Effectiveness of the LiPS program on
Phonological awareness of Bilingual children

By

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Effectiveness of the LiPS program on Phonological awareness of Bilingual children

Natalie Adib Ghattas

Abstract

The purpose of this study was to determine the effectiveness of the LiPS program in improving phonological awareness skills of bilingual grade 1 students having poor phonological awareness knowledge in Arabic and English languages. Specifically, this study aimed at examining the relationship between phonological awareness in Arabic and English language. The sample included 6 bilingual students from grade one from one private school in Beirut. The instrument used to measure student’s level of phonological awareness in English was the Woodcock-Johnson III, Test of Sound Awareness and an adapted Arabic version that was constructed by the researcher to measure student’s phonological awareness levels in Arabic. Results showed that there is a strong relationship between Arabic and English phonological awareness. Results also showed significant improvement of students’ phonological awareness in English; however, no improvement was shown in Arabic phonological awareness after the Lindamood Phonemic Sequencing intervention.

Keywords: LiPS program, Phonological Awareness, Bilingual students, Woodcock-Johnson III
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CHAPTER ONE
INTRODUCTION

There is a lot of research on the effectiveness of PA training programs in English, including LiPS. However, no research has investigated whether phonological awareness intervention in one language transfers to another language. Phonological awareness refers to the awareness of phonemes and larger units of spoken language and it is attained after students develop an awareness of rhyming words, syllables, and onset rime units. However, Phonemic awareness consists of individual sounds, and it is the ability to attend to and manipulate the smallest sounds of spoken language (Cossu, Shankweiler, Liberman, Katz, & Tola, 1988; de Manrique & Gramigna, 1984).

Many students are exhibiting limited PA at an early age in different languages and this is affecting their reading later on. The importance of PA to reading development skills at later stages is well documented through research done by (Adams 1990; Geva & Wang, 2001; Goswami & Bryant, 1992; Wagner & Torgesen, 1987). When PA is taught to young children, it improves phonological awareness and early reading skills (Ball & Blachman, 1991; Bradely & Field-Barnsley, 1993). So there is a close relationship between PA and reading. PA seems to be a predictor for reading success at later stages. We as specialists have to deal with students who have poor phonological skills at an early stage and early intervention is very important to stimulate phonological awareness development and letter name knowledge hence enhancing the child’s spoken communication skills (Gillon, 2002).

In order to prevent later reading disorders, teachers should implement a phonological awareness intervention which improve student’s phonological awareness skills and target different aspects of phonological awareness from simple to more complex tasks. Research indicated that children’s
phonological awareness can be developed through explicit training in preschool or kindergarten (Ball & Blachman, 1991; Bradley & Bryant, 1985; Lundberg, Frost, & Petersen, 1988; O'Connor, Jenkins, & Slocum, 1995).

In Lebanon most students’ native language is Arabic. They learn English or French as a second language. Given the number of English language learners, it is important to investigate if PA skills transfer from one language to another. Haddad and Geva (2001), explained a cross-linguistic relationship between PA in English and Arabic. They stated that individual differences in English PA are positively related to individual differences in Arabic PA. This positive correlation shows that most students who have poor phonological awareness in English also have poor phonological awareness in Arabic. Thus, this relation shows that phonological awareness is not language specific; however, it is a cognitive factor. A growing body of research investigated the relation of phonological awareness across different languages and found that the phonological awareness transfers from one language to another (Cardenas-Hagan, Darlson, &Pollard- Durodola, 2007,Carillo, 1994; Chiappe& Siegal, 1999; Durgunoglu et al. 1993; Gonzalez & Gracia, 1995; Hamilton &Gillon, 2006; Lindsey et al. 2003; Wade-Woolley and Geva, 2000).

However, no research has investigated the effect of enhancing students’ phonological awareness in one language on another. In other words, would phonemic awareness training in English translate to PA gains in Arabic?

To improve students’ phonological awareness at an early age, different intervention programs were empirically researched. Chief among them is the Lindamood Phoneme Sequencing Program. This program is improves efficient and accurate word decoding and encoding and it promotes higher level thinking along a developmental continuum (Lindamood & Lindamood, 1998; Mcintyre, Protz, and McQuarrie (2008); Pokoroni, Worthington, and Jamison (2004); Torgesen et al.,2001; Torgeson,
Wagner, Rashotte, & Herron, 2003). The researcher would use the Lindamood Phonemic Sequencing program to enhance students’ phonological awareness skills in Arabic and English languages.

Purpose

The purpose of this study was to determine the effectiveness of the LiPS program in improving phonological awareness skills of bilingual grade 1 students having poor phonological awareness knowledge in Arabic and English languages. Specifically, this study aims at examining the effectiveness of the Lindamood program on the English language and the extent of extending this effectiveness to Arabic.

Rationale and Significance

This study is significant since a program that improves student’s phonological awareness in Arabic is needed in Lebanon. Schools in Lebanon rarely measure student’s phonological awareness in Arabic since there are no resources or assessment tools for that. Furthermore, thirty-one studies reviewed by the WWC investigated the effectiveness of the LiPS program on students’ PA in English (WWC, 2010). None have tested the effect of this program on student’s phonological awareness in other languages. Research have also showed that phonological awareness transfers from one language to another (Hamilton & Gillon, 2006; Cardenas-Hagan, Darlson, & Pollard- Durodola, 2007).

The aim of this study is to improve phonological awareness deficits of students in English and translate it to the Arabic language.

The key questions that led to this study were the following:

1) Does the Lindamood Phonemic Sequencing (LiPS)® program improve phonological awareness of students having poor phonological awareness skills in English?
2) Does training students’ phonological awareness in English improve student’s phonological awareness in Arabic?

**Dependent and Independent Variables**

The independent variable in this study is the use of the Lindamood Phoneme Sequencing program (LiPS) with first grade students. The dependent variables are the student’s phonological awareness levels in Arabic and English languages.

**Operational definitions**

**Phonological awareness** refers to the understanding that spoken words can be broken down to smaller parts. It is a multilevel skill and is comprised of syllable awareness, onset-rhyme awareness, and phoneme awareness (Gillon, 2004). “Phonological awareness is the conscious ability to detect and manipulate sounds of language.” (Liberman and Shankweiler, 1985, Wagner and Torgesen, 1987).

**Phonemic awareness** is the most difficult aspect of phonological awareness since it includes awareness of phonemes and larger units of spoken language and it is attained and developed after students become aware of rhyming words, syllables, and onset rime units (Cossu, Shankweiler, Liberman, Katz, & Tola, 1988; de Manrique & Gramigna, 1984). Poor Phonological awareness knowledge is defined by Gillon (2004), as the poor awareness of the syllable, onset rime, or phoneme structure of the words. The *Lindamood Phonemic Sequencing (LiPS)® program* (formerly called the Auditory Discrimination in Depth® [ADD] program) is designed to teach students skills to decode words and identify individual sounds and blends in words. This program is based on a sensory-cognitive processing instruction, and it improves efficient and accurate word decoding and encoding (Lindamood & Lindamood, 1998).
Methodology

Design. The research design used in this study is the pre test-post test one group design. In this design a single group is pretested and treatment is provided to all subjects then a post-test is done to measure students’ performance after the treatment. In this study the scheme involves one group of students. The group receives intensive training in the Lindamood Phonemic Sequencing (LiPS)® program. The sample type is purposive sampling where random sampling is not applicable. Based on the specific purpose of the research, the researcher tested students using the Woodcock Johnson test of sound awareness (Woodcock, McGrew, & Mather, 2001) and parallel Arabic test the lowest 6% were chosen for the study. So the subjects are selected for their similarity on a given characteristics.

Sample. The study includes six students at an American school in grade one in Lebanon. All students’ native language is Arabic and they know English as a second language. None of the students had any visual, hearing, psychological, behavioural or neurological disorders. These six students scored at a lower grade level on one of the two phonological awareness tests, one in English and the other in Arabic. The six students were assigned to LiPS® Intervention and they received three 40-minutes sessions a week for 2 month.

Instruments. Two pre-tests and two post-tests were conducted after a period of two month. The first test is in the English language to test student’s phonological awareness in English; it is the Woodcock-Johnson III, Test of Sound Awareness (Woodcock, McGrew, & Mather, 2001). A parallel test was developed in the Arabic language. Although developing an instrument has its problems and it is advisable to use an already developed instrument (Frankeil & Wallen, 2006), the researcher constructed the Arabic phonological awareness test since there is no ready existing instrument of some sort. The Woodcock-Johnson III, Test of Sound Awareness includes four subtests which are: Rhyming, Deletion,
Substitution, and Reversal. The researcher included in the Arabic test the same four subtests as the Woodcock-Johnson III, Test of Sound Awareness (Woodcock, McGrew, & Mather, 2001) and included similar items. The tests are done on one-to-one basis. The teacher tests the child’s phonological awareness orally and scores the child objectively on a rubric. The Arabic test was improved with the help of an Arabic coordinator and an expert in special education.

The Woodcock-Johnson III, Test of Sound Awareness is a norm-referenced test which allows a comparison of student’s phonological awareness against a large group of children with a typical phonological awareness development.

In the first section, the researcher introduced the topic intended to investigate and pointed out the rationale, significance and research question pertaining to this project. In the following chapter, the researcher will discuss the literature review behind phonological awareness theories, the effectiveness of the LiPS program and the PA transfer across languages.
CHAPTER TWO
LITERATURE REVIEW

This chapter summarizes the research on phonological awareness and the effectiveness of the Lindamood Phonemic Sequencing program on PA. It will also shed light on PA across specific languages. The first part of this section presents a summary of research discussing the general sequence of PA. The second part presents research that discusses the differences among PA tasks. The third part presents research on the cross-linguistic transfer of PA. The last part of this section discusses the effectiveness of the LiPS program on student’s phonological awareness.

Phonological Awareness

Phonological awareness has shown to be critical for reading and spelling acquisition. Early identification of poor phonological awareness knowledge is important to prevent at risk children from having reading problems later on. Research indicated that phonological awareness transfers from one language to another (Carillo, 1994, Chiappe & Siegal, 1999; Denton, Hasbrouck, Weaver & Riccio, 2000; Durgunoglu et al. 1993; Gonzalez & Gracia, 1995; Lindsey et al. 2003; Wade-Woolley and Geva, 2000). However, very few studies were conducted regarding the use of remediation programs that can improve phonological awareness of bilingual children.

Language Universal Sequence

As documented in different studies, there is a language universal sequence of the development of phonological awareness (Cisero & Royer 1995, Dugunoglu & Oney, 1999). Gillon (2004) stated in his book that children are predisposed biologically to learn about the sound structure of language. He
indicated that the perception of sounds from infancy occurs at an unconscious level. However, PA requires children to make explicit their knowledge of the language structure in order to consciously reflect on elements of spoken language. Studies indicate that children awareness of syllables occurs before awareness of phonemes. A developmental chain in PA starts with an awareness of large units and then awareness of smaller units. (Chaney, 1992; Fox & Routh, 1975; Johnston, Anderson, & Holligan, 1996; Stanovich et al., 1984; Treiman & Zukowsky, 1991). According to the Lexical Restructuring Model (LRM), children are first aware of words represented holistically then students begin making comparisons among words internally. This aligns with the language universal sequence of PA where students begin to segment later on (Wise, Sevcik, Robin, & Morris, 2007). Children sensitivity to language follows a hierarchal model where children progress from identifying large linguistic units to smaller linguistic units (ANTHONY et al. 2003).

Anthony & Francis (2005) discussed the stages of development of phonological awareness, and indicated that in the first stage children manipulate syllables then they manipulate onsets and rhymes, after that they manipulate individual phonemes within intrasyllable word unit. After children are able to manipulate phonemes they will blend phonological information. In the last stage, children refine phonological awareness skills that they acquired in the afore-mentioned phases while they earn new phonological awareness skills. Moreover, Spanish-speaking students seem to identify syllables, then onsets and rimes within words, and finally individual phonemes (Denton, Hasbrouck, weaver & Riccio, 2000). This indicates that Spanish-speaking children also follow the same sequence of phonological awareness development.

Another study done by Anthony, Lonigan, Driscoll, Phillips and Burgess (2003) examined the order of acquirement of phonological skills in preschool and kindergarten children. The sample included a
large group of children (n = 947). Four tasks of different complexity levels were used with students to detect their phonological sensitivity. These skills are: blending, detection, elision detection, blending, and elision. Results revealed that there are consistent patterns in the order of acquiring PA sensitivity skills. This general pattern was the same within each of four different tasks. These results support the developmental theory of phonological sensitivity

*Difficulty Level of PA tasks*

Research investigated the differences among phonological awareness tasks and they discussed that tasks vary in difficulty level; thus some tasks are easier than others (Adams, 1990; Smith, Simmons, & Kameenui, 1998; Yopp, 1988). As indicated by Signorini (1998), tasks that require the manipulation of phonemes are more difficult than tasks that require the manipulation of syllables. This is consistent with the phonological awareness sequence of development where students first acquire awareness of syllables and at a later stage they acquire awareness of phonemes. Some research also explained that the location of the phoneme (initial or final) is also related to task difficulty (Lewkowicz and low 1979; Skelfjord 1987). Yopp also argued that the middle sound is more difficult to attend than the initial or final sound.

According to Yopp (1988), another issue that affects students’ performance on a phonological awareness task is the simple or complex phoneme awareness that the task assesses. Yopp (1988) found that there is a difference in cognitive complexity to measure between phonological awareness tasks and that phoneme deletion and substitution tasks involve greater deal of cognitive complexity. Adam (1990) has also discussed this issue explaining that some phonological awareness tasks require more cognitive processing and linguistic analysis. Moreover researchers discussed that phonological
Language Transfer

The phonological sequence across languages shows that there is a relation between phonological awareness of different languages. To explore this relationship, the examiner will investigate the cross-linguistic transfer of these skills in different languages in the following part of this section.

Studies have shown that the development of phonological awareness in other languages follows the same sequence as in English (Gillon, 2004). Moreover, development of phonological awareness in one language transfers to another language (Chiappe & Siegal, 1999). Research has been done to investigate the cross-linguistic transfer of phonological awareness and this transfer has been shown between specific languages. For example, Spanish and English (Cisero & Royer, 1995; Durgunoglu et al. 1993; Lindsey et al. 2003; Carlson, Duradola & Hagan, 2007), Hebrew and English (Wade-Woolley & Geva 2000), Arabic and English (Wagner et al. 1989), and French and English (Chiang and Rvachew 2007; Comeau et al. 1999; LaFrance & Gottardo, 2005). This means that the development of phonological awareness is not language specific and students’ levels of phonological awareness skills in one language can be applied to other languages (Carillo, 1994; Denton, Hasbrouck, Weaver & Riccio, 2000; Gonzalez & Gracia, 1995).

English and Hebrew PA Transfer

A study done by Wade-Woolley and Geva (2000), aimed at examining phonological and orthographic processing of bilingual children in English(L1) and Hebrew(L2) languages. The cross-linguistic transfer
of these two languages was investigated through determining the difficulty level of unfamiliar PA for L2 readers. The students were administered a phonological awareness tasks in both languages English and Hebrew. Results showed a significant cross-linguistic correlation in phonological awareness skills between both languages which shows that the two languages are similar in their phonological processing. Moreover, phonological awareness and reading measures were positively correlated across languages. However, no cross-linguistic correlation was identified between the orthographic recognition tasks. The study suggests that there is a cross-linguistic transfer in phonological awareness of the two languages and that phonological deficits lie behind the interlanguage phonology factors.

*English and Samoan PA Transfer*

A study done by Hamilton and Gillon (2006) examined the phonological awareness of school-aged children who are bilingual in Samoan and English languages. The aim of the study was to examine the relationship between phonological awareness skills in Samoan and English for children who are bilingual. Assessment of students’ phonological skills included Test of Phonological Awareness (TOPA) (Torgesen & Bryant, 1994) and a Comprehensive Test of Phonological Processing (CTOPP) (Wagner, Torgesen & Rashotte, 1999). Comparable results were found of the participant’s scores on the phoneme level subtests (phoneme blending, phoneme isolation, phoneme deletion, phoneme segmentation) across both languages. The researchers stated that, since participants performed at similar levels in both languages then cross-linguistic transfer of phonemic awareness skills is likely to have occurred.

*English and Arabic PA Transfer*

Another research by Haddad and Geva (2008), explored the relationship between phonological and morphological awareness in English and Arabic, and tested whether these skills are related to word,
pseudo word reading accuracy and complex word reading fluency. The purpose of the study was to explore the relationship between morphological and phonological skills in the two languages and to compare these skills and their relatedness to reading in these two languages which differ in morphological transparency and orthographic depth. The subjects included forty-three English speaking children who were attending a bilingual English-Arabic private school. To measure the student’s phonological awareness in English, the researcher used the Auditory Analysis Test (Geva, Yaghoub-Zadeh & Schuster, 2000). The researchers adapted a parallel test of phonological awareness in Arabic. Results showed that the two languages were correlated positively and significantly. They also found that phonological awareness was a consistent correlate of word reading and pseudo decoding across languages however, morphological awareness was not.

*English and French PA Transfer*

Chiang and Rvachew (2007) examined the phonological awareness skills in English and French languages. The aim of the study was to examine the cross-linguistic relationships between PA skills in both languages. The sample included Forty-four kindergarten-aged children. Students were assessed through the English Auditory Analysis Test (AAT; Rosner and Simon, 1971) and the French version of this test was also administered. Results showed a transfer of phonological awareness skills across both languages.

*English and Spanish PA Transfer*

Hagan, Carlson and Duradola (2007) investigated the development of early language and literacy skills and the cross-linguistic transfer of these skills. The purpose of this study was to examine the effects of initial first and second language, and the relationship between native English language ability
of students and their development of early literacy skills. The Comprehensive test of Phonological processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999) and the Spanish test (TOPPS) (Francis et al. 2001) was administered. The researchers examined the relationship between L1 Spanish language skills and L2 English language skills and how they varied according to instruction. Results from this study showed that Spanish-speaking students having high levels of Spanish letter name and sound knowledge tend to show high levels of English letter name and sound knowledge. Results also showed that children with poor L1 (Spanish) skills will be at a disadvantage for educational achievement in English.

Cisero and Royer (1995), investigated the relationship between English and Spanish speaking first grade students. They discussed that students who were able to isolate initial sounds in their native language where also able to segment sounds in their non-native language. Although students had low familiarity with the non-native language, they still showed comparable results in both languages. This also shows a cross linguistic transfer between the two languages English and Spanish. This finding was consistent with Cummins’s (1979) when he stated that skills in a second language are influenced by skills in the first language.

A study done by Manis, Lindsey and Balley (2004); investigated the cross-language transfer from Spanish to English, and the investigated the development within each language from the end of kindergarten to the end of second grade. The purpose of the study was to examine the contribution of early linguistic skills to reading achievement of bilingual children. The sample included 303 Latino kindergarten children from a Texas border town. Instruments that were used tested letter knowledge, word identification, sentence recall, confrontation naming, phonological awareness, and print concepts. Results showed that a variety of theoretically important skills in L1 can be used to predict later reading achievement in L2.
A review done by Denton, Hasbrouck, Weaver & Riccio (2000), examined the role of phonological awareness in the development of literacy for Spanish-speaking students. They discussed that there is a cross-language transfer of phonological awareness skills between Spanish and English. They explained that students learn how language works and strategies for processing language regardless of the language in which these strategies are developed. Moreover, the researchers indicated that Spanish phonological awareness appears to develop in stages and there is a close relationship between Spanish-language phonological awareness and literacy development where phonological awareness ability has been shown to be a better predictor of a student’s reading in Spanish than IQ. Teachers would be assisted to make an appropriate curriculum and instructional decisions by investigating the learning environments with monolingual and bilingual students.

Moreover, Yopp and Lilia Stapleton (2008), investigated the cross-linguistic transfer between languages. They discussed that the ability to attend to the sounds of spoken language transfer from one language to another. After gathering data from different studies, the researchers concluded that developing students’ awareness of the sound structure of spoken language in their native language can facilitate their reading ability. “Phonemic awareness is an insight on the nature of spoken language that contributes to emergent readers’ success in negotiating an alphabetic orthography”. (Yopp and Lilia Stapleton, 2008) The researchers also stressed that ELL educators can support students’ phonological awareness in their native language by engaging students in activities that play with sounds which are very beneficial for students.

LiPS Program

After discussing the universal sequence of phonological awareness and discussing its relation with different languages, it is important to identify a remediation program that tackles phonological awareness difficulties at an early age. Anthony and France (2005) stated that before students start to
read, they should be administered with a developmentally appropriate intervention. One remediation program which is well research based is the Lindamood Phoneme Sequencing program (LiPS). According to What Works Clearinghouse (2010), The Lindamood Phoneme Sequencing program (LiPS) was formerly called the Auditory discrimination in Depth (ADD) program have found to have positive effects on alphabetic, reading fluency and math. It is designed to teach students decode words, identify sounds and blend in words. Thirty one studies investigated the effects of LIPS; however one study which is (Torgesen et al., 2001) have met the standards or eligibility screens of WWC. Below are summaries of articles that have shown the effectiveness of the LIPS program on students’ phonological awareness specifically.

Pokoroni, Worthington, and Jamison (2004) aimed to compare the effectiveness of three interventions (FFW, Earobics, and LiPS) on Phonological Awareness of students with language impairment and reading deficits. 54 students were randomly assigned to one of the intervention programs. Pretests and Posttests were conducted to measure the effectiveness of the three interventions. Tests used were the two subtests of Phonological Awareness Test (PAT; Roberston & Salter, 1997), three subtests of the Clinical Evaluation of Language Fundamentals-3 (CELF-3; Semel, Wig, & Secord, 1995) and four subtests of the Woodcock Language Proficiency Battery-Revised (Woodcock, 1991; WLPB-R). The researchers used three repeated multivariate analysis of variance (MANOVAS) for analysis. The analysis showed that the LiPS intervention did a significantly better job than the two other interventions in the area of blending phonemes (Pokorni et al. 2004). Both Earobics and LiPS were associated with more gains in phonological effects to language or reading.

Another research done by McIntyre, Protz, and McQuarrie (2008), explored the improvement of phonemic awareness for beginning readers. The purpose of the study was to determine if the Lindamood Phoneme Sequencing Program improved phonemic awareness skills of typically achieving students and
students classified at risk for reading failure between kindergarten and grade one. The sample included 227 students who were instructed by 16 teachers. The teachers administered an individual assessment of phonemic awareness, letter/sound identification and word reading using. The instruments that were used to gather information of student’s achievement in phonological awareness were the Kindergarten Screening Tool (LDWC, 2005) and the Grade One Screening tool (LDWC, 2002). Data was analyzed using Statistical Package for the Social Sciences (SPSS); a descriptive analysis included measures of central tendency and variability as well as t-tests to compare means. The results showed that phoneme identity and phoneme blending demonstrated an increase between Kindergarten and Grade one for at-risk and not at-risk students. Specifically students who are at-risk showed greater gains than students who were considered not at-risk for reading failure.

Torgeson, Wagner, Rashotte, & Herron, 2003 compared the effectiveness of the LiPS and Read, Write and Type (RWT) programs on students’ phonological awareness. The sample included 52 LiPS® students and 53 RWT students across five schools. The authors assessed students at the end of the study period using the Phoneme Blending, Phoneme Elision, and Phoneme Segmenting subtests of the Comprehensive Test of Phonological Processes. They were also given the Word Attack, Word Identification, and Passage Comprehension subtests of the Woodcock Reading Mastery Test. Results revealed significant improvement for the alphabetic domain and phonological awareness domain after the LiPS intervention; however, no significant gains were recorded after the RWT intervention.

The reviewed studies suggest that phonological awareness has a universal sequence in English and other languages and it also indicates that phonological awareness tasks differ in difficulty levels. The phonological sequence across languages shows that there is a relation between phonological awareness of different languages. Research has shown also that there is a cross-linguistic transfer between
languages, which makes phonological awareness non specific to language. Moreover, research has focused on the importance of a remediation program that tackles the poor phonological awareness knowledge. A well researched program is the Lindamood Phoneme Sequencing program (LiPS) which has shown effectiveness through research. Based on the research of cross-linguistic transfer and LiPS effectiveness as a remediation program, the researcher has come to think about the possible effect of the LiPS program not only on English phonological awareness but also on Arabic, and this supports the cross-linguistic hypothesis. In the following chapter, the researcher will discuss the methodology that was used in this study.
CHAPTER 3

METHODOLOGY

This chapter details the methodology part of the study which includes design, participants, procedures, implementation of instruments, intervention and data analysis.

Design

The type of research used in this study is the experimental research, which is the design of choice for testing a hypothesis about cause-and-effect relationships and exposing one or more experimental groups to one or more treatment conditions and then comparing the results (Frankel & Wallen, 2006; Isaac & Michael, 1982; Keith & Punch, 2009). According to Thomas (2003), an experiment treats objects in a defined way and then evaluates the outcome to indicate the way the treatment influenced the objects and the reason behind this effect on the objects. The design used in this study is the One-Group Pretest-Posttest Design. The advantage of this design is that the pre-test and post-test provides comparison between the performance of the same group before and after the intervention (Isaac & Michael, 1982). One group of students was identified as having poor phonological knowledge as evidenced by their low score on the Arabic and English pre-test. These students were assigned to the Lindamood Phoneme Sequencing program (LiPS) program and were post-tested after the intervention. The independent variable in this study is the intervention program of the LiPS. The dependent variables are the student’s phonological awareness levels in Arabic and English languages.

The sampling technique is the purposive sampling which is a non random sampling technique. This sampling technique uses the researcher judgment to select a sample that provides data needed (Frankel and Wallen, 2006). Maxwell (1997) further defined purposive sampling as a type of sampling in which particular settings, persons, or events are selected based on the importance of information they can provide and
that would answer the research question. Based on the specific purpose of the research, the researcher chose students having poor phonological awareness knowledge in English and Arabic. The subjects are selected for their similarity in given characteristics which are bilingualism in Arabic and English, poor phonological awareness and same grade level and school.

Setting

The study was conducted in a private international, American style school in Beirut. The school applies a Primary Years Program (PYP) which is an international program for primary years and it applies differentiated strategies to teach students having different abilities and special needs. The school also aims to develop student’s language capacities to the fullest in Arabic and English where bilingualism is valued and the curriculum is designed to support students’ learning in each language equally in all subject areas. The reason for choosing this school is because it favors bilingualism, has a learning support department and is convenient and easily accessible as the researcher teaches in there.

Participants

The sample included 6 grade one students whose age ranged from 6 to 7 years. The group was comprised of five girls and one boy. All students were bilingual in English and Arabic, with Arabic as their native language and English as L2. At the school, there are two grade one sections. Potential candidates for the LiPS intervention were nominated by the homeroom teachers and the researcher based on observations of the students’ language capabilities in English and Arabic and the students’ performance on phonological awareness tasks in their regular classroom. Then ten students were selected and they were assessed using the Woodcock Johnson-III, Test of Sound Awareness (from the Achievement Battery, Form A) (Woodcock, McGrew, & Mather, 2001), and the Arabic adapted
version. The intervention students were selected based on their scores on the phonological awareness tasks. Three students were eliminated from the potential sample; one student’s native language was English and the other two students scored at grade level in both tests Arabic and English. Six students who scored at a lower grade level in one of the tests were assigned to the LiPs program. None of the participants had any significant visual, hearing, physical, psychological, behavioural or neurological disorders and none previously received any special education services.

Procedure

After securing the consent of the head of school and the parents to conduct the study, the researcher tested the students using the Woodcock-Johnson III, Test of Sound Awareness (Woodcock, McGrew, & Mather, 2001), and the Arabic test in order to identify students with poor phonological awareness. The English and Arabic pre-tests were administered in the beginning of January. They tested students’ skills in rhyming, deletion, substitution and reversal tasks. Six Students with poor phonological awareness knowledge were assigned to the LiPS program. Intervention started by pulling out students from their regular classroom to the resource room. The researcher started the intervention at the end of January 2011 where students were pulled out as a group twice a week to a calm well equipped resource room, and the duration of the session was 50 minutes for two month. At the end of the two-month training period which involved remediating students’ phonological awareness using the LiPS, two equivalent post tests were administered at end of March.
LiPS Program

This LiPS program addresses the development of phonemic awareness in order to enhance reading and spelling. It focuses on identifying phonemes using sensory information (hearing seeing and feeling). Teaching students through sensory information is the key to develop students’ phonemic awareness, reading and writing skills. The LiPs program is structured and systematic where there is a specific scope and sequence that describes the concepts and tasks that are taught to students during LiPS remediation sessions (Lindamood & Lindamood, 1998). Table 1 explains the concepts and tasks that were followed applying LiPS remediation sessions.

Table 1
LiPs Major Concepts and Tasks

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Tasks (students will...)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting the Climate for learning</td>
<td>Think with three kinds of sensory information and become aware of sounds around them</td>
</tr>
<tr>
<td>Identifying and Classifying speech sounds</td>
<td>Identify voiced and unvoiced sounds, consonant brother pairs, cousin sounds, borrowers, and vowels by oral motor features</td>
</tr>
<tr>
<td>Tracking Speech sounds</td>
<td>Track isolated sounds (two to three isolated sounds) with mouth pictures and colored blocks then track sounds in syllables with colored blocks.</td>
</tr>
</tbody>
</table>

Note. The information in this table was extracted from the Lindamood Phonemic Sequencing Program.
Instruments

The English test was used to assess students’ phonological awareness in English is the Woodcock-Johnson III, Test of Sound Awareness (Woodcock, McGrew, & Mather, 2001). The test included four subtests which are: rhyming, deletion, substitution and reversal tasks. The rhyming task had three parts. The first requires subjects to recognize the rhyme (e.g. “look at eye, pie, sock; which ones rhyme?” = eye and pie). The second part requires students to finish a phrase with a word that rhymes. (e.g. “Come and see it is a” = bee). The third part of the rhyming task is rhyming generation tasks where students are asked to generate rhymes (e.g. “What rhymes with go?” = no). The second subtest is the deletion task. This task requires the student to delete the syllable or phoneme from a word and say the remaining sound sequence. The task starts from deletion at the whole word and syllable level (e.g. “Say raincoat without the coat” = rain). Then the second part is phoneme deletion task that results in a real word (e.g. say cart without the /t/ sound” = car). The third part is phoneme deletion of words involving blends (e.g. “Say snap without /n/ = sap). The third subtest is substitution. The first part of substitution is to change one part of a word to make a new word (e.g. “Say penny and change pen to sun, the new word would be” = sunny). The second part of substitution is to change one sound in a word (e.g. “Change /t/ in tip to /s/ = sip). The last subtest is the reversal subtest. The first part of the reversal subtest is reversing two words and saying them backwards (e.g. “Say corn….pop backward” = popcorn). The second part of the Reversal subtest is phoneme reversal (e.g. “Say bat backwards” = tab). The number of items in the Rhyming task is 17, the deletion task is 10; the substitution task and reversal task each include 9 items. These four tasks were used because they present various types of sound awareness tasks and they assess student’s phonological awareness as a whole entity. Moreover these subtests include items that start at an easy level to a more challenging level and it has several training items. The instruments were administered individually in a quiet room by the researcher in a period of two weeks.
The second test which is the Arabic test is an adapted version of the Woodcock-Johnson III, Test of Sound Awareness (Woodcock, McGrew, & Mather, 2001). It has the same subtests which are: rhyming, deletion, substitution and reversal tasks. It also has equal test and training items on each task. The items in the Arabic test start at an easy level and move to a more challenging level. The tasks were developed by the researcher in conjunction with a special educator and an Arabic teacher and they were selected to be ones that the children would recognize and use. All the Arabic subtests were designed to be equivalent to the English test. The rhyming task is the first subtest and it includes three parts. The first part requires subjects to recognize the rhyme (e.g. “look at بيت، زيت، ولد; which ones rhymes?” = بيت زيت). The second part of the rhyming task requires a student to continue a phrase with a rhyming word (e.g. الكبير =”ال الطفل الصغير والأب...”). The third part of the rhyming task involves generation of rhymes (e.g. “What rhymes with فأس” = كأس). The second subtest is the deletion subtest (e.g. “Say كرة قدو without” = كرة). Another example of the deletion subtest is “say نًَم without” = نىْ. The third subtest is the substitution subtest where the student has to change one part of the word to make a new word (e.g. “Say نعبوا change نعب to كتب” = كتبوا). Another example of substitution is to substitute a phoneme with another phoneme (e.g. “change /و/ in ولد to” = بلد). The fourth subtest is the reversal tasks. The first part of the reversal task includes reversing words. (e.g. “Say قطرة يطر backwards” = قطرة يطر). The second part involves reversing phonemes (e.g. Say حنس backwards” = مقطرة مطر). 

Data Analysis
The latest version of Statistical Package for the Social Sciences (SPSS) 17.0 was used to compute descriptive statistics: means, standard deviations, and correlations. This data was collected from the two forms of sound awareness tests. Paired T-tests were used to analyze significant gains between student’s pre-tests and post-tests in English and Arabic. Correlation analysis was used to determine if there was a relationship between Arabic and English phonological awareness.

This chapter presented the design used, participants, implementation of instruments, intervention and data analysis methods. The next chapter would introduce the analysis of the data and results derived from the study.
CHAPTER 4
RESULTS

This study had two purposes: first, to examine whether a relationship is found between Arabic as L1 and English as L2 phonological awareness levels. Second, the study aims to examine the effect of the Lindamood Phonemic Sequencing program on improving phonological awareness of the two languages Arabic and English. Data were collected from grade one (two sections) specifically students having poor phonological awareness knowledge from one private school in Lebanon. This chapter presented the results of the data analysis and all statistical analyses were performed using the Statistical Package for Social Sciences (SPSS).

The students’ performance on phonological awareness in the Arabic subtests was compared to their phonological awareness levels in the English subtests. In order to determine the change in phonological awareness skills of students with poor phonological awareness knowledge from English and Arabic pre-tests to post-tests, means and standard deviations of the raw scores from components of the Woodcock Johnson test of sound awareness (Woodcock, McGrew, & Mather, 2001) and the parallel Arabic test were analyzed. Assessment of phonological awareness in both tests included rhyming, deletion, substitution and reversal tasks. Table 2 presents the subtests by language of instruction. Students seemed to improve in all subtests after the LiPS program intervention in both tests Arabic and English. However, most means in the English subtests were higher than the Arabic subtests except for the substitution task.
Table 2

*Mean scores and Standard Deviations of the subtests*

<table>
<thead>
<tr>
<th>Phonemic Awareness Subtests</th>
<th>English language</th>
<th></th>
<th></th>
<th>Arabic language</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-tests</td>
<td>Post-tests</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Rhyming</td>
<td></td>
<td></td>
<td>4.83</td>
<td>2.23</td>
<td>12.67</td>
<td>2.33</td>
</tr>
<tr>
<td>Deletion</td>
<td></td>
<td></td>
<td>4.83</td>
<td>.75</td>
<td>9.00</td>
<td>1.09</td>
</tr>
<tr>
<td>Substitution</td>
<td></td>
<td></td>
<td>1.50</td>
<td>1.51</td>
<td>6.16</td>
<td>.75</td>
</tr>
<tr>
<td>Reversal</td>
<td></td>
<td></td>
<td>3.33</td>
<td>.516</td>
<td>7.166</td>
<td>.75</td>
</tr>
</tbody>
</table>

The effectiveness of the LiPS program was assessed by comparing the mean pre- and post-scores of students in both Arabic and English languages. Students’ phonological awareness in Arabic and English has increased but at different rates. The mean score of the Arabic pre-test was 13.67 and Arabic post-test was 33.33. However, the English pre-test mean score was 14.67 and post-test was 35.00. Thus the English mean scores seem to be higher than the Arabic mean scores. (see figure1)
In order to calculate statistical significance, a paired sample t-test was used to compare the extent of change of the pre-tests and post-tests. The researcher applied t-tests since it could be that this difference we have found exists as a coincidence of the sample rather than resulting from a difference in the population (Muijs, 2004). Using the paired t-test, we found a significant difference between the English pre-test and post-test ($t(6)=-48.23$, $p=0.005$) so students scored significantly greater on the English post-test than on the English pre-test. Using the paired t-test, we didn’t find any significant difference between the Arabic pre-test and post-test ($t(6)=-19.889$, $p=0.114$). There were no significant differences between the Arabic pre-test and post-test scores. Thus, pre-test L1(Arabic) didn’t contribute significantly to post-test L1; however, pre-test L2(English) contributed significantly to post-test L2.

*Figure 1.* Mean pre- and post- test scores of the English and Arabic tests
Table 3  
*Results of paired sample T-tests*

<table>
<thead>
<tr>
<th>Pairs</th>
<th>N</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Pre-test &amp; Post-test</td>
<td>6</td>
<td>-48.225</td>
<td>0.005</td>
</tr>
<tr>
<td>Arabic Pre-test &amp; Post-test</td>
<td>6</td>
<td>-19.889</td>
<td>0.114</td>
</tr>
</tbody>
</table>

Correlations Between the Arabic and English Tests

To answer the second research question that inquired about the relationship between the English and Arabic phonological awareness, Pearson product moment correlation coefficients were calculated. Correlations were conducted between the rhyming task, deletion task, and substitution task in both Arabic and English languages. Also correlations were done between the total score of subtests in Arabic and English languages.
Table 4

**Correlation between Arabic and English Rhyming tasks**

<table>
<thead>
<tr>
<th>Correlation between variables</th>
<th>English Rhyming Pre-test</th>
<th>English Rhyming Post-test</th>
<th>Arabic Rhyming Pretest</th>
<th>Arabic Rhyming Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Rhyming Pre-test</td>
<td>1</td>
<td>.646</td>
<td>.841*</td>
<td>.968**</td>
</tr>
<tr>
<td>English Rhyming Post-test</td>
<td>.646</td>
<td>1</td>
<td>.814*</td>
<td>.744</td>
</tr>
<tr>
<td>Arabic Rhyming Pre-test</td>
<td>.841*</td>
<td>.814*</td>
<td>1</td>
<td>.840*</td>
</tr>
<tr>
<td>Arabic Rhyming Post-test</td>
<td>.968**</td>
<td>.744</td>
<td>.840*</td>
<td>1</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed)

Results showed a significant positive relation between the English rhyming pre-test and Arabic rhyming pre-test (0.841) and a positive correlation between the English rhyming post-test and Arabic rhyming post-test (0.744). The rhyming English and Arabic pre-test is more correlated than the English and Arabic rhyming post-test (see table 4).
Table 5

*Correlation between Arabic and English Deletion task*

<table>
<thead>
<tr>
<th></th>
<th>English Deletion Pre-test</th>
<th>English Deletion Post-test</th>
<th>Arabic Deletion Pre-test</th>
<th>Arabic Deletion Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>1</td>
<td>.728</td>
<td>.692</td>
<td>.802</td>
</tr>
<tr>
<td>Deletion Pre-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Post-test</td>
<td>.728</td>
<td>1</td>
<td>.124</td>
<td>.456</td>
</tr>
<tr>
<td>Arabic Pre-test</td>
<td>.692</td>
<td>.124</td>
<td>1</td>
<td>.834*</td>
</tr>
<tr>
<td>Arabic Post-test</td>
<td>.802</td>
<td>.456</td>
<td>.834*</td>
<td>1</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed)*

Results showed a positive correlation between the English deletion pre-test and Arabic deletion pre-test (0.692) and between the English deletion post-test and Arabic deletion post-test (0.456). The English and Arabic deletion pre-tests had a higher correlation than the English and Arabic deletion post-tests (see table 5).
Table 6

*Correlation between Arabic and English Substitution tasks*

<table>
<thead>
<tr>
<th></th>
<th>Correlation between variables</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English Substitution Pre-test</td>
<td>English Substitution Post-test</td>
<td>Arabic Substitution Pre-test</td>
<td>Arabic Substitution Post-test</td>
<td></td>
</tr>
<tr>
<td>English Substitution Pre-test</td>
<td>1</td>
<td>.263</td>
<td>.846*</td>
<td>-.045</td>
<td></td>
</tr>
<tr>
<td>English Substitution Post-test</td>
<td>.263</td>
<td>1</td>
<td>.038</td>
<td>.872*</td>
<td></td>
</tr>
<tr>
<td>Arabic Substitution Pre-test</td>
<td>.846*</td>
<td>.038</td>
<td>1</td>
<td>-.329</td>
<td></td>
</tr>
<tr>
<td>Arabic Substitution Post-test</td>
<td>-.045</td>
<td>.872*</td>
<td>-.329</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed)

Results showed a significant positive relation between the English substitution pre-test and Arabic substitution pre-test (0.846) and between the English substitution post-test and Arabic substitution post-test (0.872). Comparable results were found between the English and Arabic substitution pre-tests and post-test. (see table 6).
### Table 7

**Correlation between Arabic and English Reversal tasks**

<table>
<thead>
<tr>
<th>Correlation between variables</th>
<th>English Reversal Pre-test</th>
<th>English Reversal Post-test</th>
<th>Arabic Reversal Pretest</th>
<th>Arabic Reversal Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Reversal Pre-test</td>
<td>1</td>
<td>0.343</td>
<td>0.500</td>
<td>0.158</td>
</tr>
<tr>
<td>English Reversal Post-test</td>
<td>0.343</td>
<td>1</td>
<td>-0.343</td>
<td>0.542</td>
</tr>
<tr>
<td>Arabic Reversal Pretest</td>
<td>0.500</td>
<td>-0.343</td>
<td>1</td>
<td>0.316</td>
</tr>
<tr>
<td>Arabic Reversal Post-test</td>
<td>0.158</td>
<td>0.542</td>
<td>0.316</td>
<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed)

Results showed a positive correlation between English reversal pre-test and Arabic reversal pre-test (.343) and between English reversal post-test and Arabic reversal post-test (0.542). The correlation was comparable in both languages (see table 7).
Table 8

*Correlation between Arabic and English Pre-test and post-test*

<table>
<thead>
<tr>
<th></th>
<th>Correlation between variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English Pre-test</td>
</tr>
<tr>
<td>English Pre-test</td>
<td>1</td>
</tr>
<tr>
<td>English Post-test</td>
<td>.928**</td>
</tr>
<tr>
<td>Arabic Pre-test</td>
<td>.761</td>
</tr>
<tr>
<td>Arabic Post-test</td>
<td>.663</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed)

Results showed that there is a positive correlation between the English and Arabic pre-tests (.761) and post-tests (0.632). There is a significant correlation between the English pre-test and post-test (0.928). There is a positive correlation between the Arabic pre-test and post-test (0.693) (see table 8). In addition there is a significant positive correlation between the English pre-tests and English post-tests (0.928). There is also a positive correlation between the Arabic pre-test and Arabic post-test (0.693). The English pretest-posttest correlation is higher than the Arabic pretest-posttest correlation.
Chapter 5
DISCUSSION

This chapter discusses the results obtained in light of the research problem and in relation to previous research studies. It also provides recommendations and discusses the limitations of this study. The purpose of this study was to determine the effectiveness of the LiPS program in improving phonological awareness skills of bilingual grade 1 students having poor phonological awareness knowledge in Arabic and English languages. The study also aimed to examine the relationship between students’ phonological awareness in Arabic and English.

After pre-testing students’ phonological awareness in Arabic and English using the Woodcock Johnson test of sound awareness (Woodcock, McGrew, & Mather, 2001) and the adapted Arabic test, a sample of six students with low phonological awareness knowledge were trained using the Lindamood Phonemic Sequencing program. Subsequently, students’ PA skills were post-tested in Arabic and English. The scores of the tests were scored then analyzed and the following paragraphs discuss the findings in relation to current research.

Findings

This study aimed at examining the relationship between phonological awareness of L1 (Arabic) and phonological awareness of L2 (English). The study also examined the effectiveness of the Lindamood Phonemic sequencing program on improving student’s phonological awareness in Arabic and English. It was hypothesized that English pre-tests and post-tests were positively correlated to the Arabic pre-tests and post-tests. All Arabic subtests were positively correlated to English subtests. Significant correlations were examined between the English rhyming pre-tests and Arabic rhyming pre-tests and significant correlations were found between the English substitution Pre-tests and Arabic substitution pre-tests and
between the English substitution post-tests and Arabic substitution post-tests. This reveals that students’
performance was comparable across both languages Arabic and English. Moreover, this indicates that
there is a close relationship between phonological awareness in Arabic and English especially in the
rhyming and substitution tasks which showed a significant correlation.

These findings are consistent with previous research which indicated that there is a positive
correlation between English and Arabic phonological awareness and there is a cross-linguistic transfer
of these skills. For example, Spanish and English (Durgunoglu et al. 1993; Lindsey et al. 2003), Hebrew
and English (Wade-Woolley and Geva 2000), Arabic and English (Wagner et al. 1989), and French and
English (Comeau et al. 1999; LaFrance and Gottardo 2005). The research also sheds light on a research
done by Haddad and Geva (2008); their results also showed that the two languages (Arabic and English)
were correlated positively and significantly. Individual differences of students’ phonological awareness
in English are positively related to individual differences in phonological awareness of students in
Arabic. These findings also support the concept that phonological awareness is primarily a cognitive-
linguistic construct that is independent of cross-linguistic differences in typology.

Moreover, the results support a study done by Hamilton and Gillon (2006) that showed similar
results of the students’ scores on the subtests (phoneme blending, phoneme isolation, phoneme deletion,
phoneme segmentation) across both languages (Samoa and English languages) this indicates a cross-
linguistic transfer of phonemic awareness skills.

Students did better on rhyming subtests than on deletion, substitution and reversal subtests. This
result could be explained in the light of Anthony and Francis (2005), since they explained the language
universal sequence of the development of phonological awareness where students become aware of
syllables before becoming aware of phonemes. They discussed that students first detect and manipulate
rhymes before they can manipulate individual phonemes. The rhyming subtest requires awareness of
syllables; however, the deletion and reversal tasks include some tasks that require manipulation of syllables and other tasks that require manipulating of phonemes which are at a higher level in the universal sequence of phonological awareness. In order to index phonological awareness, the researcher should administer a test that measures multiple levels of task complexity so a good test should measure different PA skills and this was found in the Woodcock Johnson test of sound awareness and the parallel Arabic test (Anthony & Francis, 2005).

Moreover, the rhyming task requires less cognitive processing and linguistic analysis than the tasks that requires blending and segmenting (Adams, 1990). The reason why students scored higher on the rhyming tasks than on other tasks is probably because other tasks required more cognitive processing (memory) and linguistic analysis. The phonological awareness subtests, in the Woodcock Johnson test of Sound Awareness requires students to blend (synthesize) and segment (analyze) phonemes in words; so students use synthesizing and analyzing before they are able to carry out phoneme deletion, substitution tasks and reversal tasks (Vandervelden and Siegal 1995). So differences in students’ performance in different tasks were due to the difference in task difficulty. As indicated by Vandervelden and Siegal (1995), tasks may differ in how much they control variables that increase task difficulty.

Results also revealed a significant improvement of students’ phonological awareness in English after using the Lindamood Phonemic sequencing program. This shows that the LiPS program may have a positive impact on improving students’ phonological awareness in English. This is consistent with a research done by Mcinytrye (2008), where there was a significant growth of student achievement on all phonological awareness subtests from kindergarten to grade 1. This is also consistent with other research
done on the effectiveness of the Lindamood Phonemic sequencing program on students’ phonological awareness in English (e.g. Anthony and France, 2005; Torgesen et al., 2001; Pokoroni, Worthington, and Jamison, 2004; McIntyre, Protz, and McQuarrie, 2008). Students did better on all English subtests after the intervention and they were able to have a more accurate insights relating to rhyme, and awareness of phonemes.

As for the Arabic language the researcher didn’t find any significant difference between the Arabic pre-tests and post-tests. Students scored lower on the Arabic pre-test than in the English pre-test; moreover, they scored lower on the Arabic post-test than on the English post-test, so students performed better in tasks presented in the English language. This result reflects the fact that students improved more significantly in English phonological awareness than in Arabic and that the LiPS intervention which is in the English language had a more positive impact on students’ phonological awareness in English than on Arabic.

This may be due to some phonemes that are found in Arabic and not found in the English language. Examples of these phonemes are: (ح، خ، ط، ق، ض، ع). Another factor that may have affected the results is the student’s familiarity to the words and usage of these words. The test employed in Arabic wasn’t tested for reliability and piloted on grade1 students in order to check if students were able to understand the items clearly and whether the items needs to be revised or rephrased.
Limitations

One of the limitations of this study was that it was limited to one school in Lebanon so the results cannot be generalized to the Lebanese community. The small sample size and the lack of verbal IQ scores limit the conclusions that one can draw from the study. Another limitation is that the Arabic test is not a standardized test where it doesn’t compare students to the norm. Other factors that may have influenced students’ performance and threatened internal validity on the English and Arabic post-tests and it includes: maturation of the students, use of other instructional approaches in the regular classroom instruction, desensitization to test taking, test reliability and other factors (Mcintyre, Protz, and McQuarrie, 2008).

To sum it up, the results of the study were conclusive since a strong relation was found between Arabic and English phonological awareness. This indicates that phonological awareness is a cognitive factor rather than being language specific. Assessing students’ phonological awareness in English would give us an insight into their level of phonological awareness in Arabic and vice versa so if a student is having poor phonological awareness knowledge in English this is not a language specific problem; however this is a deficit in phonological awareness that impacts both languages (Hamilton &Gillon 2006). Moreover, the study was also consistent with other research that showed that the LiPS had a positive effect on students’ phonological awareness in English; however, the hypothesis that the LiPS program improves students’ phonological awareness in Arabic was not supported in this study. This may be due to difference in some phonemes that are found in Arabic but not in English. Moreover, the test employed in Arabic should be tested for reliability and piloted on grade1 students in order to check if students were able to understand the items clearly and whether the items needs to be revised or rephrased.
Implications

This study adds evidence to the cross-linguistic transfer of phonological awareness in Arabic and English. In addition, it provided further evidence about the effectiveness of the Lindamood Phonemic Sequencing program on the English language. To improve students’ phonological awareness in Arabic we may include phonemes that are found in the Arabic language and not found in the English language (، غ، خ، ح، ط، ق، ض، ع، ع) in the LiPS instruction so that students would be familiar with all phonemes in Arabic and English and would do better on phonological awareness tasks.

Recommendations for Further Research

The results of this research on phonological awareness emphasize the importance of further investigating if phonological awareness instruction in one language improves phonological awareness in another language. Hence, further research should construct a reliable Arabic test that measures students’ phonological awareness. It is recommended that future studies encompass larger samples from different schools in Lebanon in order to better generalize the results to the society. Larger samples clearly investigate any differences between pre-tests and post-tests and investigate more the correlations between the Arabic and English subtests. Further research may add on the LiPS instruction phonemes that are found only in the Arabic language.
References


