

The Effects of the Lindamood Bell Phoneme Sequencing Program on Bilingual and Premature
Preschool Students with Speech Delays

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Abstract

A speech delay occurs when the speech process is acquired at a slower rate than typical and can delay learning to read. This quasi-experimental study observed how the intervention of Lindamood Phoneme Sequencing Program (LiPS) benefited preschool students that were either bilingual or prematurely born with a speech delay. The LiPS program consisted of face placement and shape, and the sound-symbol connection for the preschool students to make deep connections with 10 phonemes: a, e, i, o, u, p, b, f, v, k. The preschool students were assessed with a pre-assessment and post-assessment to observe if any improvement was achieved with the LiPS program. The results found that the premature students gained more from the LiPS program, but that it was beneficial for both groups. This study rejected the null hypotheses for there were significant differences in learning the 10 English phonemes with the LiPS program.

CHAPTER I

INTRODUCTION

Overview

Most people do not need to be reminded that their speech is tied closely to how others perceive them. Speech is the most important means of communicating emotions, needs, and hopes to listeners. Much of our opinion of others is determined by reactions to what and how they are talking. A person who talks as if he knows more than others may turn people off. On the other hand, people find it enjoyable to talk with someone who has a friendly, relaxed, and sincere manner of speaking. Unfortunately, there are some students who have speech delays, and a speech delay could impact their self-identity if their peers view them in a negative light. By not wanting to seem different, students with speech delays tend to limit their interaction among their peers. It is important to realize that students with a speech delay might be shy and less likely to participate, and that teachers need to have empathy and patience when working with students with a speech delay. When these students are given the appropriate assessment and instruction, they are more likely to succeed when learning how to read and speak, which may encourage self-confidence in themselves.

Speech is the way humans communicate with each other to exchange ideas, opinions, and information. Speech develops during the first year of life and continues as the child develops. During the first three years of a child's life, the brain is developing and absorbing information on speech and language like a sponge absorbing water. The brain and ears are taking in the sounds to make connections to learn how to talk and eventually allows children to use those connections to learn how to sound out print language. However, in some children, speech is delayed. A speech delay occurs when the speech process is acquired at a slower rate than typical. Speech

delays can be an early signal for a learning difference in some students (American Speech Hearing Association, 2017). So, it is important to be aware of the early signs of a learning difference to provide the correct early intervention to close any learning gaps. Speech delays are a common diagnosis in students with learning differences and late language developing students. A speech delay can be a learning difference, like dyslexia, or can be connected to late language development, like hearing impairments. An example of a student who has a speech delay for late language development is when they cannot hear all of the sounds in fish and call it “ish” instead. They did not hear the f sound, and so their language development is delayed. A teacher can provide the student with the idea that fish has 3 phonemes and not just 2 phonemes, such as in /f/ /i/ /sh./ According to the National Institute of Health (National Institute of Health, 2016), “Between 6 and 8 million individuals in the United States have some form of language impairment. For children who do not use language normally from birth, or who acquire an impairment during childhood, language may not be fully developed or acquired” (Doty, 2016, p. 2). This lack of speech and language acquisition affects students in school and subsequently, their self-esteem.

Speech delays can also be related to a hearing impairment that interferes with the hearing of sounds in words, as resulting in late language development. Some students who develop late in language can be at a disadvantage in acquiring all 46 speech sounds of the English language. By having lessons on specific speech sounds, students with language development can improve hearing, seeing, or feeling the sound with multisensory language activities. If speech delays are left undiagnosed, students often begin to lag behind their peers in the acquisition of language skills and have difficulty in school. If a speech delay is identified in sufficient time, students can

receive intervention plans that will help close the language gap between their peers (American Speech Hearing Association, 2017).

When teaching young students, it may become apparent that some would have difficulty with following directions and engaging in conversations. A teacher needs to clearly enunciate the sounds in words to help the students hear every sound. Hypothetically, if the sounds are understood as the 46 phonemes in the English language, children's speech would become clear and their difficulties would begin to dissipate. In order to create a thorough foundation of phonemic awareness, it is key that multisensory lessons are taught in a specific order so students have a complete understanding of the individual sounds that make up words. Phonics lessons need to build upon phonemic awareness in creating a sound-symbol relationship, and lead into lessons on sound-spelling relationships, phonics manipulation, blending, and word building (American Speech Hearing Association, 2017). Explicit and systematic phonemic awareness instruction are important for students to become proficient and automatic with the sounds that make up the English language, which provides the student with confidence to succeed in speech and language skills.

Statement of Problem

The purpose of this study was to determine the benefit of explicit instruction from the selected 10 phonemes from the Lindamood Bell Phoneme Sequencing Program (LiPS) intervention program for bilingual and premature students.

Hypothesis

Hypothesis 1: The LiPS Program, with just the 10 phonemes, will not have an impact on bilingual preschool student's speech development.

Hypothesis 2: The LiPS Program, with just the 10 phonemes, will not have an impact on premature preschool student's speech development

Operational Definitions

Articulation Disorders: problems making sounds through substituted, deleted, added or changed

Auditory learners: learn by hearing and listening to organize information

Bilingual: having or expressed in two languages

Early Identification: includes the evaluation and treatment for children under 3 years old who are at risk for having, a disability, or delay in speech, language or hearing

Early Intervention: a system of services that helps babies and toddlers with developmental delays or disabilities

Emergent Literacy: the knowledge that the words printed in books have meaning

Graphemes: letters of the English language

IDEA: Individuals with Disabilities Education Act

IEP: Individual Educational Plan

IFSP: Individual Family Service Plan

Kinesthetic learners: a sense mediated by receptors located in muscles, tendons, and joints and stimulated by bodily movements and tensions to help learning

Language Delay: a child's language is developing at a slower rate than peers

Learning Difference: any of various conditions, such as dyslexia, that interfere with an individual's ability to learn

Literate: able to read and write

LiPS: Lindamood Phoneme Sequencing

Multisensory: relating to or involving several physiological senses

Premature: born before 37 weeks

Phonemes: any of the abstract units of the phonetic system of a language that correspond to a set of similar speech sounds which are perceived to be a single distinctive sound in the language

Phonemic Awareness: the knowledge that spoken words can be broken apart into smaller segments of sound known as phonemes

Phonics: the knowledge that letters of the alphabet represent phonemes, and that these sounds are blended together to form written words

Phonological Disorders: a phonological process disorder involving patterns of sound errors

Speech Delay: when a child has difficulty with saying the sounds of their native language at a significantly slower rate

Visual learners: prefer using images, pictures, colors, and maps to organize information

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this review is to discuss research when a speech delay is indicative of a learning difference versus when it is considered normal development of language in toddlers across the spectrum. The literature review researches topics in speech development, language development, association between speech production and early literacy skills, learning differences and late language development, as well as, early identification and early intervention.

Speech Development

During the first three years of a child's life, the brain is developing and absorbing information on speech and language, like a sponge absorbing water. These first three years are critical in developing speech sounds and understanding the oral language that surrounds toddlers day in and day out. If toddlers can develop and start to mimic speech sounds, they are more likely to develop into fluent readers. On the other hand, toddlers who are having difficulty developing speech and language sounds, will likely have difficulties in acquiring speech and learning to read. Speech development is composed of a variety of milestones that begin the communication process of language. The first sign of speech development is when infants cry for food and comfort (Moharir, et al., 2014.) By the time infants are six months, they can recognize sounds and words of their native language, as well as their parents' voices. Around six months, infants begin to follow parents' lips with their eyes, and learn to babble sounds, such as p, b, and m. As the infants enter seven to twelve months, their speech development improves. Infants listen when spoken to, understand basic words (cup, cat, ball), babble groups of sounds (tata, upup, bibibi), and begin saying words (Mommy, Daddy, hello, and bye). During the ages of one to three, infants begin to say more sounds, such as k, g, f, t, d, n, name objects around them, and

create short sentences, such as “Where’s sister?”. Due to their basic level of speech and language, infants speak in a way that is understood mainly by family members.

At the end of three years, infants transition into toddlers, with an almost complete mastery of the speech sounds of the English alphabet and are understood by family members and teachers. Toddlers have difficulty with sounds, such as, l, s, r, v, z, ch, sh, and th, but by the age of seven, they should understand those sounds (Moharir, et al., 2014). As toddlers reach four years of age, they begin to learn how to speak in correct grammatical order, become more inquisitive, and speak with ease. By the age of seven, children have developed their speech correctly, can communicate easily with peers and adults, pay attention to whomever is speaking, and understand what is being said. Speech development takes place from birth to seven years old to allow children to hear, to explore, and to manipulate sounds and words of their native language. Learning the sounds of their language is considered phonemic awareness, which is the first step of learning to read. Once children have learned all 46 phonemes of the English language, they then learn the sound-symbol relationship, called phonics, which connects oral and written languages. Speech and language build upon each other to provide children with the necessary skills to become fluent, literate readers.

Language Development

Oral language has been around since 3,000 B.C., while written language has been a relatively recent phenomenon (Harrub, Thompson, & Miller, 2003). Written language is a uniquely human trait that was developed about 5,000 years ago, progressing from pictographs to symbols of oral languages (Horowitz-Kraus & Hutton, 2015). Oral language was the dominate way to communicate prior to 5,000 years ago, and it was used to deliver messages in connected countries, such as Mesopotamia and Egypt. As countries were populated with more people, there

was a need to write oral language down on paper to communicate messages clearly and to keep records of people and sales transactions (Harrub, et al., 2003). These new written languages inspired cultures, such as Greek and Roman, to create their own written languages. The Greek and Roman languages created an alphabet that represented the written letter of an oral sound, which created a need for the understanding of phonemic awareness and phonic awareness (Horowitz-Kraus, et al., 2015). Once written language was introduced, it rewired how the brain processed language.

As oral language began to be translated to written language, the brain began to process language in a whole new way. The left hemisphere of the brain is where oral and written language are processed. As a word is heard, the sounds of the word enter an ear canal, which moves the sounds with neurons to the rear of the left hemisphere of the brain. Once the sounds reach the left hemisphere of the brain, they move to the front of the left hemisphere to connect the sounds to comprehend the word (Horowitz-Kraus, et al., 2015). This process of hearing and understanding sounds of a word happens instantly in children with normal language development. However, in children with a speech delay, the sounds of the word become lost in the neuron's path from the ear to the back of the brain to the front of the brain. A child's brain, with a speech delay, is wired differently to acquire language than that of a normal developing child's brain. All human brains are wired for various learning styles, such as kinesthetic, visual, and auditory, and have a specific way to learn new information through one of the three learning styles. Traditional schools are taught in an auditory learning style, which only benefits auditory learners, while kinesthetic and visual learners will be at a disadvantage in learning new material. As teachers, it is important to recognize that students learn differently, identify their learning styles, and teach to their strengths.

Due to how the brain processes language, there are milestones that show appropriate acquisitions of language development. Language development follows speech development closely with similar milestones. From birth to six months, infants are making vocalizations, responding to parent's voices, and responding to the infants' names. Between six to eighteen months, infants can understand instructions, and learn about twenty words. During the eighteen to twenty-four months, infants' language development begins to increase in complexity of grammar and vocabulary (Luinge, Post, Wit, & Goorhuis-Brouwer, 2006). At this stage, infants can name objects, speak in small sentences, and have a vocabulary bank between 150-300 words (Unhjem, Eklund, & Nergard-Nilssen, 2014). During the ages of two and three, toddlers become more verbal and acquire a vocabulary of 1,000 words. Also, toddlers are able to communicate clearly, understand simple directions, ask multiple questions, and express their thoughts with reason (Duff, Reen, Plunkett, & Nation, 2015). Speech and language are intertwined and build upon each other to develop an understanding of oral and written languages to allow children to communicate appropriately with their family, peers, and teachers.

Part of language development is emergent literacy, that was put forward about fifty years ago by the researcher, Marie Clay, in 1966. Marie Clay, a child psychologist, explained how emergent literacy is composed of several elements: phonological awareness, letter knowledge, print awareness, print motivation, vocabulary, and narrative skills (as cited in Doyle, 2011). Children are exposed to language from birth, and they learn the sounds and letters of the alphabet. From learning the phonemes and phonics, children learn how to read and write in English. Phonemic awareness and phonics are two of the beginning pieces of reading and writing literacy, or

phonological awareness and letter knowledge. Phonemic awareness is the understanding of the sounds and the ability to manipulate those sounds with ease. Phonics is the sound symbol relationship of letters to their corresponding sound(s). In the English language, there are about 46 phonemes to 26 graphemes, which can make learning the English language difficult for some students with speech and language difficulties. Child development and emergent literacy relate to how well the child can absorb the sounds of the language and learn the skills of reading and writing. Print awareness consists of holding a book correctly, learning that prints moves in a left to right fashion, observing that sentences are formed from words and placed in a grammatical formation, as well as learning that books are written by authors and pictures are drawn by illustrators. Print motivation engages children to learn more about a specific topic, discover various genres, and encourage the exploration of written language. Vocabulary introduces children to new words to be used to describe people, expands on current knowledge, and improves words for speaking and writing. Narrative skills prepare children for creating their own stories. By exposing children to a variety of language activities, such as conversations, reading stories, learning new vocabulary, and understanding what is taking place in a story, they become fluent and literate in reading and writing.

Association Between Speech Production and Early Language/Literacy Skill

Speech and language go hand in hand when toddlers are developing skills to communicate. Speech development exposes the toddlers to the 46 phonemes of the English language from the 26 graphemes of the English alphabet. Language development allows toddlers to gain the correct pronunciation and meaning of words. Speech and language development start at the phonological level of hearing sounds and creating a sound awareness, which is known as phonemic awareness. Phonemic awareness is the ability to understand and manipulate sounds. In

order to create sound awareness, it is helpful to use rhyming activities, like, “Do cat and dog rhyme – no, do cat and hat rhyme – yes,” as well as saying the individual sound with a list of words to expose toddlers to phonemic awareness. Once toddlers have developed a complete understanding of the 46 phonemes in the English language, they can begin to manipulate the individual sounds in word. For example, for the word bat, the teacher may say, “I want you to change the /b/ to a /s/ and what word do you make now – sat.” Phonemic awareness is the connecting block of speech and language. In addition to phonemic awareness, toddlers learn to understand basic words and phrases parents say to the toddlers, and they in turn develop their listening skills further. Around twelve to twenty-four months, toddlers are beginning to imitate sounds and words they are hearing, and by three years old they have almost a word for everything. By the time children are six years old, they have a beginning knowledge speech and language sounds and basic vocabulary. At this stage, phonics, the sound-symbol relationship, is introduced to help solidify the correct sounds to the correct graphemes to understand how to spell and say words correctly (American Speech Hearing Association, 2017). Phonemic awareness is the key to learning speech and language sounds. Without a concrete foundation of the 46 phonemes, learning phonics and reading becomes more difficult for toddlers with a speech delay.

Speech and language use verbal and nonverbal signs to communicate thoughts. Verbal signs are working meaning, like creating a schema of the phonemes and sound-symbol relationship, as well as receptive language, the ability to understand what is being told (Chilosi, et al., 2009). Other verbal signs are expressive language, the ability to respond to what is being asked, and verbal intelligence, the ability to analyze words and problem solve questions.

Nonverbal signs are visual working memory and facial expressions. Visual working memory is using cognitive functions, like schemas and neurons, to place information in memory sections of the brain. Facial expressions are motions of the face muscles to convey information, such as confusion, understanding, or happiness. Speech and language are from the left hemisphere of the brain that allow information to be heard, processed, and remembered by using verbal and nonverbal abilities. If there is an issue in the delivery of information in the brain, toddlers are more likely to have speech issues that can eventually turn into language differences. It is important for toddlers with speech delays to be given various opportunities to hear and practice speech sounds and language skills.

Speech Delays

A speech delay is when the speech process is at a slower rate than typical and involves difficulty in acquiring and hearing sounds. On the other hand, a language delay is difficulty with understanding word parts (morphemes), meanings (vocabulary), and the main idea (comprehension). Speech delays are the most common developmental issue that can range from no verbal communication to unclear speech. By about twelve months, infants reach the milestones of babbling and move on to increasing their vocabulary to thirty words by eighteen months (Lowth, 2014). Parents tend to worry about their children's speech development around eighteen to twenty-four months, since that is when infants begin to speak with limited words and phrases. If infants reach eighteen months with a vocabulary of six words or less and drool constantly, they are more likely to have a speech delay since their speech has not reached a typical milestone. Speech delays can be caused by a variety of problems and can be an early warning sign for a learning disability (Paul & Roth, 2011). The main reason for a speech delay is a learning difference, where toddlers cannot process language phonologically due to their brain

being wired differently for language development. Secondary issues of a speech delay can be caused by difficulties in speech articulation (weak tongue and lip muscles, stuttering), deafness and hearing impairments (ear infections), autism, cerebral palsy, premature births, twins, multiple births, selective mutism, childhood apraxia, bilingualism, and family history. While speech delays can be improved with speech therapy for communication purposes, it is important to recognize that speech delays can be an early detection of a learning difference.

Speech errors can be both common and uncommon in speech and language development. During the first two years, infants are hearing and learning the sounds of words and phrases from their parents. As they become toddlers, they have a speech vocabulary of basic alphabet letter sounds and basic words and phrases. Even in the infant and toddler stages, speech errors are common, but some errors can be a sign that children are not processing the sounds correctly. Speech errors are either related to articulation disorders or phonological disorders. Articulation disorders occur when a sound can be omitted, distorted, or substituted (Mann & Foy, 2007). An omission of a sound is when children say “og” for “dog” and the letter d is omitted from the word dog. A distortion is when children say a non-typical sound or word for a typical sound or word, such as calling a bikini a zucchini. A substitution is the most common speech error, where children say fire distinguisher for fire extinguisher. Typically, omissions and distortions are uncommon and can be a sign for a speech and language issue. Phonological speech errors are another sign that there is a speech and language issue. Speech errors for phonological disorders are cluster reduction, final consonant deletion, velar fronting, stopping, and liquid glides. A cluster reduction is when children have difficulty with consonant clusters and will delete a consonant sound out, like in the word snail, the s is deleted to say nail. A final consonant deletion is when children do not say the final consonant sound, such as in the word fish, he

would say fi and not the sh. Velar fronting is when children have difficulty with consonant sounds, c, g, k, and t. They are unable to say those four sounds correctly and use their tongue to say c, g, k, and t instead of the lips or roof of the mouth. Stopping is when the sound is produced by a puff of air when it should be pronounced with a stream of air, the word ship could be pronounced tip. Liquid glides are when the letters r and l are replaced with the sounds for w and y, which is when the word rabbit is said wabbit or the word melon is say meyon. Being aware of what type of speech errors toddlers have when speaking, could help to identify a speech delay. Mistakes are common in any subject humans are learning; if toddlers are having more than the typical errors, it could be a sign of a speech delay or a learning difference.

Learning Differences and Late Language Development

A speech delay can be an early warning sign for learning differences or can reflect the older age of the language development spectrum in toddlers. Learning differences occur when there is a neurological processing problem, or when the brain is wired differently to acquire language skills, such as reading, writing, and speaking (Grünke & Cavendish, 2016). Learning differences interfere with learning how to speak and read, and can create issues in long-term and short-term memory, attention to material, and effective communication among peers, parents, siblings, and teachers. Learning differences can be diagnosed and offered interventions to acquire and improve language skills in children that are struggling with learning how to read, speak, and write. Learning differences are not related to late language development, which can be caused by developmental problems in hearing, seeing, or premature births. If babies are not carried full-term, they are more likely to have developmental issues that can interfere in acquiring speech and language skills. Late language development can also be caused by

bilingualism, where the brain is processing at least two different languages, and the sounds and rules of those multiple languages.

Early Identification and Early Intervention

There are two ways to help toddlers with speech delays: receive early identification and the development of an early intervention plan to help toddlers master the phonemes and phonics of the English language. Early identification is a process where toddlers are evaluated to see if they are at risk for a speech delay or a learning difference (Mercieca, & Mercieca, 2013).

Toddlers are given a series of assessments to identify what is the need. Once the need is identified, specialists develop an early intervention program, which incorporates a series of coordinated services that provide a treatment to reach the appropriate benchmarks. According to the law, The Individuals with Disabilities Education Act (IDEA) requires every state in the United States to have early intervention programs in place for students that need the additional help. Early identification and intervention are for students that have development delays and disabilities.

Some toddlers are immediately identified with a speech and language developmental delay or disability at birth (hearing impaired or premature births), while other toddlers may not present developmental delays or disabilities until they begin to talk (speech delay or dyslexia). The process of early identification and early intervention takes places typically with Child Find, an organization created to help infants and toddlers with developmental delays and disabilities. At this step, toddlers are evaluated to see if there is a developmental delay or disability, and if one is discovered, a group of qualified specialists will create a plan (early intervention) for the toddler (Mercieca, & Mercieca, 2013). In addition to creating an early intervention plan, this team will assess the toddler's family for any additional background information, such as a family

member with dyslexia or a physical/mental condition, cerebral palsy or attention deficit hyperactivity disorder. Once the information has been collected, the team writes an Individualized Family Service Plan (IFSP) that has guidelines for the toddler's developmental delay or disability, specific services the child will be receiving, and the duration of these sessions. An example of an early intervention program for a toddler with a speech delay would be the Lindamood Phoneme Sequencing Program (LiPS) for Reading, Spelling, and Speech Program. The LiPS program teaches the 46 phonemes in the English language in a multisensory technique to develop phonemic awareness to hear and understand the sounds, as well as, how to manipulate the sounds (Pro-Edu, 2011). This program also helps in other areas, such as, spelling, word attack, and syllabication. The LiPS program breaks a word down to its smallest form, a phoneme, and shows the students where the phoneme is being produced on the face, by cueing with a mirror to show its placement on either the mouth, nose, or throat. The early identification process and intervention plan are used to screen, evaluate, and assess toddlers, in order to develop an IFSP for toddlers to gain the appropriate skills, like speech and language, so that they may acquire a foundation to succeed in an academic environment.

Conclusion

This literature review examined the topic of when a speech delay is indicative of a learning difference versus when it is considered normal development of language in toddlers across the spectrum. By examining the process of speech and language developments, these milestones exist, which provides toddlers with a place should they reach naturally, but also shows where some toddlers take longer to reach. For the toddlers that are unable to reach their appropriate milestones, speech delays arise from non-verbal communication to unclear speech. Speech delays can be an early warning sign for learning disabilities or could be a sign of speech

impediments. Speech delays can be diagnosed and intervention plans can be created to acquire and improve language skills in toddlers that are struggling with learning how to speak and read. Education is a social experience where speech and language allow people to interact with each other. A speech delay can cause difficulty in education or social interactions, but with the proper identification and intervention techniques, toddlers with a speech delay can learn how to communicate in their classrooms and homes, and become literate, successful individuals in society.

CHAPTER III

METHODS

Introduction

From working with students with speech delays, as well as the desire to learn about how speech delays are connected to learning differences, the topic of speech delays in preschool children became an interest to the researcher. “Children with specific speech sound disorders, which has also been termed articulation disorder or phonological disorder, have clinically significant difficulties producing the speech sounds of their language expected for their age” (National Institute of Health, pg. 2, 2016). The researcher learned that is important to use multisensory techniques, such as Lindamood Phoneme Sequencing (LiPS), to create a foundation for language through phonemic awareness and phonics. The study was conducted using a small group of preschool students who were either bilingual or prematurely born. The researcher employed a pretest, intervention, and a posttest design.

Design

The study utilized a quasi-experimental design, which consisted of a pretest and a posttest, which were comprised of a checklist of the 10 phonemes to assess if the student could produce the correct sounds for the 10 different graphemes. The intervention was a program called LiPS. The reason this study is quasi-experimental is the sample is not random. In the quasi-experimental study, both groups are receiving the LiPS intervention. Progression through LiPS lessons of the 10 sounds, observations of student’s behavior and attention span were monitored during the sessions, and all information was logged at the end of each 2-week period for both groups. The study spanned over 4 weeks in February; the bilingual students received 2 weeks of intervention and the premature students received 2 weeks of intervention. The

assessments gathered data through sound knowledge of letters, and the LiPS lessons gathered data through informal assessments, such as memory games and questions. Results were gathered in the form of assessments to determine the impact of the LiPS program for both groups.

Limitations of this study are that only 10 phonemes were used out of the total of 46 phonemes in the English language, and the group of participants consisted of only four preschool students.

Participants

The participants in this study are four preschool students: two bilingual students and two premature birth students. The bilingual students attended a preschool in Baltimore County, Maryland. The premature group had one student, who attended preschool in Fairfax County, Virginia and the other premature student attended preschool in New Freedom, Pennsylvania. These four preschool students were selected for this study to observe speech delays and development in bilingual students and premature students. The demographics of the students consisted of one three-year-old girl and one four-year-old girl who both speak Spanish and English, and one three-year-old girl and one four-year-old girl who were born prematurely. The bilingual students were half Caucasian and half Hispanic, while the premature students were both Caucasian. According to the United States Census, the median household income for Baltimore County was \$67,095 (U.S.Census, 2015). The median household income for Fairfax County was \$112,552, and the median household income for York County, PA was \$58,906. All students were diagnosed with a speech delay. The bilingual students' families, living in Baltimore, consisted of a mother, father, and sibling, and both fathers worked while the mothers raise the children. The first premature student, lived in Virginia, was an only child with a mother and father, and the father worked from home. The other premature student, lived in Pennsylvania,

was the youngest of five siblings; both parents worked. All parents of the students in the study had a bachelor's degree from a college in the United States.

Instrument

The Lindamood Phoneme Sequencing (LiPS) has been tested for reliability and validity according to the Buros Institute of Mental Measurements (Newcomer & Barenbaum, 2003). The alpha numbers for reliability were .87 and .97 while composite numbers were .91 and .97, and the alpha numbers for validity were .40 and .74. The LiPS program was used to measure the four preschool students' achievement on the 46 phonemes of the English language. This program used multisensory methods to help students develop phonological awareness in an explicit, direct, and systematic instruction. Even though the LiPS program is designed to measure all 46 phonemes found in the English language, this study focused on only 10 of those phonemes: a, e, i, o, u, p, b, f, v, k. For example, students were given a specific sound and a letter that corresponded to that sound, such as how the "puh" sound is associated with the letter "p". Students learned that their lips pop together to produce the sound for "p". This instrument has taken the 46 phonemes of the English language and divided the phonemes into 15 groups of how they are produced on the face through lips, teeth, tongue, nose, or throat areas. With individual sound lessons, students hear, see, and feel the physical characteristics of sounds. When students are given opportunities to practice with LiPS materials, typically they make gains in improving their phonological awareness to help with decoding words. The LiPS program builds on the 46 phonemes of the English language to create a solid foundation of the sounds to help students create a sound-symbol connection. Once the sound-symbol connection is mastered, students can sound out an unknown word through their decoding skills. Phonemic awareness is the first part

of learning to read, and by using the LiPS program, students are more likely to improve their understanding of the 46 phonemes.

Procedure

After gaining permission from the parents to use their students in the study, a procedure plan was designed to execute the research. All four students were tested and provided lessons individually. The first step of the study was the pretest checklist of the 10 phonemes: a, e, i, o, u, p, b, f, v, k, which took 10 minutes for the students to look at the letters and identify the sounds. For the pretest checklist, all students were unfamiliar with the 10 phonemes and would produce either a shape or a different sound. The data were recorded on the pretest assessment sheet. On the same day as the pretest, the students, individually, would receive one lesson on the short “a” sound. The lesson was comprised of one hour with an introduction of the sound, activities, and a review of the specific sound. By the end of the first week, the first 5 phonemes were reviewed to observe any improvement in their memory. In the following 9 days, the researcher presented the students the other 9 phoneme lessons for one hour daily. On the Friday at the end of the intervention, all 10 phonemes were reviewed to observe how fluent the students were with the sounds. Once all the lessons were completed, the posttest assessment was used to determine if any growth or decline occurred from the pretest. On the Saturday at the end of the two weeks, the posttest checklist was given to the students, individually, which took the students 5 minutes to correctly identify all 10 phonemes. The information for the assessments was used to determine the effects that the LiPS program had on the four preschool students.

Summary

The LiPS program provided the preschool students time to explore the sounds with multisensory materials to learn the 10 phonemes. The students could hear the sounds, feel the

sounds, and see the 10 phonemes during the LiPS lessons. Allowing the students to observe with the mirror where the phonemes were being produced, provided more information to make meaningful connections. By using the research design of pretest, intervention, and posttest, the students were exposed to the 10 phonemes in different formats. The assessments determined how fluent the students were with the 10 phonemes and the intervention introduced and/or expanded on the 10 phonemes. The intervention was delivered through direct, explicit, and systematic teaching of the 10 lessons. Data was collected throughout the assessments and lessons, to observe how quick the four students learned the 10 phonemes. The LiPS program is designed to help students, with speech delays, in acquiring the phonemes of the English language.

CHAPTER IV

RESULTS

The purpose of this study was to determine the impact of explicit, multisensory instruction of 10 phonemes found in the English language for premature and bilingual preschool students. The study utilized a quasi-experimental design, which consisted of a pretest, intervention, and a posttest of the preschool students. The null hypotheses stated that premature and bilingual groups would not benefit from explicit instruction of the ten phonemes, proved to be false due to the p values: $p= 0.000159^*$ and $p= 0.027262^*$. Results were gathered in the form of pre-assessments and post-assessments to determine the impact of the LiPS program for both groups. The bilingual and premature students both benefited from the LiPS program. The bilingual students could pick up on the sounds quicker than the premature students. The bilingual students could grasp the idea of the phonemes in 15 minutes, while it took the premature students 30 minutes to fully grasp the phonemes. The scoring for the consonant and short vowel assessments is based from zero to five, with zero being the lowest score and five as the highest score.

Tables 1 and 2 show the bilingual students performance with the consonants and short vowels for the pre-assessments and post-assessments. In Table 1, the 3-year-old bilingual student knew none of the consonants phonemes on the pre-assessment, while she knew only two consonant phonemes on the post-assessment. The 3-year-old bilingual student's difference was two. The bilingual 4-year-old student, knew only three of the consonant phonemes on the pre-assessment, and she could recall all five consonant phonemes on the post-assessment. The 4-year-old bilingual student's difference was two. Table 2 presents both the bilingual students' performance on the short vowel phonemes. On both the pre-assessments and post-assessments,

both bilingual students did not know the five short vowel phonemes on the pre-assessment, but on the post-assessments, they could remember the five short vowel phonemes. Both the 3-year-old and 4-year-old bilingual students' difference was five.

Table 1: *Student Performance- Consonant Sounds*

Participant	Pre-assessment	Post-assessment	Difference
Bilingual Student 1- 3-Year-Old	0	2	+2
Bilingual Student 2- 4-Year-Old	3	5	+2

Table 2: *Bilingual Student Performance- Short Vowel Sounds*

Participant	Pre-assessment	Post-assessment	Difference
Bilingual Student 1- 3-Year-Old	0	5	+5

Bilingual Student 2- 4- Year-Old	0	5	+5
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Tables 3 and 4 shows the premature students’ performance on the consonants and short vowels for the pre-assessments and post-assessments. Table 3 provides information on the pre-assessments and post-assessments with the five consonant phonemes. On both the pre-assessments and post-assessments, the 3-year-old and 4-year-old students did not know the consonants’ phonemes on the pre-assessments and learned the five sounds on the post-assessments. The difference between the pre-assessment and post-assessment was five. In Table 4, the pre-assessments and post-assessments of the premature students on the short vowel phonemes are the same results found with the consonant phonemes. The difference between the pre-assessment and post-assessment was five. The premature students knew none of the 10 phonemes at the beginning of the intervention, and at the end of the intervention, the premature students learned all 10 phonemes.

Table 3: *Premature Student Performance- Consonant Sounds*

Participant	Pre-assessment	Post-assessment	Difference
Premature Student 1- 3-Year-Old	0	5	+5
Premature Student 2- 4-Year-Old	0	5	+5

Table 4: *Premature Student Performance- Short Vowel Sounds*

Participant	Pre-assessment	Post-assessment	Difference
Premature Student 1- 3-Year-Old	0	5	+5
Premature Student 2- 4-Year-Old	0	5	+5

Tables 5 and 6 are the mean difference of both groups, bilingual and premature, for the consonants and short vowels phonemes. Table 5 presents scores on the five consonant phonemes on the pre-assessments and post-assessments. The bilingual students' mean was a 1.5 on the pre-assessment, and a 3.5 on the post-assessment. The difference between the pre-assessment and post-assessments is 2. The premature student's mean on the pre-assessments was 0, while the post-assessments mean was 5. The difference between the pre-assessments and post-assessments for the premature students is 5. Table 6 presents the information for the short vowel phonemes on the pre-assessments and post-assessments. Both groups, bilingual and premature, had a mean score of 0 on the pre-assessments and a mean score of 5 on the post-assessments. The mean of both groups was 5.

Table 5: *Mean Difference of Student Performance by Group- Consonants Sounds*

Group	Pre-assessment	Post-assessment	Difference
Bilingual Students	1.5	3.5	+2

Premature Students	0	5	+5
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Table 6: *Mean Difference of Student Performance by Group- Short Vowel Sounds*

Group	Pre- assessment	Post- assessment	Difference
Bilingual Students	0	5	+5
Premature Students	0	5	+5

Table 7 is the paired t-test analysis for the bilingual students, and Table 8 is the paired t-test for the premature students. Two separate paired t-tests were conducted to assess the impact of 4 weeks of LiPS Instruction on the learning of the identified phonemes for the premature and bilingual students. The paired t-test score for the bilingual students, found in table 7, analyzed the data of the pre-assessments and post-assessments over the span of 2 weeks with the LiPS intervention. The analysis presented significant differences between the pre-assessments scores (M=.75, SD=1.5) and post assessment scores (M=4.25, SD=1.5), which suggested that the LiPS intervention had a positive impact on the bilingual students' acquisition of the consonant and short vowel phonemes. The p value for the bilingual paired t-test was $p=0.027262^*$. The p value for the premature paired t-test was $p=0.000159^*$. In Table 8, the paired t-test for the premature students, over a 2-week span of LiPS intervention, analyzed the pre-assessments (M=0, SD=0)

and post-assessments (M=5, SD=0). The premature students also benefited from the LiPS intervention program.

Table 7: Paired T-Test Analysis of Combined Consonants and Short Vowel Pre-assessment and Post-assessment Scores- Bilingual Students

Assessment	N	Mean	SD	df	P
Pre-assessment	2	.75	1.5	1	0.027262*
Post-assessment	2	4.25	1.5		

Table 8: Paired T-Test Analysis of Combined Consonants and Short Vowel Pre-assessment and Post-assessment Scores- Premature Students

Assessment	N	Mean	SD	df	p
Pre-assessment	2	0	00	1	0.000159*
Post-assessment	2	5	0		

Summary

The results presented significant differences between the pre-assessment scores and the post-assessment scores. Those results advocate that the LiPS intervention was beneficial on the premature and bilingual preschool students' learning of the consonant and short vowel phonemes. Overall, the preschool students benefited from the LiPS program more than the bilingual students, though the LiPS program made a helpful improvement in speech development for the bilingual students, too.

CHAPTER V

DISCUSSION

Introduction

The purpose was to determine if explicit instruction using LiPS would impact speech/language development. This study utilized a quasi-experimental design consisting of a pretest, LIPS intervention, and a posttest to determine the effectiveness learning 10 phonemes. The null hypotheses stating there would be no difference in learning the 10 phonemes were rejected.

Implications of Results

The effect was on the learning of phonemes/language development using the LiPS program with bilingual and premature students. The result found a significant difference between the pre-assessment and post-assessment for both groups. The researcher used 10 phoneme lessons to increase the preschool students' knowledge of those specific 10 phonemes. Communication between the researcher and the students was vital to hearing, seeing, and feeling the 10 phonemes, as well as, to make sure that all directions are clear and understood by the students. The implication of the results was that the LiPS program, the premature students gained more from the program than the bilingual students. However, both groups benefited from effective instruction of the 10 phonemes. The LiPS program was proven to be a helpful tool in helping students with speech and language delays.

Threats to Validity

The variables that were threats to the validity of this study were the limited number of subjects, limited gender, limited number of phonemes, and limited amount of time. This study used four preschool students who ranged from the ages of three to four. Due to the small number

of participants, the results only showed the score range of four students. In addition, those four preschool students were all female. This study used only 10 phonemes out of the 46 phonemes that are in the English language. The intervention was presented over a 2-week span for both groups, so the time was restricted for this study. It would be interesting to have seen what the results would have been if there were more participants of both genders and using all the phonemes with an increased amount of time.

Relationships to Literature

There was a similar study that related to this study of speech delays in preschool students, *Speech Development Patterns and Phonological Awareness in Preschool Children* by Mann and Foy. In their study, Mann and Foy researched the connection among speech production and phonological awareness with consonants sounds. “To date, there has been growing support for a link between phonological awareness and speech perception” (Mann & Foy, 2007, p.3). Virginia and Foy concluded that the connection between speech production and phonological awareness will help to identify preschool students for early identification for reading difficulties. Even though, this researcher used short vowels and five consonant phonemes, the information from both experiments saw patterns of speech errors and speech patterns. Just as in Mann’s and Foy’s experiment, the idea that speech production and phonological awareness are connected, which paralleled with the researcher's main idea.

Implications for Future Research

The topics of speech delays and early literacy skills have an abounding amount of research and will probably be studied in the future. As this specific study of speech delays progressed, there was still more to research and to learn about speech delays in bilingual and premature preschool students. The time spent with the subjects was during a 4-week span, may

not have been sufficient in gaining the results from all 46 phonemes in the English language. In order to provide all the lessons of the LiPS Program with the four students in the study, additional time would be needed to provide a complete and thorough study. The four students would benefit from the LiPS Program by having one on one instruction for the other 36 phonemes. A schedule could be established to meet five days a week for one hour to provide support in the developing phonemic awareness to decrease the impact of their speech delays. By providing the students with a complete and thorough understanding of the 46 phonemes, they can also learn how to manipulate all the phonemes. The full foundation of phonemic awareness will provide a launching pad to learn phonics, vocabulary, fluency, and comprehension for reading. In addition to providing students lessons with the LiPS Program, it would be helpful to provide parents with supplementary activities to help remember the sounds. A future group of bilingual and premature students that will be larger in size may prove to have more pivotal results.

Conclusion

This study consisted of two groups, bilingual and premature preschool students, that were given a pre-assessment and a post-assessment for the LiPS intervention program. The results of this study indicated that students with speech delays benefited from a multi-sensory program, such as LiPS, to gain the necessary skills to develop phonemic awareness. The results that were observed showed the impact of the intervention, and that the students could make connections of where the sound forms on the face. This study rejected the null hypotheses stating that there would be significant difference in the learning of English phonemes. The LiPS program was beneficial to the participated that were involved.

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Appendix A

Pre-Assessment

Isabella
Bilingual

Short Vowels	Knows the sound	Does not know the sound
A		✓ (e)
E		✓ (long vowel) (e)
I		✓ (e)
O		✓ (e) ^{unk}
U		✓ (no)

Consonant Sounds	Knows the sound	Does not know the sound
P		✓ circle
B		✓ unk
F		/f/
V		✓ (no)
K		f

Post-Assessment

Short Vowels	Knows the sound	Does not know the sound
A	✓	
E	✓	
I	✓	
O	✓	
U	✓	

Consonant Sounds	Knows the sound	Does not know the sound
P		k
B		b
F		f
V	✓	
K	✓	

Appendix B

Pre-Assessment

Camilla / 4yrs
Bilingual

Short Vowels	Knows the sound	Does not know the sound
A		✓
E		✓
I		✓
O		✓
U		✓

Consonant Sounds	Knows the sound	Does not know the sound
P		✓
B		✓
F	✓	
V	✓	
K	✓	

Post-Assessment

Short Vowels	Knows the sound	Does not know the sound
A	✓	
E	✓	
I	✓	
O	✓	
U	✓	

Consonant Sounds	Knows the sound	Does not know the sound
P	✓	
B	✓	
F	✓	
V	✓	
K	✓	

Appendix C

Pre-Assessment

Zoe
Premature
3yrs

Short Vowels	Knows the sound	Does not know the sound
A		✓
E		✓
I		✓
O		✓
U		✓

Consonant Sounds	Knows the sound	Does not know the sound
P		✓
B		✓
F		✓
V		✓
K		✓

Appendix D

Pre-Assessment

B premature
 PLS
 12/1/12 (4)rs

Short Vowels	Knows the sound	Does not know the sound
A	✓	✓
E	✓	✓
I	✓	✓
O	✓	✓
U	✓	✓

Consonant Sounds	Knows the sound	Does not know the sound
P	✓	✓
B	✓	✓
F	✓	✓
V	✓	✓
K	✓	✓

Post-Assessment

Short Vowels	Knows the sound	Does not know the sound
A	✓	
E	✓	
I	✓	
O	✓	
U	✓	

Consonant Sounds	Knows the sound	Does not know the sound
P	✓	
B	✓	
F	✓	
V	✓	
K	✓	

Post-Assessment

Short Vowels	Knows the sound	Does not know the sound
A	✓	
E	✓	
I	✓	
O	✓	
U	✓	

Consonant Sounds	Knows the sound	Does not know the sound
P	✓	
B	✓	
F	✓	
V	✓	
K	✓	