting target verbs which possess similar phonological features (same rime patterns used to depict present tense form), but undergo irregular inflectional change (e.g. brake-broke, make-made, awake-awoke and forsake – forsook) to indicate the past tense form. Equipping students with awareness regarding word transformations may enhance word identification performance. Target words with low frequency manifesting sequences in the English language or those that

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vary past tense transformation depending on context (e.g. dive – dived/dove, hang – hung/hanged) would require being introduced to learners via immense exposure in differing contexts before an individual presenting with specific language weakness could fully grasp its suitable use.

The treatment approaches were all based on teacher-child interactions, which aimed to foster development of pertinent reading skills through a specialized form of instruction that entailed scaffolding metalinguistic awareness activities explicitly. These included, but were not limited to: singing nursery rhymes, pointing out rhyming words (e.g. “Conner has a tag in his bag! Let’s listen. Tag and bag are words that rhyme!”), drawing students’ attention to alliterative texts in books (e.g. *Big Bad Bubble* by Adam Rubin and Daniel Salmieri), supporting attentional skills (e.g., “Alexis has a picture pinned on her shirt. Let’s see her find a person with a different picture but the name of that object in the picture rhymes with hers.”), introducing the alphabet and how letters are formed together with their sounds, blending syllables into words or letters of the alphabet with their corresponding sounds, distinguishing sound components (e.g., “How many sounds can you hear in the word *bats*?”), sorting objects by their beginning sounds and then by their ending sounds, analyzing parts of a word via affix recognition, finding root words, emphasizing the past tense *-ed* as they sing the song “Little Fish, little fish” and building compound words using tape words with pictures onto blocks (basketball, treehouse, jellyfish, seahorse, etc.). Successful implementation of the said treatment approaches then requires not only explicit understanding of phonological and morphological theories, but also the effective and efficient transference of these

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metalinguistic skills among students; in order to prevent any confusion in the acquisition of these fundamental skills in reading.

In addition, more specialized training for teachers is imperative, as it can impact the delivery of quality intervention services among children with language deficiencies. In the provision of early mediation, a good deal of knowledge involving the critical components of language and a firm grasp surrounding the factors and processes leading to successful reading are vital to ensure that important areas are assessed and appropriate forms of instruction are provided. Teachers now become front liners of language and literacy in providing alternative means of educational support, as they intercede in helping students the moment they demonstrate signs of learning difficulties. The practice of implementing an early intervention inside the classroom is also a proactive stance in resolving the dilemma of waiting for children to experience sufficient failure; in order to qualify for state-funded special education services support.

#### *Highlighting the role of bilingualism in literacy difficulties*

Metalinguistic awareness skills (phonological and morphological awareness) acquired in one language may influence the linguistic features acquired by a child in another. Commonalities between languages may support the development of the recognition of a language construct. Delineating similarities in phonological properties and morphological transformations across two languages may also heighten both phonological sensitivity and morphological production in each of the languages. Thus, children exhibiting deficits in language and reading skills in English may be supported by strengthening their overall bilingual experience.

In the case of the children investigated in this doctoral thesis, the Spanish, Samoan and Tagalog speakers may have additional opportunities in enhancing their literacy performance because these languages have both phonological similarities with English (voiced and voiceless labial /p/, /b/ and /d/, fricatives /f/ and /s/, approximant /l/, and nasals /m/, /n/ and /ŋ/), and share similar mapping symbols with the English language (Duncan, 2018, Marinova-Todd & Hall, 2013; Montanari, 2011; Westerveld, 2013). Such commonalities should help promote linguistic repertoire by becoming sensitive to the relationships between the novel words in the target language and the existing words in their other language. Using these commonalities as an appropriate pedagogical strategy should increase the students' deeper understanding of the relationship between a language and its written form.

With regard to responsiveness to morphemic knowledge, children's awareness of cross-language suffix correspondence may act as a bridge upon which they can carry morphological knowledge in one language to support word processing and hence reading comprehension in another. This was evidenced by a study by Hipfner-Boucher, Lam, Chen, and Deacon (2015) which demonstrated that even as early as grade 1, children were capable of matching suffixes in morphologically complex French words with English translations (such as “-ity” / “ité”). Such findings were also observed by Hancin-Bhatt and Nagy (1994) as Spanish-English bilingual primary students were able to determine common meaning between suffixes “-ous” in English and “-oso” in Spanish. A statistically-significant correlation was also shown between the children's

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understanding of Spanish-English suffix relations and their ability to explain morphologically complex words in English.

The identification of cross-language suffix correspondences may allow children to use morphological awareness knowledge developed in one language to support understanding of syntactic structures in another language (Tyler & Nagy, 1990). Grasping how syntactic structures work would then lead to comprehending whole texts (see Deacon & Kieffer, 2018). In short, morphemes convey significant information about word class, which eventually brings insight into the syntax of single words and whole sentences. For example, derivational suffixes often distinguish parts of speech (e.g. The agentive “- er” word formulation rule changes a verb into a noun: teach – teacher). The suffix word formation could explicitly be taught among Filipino children, as productivity in Tagalog is as prevalent as in English (e.g. adding the morpheme “an” to the verb “kain”, which means ‘to eat’, in order to produce a new word “kainan” which means gathering). Children can then generalize this knowledge to produce novel derivations in Tagalog and transfer this awareness to support morphological processing in a new language.

### **Expanding knowledge about theories of reading through current findings**

Deepening our understanding on how children approach literacy is crucial in order for educators to develop and carry out effective literacy instruction within the classrooms. The investigation conducted in this thesis extends present understanding related to various theories of learning to read.

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### *The Simple View of Reading*

The Simple View of Reading (Gough & Tunmer, 1986), presented in the first chapter, espouses the idea that central to the reading process is the comprehension of meaning in printed texts. This requires the interplay of two components: word recognition and linguistic comprehension. The simple view of reading acts as a framework for classifying reading deficits (Carson et al., 2013). This view of reading offers a means to discriminate weaknesses in reading based on word identification (spoken language impairment), language comprehension (e.g. specific comprehension deficits) or a combination of weaknesses in both components (e.g. mixed reading disability).

Research discussed in this study emphasize the significance of developing phonological and morphological skills as a way to support word recognition. Explicitly educating children regarding the underlying principles behind phonological and morphological aspects of word decoding at the onset of literacy may enhance the way they decipher printed words on the page. A familiarity with the sound and morphemic structures of words should give the learner a range of decoding strategies than can enhance reading accuracy.

### *The Dual Foundation Theory of Reading*

The Dual Foundation Theory of Reading proposed by Seymour (1990) advocates the idea that orthographic development is viewed as mutually dependent on an alphabetic processor (alphabetic decoding mechanism) and a logographic processor (sight word identification process). These two specific processors can emerge in

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parallel, but when combined, they offer a foundation for the orthographic processor/framework (internal mechanism for checking legitimate spellings and building around established linguistic structures such as appropriate word models and letter-sound correspondences). The influence of the two information processing systems (i.e., alphabetic and logographic) may be unidirectional or bidirectional. The highest stage attainable is the morphographic literacy level. In this level, syllable-sized components may be merged to create multisyllabic words.

The Dual Foundation Theory explains that letter-sound acquisition is fundamental to languages with alphabetic orthographies (Phase 0). Such acquisition may not be impacted by language differences, but can be influenced by educational variables such as teaching method or age of learning letter-sound correspondence, socio-economic status (SES) and language learning deficits. The next phase (Phase 1), the foundation literacy stage, involves both simple decoding (alphabetic process) and sight-word recognition (logographic process) or simply either one of the aforementioned processes. The foundation literacy stage may vary across languages. Languages with simple syllable structures (e.g., Bahasa Indonesia, Te Reo Maori, Spanish) may develop their alphabetic system processing faster; while languages with complex syllabic structure (e.g., German, Danish, Norwegian) may have slower establishment of the same processing system. It is likewise formed more slowly in languages with deep orthographies (e.g., English, French) than those with shallow orthographies (Italian, Finnish). On the other hand, the acquisition of sight word processing is slower in orthographies that go beyond the threshold level of depth or complexity. Seymour

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hypothesized that languages with deep orthographies prompt the emergence of a dual foundation that comprises of unique logographic (sight word) and alphabetic (decoding) processes. A still slower form of acquisition may be experienced by children presenting with language learning deficits, while individual performance variability may occur among typically-developing learners. Orthographic literacy, Phase 2, may also vary between languages. Languages with simple syllabic structure may experience more rapid formulation of an internal model of the spellings of all conceivable monosyllables than those classified as complex syllable languages. Further delay may happen in relation to the degree of violation to the one letter-one sound principle. Morphographic literacy (Phase 3), the final stage, emphasizes the use of spelling in indicating lexical identity and recognizing morphological function.

The findings reported in this research focus on the relevance of establishing phonological and morphological skills within the Dual Foundation Theory. The difficulties for beginning readers in English are likewise explicable within this scheme. It appears that the challenges arise for students learning English at each specific phase of the reading process. At first (Phase 0), immaturity due to untimely school entry may hinder the attainment of fluency in processing grapheme-phoneme relationship. In the next phase (Phase 1), slower learning further results and is affected by the overall complexity of the orthographic and phonological environment. The acquisition of sight words may be delayed due to the presence of numerous words in the language that breach the one letter to one sound principle. Rudimentary decoding may also be negatively impacted by the complicated syllabic structure of the language. Then in

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Phase 2, the establishment of an internal model of the spellings in the language may be delayed by the presence of various monosyllables with inconsistent rime spellings. Additional complications arise in Phase 3 for English language readers because the said language has a complex and ambiguous syllable structure. This leads to a more time-consuming process for the internalized word forms to be processed and analyzed based on lexical and morphological features.

The investigation conducted in this thesis indicate that children with specific language weaknesses may benefit from instruction of reading via an alphabetic process of letter-sound decoding and/or a logographic process of learning (acquiring concepts of meaningful units in words through sight vocabularies). The knowledge provided by the alphabetic learning of letter-sound associations enable the reader with a method that can be employed to pronounce and decipher unknown words he/she may encounter. On the other hand, the logographic process of sight-word recognition may likewise permit unlocking of meaning, especially with words that that do not conform to phonetic rules. With constant exposure to print, they begin to identify words in print rapidly through familiarity with its orthographic form

### **Limitations and Directions for Future Research**

The benefits derived from the implementation of early classroom intervention, as documented throughout the experiments in this thesis must be interpreted within the confines of the study's limitations. One such limitation, which is similar across the four studies is the small number of invited participants. An increase in the total number of participants would offer more certainty to generalize the results. Further investigations

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across different country or educational systems would also help determine to which contexts the findings can be generalized. Studies with larger samples may also be able to control for the schedule (time and day) of implementing the different types of interventions: for example, delivering the treatment approaches at the same time, during specific weekdays for all the intervention groups. Controlling for the schedule of intervention may eliminate a presentation pattern or sequence by session or time of day that may potentially influence the effect of the intervention (e.g. children may be active and participative in the morning and lethargic in the afternoon after a full day of activities). The participants may even receive two intervention training within the day – one in the morning and one in the afternoon to control for order effects, when delivering the treatment. And longitudinal studies across several years of education would increase our understanding regarding the trajectory of reading and spelling acquisition among children with specific language weaknesses, particularly following classroom phonological awareness, morphological awareness or even orthographic awareness instruction.

With regard to the assessment measures, tasks measuring various types of morphological awareness, such as syntactic, relational and judgment awareness, may prove just as informative. Besides inclusion of inflectional and derivational morphemic knowledge tests, succeeding research may evaluate compounding knowledge among children to add more depth in understanding morphological awareness development. It may also be more meaningful to create morphological awareness performance tasks which involve the use of *pseudo-words* that would necessitate children to utilize

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productive rules to make appropriate derivations of novel words. For example, learners could be asked to build words by combining smaller parts: “ang” + “kesh” to form “angkesh” or “beki” + “londi” to create “bekilondi”. Children may also be given activities that oblige them to decompose apparent suffixes in pseudowords (e.g. “kesh” parsed into “kep” + “s” or “chipanger” into “chipang” + “er”). Longitudinal studies may similarly reveal understanding of morphemic rules governing a language, as relations might vary across languages and their corresponding orthographies. In English, for instance, affixes and grammatical tense are crucial markers of morphological awareness. On the other hand, in Chinese, affixes and grammatical markers are relatively uncommon. Meanwhile, in Hebrew and Arabic, knowledge pertaining to word derivations and inflections are critical; given that many derivations of nouns and verbs serving as base words undergo various morphological changes (McBride, 2016).

On the other hand, in terms of understanding profoundly the perception of sound structures in language, further evaluating the role of phonology and how it is utilized suitably by typically-developing older school age children versus atypically-developing peers who have received more than five years of intervention may prove beneficial. This may present opportunities to determine the role of phonology in aiding lexical access as reading skill increases. A possible research may entail tracking eye fixations on correct target words embedded together with homophones and orthographic controls (i.e., a word that contains similar letter strings to that of the target word) during silent reading. Participants would be required to read short sentences (e.g. The forest ranger protected the fawn/faun/fain against poachers); in order to measure and compare reading times

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on the correct word, homophone and orthographic control. It would help clarify whether shared phonology with target words would facilitate delayed or immediate lexical identification, which can give additional evidence for a pre-lexical role of phonology.

It is also significant to conduct future replication studies, but with the inclusion of a no-treatment control group. The addition of a control group might be beneficial to rule out the possible influence of other treatment factors that participants receive during the period of training. The observer effect may be minimized by treating intervention and control group the same in every conceivable means. Another strategy to be adopted within this future research would be to ensure that participants and researchers are not aware of certain information that would taint the results, much like the one observed in the current investigation. A long-term approach would likewise be applied, extending the timeline of the study to three years (Year 1 to Year 3) to ensure that any change efforts will be sustained over a period time.

Succeeding investigations may compare the type of bilingual exposure experience by children (i.e., early exposed bilinguals and later exposed bilinguals) to ascertain the effects of such contexts on intervention results. Studying children's time of exposure to two languages would allow an examination of the developmental growth as suggested in research by Hernandez et al. (2005) who identified differences between early and late bilinguals in terms of L2 learning. Their data suggested that the second language seems to develop a reliance on the first language skills for late bilinguals but not for early bilinguals. Furthermore, given their findings for greater evidence of neuroplasticity for early bilinguals, it is possible that late bilinguals need to employ more

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controlled use of metacognitive strategies to support second language learning. Practice of such metacognitive strategies may lead to advantages in executive functions for late bilinguals; though further research is required to determine clearly the relationship between language development and executive function.

A particularly worthwhile avenue to research would be understanding the process of deriving meaning, gaining comprehension and expanding knowledge based on the development of morphological awareness by designing instructional strategies that combine two languages. This method may facilitate more rapid growth of morphological awareness as learners can relate word formation rules in the language in which they are more proficient in to another language that may be less familiar. Past studies have demonstrated that cross-linguistic influence can promote morphological knowledge development (see Candry, Deconick, Eckymans, 2017; Ke & Xia, 2015; Pasquarella et al., 2011); and that cross-linguistic interactions at the morphological level can occur between typologically-distinct languages (Ke & Xia, 2015; Pasquarella et al., 2011). Lyster et al. (2013) investigated the advancement of derivational morphology by alternatively teaching it in French and English. Their findings indicated that learners taught in this strategy performed better than children in a control group on measures of French morphological awareness. Further research examining whether teaching derivational morphology (affixing and compounding) via cross-linguistic strategies can positively impact a learner's morphological awareness would be very interesting.

Another particularly interesting inquiry that may be conducted would be the adaptation of the phonological and morphological awareness training resources, to

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include the study of Chavacano – a Spanish-based creole in the Philippines. It would be fascinating to discover distinct differences in morphological awareness features between Chavacano and Spanish. There are 600, 000 speakers of the dialect and a comparative study of cross-language transfer which contrasts Chavacano speakers from Zamboanga city in the Philippines and speakers of the Zamboanga dialect of Chavacano in Sempornah, Malaysia would be worthwhile to investigate. The research may be significant in evaluating whether transfer of phonological skills would indeed be possible, given the evidence that acquiring phonological awareness skills is universal among alphabetic languages.

Furthermore, in New Zealand, it might be useful to replicate the findings of the current study to larger groups of students that include Maori and Pasifika primary 1 children. These two groups have been referred to as the country's two at-risk populations (Carroll, 2016). For example, studies have reported that the disparity between Maori and New Zealand European (Pakeha) students increases over the primary years of schooling (Crooks & Caygill, 1999, see also the recent data from Schluter, 2018). Given the critical role played by foundational literacy skills in ensuring educational and life opportunities of individuals, such documented underachievement have concerned researchers, educators and government officials since the 1990s (Wilkinson, Freebody, & Elkins, 2000). Since the investigations discussed in this thesis offer the potential to raise achievement of vulnerable learners, administering such treatment approaches may strengthen learning during the foundation years of young Maori and Pasifika.

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## Conclusions

A constant challenge plaguing the field of education is to identify mechanisms that would ensure successful acquisition of reading skills among children presenting with persistent reading difficulties. Several initiatives have been undertaken such as the provision of remedial teaching or implementation of small-group tutorials for those considered to be the highly 'struggling' segment of the school population. However, translating evidence-based research as a form of support to regular classroom instruction is pivotal in bringing immediate and lasting systematic change that is necessary to elevate literacy achievement, for learners faced with literacy deficits.

Methods investigated in this particular thesis highlight the effectiveness of integrating metalinguistic awareness intervention training programs focusing on phonological and morphological awareness development among early readers in an educational setting. In order to realize this, the research reported in this study demonstrated that phonological and morphological awareness training can be merged within pre-existing classroom reading programs through short-term implementation, targeting broad phonemic and morphemic units taught less than two hours per week for ten weeks. These intervention programs ensure that children possess the requisite skills to cope with academic demands of beginning reading instruction. Hence, the implementation of the aforementioned instructional training may support the existing literacy curriculum, as it offers extended opportunities for children with specific language weaknesses and results to equitable practices by giving each child access to fundamental mechanisms that ultimately lead to autonomous learning and genuine literacy success.

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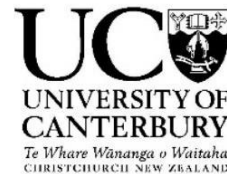


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## Appendix

### Appendix A. Ethics Approval



#### HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson  
 Telephone: +64 03 369 4588, Extn 94588  
 Email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)

Ref: 2017/14/ERHEC

21 April 2017

Joel "Ginj" Chang  
 School of Teacher Education  
 UNIVERSITY OF CANTERBURY

Dear Joel

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal "Phonosyntactic and Morpho-semantic Interventions in Early Readers with Specific Language Impairment" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your emails of 20<sup>th</sup> March, 31<sup>st</sup> March, 7<sup>th</sup> April and 12<sup>th</sup> April 2017.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

PP

Dr Patrick Shepherd  
**Chair**  
**Educational Research Human Ethics Committee**

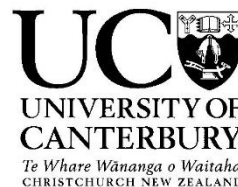
*Please note that ethical approval relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval by the Educational Research Human Ethics Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research.*

F E S

## Appendix B. Background Questionnaire

**College of Education, Health and Human Development**

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
 Email: [ginj.chang@pg.canterbury.ac.nz](mailto:ginj.chang@pg.canterbury.ac.nz) / [joel.chang01@yahoo.com](mailto:joel.chang01@yahoo.com)



Name: \_\_\_\_\_ Contact number: \_\_\_\_\_  
 Date of Birth: \_\_\_\_\_ Occupation: \_\_\_\_\_  
 School: \_\_\_\_\_ Spouse's Occupation: \_\_\_\_\_

**QUESTIONNAIRE**

1. What is your child's name? \_\_\_\_\_
2. How old is your child? \_\_\_\_\_ yrs. \_\_\_\_\_ months
3. What is the child's gender? \_\_\_\_\_ M \_\_\_\_\_ F
4. Who are the teachers involved in your child's learning? \_\_\_\_\_
5. Did your child attend another school prior to the current one? \_\_\_\_\_ Yes \_\_\_\_\_ No
6. Does your child have siblings? \_\_\_\_\_ If Yes, how many?
7. Are there other persons living with you at home? \_\_\_\_\_ Yes \_\_\_\_\_ No  
 If Yes, what is your relationship to this individual? \_\_\_\_\_
8. Language/s spoken at home: \_\_\_\_\_
9. Has anyone in the family been diagnosed with a speech, language, reading or learning difficulty?  
 \_\_\_\_\_ Yes \_\_\_\_\_ No  
 If Yes, what is your relationship to this individual? \_\_\_\_\_
10. Is your child receiving any extra help or is presently enrolled in any special education program outside school? \_\_\_\_\_ Yes \_\_\_\_\_ No  
 If Yes, please provide details: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Please return the questionnaire and consent form to your child's teacher.**

## Appendix C. Information Sheet for Research Participants

### College of Education, Health and Human Development

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
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### A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY TEACHING TWO TYPES OF LANGUAGE SKILLS

#### Student Information Sheet

Hi! My name is Joel 'Ginjr' Chang. I am a student at the University of Canterbury.

I am making a study to know if teaching two language skills help children read better. It is my hope to help children like yourself in the future.

Now, I would like to invite you to join this study. If you do, I will teach you together with your classmates as a group for 15 minutes and by yourself for 15 minutes as well; 3 times a week for 10 weeks. There will also be moments where you will be working alone. I will be with your class teacher in a classroom you know very well.

The lessons will be short, so you won't get bored. The lessons will be about finding words that rhyme. There will also be games like naming a letter and sounding it out. We will sing lots of songs, too.

We will listen to stories too! All you need to do is pay attention, so you can arrange events in the stories well. I will be the one to help you in all of these.

Don't worry, no one will know you joined. You can even quit any time. When you want to stop, you can go back to your normal lessons. I am sure you will enjoy! There will be lots of games, so you can have fun.

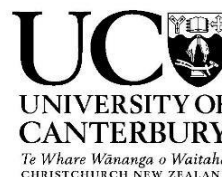
I hope you can help me with my study.

JOEL 'GINJR' CHANG

## Appendix D. Consent Form for Research Participants

**College of Education, Health and Human Development**

Joel 'Ginjr' Chang  
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 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
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**A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY  
 TEACHING TWO TYPES OF LANGUAGE SKILLS**

**Student Consent Form**

(Please tick each box)

- I have been told what this research is about and I understand the reason for the teaching that I am taking part in
- I know that the person doing the study will tell no one that I have helped with this research except my teacher and my parent
- I know that no-one will know what my scores are in the tasks that I will do
- I have been told that the group lessons are 15 minutes long and one-on-one lessons are also 15 minutes long; 3 times a week for 10 weeks in total
- I have been told that the file will be stored safely with a secured password and will be destroyed after 10 years
- I also know that I can ask to leave the study at any time
- I agree to take part in this research

**My name:** \_\_\_\_\_

**My class:** \_\_\_\_\_

**My teacher:** \_\_\_\_\_

**Date:** \_\_\_\_\_

- My teacher helped me with the above

## Appendix E. Information Sheet for Parents

### College of Education, Health and Human Development

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
 Email: [ginj.chang@pg.canterbury.ac.nz](mailto:ginj.chang@pg.canterbury.ac.nz) / [joel.chang01@yahoo.com](mailto:joel.chang01@yahoo.com)



#### **A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY TEACHING TWO TYPES OF LANGUAGE SKILLS Parent Information sheet**

I am a postgraduate student studying towards earning a PhD degree in Education at the University of Canterbury (UC), New Zealand. I have designed two treatment methods that should be useful to support learning to read.

I am writing to ask if you will give permission for your child to be a participant in the study. The information below describes the purpose of the research and the procedures that will be used in the study.

#### **Objectives of the Study**

The aim of this research is to determine whether reading improves after providing one of two types of teaching approaches.

#### **What the Study Involves**

The study includes a questionnaire, completed by a parent, asking general information about you and your child to collect demographic information. Children will only be asked to participate in the study, if they have been found to show specific language weaknesses such as having trouble getting words in a sentence or phrase in the right order (e.g. Me play with teacher.), missing out some small words from their sentences like "is", "are", "a", "an" and "the" (i.e. Why you need key for? or It just sad.), and having difficulty putting words in correct order when asking questions (e.g. Why her turning this way?).

Direct instruction will be personally given to children in the classroom during school hours. The first form of approach would be training students in sound patterns of language and their meanings. Students will be taught on how sounds come together to form speech and words. In this particular method, students' letter-sound knowledge, sound articulation and vocabulary are intensified through reading activities. Learning tasks surrounding this approach include: matching words that rhyme, deleting words that start with the same sound, blending syllables to form words, and deleting a syllable from a word. However, the oral language training shall revolve around developing knowledge in the structure of word forms. Focus of instruction will be on boosting verbal skills specifically spoken narrative ability, listening skill, vocabulary and expressive language. Spoken narrative activities will highlight sequencing and elaborating of events.

Interventions will occur during 15-minute individual and 15 -minute group sessions, up to 3 times during a week for about 10 weeks in total. I will coordinate with the school administrator and classroom teacher, to ensure that the intervention schedule does not conflict with the work of the teacher. Rather, the aim will be to complement the work of the class teacher (as a teaching

assistant would) though within the framework of the intervention work – this framework will be agreed with the teacher prior to start of the intervention. Hence, I will teach alongside the classroom teacher during that specific period of time. All assessments and interventions shall be administered personally by me. You do not have to bring your child elsewhere or worry that he/she will miss class, I will personally make arrangements with the school administrator and classroom teacher to make sure that important lessons are not missed and that everything is done appropriately.

#### **Voluntary Participation and Withdrawal from the Study**

Your participation in this research, as well as your child, is entirely voluntary. Should you and your child wish to withdraw, you may do so at any time. If you choose to withdraw, I will use all efforts to remove and to delete all of the information relating to you and your child from the project.

The results of the project may be published, but rest assured that complete confidentiality of data gathered in this investigation will be maintained at all times. You or your child's identity will not be made public. To ensure confidentiality, your information will be coded with an anonymous number rather than a name and only I (and my supervisors) will know which number relates to which child. Also, all of the information you provide shall be protected. Hard copies of completed questionnaires and signed consent forms shall be kept in the College of Education, Health and Human Development. Meanwhile, soft copies of data gathered, including audio files, shall be uploaded in the University of Canterbury servers with encrypted password. Only my research supervisors and I have access to the said files, which will be permanently destroyed after ten years (the normal time for storage of data). At the end of the investigation, I will personally provide you a summary of results upon request.

The project is being carried out as a requirement for my PhD degree under the supervision of Dr. John Everatt and Dr. Brigid McNeill. For any questions or concerns pertaining to the study, please feel free to contact me or any of my supervisors. All of our contact details are provided below for your reference.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)).

If you agree to participate in the study, you are asked to complete the consent form and return it to your child's school.

Sincerely,

Joel 'Ginj' Chang  
Researcher

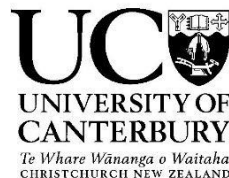
Supervisors: Dr. John Everatt / Dr. Brigid McNeill  
School of Teacher Education  
College of Education, University of Canterbury – Dovedale Campus  
Christchurch, New Zealand  
Email: [john.everatt@canterbury.ac.nz](mailto:john.everatt@canterbury.ac.nz) / [brigid.mcneill@canterbury.ac.nz](mailto:brigid.mcneill@canterbury.ac.nz)



## Appendix F. Consent Form for Parents

**College of Education, Health and Human Sciences**

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
 Email: [ginj.chang@pg.canterbury.ac.nz](mailto:ginj.chang@pg.canterbury.ac.nz) / [joel.chang01@yahoo.com](mailto:joel.chang01@yahoo.com)



**A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY TEACHING TWO  
 TYPES OF LANGUAGE SKILLS**

**Informed Consent form for Parents**

**My child's name:** \_\_\_\_\_

(Please tick each box)

- I have read the information sheet and understand what will be required of my child if they participate in this project.
- I understand that my child will be asked to take some simple language and literacy tasks as explained in the information sheet.
- I understand that the researcher/teacher will work with my child to support the acquisition of reading as explained in the report.
- I understand that access to the information collected will be restricted to the researcher's supervisory team and the researcher. All information collected will be kept confidential and secure (in locked and secure facilities and/or password protected electronic form), and it will be destroyed after ten (10) years.
- I understand that neither my child, nor the school, will be identified in any publications or presentations that draw on this research including my PhD thesis which is a public document and will be available through the university library.
- I understand that my child's participation is voluntary and that he or she may choose to withdraw at any time.
- I understand that I can receive a report on the findings of this study. I have written my email address below for the report to be sent to – or I can request a paper copy of the report if I do not have access to computer.
- I understand that I can get more information about this project from the researcher and that I can contact the researcher's supervisor (Prof John Everatt, address as below; email: [john.everatt@canterbury.ac.nz](mailto:john.everatt@canterbury.ac.nz)) or the University of Canterbury Ethics Committee (address as below; email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)) if I have any complaints about the research.
- I agree to my child participating in this research and my child has also given consent on their consent form.

**My name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Email address for report:** \_\_\_\_\_

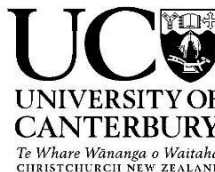
**Paper copy for report (please tick)  (this will be returned via school)**

**Please return the questionnaire and consent form to your child's teacher by 15 April 2017**

## Appendix G. Information Sheet for Teachers

### College of Education, Health and Human Development

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
 Email: [ginj.chang@pg.canterbury.ac.nz](mailto:ginj.chang@pg.canterbury.ac.nz) / [joel.chang01@yahoo.com](mailto:joel.chang01@yahoo.com)



### **A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY TEACHING TWO TYPES OF LANGUAGE SKILLS**

#### **Teacher Information sheet**

I am a postgraduate student studying towards earning a PhD degree in Education at the University of Canterbury (UC), New Zealand. I have designed two treatment methods that should be useful to support learning to read.

I am writing to request your assistance in my research project. The information below describes the purpose of the research and the procedures that will be used in the study.

The aim of this research is to determine whether reading improves after providing one of two types of teaching approaches.

In my study I am looking for children who have language weaknesses related to vocabulary, the arrangement of words and the structuring of words or part of words. As part of this, I would like to discuss with you any child who you think may have these sort of problems – for example they say ‘Mc can play with them?’ (an example of problems with word arrangement), or ‘It just sad’ (not using linking verbs such as “are” and “is”), or ‘Why you need key for?’ (not using function words such as “a”, “an” and “the” in sentences or phrases), or ‘Why her turning this way?’ (again, a problem related to the incorrect use of words in speech). These are features often shown by children who struggle with language; and these are the children that I want to support as part of my research. For those children who we discuss as showing these features, I will ask the child’s parent/guardian if I can talk to the child about working with me on my research – the child will participate voluntarily in my study, so all involved will be given the opportunity to take part or not. An additional reason for the initial meeting with you is to ensure that everything that I am planning to do is explained clearly and to answer any questions that you might have about the research.

The study also includes a questionnaire, to be completed by a parent, asking general information about them and their child to simply obtain demographic data.

The first form of approach would be training students in sound patterns of language and their meanings. Students will be taught on how sounds come together to form speech and words. In this particular method, students’ letter-sound knowledge, sound articulation and vocabulary are intensified through reading activities. Learning tasks surrounding this approach include: matching words that rhyme, deleting words that start with the same sound, blending syllables to form words, and deleting a syllable from a word. However, the oral language training shall revolve around developing knowledge in the structure of word forms. Focus of instruction will be on boosting verbal skills specifically spoken narrative ability, listening skill, vocabulary and expressive language. Spoken narrative activities will highlight sequencing and elaborating of events.

The interventions will occur during 15-minute individual and 15 -minute group sessions, up to 3 times during a week for about 10 weeks in total. I guarantee, that I will coordinate with you to ensure that the intervention schedule does not conflict with your work, and that important lessons are not missed. The aim

will be to complement with your work in class (as a teaching assistant would), though within the framework of the intervention work. Hence, I will teach alongside you during that specific period of time, will collaborate with you to create lessons and activities that would engage the children, and will personally administer all assessments and interventions to ease the burden from you. I will act as a teacher aide who will conduct all the teaching interventions for children with the aforementioned language weaknesses. Rest assured that I can maintain the kind of quality you expect in teaching, as I have experience in educating children with specific language needs; working as a teacher in several international schools abroad and undergoing placements in various schools in Christchurch as part of the speech therapy coursework I previously took at the University of Canterbury.

Again, I will act in ways consistent with the work of a teaching assistant, so that no potential risk than would be normal within the context of the school would arise. In this way, a culture in which students with language learning difficulties can feel safe and accepted is promoted.

Your participation, as well as the parent and the student's participation in this research, is entirely voluntary. Should you, the parent or the child wish to withdraw, you may do so at any time. If you decide to withdraw, I will use all efforts to remove and to delete all of the information relating to you from the project.

The results of the project may be published, but rest assured that complete confidentiality of data gathered in this investigation will be maintained at all times. You, the school, the parent or even the student's identities will not be made public. To ensure confidentiality, all information will be coded with an anonymous number rather than a name and only I (and my supervisors) will know which number relates to which child. Also, all of the information provided shall be protected. Hard copies of completed questionnaires and signed consent forms shall be kept in the College of Education, Health and Human Development. Meanwhile, soft copies of data gathered, including audio files, shall be uploaded in the University of Canterbury servers with encrypted password. Only my research supervisors and I have access to the said files, which will be permanently destroyed after ten years (the normal time for storage of data). At the end of the investigation, I will personally provide you a summary of results upon request.

The project is being carried out as a requirement for my PhD degree under the supervision of Dr. John Everatt and Dr. Brigid McNeill. For any questions or concerns pertaining to the study, please feel free to contact me or any of my supervisors. All of our contact details are provided below for your reference.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)).

If you agree to participate in the study, you are asked to complete the consent form and return it to me.

Sincerely,

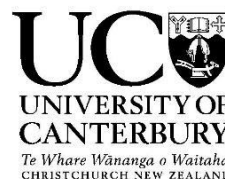
Joel 'Ginj' Chang  
Researcher

Supervisors: Dr. John Everatt / Dr. Brigid McNeill  
School of Teacher Education  
College of Education, University of Canterbury – Dovedale Campus  
Christchurch, New Zealand  
Email: [john.everatt@canterbury.ac.nz](mailto:john.everatt@canterbury.ac.nz) / [brigid.mcneill@canterbury.ac.nz](mailto:brigid.mcneill@canterbury.ac.nz)

## Appendix H. Consent Form for Teachers

**College of Education, Health and Human Development**

Joel 'Ginjr' Chang  
 University of Canterbury  
 Dovedale Avenue, Christchurch, New Zealand  
 Phone: 0274112084  
 Email: [ginj.chang@pg.canterbury.ac.nz](mailto:ginj.chang@pg.canterbury.ac.nz) / [joel.chang01@yahoo.com](mailto:joel.chang01@yahoo.com)



**A STUDY ON IMPROVING READING SKILLS OF CHILDREN BY TEACHING TWO  
 TYPES OF LANGUAGE SKILLS  
 Teacher's Consent Form**

(Please tick each box)

- I have read the information sheet and understand what will be required of my students if they participate in this project.
- I understand that I will only refer students who possess language weaknesses in vocabulary, arrangement of words and structuring of words and part of words that have adverse effects on academic performance.
- I understand that my student will be asked to take some simple language and literacy tasks as explained in the information sheet.
- I understand that the researcher will collaborate with me in providing additional support to my students; aiding the acquisition of reading as explained in the report.
- I understand that the researcher will be teaching alongside me and that the study will require my students to participate for a 15-minute individual training session and 15-minute group training session, 3 times during the week for 10 weeks in total.
- I understand that access to the information collected will be restricted to the researcher's supervisory team and the researcher. All information collected will be kept confidential and secure (in locked and secure facilities and/or password protected electronic form), and it will be destroyed after ten (10) years.
- I understand that no one, including me, my student, or the school, will be identified in any publications or presentations that draw on this research including my PhD thesis which is a public document and will be available through the university library.
- I understand that my participation is voluntary and that I may choose to withdraw at any time.
- I understand that I can receive a report on the findings of this study. I have written my email address below for the report to be sent to – or I can request a paper copy of the report if I do not have access to computer.
- I understand that I can get more information about this project from the researcher and that I can contact the researcher's supervisor (Prof John Everatt, address as below; email: [john.everatt@canterbury.ac.nz](mailto:john.everatt@canterbury.ac.nz)) or the University of Canterbury Ethics Committee (address as below; email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)) if I have any complaints about the research.
- I agree in participating in this research.

**My name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Email address for report:** \_\_\_\_\_

**Paper copy for report (please tick)**  **(this will be returned via school)**

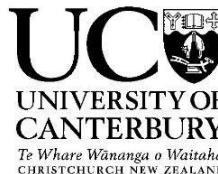
**Please return this consent form to your child's teacher by 15 April 2017**

University of Canterbury Private Bag 4800, Christchurch 8140, New Zealand. [www.canterbury.ac.nz](http://www.canterbury.ac.nz)

## Appendix I. Information Sheet for School Administrators

### College of Education, Health and Human Development

Joel 'Ginjr' Chang  
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 Dovedale Avenue, Christchurch, New Zealand  
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To whom it may concern,

I am a postgraduate student studying towards earning a PhD degree in Education at the University of Canterbury (UC), New Zealand. I have designed treatment approaches for my thesis entitled "Phonosyntactic and Morpho-semantic Interventions in Early Readers with Specific Language Impairment." The aim of this research is to determine whether reading improves after providing one of two types of teaching approaches.

I am writing to ask your permission to include your students as participants of my study. It is hoped that the findings of the study will improve curriculum planning and design, as well as teaching children with special needs in the future.

The information below describes the purpose of the research and the procedures that will be used in the study.

I will first inquire among your teachers whether they recognize in any of the students attending their classes, language weaknesses in vocabulary, structuring of words and part of words that have adverse effect on academic performance; specifically, improper arrangement of words in a sentence or phrase (e.g. Me can play with them?), deletion of linking verbs "are" and "is" (e.g. It just sad) and function words "a", "an" and "the" in sentences or phrases (i.e. Why you need key for?), and incorrect question form substitution (e.g. Why her turning this way?). These children who struggle with the said language features will then be invited to participate voluntarily in my study. I will personally conduct one-on-one discussions with your teachers to ensure proper assistance is given and that everything is explained to them clearly.

Next, the research project will require screening year 1 students that were referred using standardized language assessment measures that further provide scores of children's language expression, language comprehension, phonological and morphological awareness, and cognitive and reasoning abilities. Those whose scores on the standardized broad spectrum language test fall at 1.25 standard deviations below the mean (confirmed and cross-checked by a certified speech and language therapist) shall be included in the research.

The study also includes a questionnaire, to be completed by a parent, asking general information about them and their child: for example, the child's age, information about problems with speaking or understanding speech – these will be used to collect demographic information.

The first form of approach would be training students in sound patterns of language and their meanings. Students will be taught on how sounds come together to form speech and words. In this particular method, students' letter-sound knowledge, sound articulation and vocabulary are intensified through reading activities. Learning tasks surrounding this approach include: matching words that rhyme, deleting words that start with the same sound, blending syllables to form words, and deleting a syllable from a word. However, the oral language training shall revolve around developing knowledge in the structure of word forms. Focus of instruction will be on boosting verbal skills specifically spoken narrative ability, listening skill, vocabulary and expressive language. Spoken narrative activities will highlight sequencing and elaborating of events.

The interventions will occur during 15-minute individual and 15 -minute group sessions, up to 3 times during a week for about 10 weeks in total. I personally guarantee, that I will coordinate with you and classroom teacher, to ensure that the intervention schedule does not conflict with the work of the class teacher, important lessons are not missed and that everything is done appropriately. The aim will be to complement the work of the class teacher (as a teaching assistant would) though within the framework of the intervention work – this framework will be agreed with the teacher prior to start of the intervention. Hence, I will teach alongside the classroom teacher during that specific period of time. I shall collaborate with him/her to create lessons and activities that would engage the children. I shall also administer all assessments and interventions to ease the burden from the classroom teacher. I will act in ways consistent with the work of a teaching assistant, so that no potential risk than would be normal within the context of the school would arise. In this way, a culture in which students with language learning difficulties can feel safe and accepted is promoted.

Your student's participation in this research is entirely voluntary. Should the parent and the child wish to withdraw, they may do so at any time. If they decide to withdraw, I will use all efforts to remove and to delete all of the information relating to them and their child from the project.

The results of the project may be published, but rest assured that complete confidentiality of data gathered in this investigation will be maintained at all times. The parent or the student's identity will not be made public. To ensure confidentiality, all information will be coded with an anonymous number rather than a name and only I (and my supervisors) will know which number relates to which child. Also, all of the information provided shall be protected. Hard copies of completed questionnaires and signed consent forms shall be kept in the College of Education, Health and Human Development. Meanwhile, soft copies of data gathered, including audio files, shall be uploaded in the University of Canterbury servers with encrypted password. Only my research supervisors and I have access to the said files, which will be permanently destroyed after ten years (the normal time for storage of data). At the end of the investigation, I will personally provide you a summary of results upon request.

The project is being carried out as a requirement for my PhD degree under the supervision of Dr. John Everatt and Dr. Brigid McNeill. For any questions or concerns pertaining to the study, please feel free to contact me or any of my supervisors. All of our contact details are provided below for your reference.

This project has been reviewed and approved by the University of Canterbury Educational Research Human Ethics Committee, and participants should address complaints to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch ([human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)).

If you agree to participate in the study, please feel free to contact me using the details written on the letterhead.

Thank you very much for your time.

Respectfully yours,

Joel 'Ginj' Chang  
Researcher

Supervisors: Dr. John Everatt / Dr. Brigid McNeill  
School of Teacher Education  
College of Education, University of Canterbury – Dovedale Campus  
Christchurch, New Zealand  
Email: [john.everatt@canterbury.ac.nz](mailto:john.everatt@canterbury.ac.nz) / [brigid.mcneill@canterbury.ac.nz](mailto:brigid.mcneill@canterbury.ac.nz)

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