UTILITY OF THE LINDAMOOD PHONEME SEQUENCING PROGRAM (LiPS)
FOR CLASSROOM-BASED READING INSTRUCTION

By

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Phonological awareness training has been found to be a crucial component of

beginning reading instruction. One reading program that is often used in the schools and

offers phonological awareness training is the Lindamood Phoneme Sequencing Program

for Reading, Spelling, and Speech (LiPS). The purpose of this study was to investigate

how the LiPS program, a program initially designed for one-on-one use, was adapted and

employed in schools with large groups of kindergarten students. Descriptive information

was collected to compare the treatment integrity of the LiPS program in the school setting

with a clinical setting where the program was employed one-on-one. Additionally, pretest

and posttest data were collected on the students in the kindergarten classrooms to assess

student outcomes. The assessment of student outcomes involved four assessment

instruments: the Lindamood Auditory Conceptualization test (LAC); the Woodcock-

Johnson Tests of Achievement (WJ-III) Word Attack and Word Identification tasks; the

Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Letter Naming and

Phoneme Segmentation tasks; and the Comprehensive Test of Phonological Processing (CTOPP) Elision, Blending Words, and Sound Matching tasks.

Results indicated that, in the school setting, instructors demonstrated low levels of treatment integrity as compared to a high degree of treatment integrity that was maintained by the instructors in a clinical setting. Important LiPS program components that were omitted in the school setting included Tracking following a prescribed sequence, formal assessment of student progress or mastery, and key instructional materials. When considering student outcomes for participants across the two school sites, statistical analyses yielded positive mean gains across all students for each assessment measure. Furthermore, mean gains achieved on the LAC were statistically significantly greater than gains on the three tasks of the CTOPP (Elision, Blending Words, and Sound Matching) and two tasks of the WJ-III (Word Attack and Word Identification). No statistically significant differences were noted between mean gains on the LAC versus DIBELS tasks. When considering benchmark progress for the LAC and DIBELS measures, gains across all students were not as great for the LAC as for the DIBELS tasks. Implications for use of the LiPS program in school settings are discussed.

CHAPTER 1
INTRODUCTION AND REVIEW OF THE LITERATURE

From educators to politicians to parents, there is widespread concern that reading instruction in our public schools is not as effective as it should be, resulting in a sense of urgency to improve literacy outcomes for our children (Torgesen, 2002). After all, the ability to read is an essential skill in today's world. "Reading is a foundation skill for school learning and life learning – the ability to read is critical for success in modern society" (Lane, Pullen, Eisele, & Jordan, 2002, p. 101). Data from the 2005 National Assessment of Educational Progress (NAEP) report indicated that 36 percent of fourth graders and 27 percent of eighth graders were reading below a basic reading level (NAEP, 2005). While learning to read has consistently been an educational priority for young schoolchildren for many decades, the focus placed on literacy outcomes today far exceeds pressures placed on students, educators, and parents in the past. According to Snow, Burns, and Griffin (1998), "The demands are far greater than those placed on the vast majority of schooled literate individuals a quarter-century ago" (p. 20).

This urgency for educators to address students' literacy needs is fueled by recent empirical findings related to outcomes for struggling readers. For example, Snow et al. (1998) reported that a student who is not a reasonably proficient reader by the end of third grade is very unlikely to graduate from high school. Therefore, "it is not just that the teaching of reading is more important than ever before, but that it must be taught better and more broadly than ever before" (Adams, 1990, p. 26).

Issues of quality instruction and early intervention to address those students at risk for reading failure pervade the current reading research literature (Adams, 1990; Snow et al., 1998; Torgesen, 2002). Fortunately, knowledge and understanding of how children learn to read and why many struggle have increased exponentially over the last three decades (Denton, Vaughn, & Fletcher, 2003). For example, dozens of professional organizations exist, such as the International Reading Association, the National Reading Conference, and the International Dyslexia Society, with members dedicated to understanding, remediating, and preventing reading failure. While reading research continues to evolve and educators learn increasingly more about what it takes to be a skilled reader, significant monetary and intellectual resources within the last decade have been devoted to learning more about and improving student reading achievement at the local, state, and national level.

Several groups have worked diligently in recent years to synthesize the extant literature related to reading achievement in some meaningful way and offer recommendations and guidelines to focus future efforts. For example, the U.S. Department of Education and the U.S. Department of Health and Human Services requested that the National Academy of Sciences establish a committee to examine issues surrounding the prevention of reading difficulties in young children (Snow et al., 1998). In a report exceeding four hundred pages in length and entitled *Preventing Reading Difficulties in Young Children*, the committee focused on summarizing the extant literature related to the effectiveness of interventions for children struggling to learn to read and providing recommendations based on empirical evidence to assist educators and parents in their work with struggling readers. In another effort, the National Reading

Panel (2000) reviewed more than 100,000 empirical studies related to reading instruction and created an influential document, entitled *Teaching Children to Read*, to assist parents and teachers, among others, in identifying key skills and methods consistently related to reading success. In their review of the reading research literature, the National Reading Panel identified effective instructional practices related to various aspects of reading including phonemic awareness, phonics, fluency, and comprehension.

Politicians and government officials have also played a role in the movement toward increasing academic success and the quality of instruction for children in the United States by introducing major legislation in recent years. In January of 2002, President Bush signed into law the No Child Left Behind Act of 2001, which served to revise and reauthorize the Elementary and Secondary Education Act. In addition to redefining the federal role in K-12 education, this act focuses on four primary issues: increasing accountability within the schools, providing increased flexibility at the local level, expanding options for parents who are dissatisfied with their child's current educational situation, and understanding and infusing research-based practices into educational curricula (No Child Left, 2002).

While a sound knowledge base exists regarding effective reading practices that produce positive outcomes for students, these instructional methods are not widely included in typical classroom instruction (Denton et al., 2003). Thus, there is an increasing focus on bridging the research-to-practice gap and improving our understanding of the process of transferring empirically supported instructional methods related to reading into the classroom and sustaining these practices. Problems persist in translating research into classroom practices (e.g., from the clinic to the classroom) and

scaling up these research-based practices to affect large numbers of students in the schools (Denton et al., 2003; Gersten & Dimino, 2001; Klingner, Ahwee, Pilonieta, & Menendez, 2003). Factors that have been cited to affect the scaling up and sustaining of educational innovations include the link between researchers and teachers, teacher access to research-based information (i.e., professional development and support), and the feasibility of knowledge and practices (i.e., practical and applicable in classrooms) (Boardman et al., 2005; Denton et al., 2003).

Fortunately, research indicates that many of the instructional practices that are effective for special education students are at least equally beneficial for general education students as well (Vaughn, Gersten, & Chard, 2000, in Boardman et al., 2005). Therefore, especially for prevention and early intervention services for younger students, research-based practices demonstrated to assist the students at-risk for later reading failure may be delivered in the general education classrooms to serve students with a range of abilities. Meeting the needs of more students simultaneously may contribute to greater acceptance of certain practices among educators and foster maintenance of these practices in the schools.

Educational researchers continue to work to determine the specific factors that play a role in children's reading development and success. "Although we do not yet understand the conditions that must be in place to prevent reading difficulties in all children, we do know what must be done to very substantially reduce the number of children who fail to acquire adequate reading skills during the primary grades of elementary school" (Torgesen, 2002, p. 22). Unfortunately, challenges persist regarding ensuring that practitioners are equipped and prepared to implement research-validated

reading practices in classrooms and with groups of students. Regarding the prevention of later reading difficulties, especially for younger students (i.e., kindergarteners) and beginning readers, one foundational reading skill that has received significant attention is phonological awareness and its instruction (Snow et al., 1998; Torgesen, 2002).

Phonological Awareness

Definition

Phonological awareness has been described as the "conscious sensitivity to the sound structure of language" (Lane et al., 2002, p. 101). In other words, it is the ability to analyze spoken language and recognize that it consists of smaller units. Phonological awareness is an umbrella term used to describe awareness of spoken language at the word, syllable, onset-rime, and phoneme level (Lane et al., 2002). Individuals with strong phonological awareness skills can detect, match, blend, segment, and manipulate speech sounds, and oftentimes the ability to rhyme is the first phonological skill that children master (Lane et al., 2002). In fact, "sometimes children have trouble learning to decode because they are completely unaware of the fact that spoken language is segmented – into sentences, into syllables, and into phonemes" (Williams, 1987, in Blachman, 2000, p. 484). The development of phonological awareness typically begins by age 3 and improves over many years as the child develops academically (Snow et al., 1998).

As indicated previously, there is a range of phonological awareness skills that children develop over time. Adams (1990) identifies at least five different levels of awareness: (1) knowledge of nursery rhymes – an ear for the sound of words; (2) ability to compare and contrast the sounds of words for rhyme and alliteration; (3) the ability to blend and segment at the syllable level; (4) the ability to blend and segment at the phoneme level; and (5) the ability to manipulate phonemes by adding, deleting, or

moving phonemes to create new words. This may be interpreted as a developmental sequence. However, the issue of phonological awareness developing in a stage-like manner is scantily addressed in the reading research literature.

Phonological Awareness v. Phonemic Awareness

The terms phonological awareness and phonemic awareness are often inaccurately used interchangeably. Whereas phonological awareness refers to a general awareness of the sound structure of language, including the ability to rhyme and blend or segment larger word parts, phonemic awareness specifically refers to an individual's ability to attend to the individual sounds in spoken language. Those with strong phonemic awareness skills are able to manipulate individual phonemes, or sounds (Lane et al., 2002). Those with sound phonemic awareness skills have an appreciation for rhyme and alliteration, as well as the understanding that every word consists or is created from a sequence of phonemes (Snow et al., 1998). Thus, phonemic awareness is believed to contribute to later reading development and achievement. "An awareness of phonemes is key to understanding the logic of the alphabetic principle and thus to the learnability of phonics and spelling" (Snow et al., 1998, p. 52). Moreover, while some sense of phonemic awareness is generally evident in the typically developing child beginning at a young age, this skill often must be specifically taught or honed. "Because of the physical and psychological nature of phonemes as well as the nature of human attention, few children acquire phonemic awareness spontaneously" (Adams, Treiman, & Pressley, 1998, in Snow et al., 1998, p. 54).

Phonological Awareness as a Predictor of Reading Achievement

Skills in phonological awareness have been demonstrated to be reliable predictors of reading achievement. Moreover, phonological awareness is cited as a key to beginning

reading acquisition (Smith, Simmons, & Kame'enui, 1995). Specifically, tasks such as identifying the first sound in a word, blending phonemes into a word, and analyzing sounds within words have been cited as effective predictors of reading development (Olofsson & Niedersoe, 1999). It is believed that instruction in these and similar phonological awareness skills assist in preparing children to learn and benefit from phonics (Lane et al., 2002). Therefore, children with poor phonological awareness skills may be at risk for having difficulties in learning to read in the primary grades. In fact, it has been noted that "children who enter first grade low in knowledge about the phonological features of words or who have difficulties processing the phonological features of words are at high risk for difficulties responding to early reading instruction" (Torgesen, 2002, p. 12). Yet, phonological awareness skills are not necessarily fully developed or intact prior to beginning reading instruction. Phonological awareness skills may strengthen as the child develops into a mature reader. "The correlation between reading and phonological awareness, which is already substantial by the start of school, becomes stronger during the early grades" (Snow et al., 1998, p. 56). However, phonological awareness abilities remain a robust predictor of early reading achievement even when assessed in very young preschool children (Blachman, 2000). In fact, even when individual differences in intelligence are considered, phonological awareness abilities assessed in preschool children continue to be significant predictors of later word recognition and spelling skills (Kennedy & Backman, 1993).

Assessment of Phonological Awareness

It is important to identify early those children that are at risk for reading failure. Given that phonological awareness is an accurate and reliable predictor of reading achievement, assessing a child's phonological awareness skills is a logical first step in

helping these children. "Educators face the formidable challenge of determining which children have weaknesses in phonological awareness and, therefore, which children are likely to develop reading problems" (Lane et al., 2002, p. 103). Since phonological awareness skills are important to reading development and later achievement, what types of tasks are being used to determine whether a child has the necessary precursors for reading success?

The assessment of an individual's phonological awareness typically involves one or more of the following tasks: isolating or segmenting one or more phonemes in a spoken word, blending or combining a sequence of separate phonemes into a word, manipulating (adding, subtracting, or rearranging) the phonemes within a word (Snow et al., 1998). Assessment tools evaluating an individual's phonological or phonemic awareness skills do not involve letters (Torgesen, 2002). It is phonological awareness tasks that involve manipulating spoken language that assist in identifying children that are at risk for reading difficulties. Researchers have found that children who are successful on phonological awareness tasks such as deletion (e.g., say *hit* without saying the /h/ sound) and categorization (e.g., *bat* and *big* go together because they both start with /b/) learn to read and spell with greater ease than those children that perform poorly on such tasks (Blachman, 2000).

Although informal methods may be used, many formal measures of phonological awareness have been developed and are available for widespread use (see Lane et al., 2002). Furthermore, the assessment of phonological awareness can be accomplished individually or in a group setting. Ultimately, it is important to assess a broad range of skills in order to have the best estimate of future reading performance. "Both conscious

awareness of the phonemes in words *and* ability to accurately identify them within words is necessary in learning to phonemically decode words in print" (Torgesen, 2002, p. 12).

Research has been conducted in recent years regarding the relationship between phonological awareness and intelligence. It is believed that strengths or weaknesses in phonemic awareness do not necessarily depend on an individual's intellectual ability or general verbal skills (Pugh et al., 2001; Shaywitz, 1996; Torgesen, 2002). "Weaknesses in phonemic awareness characterize children with reading problems across a broad span of general verbal ability" (Torgesen, 2002, p. 12). It has been found that phonological awareness skills predict future reading achievement even when intelligence is controlled. "Tests of phonological awareness are among the best predictors of children's progress in learning to read and typically account for large amounts of variance in reading skill even after the effects of age and IQ have been controlled for" (McDougall, Hulme, Ellis, & Monk, 1994).

Intervening with Children Struggling to Learn to Read

For those individuals identified as having weaknesses in phonological or phonemic awareness, it is important to intervene as early as possible in order to prevent further reading difficulties. "Children who are delayed in the development of phonemic awareness have a very difficult time making sense out of 'phonics' instruction" (Torgesen, 2002, p. 12). Therefore, these students must obtain the necessary instruction to strengthen their phonological awareness skills and prepare them for future reading instruction. Early preventative or remedial efforts will prevent academic frustrations from consuming these children. Therefore, the total number of negative side effects from experiencing reading failure can be reduced (Olofsson & Niedersoe, 1999).

To foster phonological awareness, children must be exposed to print at an early age. Among other things, this can be accomplished by reading to children, talking about literature and storybook characters, and pointing out signs along the roadside. "Such global awareness of the forms, functions, and uses of print provides not just the motivation but the basic conceptual backdrop against which reading and writing may best be learned" (Adams, 1990, p. 337). Current reading research literature explicitly indicates that incorporating phonological awareness components into early reading instruction is essential. Those children that have strong phonological awareness skills, either due to explicit instruction or developed through early family and preschool literacy experiences, appear to have an early reading and spelling advantage (Blachman, 2000).

Critical Elements of Instruction

While early literacy experiences including exposure to printed materials provide an important foundation for later reading success, there are several critical elements of reading instruction that should be present in early elementary classrooms. Reading research has demonstrated that "there is strong evidence of a positive effect on reading with intervention that combines phonological awareness instruction and explicit, systematic instruction in reading" for children in kindergarten, first, and second grades (Blachman, 2000, p. 486). Although it is beneficial for all children in the early elementary grades to receive instruction in phonological awareness that is direct, systematic, and explicit, there is a heightened necessity for this to occur for the struggling reader or those students at risk for later reading failure. "Specifically, instruction for children who have difficulties learning to read must be more *explicit and comprehensive*, more *intensive*, and more *supportive* than the instruction required by the majority of children" (Foorman & Torgesen, 2001, p. 206). Due to deficiencies in phonological

awareness abilities, some children will not discover connections between spoken and written language independently, despite having had quality preschool literacy experiences and opportunities to interact with language (Blachman, 2000).

By ensuring that these critical elements of classroom instruction are present for all students, especially those most in need of reading support, the percentage of children remaining poor readers can be significantly reduced (see Torgesen, 2002). For children with the most severe reading difficulties, phonological awareness interventions that are longer, more intense and explicit, and structured to move beyond accuracy in decoding are necessary to facilitate fluent word recognition (Blachman, 2000), and therefore later academic success.

To deliver reading instruction in intensive, meaningful, and efficient ways, teachers employ various grouping practices in their classrooms. These include organizing and delivering instruction to a whole classroom of students simultaneously, in small groups, or individually. The efficacy of these different instructional arrangements on teaching reading to average and struggling readers has been detailed in the reading research literature. Generally, research has demonstrated that small group and one-on-one instructional arrangements represent the most effective grouping practices for reading instruction (Elbaum, Vaughn, Hughes, & Moody, 2000). However, many teachers consider whole class instruction to be the preferred approach to reading instruction (Elbaum et al., 1999) for general and special education students, and this continues to be the most common practice (Elbaum et al., 1999; Logan, Bakeman, & Keefe, 1997). Unfortunately, the ways in which teachers group students for reading instruction affect student outcomes, and small group and individual instruction have been demonstrated to

be more effective than whole class instruction (Ehri, 2004; Elbaum et al., 2000; Vaughn et al., 2003).

Measuring Progress and Reading Achievement Outcomes

There is empirical research to demonstrate that phonological awareness plays a significant role in reading ability and disability (Lane et al., 2002; Olofsson & Niedersoe, 1999; Smith et al., 1995; Stone & Doane, 2001; Torgesen, 2002). Regardless of the grouping arrangements or the specific instructional content, it is important to consider methods that can be used to monitor progress and evaluate outcomes for those students that are at risk for reading failure or are involved in some sort of reading intervention. In selecting measures to document student progress or evaluate the efficacy of an intervention, it is important to consider the psychometric adequacy and the degree of specificity of each outcome measure (Stone & Doane, 2001).

Norm-referenced, standardized assessment instruments provide information about a student's current level of functioning compared to a large, often nationally representative group of same-aged peers. This information can be especially important when evaluating student achievement gains or in making eligibility determinations. Norm-referenced tests can be used district-wide, statewide, or even nationally, to provide a unified method for determining eligibility for special education programs (Shinn & McConnell, 1994). Norm-referenced, standardized assessment tools are often valued for their ease of interpretation, presumed technical adequacy, and provision of norms to compare student performance (Sofie & Riccio, 2002). An example of a norm-referenced, standardized measure that can be implemented to assess skills such as word identification and reading fluency is the Woodcock Johnson Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001). The Comprehensive Test of Phonological Processing (CTOPP; Wagner,

Torgesen, & Rashotte, 1999) is one common standardized measure used to evaluate an individual's phonological awareness abilities.

While there is often an emphasis on selecting norm-referenced, standardized tests to make special education decisions (Sofie & Riccio, 2002), other evaluative tools can be employed to monitor student progress or document achievement gains. Curriculum-based measurement (CBM) is a dynamic assessment tool that can be employed to monitor student progress and assist in evaluating achievement outcomes relative to a particular intervention. CBM "relies on a traditional psychometric framework by incorporating conventional notions of reliability and validity so that the standardized test administration and scoring methods have been designed to yield accurate and meaningful information" (Deno, Fuchs, Marston, & Shin, 2001, p.508). Therefore, using CBM, student performance can be closely monitored throughout instruction, and decisions can be made immediately as to whether academic progress is satisfactory as this progress relates to the curriculum. One example of curriculum-based reading materials that have gained enormous popularity in recent years as a means of identifying at-risk students and monitoring student progress is the Dynamic Indicators of Basic Early Literacy Skills, or DIBELS (Good, Kaminski, Laimon, & Johnson, 1992; Kaminski & Good, 1996). One type of DIBELS task that has been employed with young children is letter naming fluency, which measures the accuracy and speed with which a child can provide the names of upper and lower case letters of the alphabet. Letter naming fluency, or letter identification, is considered to be one of the strongest predictors of school readiness and later reading achievement (Elliott, Lee, & Tollefson, 2001; Snow et al., 1998; Speece, Mills, & Ritchey, 2003)

Selecting Reading Curricula and Delivering Instruction

Through comprehensive meta-analyses of the reading research literature and influential documents such as *Preventing Reading Difficulties in Young Children* and *Teaching Children to Read*, findings regarding effective prevention and intervention strategies for teaching children to read are becoming apparent. For example, through its review of the reading research literature, the National Reading Panel (2000) identified several instructional components that should be present in order for children to succeed in learning to read. Among these are the incorporation of phonemic awareness activities into early reading instruction and the importance of direct instruction (National Reading Panel, 2000). In order for beginning reading instruction or interventions to be effective, phonological awareness training must involve explicitly and systematically teaching children in small groups to manipulate phonemes with letters (National Reading Panel, 2000).

However, while prominent researchers and major legislation appear to resoundingly support certain instructional practices and intervention methods as being effective, a significant number of children continue to struggle in learning to read. "A large number of students who should be capable of reading ably given adequate instruction are not doing so, suggesting that the instruction available to them is not appropriate" (Snow et al., 1998, p. 25). A host of instructional conditions remain in a significant number of schools today that contribute to the failure of many students in learning to read. These include lack of an appropriate curriculum, low expectations for student success, teachers poorly trained in effective methods for teaching children to learn to read, unavailability of appropriate curricular materials such as books, and noisy or crowded classrooms (Snow et al., 1998). Oftentimes, phonological awareness

instruction, which has been documented to be a necessary component of early reading instruction or intervention, is not adequately addressed in general classroom instruction. Unfortunately, while the ability to manipulate and segment phonemes correlates strongly with later reading success, these skills are generally unattainable unless children receive formal reading instruction in these areas (Adams, 1990).

Just as children must acquire knowledge in a variety of academic subjects – social studies, science, and mathematics, for example – quality reading instruction should address various facets of reading in addition to phonological awareness. These skills include phonics, fluency, vocabulary instruction, and text reading comprehension (National Reading Panel, 2000). Phonological awareness training offers the necessary foundational knowledge in the alphabetic principle and serves as one component in a comprehensive instructional program, but other competencies must be acquired as well to ensure student success in reading and writing (National Reading Panel, 2000). However, for the young student, phonological awareness instruction provides the necessary foundation for later instruction in other reading principles.

With the accountability pressures placed on schools and the financial woes of local and state educational systems, educators must continue to find ways to deliver effective reading instruction to students and provide meaningful interventions to those students struggling to learn to read for whatever reason. One such program that focuses on phonological awareness training and has received attention in the reading research literature is the Lindamood Phoneme Sequencing Program. While originally devised for clinical use with students in a one-on-one setting, this program has been "scaled up" for

use in the schools, in both prevention and intervention efforts, and has been delivered in various grouping arrangements.

The Lindamood Phoneme Sequencing Program

Program Purpose

The Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS) is a multisensory program that incorporates auditory, visual, and tactile-kinesthetic strategies to teach phonemic awareness, and eventually reading and spelling skills, through direct instruction. "The contribution of the LiPS Program is the development of an oral-motor, visual, and auditory feedback system that enables *all* students to *prove* the identity, number, and order of phonemes in syllables and words" (Lindamood & Lindamood, 1998, p. xiv). The LiPS program can be employed as the primary language arts component of an educational curriculum, or can be used in conjunction with existing reading materials used within the schools (Lindamood & Lindamood, 1998).

Program Sequence

According to the LiPS manual, the progression of the program is generally organized into five levels. These components include Setting the Climate for Learning, Identifying and Classifying Speech Sounds, Tracking Speech Sounds, Associating Sounds and Symbols, and Spelling (Encoding) and Reading (Decoding).

Setting the climate for learning

The purpose of the first level, Setting the Climate, is to engage the student actively in the learning process by helping him to know what he will be doing and why (Lindamood & Lindamood, 1998). In this portion of the program, the student learns more

about how to see, hear, and feel the sounds in words in order to make learning to read and spell easier (Lindamood & Lindamood, 1998).

Identifying and classifying speech sounds

In Identifying and Classifying Speech Sounds, the student is introduced to the process of categorizing speech sounds based on similarities and differences between them. The student begins the multisensory experience, hearing, feeling, and seeing sounds as they are produced in order to identify, classify, and label each of the consonant and vowel sounds (Lindamood & Lindamood, 1998). As new sounds are introduced and labeled, letter symbols may be presented concurrently, or this component may be postponed to a later level.

Tracking speech sounds

Tracking involves the manipulation of concrete objects – mouth pictures, colored blocks, and/or colored felts – in order to learn the identity, order, and sameness/ difference of speech sounds in syllables and words. "The ability to track sounds in sequences and conceptualize them visually is a critical factor in reading and spelling" (Lindamood & Lindamood, 1998, p. 11). During this component, the student hones his skills in "tracking sounds in sequences and associating sounds and symbols with these sequences" (Lindamood & Lindamood, 1998, p. 11). Beginning at the syllable level with two to three sounds, tracking continues throughout the sequence of the program to the multisyllable level. During the tracking activities, the student learns to track five types of changes in syllables as one sound at a time is substituted, taken away, added, repeated, or switched (Lindamood & Lindamood, 1998).

Associating sounds and symbols

 If letter symbols were not previously introduced, they can be introduced at this

stage of the program. While letter symbols can be used for reading and spelling activities

(oftentimes mouth pictures are used initially for younger or more severe students),

tracking activities never involve the use of letter symbols. This is because tracking

activities involve the manipulation of phonemes, and letters oftentimes do not match to

sounds with a one-on-one correspondence (e.g., /th/ is one sound, but is represented by

two letters). "Sound-symbol association activities in Spelling and Reading should be

overlapped with the Tracking activities as a separate but concurrent task" (Lindamood &

Lindamood, 1998, p. 13).

Spelling (encoding) and reading (decoding)

Through reading and spelling activities – first with mouth pictures, then letter

symbols – the student has the opportunity to integrate the auditory tracking skill with the

sound-symbol associations developed in previous levels of the program (Lindamood &

Lindamood, 1998). Spelling and reading tasks extend from the simple syllable level to

the complex and multisyllable levels, depending on the age and developmental level of

the student.

Program Paths

There are two paths through the LiPS program: the Horizontal Path and the Vertical

Path (Lindamood & Lindamood, 1998). The order of progression through the program

materials depends on the age and developmental level of the student, as well as instructor

preference. In the Horizontal Path, all consonant sounds are presented first, followed by

all vowel sounds. Then tracking, reading, and spelling of syllables and words are

introduced, from simple, to complex, to multisyllable words. The Vertical Path, however,

presents three consonant pairs and three vowel sounds, and uses these to track, read, and spell simple syllables and words. Next, the remaining consonants and vowels are introduced slowly as tracking, reading, and spelling continues to the multisyllable level. The Vertical Path is deemed most appropriate for younger children, children with developmental delays, or those students that have experienced limited academic success (Lindamood & Lindamood, 1998).

According to the program manual, the length of LiPS treatment will vary depending on the type of instructional setting (Lindamood & Lindamood, 1998). In a classroom, it is suggested that instruction should be provided daily for approximately 40 to 50 minutes in order to reach the complex syllable level within two to three months. For a clinical setting with one-on-one or small group instruction, it is suggested that intensive treatment be administered for three to four hours each day. Length of treatment will depend on the age and skill level of the student.

Key Program Components

A key element of the LiPS program is the quality of exchanges between the instructor and the student or students. The program developers describe a Socratic questioning interaction that they term *responding-to-the-response* (Lindamood & Lindamood, 1998). In responding-to-the-response, the instructor incorporates simple and direct questioning in such a way as to allow the student to discover new concepts, monitor his or her own progress, and identify and self-correct errors. "This questioning elicits the sensory-cognitive connections that are the goal of the LiPS Program" (Lindamood & Lindamood, 1998, p. xiii). For example, instead of correcting a student's incorrect response by providing the correct answer, the instructor uses a series of questions to lead the student to the desired response. This is believed to be the most

critical element of the instructor-student interactions throughout the entire program

(Lindamood & Lindamood, 1998).

Training of Instructors

While training in the LiPS program has varied since the program's inception,

persons affiliated with the Lindamood-Bell Learning Processes company train interested

individuals throughout the country on a regular basis. Currently, program developers and

affiliated trainers offer a three-day workshop to prepare persons to teach the LiPS

program to individuals or groups of students. A minimum of 70 to 80 trainings are

offered nationally each year for professionals interesting in learning the LiPS program (P.

Worthington, personal communication, September 28, 2005). Presently, Lindamood-Bell

has contracts with over 100 schools and districts nationwide, infusing trainers into these

systems to teach teachers how to instruct students in the LiPS program and offering

consultative services to these schools for at least one school year (P. Worthington,

personal communication, September 28, 2005).

Previous LiPS Research

The LiPS program has been implemented in dozens, if not hundreds, of educational

and clinical sites throughout the nation. However, substantial empirical evidence

regarding student outcomes as a result of this reading intervention remains limited. There

are only a small number of studies that have examined issues surrounding one-on-one

implementation of the LiPS program, and fewer that address LiPS program

implementation with small groups or classes of students. The following describes some

of the LiPS program research that has been documented in recent years.

Individual implementation

A handful of studies have been published in recent years evaluating the efficacy of the LiPS program with one-on-one implementation. Research involving the Lindamood program has been conducted with samples of various sizes, with participants with a wide range of ages, and in both school and clinical settings. In one of the first studies to examine issues of program effectiveness with students with learning disabilities in the schools, Kennedy and Backman (1993) compared student reading achievement scores for nine students who received the Lindamood program in addition to the school's traditional curriculum with nine students in a control group who received only the traditional curriculum. Participants were between the ages of 11 and 17 and attended a nonprofit residential school for high school students with severe learning disabilities. An educational consultant and a teacher who had previously been trained in the Lindamood program, along with a speech-pathologist, trained the ten teachers implementing the intervention during a series of in-service trainings and regular bi-weekly meetings. Assessment measures were administered at the beginning of the school year, at mid-year, and at the end of the school year. Treatment for those receiving the Lindamood program began after pretesting in September, was administered individually, and consisted of three 50-minute class periods per day for six weeks, totaling 75 hours (Kennedy & Backman, 1993). While all of the participants in this study were reported to have made significant gains on standardized reading and spelling measures, there was no evidence that those students in the experimental condition made significantly more gains than the control group on these standardized reading and spelling measures (Kennedy & Backman, 1993). However, there was evidence of significantly greater gains made by those students receiving the Lindamood program on measures of phonological awareness

and use of phonetic strategies in spelling real and nonwords (Kennedy & Backman, 1993). Overall, the authors concluded that the Lindamood program "was a successful addition to a comprehensive remedial program in terms of improved ability to sequence speech sounds and phonetic accuracy in spelling real and nonwords within this sample of students with severe LDs" (Kennnedy & Backman, 1993, p. 258).

While Kennedy and Backman (1993) evaluated the Lindamood program's effectiveness with a high school sample, Torgesen et al. (1999) addressed the program's success with elementary school students. Torgesen et al. (1999) evaluated the relative effectiveness of three methods, including a variation of the LiPS program, for preventing reading disabilities in children with weak phonological skills (n = 138). Students were recruited to participate in the two and a half year study midway through their kindergarten year. The research design consisted of four conditions: a phonological awareness plus synthetic phonics (PASP) condition, an embedded phonics (EP) condition, a regular classroom support (RCS) condition, and a control group that did not receive treatment (NTC). Only two of these conditions, PASP and EP, were considered to be truly experimental in nature; the third intervention (RCS) was designed to be most closely aligned with the children's present reading curriculum. In the PASP condition, students received the LiPS program (referred to in this study and formerly known as the Auditory Discrimination in Depth, or ADD, program) with a focus on explicit instruction in phonemic awareness in conjunction with some instruction in reading decodable text. While both the PASP and EP programs consisted of direct instruction in phonemic decoding strategies, "the most important instructional contrast involved the degree of explicitness of instruction in phonological awareness and phonemic reading skills as well

as the extent of decontextualized, focused practice on these skills" (Torgesen et al., 1999).

Participants in each of the three treatment conditions received four 20-minute sessions of one-on-one instruction per week over the two and one half year period. Certified teachers led two of the weekly sessions, and the two additional weekly sessions were led by aides who followed the teacher's written lesson plans. The certified teachers, referred to as tutors, were recruited for this study, randomly assigned to either the EP or PASP condition, and received eighteen hours of initial training by members of the research team in the program to which they were assigned. In fact, Patricia Lindamood, one of the developers of the program, trained the tutors involved with the PASP program. This initial training was followed up by biweekly evaluations of treatment integrity from research project members via videotaped sessions and inservice trainings throughout the treatment period. In sum, total treatment time consisted of 88 hours of one-on-one instruction beginning in the middle of kindergarten and extending through the 2nd grade (Torgesen et al., 1999).

According to Torgesen et al. (1999), the most phonemically explicit condition, the PASP condition, produced the strongest growth in word level reading skills. Participants in the PASP condition demonstrated significantly stronger phonological awareness, phonemic decoding, and untimed context-free word reading skills that those in the EP group. Moreover, children in the PASP group also demonstrated greater gains on word level reading skills than participants in either the RCS or NTC groups. No significant differences were noted between the groups in the area of reading comprehension (Torgesen et al., 1999). During the study, 26% of the sample was retained in either

kindergarten or first grade, and there was a significant difference in retention rates across conditions. It is interesting to note that only 9% of the PASP participants were retained, whereas the percentages for the NTC, the RCS, and EP conditions were 41, 30, and 25 respectively (Torgesen et al., 1999). In addition, the percentages of children that were referred for special services during the research period also differed with the NTC, RCS, EP, and PASP conditions at 22, 24, 42, and 18, respectively (Torgesen et al., 1999).

Torgesen and his colleagues again contrasted the relative effectiveness of the LiPS program, referred to by the authors as the ADD program, with the Embedded Phonics (EP) program – this time with participants between the ages of eight and ten who were previously diagnosed as having a learning disability (Torgesen et al., 2001). While sixty children participated in the treatment phase of the study, only fifty participants are included in the results due to attrition. Participants were randomly assigned to one of two conditions, or instructional approaches. The authors distinguished the two instructional approaches by their relative focus on word level decoding versus application to meaningful text. "The EP program provided much more practice than the ADD program in reading and comprehending meaningful text, while the ADD program provided more explicit and extended practice on phonemic awareness and phonemic decoding skills than the EP program" (Torgesen et al., 2001, p. 35). Treatment was provided to each participant one-on-one in two 50-minute sessions each day of the week. Total treatment time for each participant was 67.5 hours, which extended over an eight to nine week period (Torgesen et al., 2001). Additionally, upon the conclusion of the intensive treatment sessions, clinicians went into the classroom of participants once per week for the next eight weeks to assist in generalizing the materials from treatment to classroom

tasks. Each clinician involved in administering the treatment (either ADD or EP) in this study had at least one year of previous experience teaching their respective method. Five different teachers taught the ADD program, and five teachers instructed participants in the EP program (Torgesen et al., 2001).

Torgesen et al. (2001) concluded that both the ADD and EP programs provided equally effective instruction for the sample of children participating in this study. According to the authors, at the end of the two year follow-up period, no differences existed between the groups on any of the important reading outcomes (Torgesen et al., 2001). While children receiving the ADD program demonstrated significantly stronger growth in accuracy of phonemic decoding skills and in the accuracy and fluency of word reading in text at the end of the treatment phase, these gains were not maintained during the follow-up period (Torgesen et al., 2001). While the outcomes in this study differed somewhat from Torgesen et al. (1999) – children receiving the ADD program in the previous study obtained consistently higher scores on measures of phonemic decoding and word identification, and these results were maintained at follow-up – the authors of the present study cited teacher experience as one possible explanation. The authors hypothesized that the experienced teachers in the present study may have been able to refine components of the EP program to account for the children's phonemic awareness abilities while reading meaningful text (Torgesen et al., 2001).

Another study documenting the Lindamood program's effectiveness is a case study of an adult who received greater than 100 hours of intensive intervention in a clinical setting. While this case study of an adult has limited generalizability to children and use of the LiPS program in the schools and the findings are less than remarkable, this study

offers a much more detailed description of treatment implementation than any other study

reviewed examining the efficacy of the LiPS program. Conway et al. (1998) examined

the effects of the LiPS program, formerly know as the Auditory Discrimination in Depth

(ADD) program, in a case study with a 50-year-old male whom had previously suffered

from a stroke that affected the left hemisphere of his brain. At fifteen months post-onset,

the patient was administered a series of pretest assessment measures and treatment began.

Treatment was performed one-on-one, for 2 to 4 hours per day, 5 days per week, and

totaling 101.1 hours over a two-month period (Conway et al., 1998). Six different

clinicians, each with extensive training in the program and between 5 and 10 years of

clinical experience, administered the treatment to the patient. The program was

implemented according to the sequence outlined in the program manual (Conway et al.,

1998). Conway et al. (1998) describe in some detail the four major components of

treatment (oral awareness training, simple nonword training, complex nonword-word

training, and multisyllable nonword-word training) implemented with this participant.

For example, the authors explained that, during the simple nonword training component,

one to two chains of ten nonsense segments (e.g., /ip/) were administered to the

participant using mouth pictures during each treatment session, totaling two to eight

chains per day. Once this task, which progressed from one to three phonemes, was

completed with 90 to 100 percent accuracy, the mouth pictures were replaced with

colored wooden blocks in order to create a less concrete representation of the phonemes

(Conway et al., 1998). Descriptions of each of the four major components of treatment

and benchmarks for advancement are included in this study and are described here in

greater detail than many other research studies detailing one-on-one implementation of the LiPS program.

Using a multiple probe design to monitor the progress of the individual and evaluate reading and spelling achievement outcomes, large gains were cited in phonological awareness, reading and spelling nonwords, and reading and spelling real words (Conway et al., 1998). Specifically, Conway et al. (1998) reported improved phonological awareness that was associated with improved reading and spelling for words that were phonologically regular. On pre- and posttest measures, the authors reported standard scores on the Woodcock Reading Mastery Test Word Attack subtest to be 99 at pretreatment and 112 at posttreatment, Word Identification subtest scores to be 99 at pretreatment and 103 at posttreatment, and Passage Comprehension subtest scores to be 117 at pretreatment and 124 at posttreatment (Conway et al., 1998). The patient was reported to have maintained treatment gains in phonological awareness and reading at two months posttreatment (Conway et al., 1998).

A few other studies have evaluated the efficacy of the LiPS program with specific populations using various research design methodologies. For example, Alexander, Anderson, Heilman, Voeller, and Torgesen (1991) evaluated the effectiveness of the Lindamood program with ten students with severe dyslexia. In this study, treatment was implemented one-on-one in a clinical setting, and participants received an average of 65 hours of LiPS training (range of treatment hours varied from 38 to 124 hours). From pretesting to posttesting, phonological awareness and decoding skills improved significantly (as measured by the Woodcock Reading Mastery Test and Lindamood Auditory Conceptualization Test). In another study, a description of the LiPS program

with suburban high school students with documented learning disabilities in the Midwest

(O'Dea, 1998) was presented. The students in this study received instruction in the

Lindamood program for 18 weeks, five days each week, for 55 minutes per day. Gains

from pretest to posttest were assessed using the Kaufman Test of Educational

Achievement. Results indicated that students made an average growth in reading

comprehension of one year and growth in decoding of approximately 6.5 months in the

18 weeks of Lindamood instruction. Improved attitudes toward reading were also noted.

Based on the information available, it did not appear that a control group was employed

in either of these studies.

Small group implementation

While there is limited empirical evidence supporting the use of the LiPS program

in both school and clinical settings when administered individually, even less research

has been conducted to evaluate the efficacy of this intervention with small groups or

classes of students. One study that did address issues of small group implementation of

the Lindamood program was McGuinness, McGuinness, & Donohue (1995). This study

compared three groups of first-grade children: one class at a Montessori school receiving

the Lindamood program in addition to traditional instruction (n = 15), one class at a

private school receiving the Lindamood program in addition to the traditional curriculum

(n = 15), and a control group at the private school receiving only the traditional

curriculum (n = 12). Teachers implementing the Lindamood program, referred to by the

authors as the ADD program, were trained by the second author for 32 hours in the

summer prior to treatment implementation, followed by a one-day practicum just prior to

the start of school, and a one-day refresher practicum prior to the second semester of the

project (McGuinness et al., 1995). The intervention was implemented in small groups of

five to seven children, for 20-30 minutes each day over an eight-month period. Pre- and post-testing was completed on all children participating in the study.

According to the researchers, both treatment groups significantly outperformed the control group on word attack and word identification measures. However, results indicated that the Lindamood program had a greater impact on decoding than word recognition, possibly due to the treatment program's heavy emphasis on phonologically regular and nonsense words (McGuinness et al., 1995). All three groups in this study increased noticeably on a measure of phonological awareness, and no significant differences were noted between the two experimental groups on any measure (McGuinness et al., 1995). Overall, the authors considered this small group implementation of the Lindamood program in these school settings to have been effective. "The adaptation of the ADD program to the classroom was effective to the extent that children who were taught by this method significantly increased their reading standard scores compared to their own initial performance, beyond what is normally expected" (McGuinness et al., 1995, p. 849). However, it should be noted that all three groups increased substantially on the Lindamood Auditory Conceptualization Test, a phonological awareness measure that reproduces some of the specific skills introduced in the Lindamood program. Additionally, authors of this study report equivalent success in successive experiments in which they eliminated some specific components of the Lindamood program (McGuinness et al., 1995).

One other study evaluating the Lindamood program as an effective reading intervention with groups of students was identified with outcomes that were less favorable. This study was conducted with both typically achieving students and students

receiving exceptional education services in the schools (Roberts, 1975). The treatment group consisted of 39 students with either average abilities or learning difficulties. The control group consisted of 29 students with similar academic characteristics. While both the treatment and control groups continued on with their traditional reading instruction, the treatment group also received instruction in the Lindamood program throughout the duration of the study. Phonological awareness (as measured by the Lindamood Auditory Conceptualization Test) and general reading achievement (as measured by the Metropolitan Achievement Test) were assessed prior to the intervention, subsequent to the intervention, and eight weeks after the intervention's termination. No statistically significant differences were noted between the treatment and control groups on the measured reading skills.

Overall, some limitations exist when drawing conclusions about the efficacy of the LiPS program for individual and group use. Despite some consistently identified student gains, descriptions of the methodologies or the actual treatment delivered were often limited in the studies described above. Therefore, it was unclear how closely treatment adhered to the Lindamood program as it was set forth in the training manual. Some studies stated that the treatment or intervention was based on the Lindamood program, but no detailed descriptions of the treatment were included in the articles. Moreover, it was unclear whether some studies included control groups or some form of alternate treatment, and many did not. Also, instructor training or previous experience with the LiPS program was not described in any detail in most of the studies, and sample sizes were often quite small.

Regardless, certain conclusions can be drawn regarding the extant literature examining the efficacy of the LiPS program. For those studies implementing the LiPS program with individual students, there is evidence to suggest that students made specific word-level reading gains in the most methodologically sound and empirically controlled studies. For example, in Torgesen et al. (1999), elementary students were randomly assigned to one of four conditions (three experimental conditions or a control group). Certified teachers underwent extensive training before delivering the instruction to study participants, and the children's progress was documented over a two and one-half year period. Results of this research indicated that students receiving the Lindamood program made significant gains in phonological awareness and phonemic decoding. While the research evaluating the LiPS program with group implementation is more scant, one empirically sound study (McGuinness, McGuinness, & Donohue 1995) demonstrated similar gains to those identified by Torgesen and colleagues. In fact, many of the studies described above demonstrated student gains in phonological awareness and increased word attack skills. For those studies using the Lindamood Auditory Conceptualization Test as a measure of student outcomes, gains were consistently noted in students receiving treatment in the Lindamood program. Based on these studies, evidence does not suggest, however, that gains in reading comprehension, word identification, and vocabulary skills are typically a result of instruction the Lindamood program. Nevertheless, some consistent gains have been noted across the LiPS research literature in specific word-level reading skills. Participants in these studies varied greatly in age (from five-years-old to adult) and included a range of academic ability levels.

Unfortunately, studies evaluating the efficacy of the Lindamood program with individuals or groups of students consistently fail to include detailed descriptions of the treatment. Specific details of the Lindamood program implementation are not offered in sufficient detail to assess treatment integrity. Therefore, in order to replicate these findings, more information is needed about treatment integrity or adherence to the Lindamood program as it was described in the program manual and how this affects student outcomes.

Purpose of this Study

Over the last three decades, reading researchers have learned a great deal about how children learn to read and why some students continue to struggle (Denton et al, 2003). One key foundational reading skill that has received significant attention is phonological awareness and its instruction (Snow et al., 1998; Torgesen, 2002). Phonological awareness involves an individual's ability to understand that spoken language is made up of smaller parts. Phonological awareness training has been found to be a crucial component of beginning reading instruction (Olofsson & Niedersoe, 1999; Smith et al., 1995; Torgesen, 2002). One reading program that offers phonological awareness training is the LiPS program.

While the LiPS program was originally designed for one-on-one implementation, this program is currently being employed in schools with individuals and groups of students. Empirical evidence exists to support the use of this program with individuals and small groups (e.g., McGuinness et al., 1995; Torgesen et al., 1999). Unfortunately, little documentation exists detailing the specific procedures that were followed in treatment implementation or how closely instructors adhered to the program as it was designed (i.e., treatment integrity).

The present study was designed to address some of the gaps in the literature relative the Lindamood program. The purpose of the present study is two-fold. First, the LiPS program was initially designed for individual treatment in the clinical setting, and much of the research addressing the efficacy of this program pertains to one-on-one implementation. However, instructors are presently being trained to implement this program in school settings, and many teachers have adapted this program to address the needs of students in small groups and whole classrooms. Therefore, the first purpose of this research is to examine issues surrounding the implementation of the LiPS program in the school setting with classes of students. Specific research questions related to treatment integrity include:

1.   When implementing LiPS in kindergarten classrooms with large groups of students, how closely do the instructors adhere to the program as described in the training manual?

2.   What decisions do instructors make about the program sequence in relation to student needs?

3.   How does program implementation vary across instructors when considering the training and experience of the two instructors?

4.   How does LiPS instruction differ from the classroom to clinical setting?

A second purpose of this study is to evaluate student outcomes in classrooms where the LiPS program is used as a regular part of the reading curriculum. Specific research questions related to student outcomes include the following:

1.   What gains do students demonstrate in reading after receiving instruction in the LiPS program?

2.   Do student academic gains differ on a measure more closely aligned with the LiPS program (i.e., the LAC) as compared to other standardized, norm-referenced measures?

3.   Does student reading achievement differ significantly from instructor to instructor?

Earlier research has examined some issues related to individual implementation of the LiPS program, with samples in these studies varying in age and severity of reading difficulty. However, these studies offer little insight into exactly how the treatment was implemented or the specific program sequence that was followed. Moreover, even less work has been done to empirically examine group implementation of this program in the school setting. This study seeks to examine the use of the LiPS program as an early intervention method and its application to a group or classroom setting.

CHAPTER 2
METHOD

Previous research has documented the efficacy of the LiPS program with individual

children (e.g., Torgesen et al., 1999) and with small groups of students (e.g., McGuinness

et al., 1995). Academic gains have been noted across studies in phonological awareness

and phonemic decoding skills. However, despite the empirical evidence to support gains

in word-level reading skills subsequent to instruction in the LiPS program, little

information is available regarding how the program was implemented in these studies.

Therefore, in order to replicate some of the findings related to LiPS efficacy, more

information is needed regarding treatment integrity. The purpose of this study was to

examine the treatment integrity of the LiPS program when it was incorporated into

kindergarten classroom reading instruction and the student progress and outcomes that

were achieved over the treatment period.

Participants

Participants included kindergarten students attending two local elementary schools

in North Central Florida. Two kindergarten classes from each school, with approximately

20 students per classroom (n =75), were involved in this study. Students were assigned to

each classroom by the school administration prior to the commencement of this research.

It was assumed at the outset of the study that each group was relatively commensurate

across academic performance levels, with higher and lower achieving students present in

each of the four classrooms. This was confirmed based on the pretest assessment data

collected. Informed consent was obtained from each participant's parent or guardian prior to the student's data being used for the study.

Settings

Two school sites participated in this research. School 1, the site of Instructor 1, was a laboratory school affiliated with the local state university. This school was considered a public school and served as its own school district within the state. The population of the school was diverse with respect to race and ethnicity and was selected to match the state in terms of Florida's socioeconomic and racial-ethnic composition. The school serves students from kindergarten through twelfth grade.

School 2, the site of Instructor 2, was a parochial school serving students in kindergarten through eighth grade. Families of children attending both schools underwent admission procedures and chose to have their children attend these particular schools.

In addition to the school settings where data was collected on whole classroom LiPS instruction, additional data was collected in a clinical setting where LiPS was used with children one-on-one. This clinical setting was a private facility in Central Florida offering remedial services to children and adults with learning difficulties. Individuals seeking assistance at this private center undergo a comprehensive evaluation, and interventions are designed to address the particular academic weaknesses of each person. The LiPS program is one of a number of remedial programs and interventions employed at this facility.

Instructors

Two instructors participated in this research. One instructor taught at each school, administering the Lindamood Phoneme Sequencing Program (LiPS) to students in her respective two classrooms. Each was a licensed speech pathologist and had been

previously trained in the LiPS program. The two instructors varied in their amount of overall clinical experience related to speech pathology, training received in the LiPS program, and specific experience administering the LiPS program to individuals and groups of students. An initial interview with each instructor was conducted early in the semester prior to program implementation to determine the level of training (where, when, number of hours) and experience (amount and type of experience – individual/group, clinical/school) each had attained with the LiPS program. The two instructors had worked collaboratively to offer speech/language services in the past; however, each individual designed and implemented the LiPS program independently at each school.

The LiPS instruction of two instructors was also observed in the clinical setting. These two instructors participated in extensive training and supervision in the LiPS program prior to their work with students at this facility. The two instructors at this clinical site had a combined total of approximately ten years of experience working with students using the Lindamood programs.

<div align="center">**Procedure**</div>

Two variables, treatment integrity and student outcomes, were assessed throughout this research. Each variable will be subsequently discussed.

Treatment Integrity

Many of the previous research studies examining the efficacy of the LiPS program employed experienced clinicians or classroom/intervention teachers trained directly by the program developers (Conway et al., 1998; Torgesen et al., 1999; Torgesen et al., 2001). Thus, while it may be assumed that these instructors strictly adhered to the program as outlined in the LiPS manual, little has been done to document the specific

program sequence that was followed during treatment by these or other less experienced instructors in the studies reviewed. In sections such as "Classroom and Clinical Activities" (p.24) and "Additional Ways to Practice Consonants in the Classroom and Clinic" (p. 82), the LiPS program manual (Lindamood & Lindamood, 1998) includes some information for classroom implementation to offer instructors ideas for practicing or reviewing previously introduced material with students. This study seeks to document and describe how closely each instructor adhered to the LiPS manual when implementing the entire program to classes of students, the decisions made by each instructor as the program was implemented in a classroom, and the types of modifications that were made to the program for group instructional purposes. From most of the previous research studies, it is unclear exactly how the treatment was implemented. Therefore, it is difficult to interpret or make generalizations regarding student outcome data that is presented in each study.

The daily and weekly lesson plans of each instructor were gathered in order to assess treatment integrity, or adherence to the program, as described in the LiPS manual. Additionally, the number of treatment hours each participant received was recorded, as indicated by the instructor lesson plans. Periodic, direct, classroom observations were conducted by the primary investigator to ensure that each instructor adhered to stated lesson plans and that lesson plans were revised when necessary to accurately reflect introduced material. Additionally, several forms were created by the primary investigator to collect data during the classroom observations. These forms included the Record of Program Delivery, the Classroom Observation Error Handling form, the Student

Opportunity to Respond form, and the Student Engagement/ On-Task Behavior form (see

Appendix A through D).

The Record of Program Delivery form was used by the primary investigator during

observations in each classroom at a minimum of eight points throughout treatment

implementation to document the occurrence or nonoccurrence of key program

components incorporated by each instructor into the instruction. The elements selected to

include on the Record of Program Delivery form were chosen based on the perceived

importance placed on these components by reviewing the LiPS training manual, as well

as the primary investigator's personal training and past experience in teaching the

Lindamood program. For each program or session component listed on the Record of

Program Delivery form, the page numbers from the LiPS manual are cited. During each

classroom observation, a Record of Program Delivery form was completed, and the

presence or absence of each component was recorded. For example, one point on the

form addresses whether the instructor avoided the use of the word "no' when a student's

answer was not the expected one. If a specific item was not applicable to that particular

session, then this was indicated on the form as well. For example, if the class lesson did

not include reading or spelling practice, then the assessment of student mastery was not

applicable.

The frequency or degree to which some of these key program components were

incorporated by each instructor into instruction was also assessed on at least eight

occasions throughout the intervention using the Classroom Observation Error Handling

form. From the Record of Program Delivery form, the frequency of occurrence for two

specific items was recorded. First, each time the instructor used a line of questioning to

lead the class or a particular student to a desired response, a tally mark was made. This is referred to as Socratic questioning in the LiPS training manual (Lindamood & Lindamood, 1998, p. 419). Also, each time the instructor questioned a student even though a correct response was made, a tally mark was recorded.

Student engagement was evaluated at least seven times per classroom throughout treatment using the Student Opportunity to Respond and Student Engagement/On-Task Behavior forms. Using the Student Opportunity to Respond form, the frequency with which each student orally responded during each classroom observation was recorded. Class lists were maintained, and a tally mark was made for each instance that an individual student responded directly to the instructor's question and the instructor acknowledged that response. On the Student Engagement/On-Task Behavior form, the number of students that were looking at the instructor at the end of each five-minute period was recorded. Again, this form was completed on at least eight occasions in each of the classrooms.

Furthermore, focused interviews were conducted with each instructor near the beginning, middle, and end of treatment (see Appendix F). This was done to obtain perspectives regarding what each individual instructor perceived to be effective during their LiPS instruction, adaptations or accommodations that were made to the curriculum, why specific curricular choices were made, and how they perceived implementation would differ if they were instructing in a one-on-one setting.

In order to make comparisons of how LiPS treatment implementation in a large group setting differed from a one-on-one instructional setting, additional observations were conducted in a clinical setting where the program was employed with students one-

on-one. Using the Record of Program Delivery and Error Handling Observation forms, observations were conducted of two instructors working individually with two different students across approximately two to four sessions per student (totaling twelve observations). The goal was to observe program presentation in a one-on-one instructional setting until stability across observations was achieved. Comparisons were then made of the similarities and differences in program implementation when conducted one-on-one versus in larger group settings.

Student Progress/Outcomes

At the outset of the school year, in September, pretest measures were administered to the participants individually over a two-week period prior to the initiation of the LiPS program in their classrooms. Posttesting was conducted at the culmination of the treatment period, during the month of February, again over a two-week period. The pre- and posttesting was conducted by the primary investigator and two other recruited volunteers trained in administering these measures. Total testing time was approximately 30 to 45 minutes each for pre- and posttesting. The order of the assessment measures given was counterbalanced in order to account for order effects. Once introduced, the LiPS program was implemented in each classroom in addition to the traditional curriculum. Termination of the treatment at each school was at the discretion of each instructor and was similar across both sites. The program was employed in each classroom at both school sites from approximately September to February.

Measures

Pretesting and posttesting to assess student achievement were conducted with the following measures:

Woodcock Johnson Tests of Achievement (WJ-III)

The WJ-III (Woodcock, McGrew, & Mather, 2001) is an individually administered, standardized, norm-referenced, achievement measure. Two reading subtests of the WJ-III were administered to participants in this study: Letter-Word Identification and Word Attack. The Letter-Word Identification task required the individual to decode real words in isolation. The Word Attack task required the student to identify individual sounds for some letters and decode nonsense words, assessing phonemic awareness skills in reading individual sounds and novel words.

From this measure, both raw scores and standard scores were obtained. This assessment tool is a widely used measure of reading achievement and has demonstrated adequate reliability and validity. For example, for children ages 5 to 19, the Broad Reading cluster, which includes Letter-Word Identification and measures of reading fluency and comprehension, has a median reliability of .93 (Woodcock et al., 2001). Test-retest correlations on the Letter-Word Identification and Word Attack subtests were .92 (n=106) and .79 (n=104) respectively, with one year between administrations for children ages four to seven at first testing (Woodcock et al., 2001). In addition, concurrent validity for Broad Reading has been documented with validity coefficients ranging from .633 to .857 with various measures of intelligence and achievement (Hintze et al., 2001).

Comprehensive Test of Phonological Processing (CTOPP)

The CTOPP (Wagner, Torgesen, & Rashotte, 1999) is an individually administered, norm-referenced measure that is used to evaluate various facets of an individual's phonological awareness and processing. The following subtests of the CTOPP were administered to participants in this study: Elision, Blending Words, and Sound Matching. The Elision task measured how well the student could identify and

manipulate word chunks or individual phonemes within orally presented words. For example, in this task, the student was asked to complete items such as saying the word *hotdog* without saying *hot* or saying the word *goat* without saying /g/. The Blending Words task assessed the individual's ability to combine, or blend, orally presented syllables, onset-rimes, or phonemes. Finally, the Sound Matching Task evaluated the student's ability to identify objects that contained the same initial or final sound as a presented word. For example, which word starts with the same sound as *cat*? *hat*, *car*, or *dog*? The Elision, Blending Words, and Sound Matching subtests comprised the Phonological Awareness Composite, and both raw and standard scores were obtained for the three tasks and composite.

Internal consistency reliability estimates have been reported to be .96 for the Phonological Awareness Composite for children aged five to six years (Hintze, Ryan, & Stoner, 2003). Moreover, internal consistency reliability for specific tasks, Elision, Blending Words, and Segmenting Words, ranges from .84 to .89 (Rashotte, MacPhee, & Torgesen, 2001). Regarding criterion-related validity, the correlation between the Phonological Awareness Composite of the CTOPP and the Letter-Word Identification task of the Woodcock Reading Diagnostic Battery was found to be .65 (Havey, Story, & Buker, 2002).

Dynamic Indicators of Basic Early Literacy Skills (DIBELS)

DIBELS (Good, Kaminski, Laimon, & Johnson, 1992) involves brief curriculum-based assessment probes that can be used to monitor student progress and serve to identify children with reading difficulties. National normative data corresponding to benchmarks is available for the various DIBELS tasks. The Letter Naming Fluency (LNF) and Phoneme Segmentation Fluency (PSF) tasks were administered to the

participants in this study. The LNF task required the student to rapidly name as many lower and upper case letters as possible from a provided page in one minute. The raw score is the total number of letters correctly identified in one minute. The second task, PSF, required the student to segment orally presented real words in a one-minute period. The raw score achieved is the total number of phonemes correctly identified in one minute.

Reliability and validity data exists to support the use of these curriculum-based probes. Alternate forms reliability coefficients for the LNF task have been documented to range from .86 (Speece, Mills, & Ritchey, 2003) to .93 (Kaminski & Good, 1996). Regarding concurrent validity, correlations for the LNF task with the Letter-Word Identification subtest of the WJ-III were .77 (Speece, et al., 2003), .75 for LNF with the Woodcock-Johnson Skills cluster that included the Letter-Word Identification task, and .60 for PSF with the same Woodcock-Johnson Skills cluster (Elliott, Lee, & Tollefson, 2001). Additionally, Hintze et al. (2003) examined the concurrent validity of the DIBELS measures with the CTOPP using data from 86 kindergarten students. Data revealed that the DIBELS kindergarten readiness tasks strongly correlated with most subtests and composite scores of the CTOPP. Specifically, both LNF and PSF correlated with the CTOPP Phonological Awareness Composite at .53.

Lindamood Auditory Conceptualization Test (LAC)

The LAC (Lindamood & Lindamood, 1971) is an individually administered assessment tool that measures phonological awareness abilities through a series of tasks involving the manipulation of colored blocks. After an elaborate training process wherein the examiner teaches the assessee how the colored blocks can be used to represent individual sounds that are sequenced from left to right, the individual's ability to identify

and represent phonemes and nonsense words with the blocks is measured. For example, the examiner might ask the student to use the colored blocks to represent the following: */p/ /b/ /t/*. The student must recognize that three sounds were presented, and each sound was different. Therefore, the student would present three different colored blocks to represent the prompt. As the items become increasingly more complex, the student must use the colored blocks to represent phonemes within words and manipulate these blocks to reflect changes made to the words (e.g., from /ap/ to /op/ or /sik/ to /siks/).

On the LAC, raw scores are entered into a formula to achieve a Total Converted Score. This formula allows for items of greater complexity to be given greater weight. The maximum score allowable is 99, and benchmarks, or Recommended Minimum Scores, are offered for each grade level from kindergarten through adult. As stated on the test protocol, by the end of the first half of kindergarten, a child should achieve a minimum score of 31, and this score should be at least 40 by the end of the second half of the kindergarten year.

Of the pre and post measures used in this study, the LAC was most closely aligned with the LiPS program. The same individuals who devised the LiPS program developed this assessment tool. Additionally, the tasks completed during the LAC assessment are included in the instruction of the LiPS program as outlined in the training manual.

Published reliability and validity research relative to the LAC test are significantly more scant than for the other assessment measures employed in this study. In one study of 660 students ranging in grade from kindergarten through grade 12, correlations between student LAC and Woodcock Reading Mastery Test (WRMT) reading and spelling performance yielded scores of .66 to .81, with an average of .73 (Lindamood,

1972). In addition, test-retest reliability using alternate forms of the LAC at least four weeks apart on a sample of 52 students in kindergarten through grade 12 was reported at .96 (Lindamood & Lindamood, 1971).

Analysis of Data

One goal of this study was to document and describe the LiPS program and how it was translated from a one-on-one to large group instructional setting. The lesson plans and interviews were employed to create a description of how the two instructors adapted the LiPS program to a classroom setting. Using data collected from the Record of Program Delivery and the Classroom Observation Error Handling forms, a description was developed detailing how closely the instructors adhered to the LiPS program as described in the program manual and how rigorously the instructors incorporated key components of the program into their classroom instruction. In addition, decisions the instructors made during treatment were described (from observational and interview data), and variance between instructors/classes was detailed.

A second goal of this study was to determine whether the students made progress or demonstrated academic gains in a program that was adapted to a large group setting. Pre- and posttest data was expressed descriptively (e.g., means across classes for each measure) and analyzed statistically. Raw score differences from the pre- and posttest measures (WJ-III, CTOPP, DIBELS, and LAC) were analyzed using ANCOVA procedures to control pretest scores and look at posttest differences between instructors and between schools. Statistical analyses were conducted to determine whether the students of one instructor made significantly greater gains from pre- to posttest than the other instructor. Additionally, a Repeated Measures ANOVA (2x4) was conducted using all four assessment measures to determine if student academic gains differ on a measure

more closely aligned with the LiPS program (i.e., the LAC) as compared to other

standardized, norm-referenced measures. Lastly, benchmark data were analyzed for the

measures best suited for monitoring student progress (i.e., DIBELS, LAC) to examine

percentages of students at each school meeting certain criteria at pretesting and

posttesting.

CHAPTER 3
RESULTS

The primary purpose of this study was to examine how the Lindamood Phoneme

Sequencing Program for Reading, Spelling, and Speech (LiPS) was adapted and

implemented with large groups of kindergarten students in a classroom setting. Over the

course of a six month period, two instructors at two different school sites offered

supplemental reading instruction to two classrooms each (four classrooms total in study,

75 kindergarten students) using the LiPS program. Descriptive information, including

classroom observations, instructor interviews, and lesson plans, was gathered to better

understand what this program, a program initially designed for one-on-one clinical use,

looked like when it was modified to meet the needs of a group of students in a classroom

setting. Three specific questions guided this research to ascertain treatment integrity and

the delivery of instruction.

1. When implementing LiPS in kindergarten classrooms with large groups of students, how closely do the instructors adhere to the program as described in the training manual?

2. What decisions do instructors make about the program sequence in relation to student needs?

3. How does program implementation vary across instructors when considering the training and experience of the two instructors?

To answer these questions, information was gathered to monitor how this program

was implemented and the students' response to the intervention. In other words, which

program path or sequence did instructors choose, which program components were

included or omitted, what decisions did instructors make in response to student progress,

and how engaged were the students during this intervention time? Regarding treatment integrity, two global factors were considered during the data collection as LiPS was implemented to whole classrooms of kindergarten students: instructor decision-making during intervention delivery (i.e., adherence to program design) and student engagement or responsiveness during the LiPS instruction.

In addition, the results of observations conducted in a clinical setting where LiPS was employed during one-on-one instruction are presented for comparison. Issues of treatment integrity and adherence to the program manual can exist regardless of group size. However, this program was initially designed for use with individual students in a clinical setting, and it was important to consider whether program implementation varied in these two different environments. Specifically, data were gathered to ascertain whether differences existed in the inclusion of key program components between the one-on-one and classroom-based LiPS instruction.

Lastly, pretest and posttest data were collected on the students in the kindergarten classrooms to assess student outcomes. The pretest and posttest data provided a means to quantify student reading gains across the treatment period. Various reading assessment measures were used to evaluate such skills as phonemic awareness, decoding, and letter naming fluency in the kindergarten participants. One measure of particular interest was the Lindamood Auditory Conceptualization test (LAC), a measure closely aligned with the LiPS program and designed to assess a student's ability to detect sameness and difference in sounds.

Descriptive Data

Whole Class Instruction

To ascertain how this program was implemented by the two instructors and the students' response to the LiPS instruction, observations were conducted in the four participating kindergarten classrooms. Over the six months of classroom intervention, weekly observations of the intervention implementation were performed, and the instructors' daily lesson plans were collected. In addition, interviews with the instructors were conducted at the beginning, middle, and end of treatment. Four specific forms were generated for this research to capture as much information as possible about treatment integrity, student response to the intervention, and the decisions instructors made throughout program implementation. The forms included a Record of Program Delivery, Error Handling, Student Opportunity to Respond, and Student Engagement/On-Task Behavior. Refer to Appendix A through D for each of these four observation instruments. The Record of Program Delivery form was completed during each classroom observation. Using this form, the presence or absence of specific program components was recorded. Included on this form were critical aspects of the program that should be present during each LiPS session. The Error Handling form was used to record frequency with which the instructors employed questioning in their instruction, particularly when errors were made, to lead the student to the desired response. The Student Opportunity to Respond form was employed to track the number of times each student engaged in dialogue with the instructor during instruction. Lastly, the Student Engagement/On-Task Behavior form employed a time sampling method to record the number of students engaged in instruction at certain intervals during instruction.

Table 1 displays the number of observations that were conducted by school and classroom over the intervention period. Each classroom was observed a minimum of seven times, with a range from seven to sixteen distinct observations in each classroom. Some classes were observed more often due to the frequency with which the instruction was delivered (e.g., Instructor 1 was in her classrooms two to three times per week; Instructor 2 delivered new instruction in her classrooms one time per week).

Table 1. Number of Observations by Instructor for Whole Group Intervention

	Instructor 1		Instructor 2	
	Classroom 1	Classroom 2	Classroom 3	Classroom 4
Record of Program Delivery	11	15	8	8
Error Handling	10	13	10	8
Opportunity to Respond	10	11	7	7
On Task	8	16	10	9

In addition to the classroom observations, interviews were conducted with each instructor prior to and throughout the intervention period. The Initial Instructor Interview was conducted with both instructors prior to LiPS implementation to ascertain their respective levels of training and prior experience with the program. Additionally, the researcher met with each instructor near the beginning, midway through, and at the conclusion of the intervention period to discuss their thoughts regarding student progress and decisions about program implementation. Therefore, a total of four interviews were completed with each instructor at various points throughout the study.

The presentation of the descriptive data for whole class LiPS instruction will be organized under two concepts: treatment integrity and delivery of instruction. Treatment integrity consists of the inclusion of key program elements and the program paths that each instructor selected. Delivery of instruction includes a discussion of the decisions that

the instructors made based on the needs of the classroom teachers, the students, and their respective levels of training and experience with the LiPS program. Subsequent to the presentation of the descriptive data for whole class instruction, data will be presented regarding the observations conducted in a one-on-one setting. Lastly, student outcomes data related to whole class LiPS instruction will be presented.

Treatment Integrity

The purpose of conducting classroom observations and collecting daily lesson plans was to assess the degree to which the instructors followed the program as it was designed to be implemented. In other words, data were collected to determine how closely the instructors adhered to the program scope and sequence as described in the LiPS Trainer's Manual (Lindamood & Lindamood, 1998). This was assessed by comparing the instructors' lesson plans with the sequence of skills to be introduced as delineated in the program manual and using the devised observation forms to assess the presence or absence of particular program components and delivery techniques.

Inclusion of key program elements

At the outset of the program, LiPS offers instruction in phonemic awareness at the oral level. Students hear, see, and feel the physical characteristics of sound units and work to compare and contrast them. "The major premise of the LiPS Program is that the auditory element of speech sounds should not be separated from the more basic oral-motor activity that produces the sounds" (Lindamood & Lindamood, 1998, p. 7). A signature component of this program is the "mouth pictures." As soon as the student is introduced to the first sounds, mouth pictures are paired with those sounds so as to offer a visual representation of what the mouth should look like when specific sounds are produced.

A focus on oral awareness and individual sound units was precisely what occurred in the classrooms of both instructors. Students were introduced to individual sounds, and mouth pictures were paired with each set of consonant sounds that was introduced. For example, the first consonant sounds that were introduced by both instructors were /p/ and /b/. These sounds are identified with the label "Lip Popper" because, in order to produce these two sounds, one's lips are pushed together and then pop open. A picture card, or mouth picture, was paired with the discussion of these sounds. The basic dialogue offered in the LiPS manual to introduce this consonant pair and all others was employed by both instructors.

Table 2. Record of Program Delivery, Percentages of Observations by Instructors Across
Intervention Period

GENERAL	Instructor 1	Instructor 2
T. reviews previously introduced material at beginning of session	92%	100%
S. provided with/encouraged to use mirror when introduced to or practicing new sounds	0%	0%
All Ss. observed to be actively engaged in learning process	8%	13%
TRACKING, READING, SPELLING	Instructor 1	Instructor 2
S. instructed to follow 3 steps in Tracking – repeat words, touch & say, make change	0%	0%
T. questions S. about label of sounds during Tracking	100%	100%
Real and nonsense words used in Tracking/Reading/Spelling	69%	50%
T. assesses S. mastery on T/R/S chains before new material introduced	0%	0%
ERROR HANDLING	Instructor 1	Instructor 2
T. incorporates *responding-to-response* (allows student to self-correct)	100%	94%
T. uses line of questioning to lead S. to desired response (Socratic)	96%	87%
T. avoids use of word "no" when student's answer is not expected one	85%	75%
T. questions S. even when correct response provided	8%	31%
T. avoids providing correct answer for S. having difficulty	27%	88%

Differences were noted, however, in the inclusion of some key program elements, as measured by the Record of Program Delivery form. These data are displayed in Table 2. The numbers noted in this table indicate the percentages of observations in which each program component was present. One important element that can be employed to help the students see what their mouths are doing during sound introduction was omitted by both instructors. Mirrors are suggested as a way to support the student with more sensory input until the mouth action can be felt strongly (Lindamood & Lindamood, 1998, p. 47). As new sounds were introduced, both instructors discussed with the students what their mouths looked like and paired the new sounds with mouth pictures to visually represent the sounds, but neither instructor included mirrors in their instruction (0% of observed sessions for Instructor 1 and Instructor 2 as measured by Record of Program Delivery form).

Student engagement, as measured by the Record of Program Delivery form, was another key program element that was calculated for each instructor. During each observation, it was recorded whether all students were observed to be actively engaged in the learning process, and the presence of this component was recorded only if *all* students appeared to be engaged in the instruction. For Instructor 1, this occurred during 8% of the observations; for Instructor 2, this occurred during 13% of the observations. More detailed information regarding student engagement was collected using the Student Engagement/On-Task Behavior form, and the results of this data will be presented later in the Delivery of Instruction section.

Instructor differences were present in the incorporation of another key program element: Tracking. Tracking refers to the process of sequencing mouth pictures or

colored blocks to represent the number, order, and sameness of sounds heard auditorally. This task can be accomplished with isolated sounds, single syllable words, and multisyllable words. "Tracking develops the students' ability to compare and contrast sequences of speech sounds and represent them visually" (Lindamood & Lindamood, 1998, p. 93). While Tracking in the LiPS program is traditionally completed with colored blocks and felts to represent individual sounds and syllables, it can be accomplished with the mouth pictures for younger or severely impaired students. For example, with mouth pictures, the examiner would say a series of sounds (e.g., /p/ /b/ /d/), and the student(s) would identify the mouth pictures that represented that sequence of sounds (i.e., lay out the mouth pictures to represent the lip popper, lip popper, tongue tapper).

It should be noted that Tracking with mouth pictures is essentially Spelling prior to the introduction of letter symbols. In other words, mouth pictures are used to represent the order and sameness of sounds prior to the introduction of symbols. Once letter symbols are introduced, these two tasks become different. Tracking continues to hone in to those phonemic awareness skills, focusing the student's attention on the sounds that they hear and making the changes in the mouth pictures (or colored blocks) only where they hear the changes in the presented sequence (e.g., from /p/ /b/ /d/ to /p/ /p/ /d/ - only the second sound changes in this sequence). Once letter symbols are introduced, Spelling then taps into different skill sets, assessing the student's ability to represent sounds with letters. For both instructors, Tracking was only completed with mouth pictures. Colored blocks were never employed for Tracking by either instructor.

Certain instructional elements of the Tracking process were specifically noted during observations using the Record of Program Delivery form. First, when appropriate,

both instructors questioned the students about the labels for the mouth pictures. This occurred during 100% of the observations during Tracking. Another observation worth noting is the instructor variability in the selection of real and nonsense words employed for Tracking, Reading, and Spelling. The necessity of incorporating nonsense, or pseudo words, into LiPS instruction is explicitly stated in the program manual. Especially in the beginning stages of the program, the inclusion of nonsense words allows the student to experience more extensive Tracking, Reading, and Spelling practice with two sound, consonant-vowel and vowel-consonant combinations than if the student were limited to real words alone (Lindamood & Lindamood, 1998). Instructor 1 incorporated real and nonsense words into her instruction all of the time for one classroom and half of the time for the other classroom (For the other half of this instructional time, she sometimes only used real words and sometimes only used nonsense words). Instructor 2 used this second approach and presented both real and nonsense words to the students for Tracking, Reading, and Spelling half of the time in her respective two classrooms. Lastly, regarding Tracking, Reading, and Spelling, neither instructor employed any means of assessing student mastery prior to introducing new material.

Even the process of Tracking was observed to look differently in the respective classrooms of the two instructors. The LiPS manual suggests that, while Tracking can be introduced to a whole class of students, intensive practice should be conducted in small groups or individually "to assure attention to individual differences in perceptual difficulty" (Lindamood & Lindamood, 1998, p. 94). The way that this task was implemented differed by instructor. Instructor 1 employed two different means to accomplish Tracking during her lessons. At times, she would complete Tracking

classwide. Using mouth pictures printed on 8 ½" by 11" sheets of paper, she would provide a series of sounds or a given word and have students stand in front of the larger group holding the mouth pictures that represented their sounds. For example, if the sounds were /p/ /f/ /k/, three students would stand holding their respective mouth pictures. If the sequence of sounds changed from /p/ /f/ /k/ to /t/ /f/ /k/, the first student would be seated and another student would take her place with the new mouth picture to represent the sound that changed. At other times, Instructor 1 would have the students complete Tracking with their own individual sets of mouth pictures. Instructor 2 only completed Tracking class wide. For Instructor 2, no student completed his or her own individual Tracking chains.

A section of the Record of Program Delivery form was devoted to monitoring Error Handling, or the ways in which the instructors offered verbal feedback to the students during instruction. An important instructional element included under Error Handling that was considered during observations of instruction was the use of "responding to the response" (Lindamood & Lindamood, 1998, p. 14). The overarching goal for instruction is to foster independence in reading and spelling, and this technique allows the student to self-monitor and self-correct their work. "You cannot *tell* this information to your students; you need to ask them questions and ask them to do things so that they use their own sensory-cognitive systems to discover information and arrive at concepts" (Lindamood & Lindamood, 1998, p. 47). According to Lindamood and Lindamood (1998), this is the most critical element in the interactions between the instructor and the students at every level of the program. As reported in Table 2, both instructors were observed to consistently incorporate the "responding to the response" technique in their

instruction (Instructor 1 = 100% of observations, Instructor 2 = 94%). For example, on one occasion, when a student responded incorrectly to a question, Instructor 2 redirected the student back to the mouth pictures hanging at the front of the room and used a series of questions to guide the student to the desired response.

Another program element related to Error Handling that was noted to occur infrequently during instruction involved the level of questioning instructors included when the students' responses were correct. It is deemed important to question students about their responses and decisions regardless of their accuracy in order to promote self-monitoring and self-correcting. As stated in the LiPS manual (Lindamood & Lindamood, 1998), "Questioning students only when they are wrong gives them a set toward self-doubt and impulsive changing of answers when questioned" (p. 419). As measured by the Record of Program Delivery form and noted in Table 2, both instructors included this component inconsistently (during 8% of the observations for Instructor 1, 31% of the observations for Instructor 2).

Program paths

Outlined in the LiPS Trainer's Manual are two distinct program paths, Vertical and Horizontal, which can be followed in introducing new concepts to students as they move through the program (Lindamood & Lindamood, 1998, p. 16). The content of each path remains the same; variation occurs only in the sequence of concepts introduced. The Vertical Path allows for the presentation of three consonant pairs and three vowels, then moves the student quickly into Tracking, Reading and Spelling with these sounds. The Horizontal Path presents all of the consonant sounds first, then the vowel sounds, and then introduces Tracking, Reading, and Spelling with all of the sounds. Figure 1 offers a visual depiction of the first few program elements as they would be introduced for each

path. The manual suggests the Vertical Path for young students (Lindamood &

Lindamood, 1998), such as those in this study.

```
┌─────────────────────┐
│  Setting the Climate │
│     for Learning     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Discover / Label 1ˢᵗ 3 │
│   Consonant Pairs    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│   Track Isolated     │
│     Consonants       │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Discover Vowel Circle / │
│    Label 3 Vowels    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│     Track/Read/      │
│ Spell Simple Syllables │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Discover / Label Remaining │
│   Consonant Pairs    │
└─────────────────────┘
```
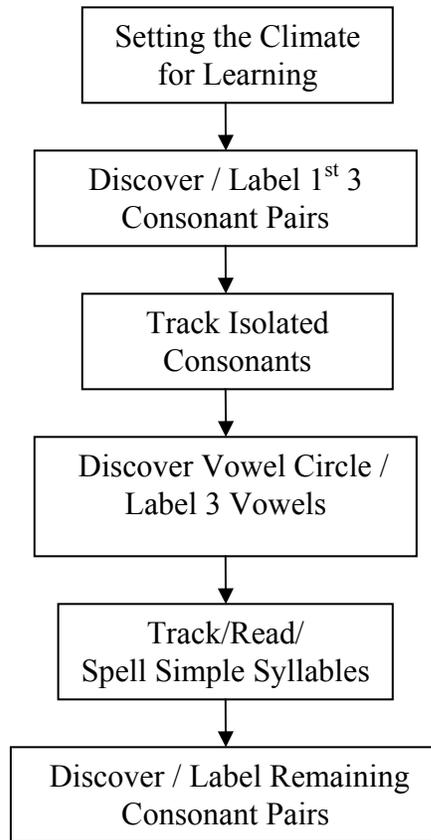
Figure 1. Vertical Program Paths (Recommended)

```
┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│ Setting the  │→  │  Discover/   │→  │  Discover/   │→  │  Discover/   │→  │  Discover    │
│ Climate for  │   │ Label 1ˢᵗ 3  │   │    Label     │   │    Label     │   │   Vowel      │
│  Learning    │   │  Consonant   │   │  Remaining   │   │    Other     │   │   Circle/    │
│              │   │    Pairs     │   │  Consonant   │   │  Consonant   │   │   Label 3    │
│              │   │              │   │    Pairs     │   │    Groups    │   │   Vowels     │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
```
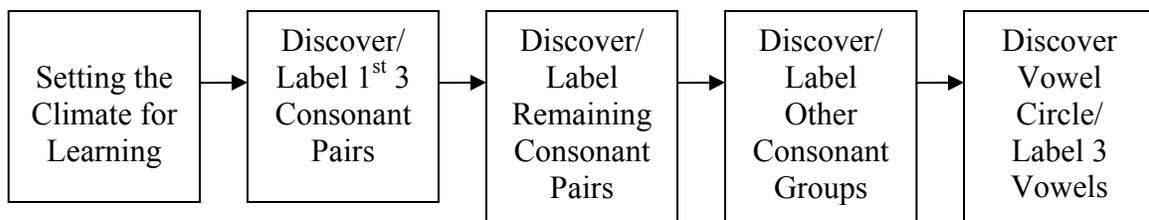
Figure 2. Horizontal Program Paths

Instructor 1

Instructor 1 chose the Vertical Path to introduce new concepts to the kindergarten

students. She moved through the Vertical Path, introducing new concepts in the following

manner: After setting the climate, this instructor introduced four consonant pairs (Lip Poppers, Tongue Tappers, Tongue Scrapers, Lip Coolers) followed by three vowel sounds (/ee/, /o/, /oe/), then proceeded to Tracking/Spelling and Reading with mouth pictures. Next, two new consonant pairs were introduced (Skinny Air, Fat Steady Air), followed by the vowel sounds /ae/ and /oe/. One consonant pair, Fat Pushed Air, was omitted altogether. Subsequent to Tracking, Reading, and Spelling with the above mentioned sounds, the Tongue Cooler and Tongue Lifter were introduced last, and Tracking, Reading, and Spelling resumed with all of these sounds. Instructor 1 chose to introduce letter symbols to the students at Lesson 6. As mentioned previously, Tracking was only ever completed with the mouth pictures; blocks for Tracking were never introduced. However, Instructor 1 did mention in her final instructor interview that she would have incorporated blocks for Tracking had she been implementing this program one-on-one. She expressed that small manipulatives were difficult to manage with the larger group of students.

Instructor 2

Instructor 2 selected the Horizontal Path to introduce new concepts to the students. Instructor 2 moved through the Horizontal Path, introducing new concepts in the following manner: First, all of the consonant pairs, or "brothers," were presented (i.e., Lip Poppers, Tongue Tappers, Tongue Scrapers, Lip and Tongue Coolers, Skinny Air, Fat Steady and Pushed Air sounds). Next, the three "cousins" were presented (i.e., Windy, Nose, Tongue Lifters). Then, the vowels /ee/, /o/, and /oo/ were introduced. Lastly, students completed Tracking (mouth pictures only), Reading, and Spelling with these sounds. Letter symbols were introduced to the students at Lesson 12. Similar to Instructor 1, blocks for Tracking were never introduced during the course of program

implementation, and, during the instructor interviews, she made no mention of a desire to include this component in her instruction.

Delivery of Instruction

Decision based on needs of classroom teacher and school

The instructors negotiated with each of the four classroom teachers regarding how the LiPS intervention would be delivered to the students. Therefore, the days and times of instruction varied by school, as well as the total instructional time across the intervention period. Table 3 presents how the LiPS intervention was delivered across instructors and classrooms. While both instructors spent similar amounts of time in the classrooms, with Instructor 1 averaging 15 total hours and Instructor 2 averaging 14 total hours per classroom across the intervention period, the way that the instruction was delivered varied by school site. For example, Instructor 1 delivered the LiPS intervention in her respective classrooms three to four times per week in twenty-minute sessions. Instructor 2 spent forty-five minutes in each classroom one day per week. Furthermore, as reflected in Table 3, the classroom teachers at Instructor 2's school site reviewed recently introduced content with the students on days that Instructor 2 was not present. According to the LiPS Trainer's Manual, "in a classroom situation, a formal work period and follow-up reinforcement should be provided daily for a minimum of 40 to 50 minutes if competency in Tracking, Spelling, and Reading is desired into the complex syllable level within 2 to 3 months" (Lindamood & Lindamood, 1998, p. 18). Due to the grade level of the intervention students (i.e., kindergarten), the children were not expected to reach the complex syllable level. Regardless, the intervention was not intensive at either school site so as to meet the criteria of 40 to 50 minutes daily.

Table 3. Description of Instruction: Sessions, Time, and Delivery

	Instructor 1		Instructor 2	
	Class 1	Class 2	Class 3	Class 4
Whole Class Sessions	20	9	14	14
Small Group Sessions (concurrently)	19		28	28
Switch to Small Group Sessions		42		
Session Length	20 min sessions	20 min sessions	30 min sessions (15 min whole class, then 15 min small group table activities); 15 min for small group	30 min sessions (15 min whole class, then 15 min small group table activities); 15 min for small group
<u>Total Instructional Time:</u> Time in Whole Class	6 hours 40 min	3 hours	7 hours	7 hours
Time in Small Group	6 hours 20 min	14 hours	7 hours	7 hours
Notes	3 times per week, 2 days whole class *and* 1 day small group of 5	4 times per week, whole class – 2 groups of 10, *then switch to* small group of 7	1 day per week, then teacher reviewed content (~5 hours); on some occasions during observations, instructor divided class in ½ for "whole class" instruction	1 day per week, then teacher reviewed content; on some occasions during observations, instructor divided class in ½ for "whole class" instruction

As reflected in Table 3, the two instructors also varied in the delivery of the

intervention relative to group size (i.e., whole classroom versus small group). In fact,

Instructor 1 delivered the LiPS intervention to her two respective classrooms differently

based on the previously established curricular organizations of the classroom teachers.

For Instructor 1, in Classroom 1, she spent two of her days each week engaged in whole class instruction and one day per week with a small group of five students both she and the classroom teacher deemed as most in need of additional instruction. In Classroom 2, Instructor 1 introduced the LiPS program to the whole class. Then, after nine sessions, she switched to small group instruction and continued to work only with the seven students deemed most in need of the intervention by the classroom teacher. These seven students continued with the intervention during their center time while the remainder of the students in the class attended other centers during that time. For Instructor 2, the LiPS intervention was delivered similarly across her two respective classrooms. She divided each class in half. Then, half the students worked with Instructor 2 to learn new content while the remainder of the class completed table activities to review previously learned material. After 15 minutes, the groups switched (i.e., 15 minutes of instruction for those previously working on small group table activities, 15 minutes small group table activities for those previously engaged in instruction with Instructor 2).

The school sites also varied in their plans for the duration of the LiPS intervention, and this affected the decisions the instructors made regarding the delivery of instruction. At the school site of Instructor 1, the classroom teachers had no specific time frame for program implementation or duration of instruction. Instructor 1 had discretion to continue the intervention as long as she deemed necessary and appropriate. At the second school site, the teachers desired to complete the LiPS program by the winter of the school year (i.e., February) and introduce a different intervention program to the students at that time. Therefore, Instructor 2 anticipated that she would have a specific number of weeks at the outset to work with the students.

While both school sites agreed to have the instructors come into the classrooms to work with the kindergarten students, the school in which Instructor 2 was working was more enthusiastic about the process. Furthermore, the level of classroom teacher involvement varied by school, and by classroom to some extent. At Instructor 2's school site, both teachers desired to learn the program themselves as their students were introduced to it. These two teachers reviewed the LiPS program manual and closely followed the students' instruction. Additionally, both teachers at this site prominently displayed large mouth pictures in their classrooms and independently reviewed previously introduced material with the students on the days that Instructor 2 was not teaching. In contrast, the classroom teachers at the school site of Instructor 1 demonstrated less interest in learning the program themselves and were available during LiPS instruction primarily for classroom monitoring and management of student behavior. During the instructor interview that was conducted after only a few days into the intervention period, Instructor 1 expressed some frustration with the limited amount of classroom teacher involvement and support in the process. Specifically, she noted that the teachers did not display the mouth pictures in the classroom or reinforce the LiPS content with students at times when Instructor 1 was not in the classroom. Additionally, Instructor 1 stated that it was difficult for her to bring her materials to the different classrooms each day and negotiate space in the rooms. For example, she noted that even finding markers and space on the board to write were difficult on some days. During instructor interviews that were conducted throughout the intervention process, Instructor 2 did not mention any classroom or teacher factors that affected her choices in the delivery of the LiPS intervention.

Decisions based on needs of students

During the course of the intervention period, both instructors made decisions regarding the delivery of instruction based on student needs. First, decisions about the sizes of the groups receiving instruction in the various classrooms changed during the intervention period. For example, in Classroom 1, Instructor 1 previewed new material with a small group of five students (deemed by herself and the classroom teacher as most at-risk or in need of additional instruction) the day before the content was introduced to the whole class of students. In another instance, Instructor 2 modified her LiPS instruction to incorporate small group table activities to reinforce newly introduced material. The decision of Instructor 2 to divide each classroom of students into two groups was also made after she introduced new content to the entire classes of students initially; she expressed that behavior management issues with whole classrooms of students made it difficult to introduce new material effectively. Therefore, she modified the instructional arrangements for her two classrooms and how she delivered LiPS instruction based on student needs.

Second, regarding the pace of instruction, Instructor 1 had more discretion to introduce material slowly and based on her perceptions of student mastery. Instructor 2, however, was not able to consider student needs as much in her decisions regarding when to introduce new content. From the outset and as mentioned previously, Instructor 2 was aware that she had a specific time period in which to deliver the LiPS intervention to the students at this school site. Therefore, Instructor 2 chose to introduce a new concept to her students at each session and based this decision more on the needs of the teachers. She did express, however, in the instructor interview at the outset of the intervention that she desired a slower pace and recognized that it was not feasible in the classroom setting

in the time frame that was allotted for this intervention. Additionally, Instructor 2

mentioned that, if she were implementing this program one-on-one, she would have

followed more closely with the pace of the students in introducing new material. With the

larger groups of students in her classrooms, Instructor 2 expressed that she attempted to

aim the pace of her instruction to the "middle" students, while at the same time reviewing

previously introduced material and introducing something new each session. Regarding

the pace of instruction, Instructor 1 voiced similar comments during the interviews. Even

from the outset of the intervention, Instructor 1 felt that she would be further along in the

program had she been working with a student one-on-one. Regardless of the pace of the

students in each classroom, Instructor 1 stated that she attempted to keep both classrooms

at the same instructional pace.

While student engagement data was collected throughout the intervention period

for research purposes, neither instructor employed any sort of specific behavior

management system nor written records of student progress in the intervention. However,

during interviews, both instructors recognized from the outset that management of

student behavior was one of the most difficult aspects of implementing the LiPS

intervention with whole classes of students. In fact, as mentioned previously, this was one

reason Instructor 2 modified her instructional arrangements only a few sessions into the

intervention. Additionally, both instructors were able to elicit assistance from the

classroom teachers to manage student behavior, at least to some extent or on some

occasions.

While neither instructor collected specific data on student engagement, this data

was collected throughout the duration of the intervention period by the primary

investigator using the Record of Program Delivery and the Student Engagement/On-Task

Behavior forms. The Record of Program Delivery form offered information regarding

whether *all* students were engaged in the LiPS instruction for a given observation period.

As mentioned previously, for Instructor 1, this occurred during 8% of the observations;

for Instructor 2, this occurred during 13% of the observations.

However, more detailed information was also collected using the Student

Engagement/On-Task Behavior form. With this form, a time sampling method was used

to record the number of students engaged in instruction at designated time intervals.

During each observation, the number of students looking at the instructor at the end of

each five minute time period was recorded. The number of students looking at the

instructor was considered the best means of quantifying and recording student

engagement in a concrete, observable way. From this information, percentages were

calculated for students engaged based on the number of students in attendance during

each observational period, and an average was calculated across classrooms at each

school site. Similarities were noted across school sites. Table 4 displays the average

percentages of students engaged in the instruction in each of the four classrooms during

the intervention period.

Table 4. Percentage of Student Engagement by Instructor

	Classroom 1	Classroom 2
Instructor 1	77%	73%
Instructor 2	72%	83%

The percentages across instructors regarding student engagement were similar and

generally consistent. For Instructor 1, percentages based on the Student Engagement/On-

Task Behavior form ranged from 59 to 85 percent for Classroom 1 and 53 to 87 percent

for Classroom 2. For Instructor 2, percentages ranged from 50 to 87.5 percent for

Classroom 1 and 72 to 95 percent for Classroom 2.

Lastly, through the formal instructor interviews that were conducted throughout the

intervention period, more information was gleaned regarding the instructors' views on

how they were altering or tailoring their instruction to meet the needs of the students.

Both instructors mentioned incorporating activities involving movement in order to

involve more participants and maintain attention to the tasks. The instructors performed

such activities as Spelling with large mouth pictures and Reading and Spelling on a large

dry erase board. Additionally, both instructors discussed the usefulness of maintaining

close proximity to struggling students during instruction. Regarding treatment integrity, it

should be noted that Instructor 2 specifically stated during the interview that was

conducted midway through the intervention period that she would have adhered more

closely to the LiPS protocol, or manual, had she been implementing this program one-on-

one.

Decisions based on training and experience of instructors

Because most of the instructors' previous experiences with the LiPS program were

in a one-on-one setting, the instructor interviews conducted at the beginning, middle, and

end of the intervention period allowed them to reflect on how their instruction might be

different in this classroom setting than it would be if they were working one-on-one with

students. As gleaned from the Initial Instructor Interviews conducted with the instructors

prior to program implementation, the instructors had differing training and experiences

with the LiPS program, although the amount of experience each had with the program

was similar. Training for Instructor 1 in the LiPS program was included in her graduate

coursework and involved a combination of live and videotaped instruction followed by

clinical work that was supervised by a professional trained in the program. Instructor 2 had no formal training in the LiPS program. She had purchased the program kit, read the manual, and reportedly taught herself the program. Subsequently, she attended trainings in other Lindamood-Bell programs, and those trainings involved a discussion of the LiPS program.

Regarding their experiences with the program, both instructors were speech language pathologists and had previous experiences implementing the program one-on-one in both clinical and school settings. Clinically, Instructor 1 had worked with several clients, including children and adults, whom she had taken through the program. In the year prior to this study, Instructor 1 spent one semester teaching the LiPS program to small groups of third through fifth graders. In the Initial Instructor Interview, Instructor 2 reported that she had approximately twelve years of experience using elements of the program in schools with individual children ranging in age from five to twelve. Additionally, in the past, Instructor 2 had worked with small groups of kindergarten students teaching components of the program. Instructor 2 stated that she had never completed the LiPS program from start to finish with a student. Both instructors reported limited experience teaching larger groups or whole classrooms of students in other reading and writing curriculums prior to this study. Overall, Instructor 1 had more rigorous training and supervision in teaching the LiPS program, while Instructor 2 had more experience teaching the program to students in the schools.

As can be seen in Table 2, some differences were noted between the two instructors in the frequency of occurrence of some critical program elements. For example, the frequency of questioning the students' responses even when correct responses were

provided varied by instructor (Instructor 1 = 8%, Instructor 2 = 31%). While both instructors employed this teaching technique infrequently during instruction, Instructor 2 used this strategy to encourage student self-checking on occasion. For example, Instructor 2 had the students cover their ears to confirm if a sound was quiet or noisy. In addition, the frequency with which the instructors avoided providing correct answers for students having difficulty varied (Instructor 1 = 27%, Instructor 2 = 88%). Often, Instructor 1 would state the correct answer if a particular student was having difficulty or she would elicit the answer from another student. Instructor 2 tended to remain with the student having difficulty, leading them to the desired response, which is recommended in the program manual (Lindamood & Lindamood, 1998, p. 419).

One-On-One Implementation

As mentioned previously, observations were conducted in a clinical setting where clinicians worked one-on-one with individual students. The purpose of this activity was to offer a comparison of what LiPS should look like in a clinical setting where the program does not need to be modified or adapted to meet the needs of a larger group of students, and it could be implemented as it was intended or designed based on the program manual.

The particular setting where the one-on-one observations were conducted was a private center offering remedial services to children and adults with learning difficulties. Individuals seeking assistance undergo a comprehensive assessment, and interventions are designed based on the particular needs of each person. The LiPS program is one of a number of academic interventions or programs that are offered at this private center. The two instructors observed at this facility underwent extensive training and supervision in

the LiPS program and had a combined total of approximately ten years of experience

working with students using the Lindamood programs.

Table 5 displays the number of observations that were conducted in the one-on-one

setting. Similar to the larger group observations, observations were conducted with two

instructors in the clinical setting. Moreover, the goal was to observe the program

presentation in a one-on-one instructional setting until stability across observations was

achieved. In other words, it was important that the observational data accurately reflect

typical behaviors or responses in this setting. Therefore, a total of twelve observations

were conducted across instructors in this setting.

Table 5. Number of Observations

	Instructor 1	Instructor 2
Record of Program Delivery	6	6
Error Handling	6	6

The intent of conducting the observations in a one-on-one setting was to compare

the level of inclusion of key instructional components with the program as it was

designed (i.e., based on the program manual). While this program was originally

designed for clinical use with individual students and it was expected that treatment

integrity would be high in this setting, some variations or deviations from the LiPS

manual were anticipated during one-on-one observations as student differences exist and

instruction has to be modified. In other words, as the instructors worked to adapt the

instruction to their individual students, it was expected that the instructors would vary

some in their delivery of the LiPS program.

Table 6 displays the percentages by instructor for one-on-one instruction of the

inclusion of key program components as measured by the Record of Program Delivery.

Overall, certain program elements were consistently included in the sessions of both

instructors in the clinical setting. Both instructors in the clinical setting offered high

levels of the following key program components in their LiPS instruction: reviewing

previously introduced material, use of mirrors, following three specific steps in Tracking,

assessing student mastery, incorporating various error handling techniques such as

responding-to-the-response and Socratic questioning.

There were, however, areas where the instructors differed from the LiPS manual or

from each other in their instruction as measured by the Record of Program Delivery form.

First, there were two program components where the instructors significantly differed

from the LiPS manual. The first is related to questioning the student about the label of the

sounds during Tracking (i.e., "I took out a Lip Popper, and replaced it with a Lip Cooler."

or "The new sound is a Lip Cooler.") Neither instructor working one-on-one with

students included this component with great frequency (Instructor 1 = 33%, Instructor 2 =

25%). While this program element may not be as critical as others based on the specific

needs of the students, it is nevertheless a component that is explicitly discussed in the

LiPS manual (Lindamood & Lindamood, 1998, p. 34) and was employed infrequently in

the clinical setting by both instructors.

A second program component that differed from the LiPS manual and was not

included to a high degree involved questioning students even when their responses were

correct. As mentioned previously, in order to promote self-monitoring and self-correcting

behaviors, the LiPS manual emphasizes questioning students regardless of the accuracy

of their responses (Lindamood & Lindamood, 1998). In this way, the students tend to

become less dependent on the instructor and more reliant on their own skills and

decision-making abilities. As measured by the Record of Program Delivery form and

noted in Table 6, both instructors included this component inconsistently (in 50% of the observations for Instructor 1, 67% of the observations for Instructor 2).

Furthermore, while both instructors in the one-on-one setting tended to include most of the measured elements of the LiPS program with similar frequency, they differed from each other on two components. First, the instructors differed significantly in their inclusion of real and nonsense words for Tracking, Reading, and Spelling (Instructor 1 = 33%; Instructor 2 = 100%). However, the lesser percentage for Instructor 1 can be attributed to her response to one of the students and the modification of the curriculum to meet his needs. This particular student that Instructor 1 was working with was an older student who had developed a great deal of sight word knowledge (i.e., had memorized a great deal of real words). Therefore, Instructor 1 included only nonsense words in the beginning of his LiPS instruction to ensure that he had the opportunity to use the skills he was learning to sound out new or unfamiliar words. Otherwise, the percentages gathered on the Record of Program Delivery forms were similar across Instructors 1 and 2.

A second program element where the two instructors differed from each other in their delivery of instruction was related to the use of the word "no." Instructor 1 avoided the use of the word "no" during 100% of the observations, while Instructor 2 avoided this word during only 33% of the observations. This difference may be attributed to individual differences in the teaching styles of the two instructors. For example, in avoiding the use of the word "no" during instruction, Instructor 1 was noted to use such statements as, "Use your mirror. Do those sounds look the same?" and "That's not a bad guess…"

Table 6. Record of Program Delivery, Percentages by Instructors for One-on-One
Treatment

GENERAL	Instructor 1	Instructor 2
T. reviews previously introduced material at beginning of session	100%	100%
S. provided with/encouraged to use mirror when introduced to or practicing new sounds	100%	100%
All Ss. observed to be actively engaged in learning process	67%	100%
TRACKING, READING, SPELLING	Instructor 1	Instructor 2
S. instructed to follow 3 steps in Tracking – repeat words, touch & say, make change	100%	75%
T. questions S. about label of sounds during Tracking	33%	25%
Real and nonsense words used in Tracking/Reading/Spelling	33%	100%
T. assesses S. mastery on T/R/S chains before new material introduced	100%	100%
ERROR HANDLING	Instructor 1	Instructor 2
T. incorporates *responding-to-response* (allows student to self-correct)	100%	100%
T. uses line of questioning to lead S. to desired response (Socratic)	100%	100%
T. avoids use of word "no" when student's answer is not expected one	100%	33%
T. questions S. even when correct response provided	50%	67%
T. avoids providing correct answer for S. having difficulty	100%	67%

Summary of Descriptive Results

The purpose of this section was to describe how the LiPS program was delivered to

larger groups of students in kindergarten classrooms. Additionally, for comparative

purposes, data were presented regarding what the program looked like in a clinical setting

where clinicians worked with students one-on-one. While some LiPS program elements

were present across both settings, a number of differences existed in how this program

was implemented in the school versus clinical setting.

Certain program elements, as measured by the Record of Program Delivery form,

were present significantly more often in the one-on-one setting than in the classroom

setting. Table 7 displays the percentages for whole group versus one-on-one instruction as measured by the Record of Program Delivery form. First, while mirrors were not employed by either instructor in the classroom setting, both instructors in the one-on-one setting consistently encouraged the use of mirrors for their students when introducing or practicing new sounds. Second, during a majority of the instructional time in the clinical setting, the students were instructed to use a specific process during Tracking (i.e., repeat the old and new word, touch the blocks while stating the individual sounds, and make the change with the blocks). In the clinical setting, Instructor 2 did not consistently have the student touch and say the individual sounds with each new word, but she did have the student state the change each time. In the classroom setting, the students were only encouraged to make the changes that they heard. They were not encouraged or required to complete the first two steps in the Tracking process.

Another important difference between the classroom and clinical settings was in the monitoring of student progress. Clinicians in the one-on-one setting recorded individual student performance on each task completed during each session. Students had to demonstrate 80% or higher mastery of the material in order to move on to the next level or receive new material. No specific records were kept regarding student progress or mastery of the curriculum content in the classroom setting.

Lastly, differences were noted between the clinical and classroom settings in the amount and type of questioning that was present. In the clinical setting, students were questioned more frequently by the instructors, even when their responses were accurate. Furthermore, instructors in the clinical setting were more inclined to avoid providing the

correct answers for the students and allowed the students to work toward the correct

answers via instructor questioning.

Table 7. Record of Program Delivery, Percentages for Whole Group versus One-on-One

GENERAL	Whole Group	One-on-One
T. reviews previously introduced material at beginning of session	95%	100%
S. provided with/encouraged to use mirror when introduced to or practicing new sounds	0%	100%
All Ss. observed to be actively engaged in learning process	10%	83%
TRACKING, READING, SPELLING	Whole Group	One-on-One
S. instructed to follow 3 steps in Tracking – repeat words, touch & say, make change	0%	86%
T. questions S. about label of sounds during Tracking	100%	29%
Real and nonsense words used in Tracking/Reading/Spelling	65%	71%
T. assesses S. mastery on T/R/S chains before new material introduced	0%	100%
ERROR HANDLING	Whole Group	One-on-One
T. incorporates *responding-to-response* (allows student to self-correct)	98%	100%
T. uses line of questioning to lead S. to desired response (Socratic)	93%	100%
T. avoids use of word "no" when student's answer is not expected one	81%	67%
T. questions S. even when correct response provided	17%	58%
T. avoids providing correct answer for S. having difficulty	50%	83%

It should be noted that one specific difference existed between the classroom and

clinical settings that was not reflected in the data collection forms but was noted by the

primary investigator during observations in both settings. This difference was in the

amount of work that was completed during each session. The amount of time devoted to

LiPS instruction in each session was similar across the classroom and clinical settings

(i.e., approximately 30 minutes per session). However, in the clinical setting, the

instructors managed to complete Tracking, Reading, and Spelling (typically ten words

each) during each session. In the classroom setting, often only one of these tasks was completed. Therefore, students in the one-on-one setting had more practice with the tasks than the students in the classroom setting.

In an effort to summarize the data, the researcher looked across all data sources including the four observation instruments (Record of Program Delivery, Error Handling, Opportunity to Respond, and Student Engagement/On-Task Behavior), instructor interviews, and anecdotal observational notes. Table 8 reflects conclusions made by the primary investigator regarding the treatment integrity maintained for instructors across the classroom and clinical settings where LiPS was employed as compared to the program as it was designed. Instructional elements rated as low for treatment integrity for either the classroom or clinical setting indicates that this component was demonstrated infrequently or not at all. In other words, this instructional element appeared significantly different from how the program was designed. Instructional elements noted as high in treatment integrity were present on most or all occasions.

Table 8. Summary of Level of Treatment Integrity for Key Program Components Across Settings

Instructional Elements	Classroom Setting		Clinical Setting
	Instructor 1	Instructor 2	One-on-One
Presence of key instructional materials (use of mirrors, incorporation of small mouth pictures, use of colored blocks)	Lo	Lo	Hi
Student engagement in learning process	Lo	Lo	Hi
Choice of program paths (vertical path is recommended for young students)	Hi	Lo	Hi
Tracking following a prescribed process	Lo	Lo	Hi
Formal assessment of student progress/mastery of concepts	Lo	Lo	Hi
Error handling techniques (e.g., incorporation of responding-to-the-response and Socratic questioning)	Hi	Hi	Hi

Hi = high treatment integrity, Lo = low treatment integrity

On key instructional elements, or program components, a high degree of treatment integrity was consistently maintained by the instructors in the clinical setting. In the classroom setting, both instructors had similar amounts of previous experience with the LiPS program and implemented the program as it was designed to similar degrees. Both Instructor 1 and Instructor 2 in the classroom setting demonstrated low levels of treatment integrity when adapting this program to teach larger groups of students. However, Instructor 1 in the classroom setting did demonstrate some higher levels of treatment integrity on certain key components, as can be seen in Table 8. For example, Instructor 1 received a "high treatment integrity" rating based on her selection of the vertical program path for LiPS implementation, as it was recommended in the program manual for younger students. Finally, it should also be noted that Instructor 1 also attempted the use of small mouth pictures during instruction on one occasion. However, she expressed that managing student behavior during this activity was very difficult as each student was engaged in the task independently. Therefore, after this one attempt, Instructor 1 discontinued the use of small mouth pictures and used larger mouth pictures with the whole group working together to complete the task. This was just one of a number of program elements that were modified or excluded as this program, which was originally created for one-on-one use, was adapted to a classroom setting.

Student Outcome Data

The purpose of this research was to document and evaluate how the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS) was implemented in the schools with kindergarten students. This study included pretesting, six months of intervention, and posttesting. The LiPS program was conducted in four classrooms of kindergarten students by two different instructors at two school sites (i.e.,

one instructor at each school site working with two classrooms of students; 35 students at School 1, 40 students at School 2). Pretest and posttest measures included the Lindamood Auditory Conceptualization (LAC) test, the Phonological Awareness Composite of the Comprehensive Test of Phonological Processing (CTOPP), the Word Identification and Word Attack tasks from the Woodcock-Johnson Tests of Achievement (WJ-III), and the Letter Naming and Phoneme Segmentation tasks from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). The LiPS program served as a supplemental reading intervention in these four kindergarten classrooms, offered in addition to the traditional reading curriculum at each school.

Below are the results of student outcomes after six months of classroom intervention using the LiPS program. The answers to three distinct research questions were sought to determine the academic gains students made after exposure to this curriculum. These questions included:

1. What gains do students demonstrate in reading after receiving instruction in the LiPS program?

2. Do student academic gains differ on a measure more closely aligned with the LiPS program (i.e., the LAC) as compared to other standardized, norm-referenced measures?

3. Does student reading achievement differ significantly from instructor to instructor?

First, to analyze the results related to student outcomes, the academic gains of all student participants collectively are examined. Then, student outcomes by school site, and therefore by instructor, are considered. Lastly, an examination of student benchmarks for certain measures offers a closer look at the data from some of the assessment instruments that are more sensitive to the small changes in student achievement over the intervention period.

Gains Demonstrated After LiPS Intervention for All Students

The raw score means and standard deviations at pretest and posttest for all students

across each measure are presented in Table 9. At pretest, the means ranged from 3.44 (SD

= 3.09) for the raw score of the Word Attack subtest of the WJ-III to 28.99 (SD = 17.13)

for the raw score of the Letter Naming task on the DIBELS. At posttest, the means

ranged from 5.56 (SD = 2.91) for the same Word Attack task to 47.47 (SD = 19.08) on

the LAC. When considering all participants collectively, positive gains from pretest to

posttest were achieved on all measures.

Table 9. Raw Score Means, Standard Deviations for Pretests/Posttests Across All
Participants

Measure	Pretest (n=75)	Posttest (n=72)
CTOPP – Elision	4.05 (2.97)	6.72 (3.48)
CTOPP – Bldg Words	4.71 (2.89)	9.68 (3.19)
CTOPP – Sound Matching	6.79 (5.08)	12.63 (5.52)
LAC	23.97 (17.36)	47.47 (19.08)
DIBELS – LN	28.99 (17.13)	45.64 (15.89)
DIBELS – PS	15.73 (13.17)	38.39 (14.26)
WJ – Wd Identification	15.56 (7.17)	22.47 (6.95)
WJ- Wd Attack	3.44 (3.09)	5.56 (2.91)

A two-way within-subjects analysis of variance (ANOVA) was conducted to assess

student gains across measures and over time (i.e., from pretest to posttest). The dependent

variable was the mean number of items correct on each measure across all participants.

The within-subjects factors were test with eight levels (Elision, Blending Words, and

Sound Matching from the CTOPP; the LAC; Letter Naming and Phoneme Segmentation

from the DIBELS; and Word Identification and Word Attack from the WJ-III) and time

with two levels (pretest and posttest). The main effect for time was statistically

significant, $F (1, 71) = 480.93$, $p < .01$. The main effect for test was also statistically

significant, F (3, 203) = 241.85, p < .01. Additionally, the interaction between time and

test was statistically significant, F (3, 243) = 78.35, p < .01. Therefore, when looking at

all students collectively, there was a statistically significant difference between mean test

scores from pretest to posttest (i.e., time) and between the means of at least one measure

(i.e., test). Furthermore, the statistically significant interaction indicates a statistically

significant difference between mean pretest and posttest scores of at least one measure.

Student Outcomes: A Comparison of Measures

To determine which measure or measures yielded the greatest academic gains from

pretest to posttest, follow up procedures were conducted from the results achieved on the

ANOVA discussed previously. Of most interest were the gains achieved on the LAC, a

measure closely aligned with the LiPS reading intervention, compared to gains achieved

on the other assessment measures. Table 10 presents the mean test differences from

pretest to posttest for all students on each measure. Mean gains from pretest to posttest

ranged from 2.44 for the Word Attack task of the WJ-III to 24.24 on the LAC. In other

words, the mean increase from pretest to posttest for the WJ-III Word Attack task was

2.44 points, and the mean increase from pretest to posttest on the LAC was 24.24 points.

Mean gains from pretest to posttest on all measures were positive.

Table 10. Estimated Marginal Means

Measure	Mean Test Difference (Posttest-Pretest)	Standard Error
CTOPP Elision	2.85	.27
CTOPP Blending Words	5.04	.34
CTOPP Sound Matching	6.07	.62
LAC	24.24	1.93
DIBELS Letter Naming	17.54	1.51
DIBELS Phoneme Segment.	22.92	1.61
WJ-III Word Identification	7.50	.49
WJ-III Word Attack	2.44	.24

In order to adjust for multiple comparisons and control for familywise error rate,

Bonferroni pairwise comparisons were calculated. Results of these comparisons are

presented in Table 11. Mean test differences were employed to determine if the gains

from pretest to posttest on the LAC were statistically different and greater than the mean

gains achieved on the other measures administered to participants. For all participants,

gains from pretest to posttest were statistically significant and greater on the LAC than on

the subtests of the CTOPP (Elision, Blending Words, and Sound Matching) and the tasks

from the WJ-III (Word Identification and Word Attack). The test differences, or gains

from pretest to posttest, on the LAC were not statistically significantly different from

those on the DIBELS Letter Naming and Phoneme Segmentation tasks. Student outcomes

relative to the LAC and DIBELS tasks will be discussed in greater detail later in this

chapter.

Table 11. Bonferroni Pairwise Comparisons

Measures	Mean Difference	Standard Error
LAC vs. CTOPP Elision*	21.39	1.99
LAC vs. CTOPP Blending Words*	19.19	1.90
LAC vs. CTOPP Sound Matching*	18.17	1.99
LAC vs. DIBELS Letter Naming	6.69	2.20
LAC vs. DIBELS Phoneme Segment.	1.32	2.36
LAC vs. WJ-III Word Identification*	16.74	1.87
LAC vs. WJ-III Word Attack*	21.79	1.93

*$p<.01$

Student Outcomes: Differences Between Instructors

As stated previously, the LiPS program was employed at two different school sites

with two different instructors. Each instructor taught the program in two kindergarten

classrooms. The means and standard deviations at pretest and posttest across each

measure for students at each school site (i.e., Instructor 1, Instructor 2) are reported in

Table 12. Additionally, the table includes means and standard deviations by classroom.

Table 12. Means and Standard Deviations by Instructor and Classroom

Measure	Instructor #1				Instructor #2			
	Class 1		Class 2		Class 3		Class 4	
	Pre (n=17)	Post (n=17)	Pre (n=18)	Post (n=17)	Pre (n=20)	Post (n=20)	Pre (n=20)	Post (n=18)
CTOPP – Elision	3.88 (2.57)	6.59 (4.42)	4.61 (3.91)	7.82 (3.34)	4.25 (2.97)	6.90 (2.97)	3.50 (2.37)	5.61 (3.05)
CTOPP – Bldg Wds	5.29 (3.37)	9.53 (3.50)	5.89 (2.89)	10.00 (2.62)	4.75 (2.38)	10.55 (3.35)	3.10 (2.34)	8.56 (3.09)
CTOPP – Snd Mchg	7.41 (4.99)	11.94 (5.79)	6.72 (4.76)	13.06 (4.70)	6.20 (5.19)	12.55 (5.48)	6.90 (5.61)	12.94 (6.38)
LAC	25.70 (17.58)	42.53 (24.80)	20.50 (18.18)	44.88 (13.61)	24.65 (16.09)	50.55 (21.35)	24.35 (18.54)	51.17 (14.20)
DIBELS – LN	21.76 (16.73)	36.12 (17.77)	33.39 (21.02)	43.88 (14.72)	28.95 (9.66)	49.75 (9.91)	31.20 (18.66)	51.72 (17.06)
DIBELS – PS	17.35 (13.00)	36.24 (12.54)	20.89 (13.01)	43.06 (5.88)	16.85 (13.93)	40.10 (18.25)	8.60 (10.25)	34.11 (15.73)
WJ-III Wd Ident	13.18 (6.11)	19.00 (6.21)	16.78 (10.10)	21.82 (6.32)	16.45 (6.14)	24.25 (6.50)	15.60 (5.70)	24.39 (7.77)
WJ-III Wd Attack	2.65 (2.06)	5.41 (2.98)	3.72 (4.93)	5.47 (3.24)	3.75 (2.45)	5.70 (2.05)	3.55 (2.28)	5.61 (3.50)

Two separate analyses were conducted in order to assess differences between

instructors on student outcomes. These included analyses of covariance (ANCOVA)

procedures and the calculation of effect sizes. In subsequent sections, the results of these

analyses are presented.

Analyses of Covariance

First, ANCOVA procedures were conducted on all academic variables using the

pretest score for each measure as the covariate and comparing the posttest score for

Instructor 1 and Instructor 2 students. The independent variable, instructor, included two

levels: Instructor 1 and Instructor 2. The dependent variables were the mean test scores

on each measure at posttest, and the covariates were the mean test scores at pretest. The

resulting ANCOVA F values appear in Table 13. Data are reported separately for each

measure administered. Statistically significant differences between students for Instructor

1 and Instructor 2 were noted for posttest scores on the DIBELS Letter Naming task and

the WJ-III Word Identification task, where students for Instructor 2 performed better than

students for Instructor 1 on both tasks. For all other measures, no statistically significant

differences were noted.

Table 13. Student Differences at Posttest By Instructor

Measure	Instructor 1 – Mean (SD)	Instructor 2 – Mean (SD)	F	Effect Size
CTOPP Elision	7.21 (3.91)	6.29 (3.04)	2.81	.04
CTOPP Blending Words	9.76 (3.06)	9.61 (3.34)	1.75	.03
CTOPP Sound Matching	12.50 (5.22)	12.74 (5.85)	.19	.00
LAC	43.71 (19.73)	50.84 (18.08)	2.59	.04
DIBELS Letter Naming*	40.00 (16.54)	50.68 (13.61)	10.66	.13
DIBELS Phoneme Segment.	39.65 (10.25)	37.26 (17.14)	.17	.00
WJ-III Word Identification**	20.41 (6.33)	24.32 (7.03)	4.23	.06
WJ-III Word Attack	5.44 (3.07)	5.66 (2.79)	2.47	.04

*p<.01, **p<.05

Effect Sizes

Second, in addition to the ANCOVAs, effect sizes were calculated to assess student

outcomes. Also included in Table 13 are the effect sizes examining instructor differences

for each measure at posttest when pretest was held constant. Unlike the ANCOVAs

which account for sample size, effect sizes were calculated to determine if differences

existed on outcome measures between instructors when sample size was not considered.

Results of calculated effect sizes yielded no statistically significant differences between

instructors on any posttest measure when pretest was held constant. In other words, when

correcting for pretest variability, no meaningful differences between instructors on

posttest measures were identified. Interestingly, effect sizes ranged from .00 for the

DIBELS Phoneme Segmentation task to .13 for the DIBELS Letter Naming task. While

previously reported ANCOVA results identified some statistically significant differences between measures, specifically for the DIBELS Letter Naming and WJ-III Word Identification tasks, no practical significant differences were noted between the measures because all calculated effect sizes were small.

Student Progress: A Closer Look

Benchmark Comparisons

In the analyses of statistically significant differences for student outcomes between measures, mean test differences were greater on the LAC than that of the WJ-III or CTOPP. However, no statistically significant differences were noted between the LAC and DIBELS tasks. Both of these assessment instruments can be used for progress monitoring and may be more sensitive to small changes in student performance relative to an intervention. Therefore, in order to further investigate any differences that may exist between these two measures, a comparison was made between mean pretest and posttest scores for the students of each instructor and benchmarks for expected levels of reading achievement or progress.

Benchmarks are typically employed for screening or grouping students (Good & Kaminski, 2003) and can serve to demonstrate meaningful differences in progress monitoring. For this purpose, the benchmarks offered a sense of student reading growth for the kindergarten participants from the beginning of the school year until the conclusion of the LiPS intervention, which was in February. Typically, "the benchmarks represent *minimal* levels of satisfactory progress for the *lowest achieving* students" (Good, Gruba, & Kaminski, 2001 in Good & Kaminski, 2003). A comparison of student changes in benchmark placement by instructor was considered for both the LAC and DIBELS tasks. Three distinct benchmarks were considered for the DIBELS tasks:

students at-risk ($\leq 20^{th}$ percentile), students considered to have some risk (21-38th percentile), and those considered at low risk ($\geq 39^{th}$ percentile) for reading difficulties. The LAC offered a distinct and unique set of benchmarks which were recommended minimum scores, and this is discussed in more detail below.

Table 14 includes the percentages of students identified in each of the three benchmark categories at pretesting and posttesting by instructor on the DIBELS tasks. For both instructors, a majority, or over eighty percent, of students were considered low risk at pretesting and posttesting on the Letter Naming task. However, on this particular task, little change was noted from pretest to posttest. In other words, the number of students identified in each of the three benchmark categories remained relatively stable, and the percentages of students considered at risk or with some risk did not change from pretest to posttest. On the Phoneme Segmentation task of the DIBELS, great improvements were noted in the percentages of students considered low risk from pretest to posttest for both instructors. While half of the students for Instructor 1 were considered low risk at pretesting, over ninety percent were considered low risk at posttesting on the Phoneme Segmentation task. For Instructor 2, approximately one quarter of the students were considered low risk at pretesting, while over eighty percent were low risk at posttesting on this DIBELS task. Moreover, while almost half of the students working with Instructor 2 were at-risk for reading difficulties, as measured by the Phoneme Segmentation task, at pretesting, only eight percent of the students remained in this category at posttesting.

Table 14. Percentage of Students at Benchmarks at Pretest/Postest on DIBELS

Task		Instructor #1			Instructor #2		
		At-Risk $\leq 20^{th}$ percentile	Some Risk 21-38th percentile	Low Risk $\geq 39^{th}$ percentile	At-Risk $\leq 20^{th}$ percentile	Some Risk 21-38th percentile	Low Risk $\geq 39^{th}$ percentile
Ltr Naming	Pre	9 (3)	9 (3)	83 (29)	0 (0)	5 (2)	95 (38)
	Post	9 (3)	9 (3)	82 (28)	0 (0)	5 (2)	95 (36)
Phoneme Seg	Pre	17 (6)	34 (12)	49 (17)	48 (19)	25 (10)	28 (11)
	Post	0 (0)	6 (2)	94 (32)	8 (3)	11 (4)	82 (31)

Note: Instructor 1: Pre n=35; Post n=34
Instructor 2: Pre n=40; Post n=38
( ) indicates actual numbers of students in each category

Table 15 includes benchmark data by instructor from pretest to posttest on the

LAC. Unlike the percentile classifications for the DIBELS tasks, the LAC offers

recommended minimum scores for students at each grade level from kindergarten

through the seventh grade. According to Lindamood and Lindamood (1971), these

recommended minimum scores were selected based on statistical data and clinical

experience. As stated in the test manual, "The recommended scores represent a level of

performance that correlates highly with adequate or better-than-adequate spelling and

reading skills for particular grades in typical American classrooms" (Lindamood &

Lindamood, 1971, p.29). Unlike the DIBELS tasks, however, no specific percentile

equivalents are offered.

The recommended minimum score for the *first* half of kindergarten was used for

comparison of students working with the two instructors at *pretest*; the recommended

minimum score for the *second* half of kindergarten was used for comparison at *posttest*.

On the LAC, improvements were seen across instructors, and the percentages decreased

from pretesting to posttesting as expected. However, while the pattern of percentages was

similar to the DIBELS tasks in that less students were of concern at posttesting, the

improvements made across participants were somewhat less than for the DIBELS tasks.

For the LAC, half of the students were below the recommended minimum score at

pretesting, and less than a third were below this minimum score at posttesting. For the

DIBELS tasks, however, typically less than twenty percent of the students were in the

higher risk categories (< 38th percentile) at posttesting. Furthermore, on the DIBELS,

these percentages were as small as five percent in some instances at posttesting (e.g.,

Letter Naming for Instructor 2.

Table 15. Percentage of Students Below Recommended Minimum at Pretest/Posttest on
LAC

Measure	Recommended Minimum	Percentage	
		Instructor #1	Instructor #2
LAC	Pre (First ½ of K = 31)	54 (19)	53 (21)
	Post (Second ½ of K = 40)	32 (11)	24 (9)

Note: Instructor 1: Pre n=35; Post n=34
Instructor 2: Pre n=40; Post n=38
( ) indicates actual numbers of students in each category

CHAPTER 4
DISCUSSION

As schools move toward early identification and the prevention of reading difficulties, reading curricula are being carefully selected and instructional time is increasing. Especially for younger students or beginning readers, more instructional time devoted to phonological awareness activities is critical. The reading research literature suggests that phonological awareness, or the ability to recognize that spoken language consists of smaller units, is a strong predictor of later reading achievement (Bus & van Ijzendoorn, 1999). Therefore, curricula that emphasizes or at least includes direct instruction in phonological awareness should be incorporated into beginning reading instruction, as including this instruction early on may be more effective than waiting until students are older (Bus & van Ijzendoorn, 1999). One such program that offers phonological awareness training and is increasingly appearing in schools is the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS).

While only a small base of empirical research exists to support this program, the LiPS program is employed nationally in both public schools and private facilities as beginning reading instruction and in remedial efforts for children and adults. Limited empirical research exists supporting the use of this program in one-on-one settings (e.g., Kennedy & Backman, 1993; Torgesen et al., 1999), and even less systematic research exists documenting the efficacy of the LiPS program for small groups or classrooms of students (e.g., McGuinness, McGuinness, & Donohue, 1995). No study to date has documented in detail how the LiPS program, which was originally designed for clinical

use, is modified for use in the school setting or what LiPS instruction looks like when employed with large groups of students.

The primary purpose of this study was to investigate how the LiPS program was adapted and employed in a school or classroom setting with large groups of kindergarten students. Along with documenting the program implementation, student outcomes after approximately six months of LiPS instruction were examined. Second, in addition to examining program implementation in a classroom setting, another purpose of this research was to compare the LiPS instruction of the classroom settings with the more traditional implementation in a clinical setting to assess treatment fidelity across the two settings.

To examine LiPS program implementation in a classroom setting, data were collected at two school sites employing this program with kindergarten students. In the school setting, participants included 75 kindergarten students from four different kindergarten classrooms – two classrooms at each of the two school sites. Two LiPS instructors, both trained as speech pathologists, one at each school site, also participated in this study. One participating school was a laboratory school affiliated with the local public state university. This school served students in kindergarten through the twelfth grade. The second school site was a parochial school serving students in kindergarten through eighth grades. For comparative purposes, data regarding treatment fidelity were also collected at a clinical site. Observations were conducted with two instructors at a private educational center offering remedial services to children and adults with learning difficulties.

Data collection included descriptive data of LiPS program implementation and quantitative data involving the assessment of student outcomes subsequent to LiPS instruction. To assess treatment fidelity, descriptive data included classroom observations, instructor interviews, and the collection of instructor lesson plans. Programmatic or instructional elements that were considered included the following: the inclusion of key instructional materials, student engagement, choice of program path, procedures employed for Tracking, instructor assessment of student program/mastery of content, and use of error handling techniques. Assessment of student outcomes involved the use of four assessment instruments: the Lindamood Auditory Conceptualization test (LAC); the Woodcock-Johnson Tests of Achievement (WJ-III) Word Attack and Word Identification tasks; the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Letter Naming and Phoneme Segmentation tasks; and the Comprehensive Test of Phonological Processing (CTOPP) Elision, Blending Words, and Sound Matching tasks.

Data were collected in various ways to glean an accurate representation of the LiPS implementation, especially in the classroom setting. Therefore, observations were conducted on a number of occasions in each of the four classrooms, several interviews were conducted with the two instructors throughout the intervention, and daily lesson plans were gathered. In considering all of the descriptive data that were collected, certain program elements were deemed most important in assessing treatment integrity based on one or more of the following: emphasis placed on particular program elements in the LiPS program manual (e.g., through repeated mention, such as error handling); the uniqueness of program elements (i.e., making the LiPS program different from other reading programs), such as Tracking; and the previous clinical experiences of the primary

investigator employing the LiPS program with children and adults with learning difficulties.

From the descriptive data collected at both the school sites and in the clinical setting, conclusions regarding treatment fidelity or integrity were ascertained. Overall, in the classroom setting, instructors demonstrated low levels of treatment integrity. In the classroom setting, the two instructors rarely or never included such program components as Tracking following a prescribed sequence, formal assessment of student progress or mastery, and key instructional materials. In the clinical setting, a high degree of treatment integrity was maintained by the instructors.

In considering student outcomes for participants across the two school sites, statistical analyses yielded positive mean gains across all students for each assessment measure. Furthermore, across all students, mean gains achieved on the LAC were statistically significantly greater than gains on the three tasks of the CTOPP (Elision, Blending Words, and Sound Matching) and two tasks of the WJ-III (Word Attack and Word Identification). No statistically significant differences were noted between mean gains on the LAC versus DIBELS tasks (i.e., Letter Naming Fluency, Phoneme Segmentation). In analyzing student outcome data between instructors, or between the two school sites, the students of Instructor 2 achieved statistically significantly greater gains than students of Instructor 1 on the DIBELS Letter Naming and WJ-III Word Identification tasks. No other statistically significant differences were noted between instructors.

Further analyses were conducted regarding student gains on the LAC and DIBELS measures, as both were well suited to monitoring student progress and more sensitive to

smaller student reading skill gains. Using benchmarks for these assessment measures (Good & Kaminski, 2003), students' reading achievement gains were compared to expected performance at pretesting and posttesting. Overall, across all participants, improvements were seen from pretesting to posttesting on the LAC and DIBELS tasks. Therefore, for the DIBELS tasks, the percentages of students in the lowest benchmark category (i.e., $\leq 20^{th}$ percentile) decreased, and percentages of students in the highest benchmark category (i.e., $\geq 39^{th}$ percentile) increased from pretesting to posttesting. On the LAC, the percentages of students working with each instructor who fell below the minimum recommended score decreased from pretesting to posttesting. However, these benchmark analyses yielded slightly different outcomes than the statistical analyses when considering amount of growth. In considering benchmarks, gains across all students were not as great for the LAC as for the DIBELS tasks. In other words, at posttesting, more students performed at the highest benchmark level (i.e., $\geq 39^{th}$ percentile) on the DIBELS tasks than at the recommended minimum score on the LAC. Therefore, while students generally did not perform significantly differently on the LAC and DIBELS tasks when the outcomes were analyzed statistically, in considering benchmarks, student outcomes for the LAC were not as great overall.

Reflecting on the Results

Treatment Integrity

Based on the classroom data collected, including lesson plans, observations, and instructor interviews, the two instructors at the school sites demonstrated low treatment integrity for LiPS instruction. This study represents an example of the difficulty in scaling up interventions that were designed for one-on-one use to a classroom with larger groups of students. "High-quality implementation depends on factors such as the

teacher's knowledge of the subject matter, beliefs about instructional priorities, and personal teaching philosophy and style" (Denton et al., 2003, p. 207). While the LiPS instructors involved in this study did not have teacher education backgrounds, they did bring specific content knowledge of the instructional program. Unfortunately, some of their difficulties related to treatment integrity may have been related to their teaching styles and lack of facility in adapting their instruction to larger groups of students. In one study examining teachers' views of research-based practices, teachers reported that they selected instructional practices that were feasible (Boardman et al., 2005). While the LiPS program has empirical support to document its effectiveness with individual students, the intricacies of the program may make it less feasible to implement in the classroom without a great deal of instructional support.

Certain adaptations could have been made to the instruction in the kindergarten classrooms to improve the treatment integrity or adherence to the program as it was designed. These involve the use of mirrors, Tracking with colored blocks, assessment of student progress, increased support from school and classroom teachers, and improved management of student behavior during LiPS instruction. Each of the components will be described in greater detail below.

Use of mirrors

First, the instructors at both school sites omitted the use of mirrors in their LiPS instruction in the kindergarten classrooms. For students lacking sufficient oral awareness to feel new or unfamiliar sounds, mirrors can serve to support one sensory system through the use of another (Lindamood & Lindamood, 1998). Mirrors during instruction, especially during the introduction of new sounds, would have proved beneficial for all students and particularly those students with poor oral motor awareness or phonological

awareness. Mirrors would have been helpful to aid in the discovery of new sounds and to serve as a self-checking device. Understandably, it could be costly to provide mirrors to classrooms of students, and the employment of mirrors may have served as a distraction for kindergarten students. Therefore, adding individual manipulatives to classroom instruction would require even greater instructor resources devoted to managing student behavior. However, as improving oral awareness is such an important component in the early stages of the LiPS program, mirrors may have offered students individual feedback to aid in the discovery of new sounds.

Tracking with colored blocks

Second, Tracking with colored blocks is another program element that could have been incorporated into instruction to improve treatment integrity in the classroom settings. Tracking is a unique element that helps to set the LiPS program apart from other reading programs focusing on phonological awareness. "By Tracking with mouth pictures and colored blocks, students can gain experience in two levels of coding before they need to use the learned medium of specific letters to code speech sounds for Reading and Spelling" (Lindamood & Lindamood, 1998, p. 166). In other words, students can have the opportunity to strengthen phonemic awareness skills without having to think about letter symbols.

While both instructors incorporated Tracking with the mouth pictures into their instruction to at least some extent, neither transitioned to completing the task with blocks. In her final instructor interview, Instructor 1 noted that she would have used colored blocks and small mouth pictures for Tracking had she been working with individual students. In a classroom, she perceived behavior management issues to interfere with completing this task in the same manner she had done previously in a one-on-one setting.

Instructor 2 most likely did not employ colored blocks for Tracking because she had no previous experience taking children through the program in its entirety; in the past, she had incorporated parts of the program into therapy in addition to other programs. Instructor 2 was probably most familiar with the oral awareness component of LiPS (e.g., mouth pictures) and not the Tracking task. Therefore, it would have been significantly more difficult for her to adapt this task to a larger group of students due to her limited experience with this task in a one-on-one setting.

In order to incorporate this key program component, instructors could have modified the task for use with a larger group of students to use colored construction paper instead of the traditional colored blocks. This idea is described in detail in the LiPS manual (page 181, Lindamood & Lindamood, 1998). Interestingly, students achieved statistically significant mean gains that were greater on the LAC than on the tasks of the CTOPP or WJ-III, even though no direct instruction was offered by either instructor in the use of colored blocks for Tracking. Tracking with colored blocks is precisely what is required on the LAC assessment; the LAC assesses students' abilities to detect sameness, difference, or changes among sounds by representing these sounds with colored blocks.

Assessment of student progress.

A third component that was absent in the classroom setting involved assessing student progress or mastery of concepts during instruction and prior to the introduction of new material. While this was demonstrated in the clinical setting, neither instructor in the school setting monitored student progress in concrete, measurable terms for the purposes of instructional decision making in the LiPS program. Instructor 1 met with a small group of identified struggling students in both of her kindergarten classrooms, so she seemed to have a sense anecdotally of how those students were grasping the new material.

Furthermore, Instructor 2 maintained close communication with the two classroom teachers at her site, meeting with them weekly to receive feedback. Unfortunately, however, no systematic or regular assessment was incorporated at either site for LiPS instructional purposes. In the LiPS manual, Lindamood and Lindamood (1998) offer a standard of 80% accuracy at the current level prior to introducing new material. This was the standard adhered to in the clinical setting.

Support of school and classroom teachers

A lack of classroom teacher support contributed to the low treatment integrity of the LiPS program at both school sites. At the first school site, the kindergarten teachers provided minimal support to the LiPS instruction or the efforts made by Instructor 1. It appeared that the instructor was perceived as a "visitor" to the classrooms; someone who offered additional reading instruction that was considered by the classroom teachers as tangential to the rest of their curriculum. While one teacher at this school site did assist with behavior management of her students during a majority of the LiPS sessions, Instructor 1 expressed feeling a lack of teacher support during several of the interviews. The teachers at the school site of Instructor 2 were more supportive of the efforts to incorporate this program into their curriculum. Teachers in both classrooms of Instructor 2 were present throughout each LiPS session, assisting with classroom management. Additionally, one teacher at this school site read the relevant section in the LiPS manual independently prior to the introduction of new material with the students in her classroom. She even expressed an interest in attending formal training in the LiPS program during the summer subsequent to the intervention. Students may have benefited from the LiPS instruction to an even greater degree had the program been infused more into their curriculum.

Management of student behavior during instruction

To offer a complex and intensive reading program such as LiPS to large groups of students requires an instructor proficient not only in the program itself, but also in managing student behavior during instruction. Throughout this study, each instructor made varied attempts to create optimal learning environments for the students. In one classroom, Instructor 1 previewed new material with a small group of students the day before introducing this material to the rest of the class. She also incorporated games into her instruction in both classrooms to allow for movement. Within the first few sessions, Instructor 2 modified her instruction to include table activities for review so that she could work with smaller groups of students to introduce new material. Regardless of the efforts made by both instructors to manage the various behaviors and personalities of the students in their respective classrooms, both instructors expressed in their interviews at least some level of frustration with this aspect of the intervention. When designing reading instruction or interventions for students in a school setting, one must consider the level of training and content expertise necessary for a desired intervention and also the instructor's training and experience in managing student behavior.

Along these lines, the two instructors made various decisions throughout the LiPS instruction to modify the grouping arrangement to better meet the needs of the students. Prior to initiating LiPS at the schools, both instructors had the intention of delivering the instruction to whole classrooms of students. For various reasons that can attributed to both the instructors and the classroom teachers, only one classroom remained engaged in whole class LiPS instruction at the end of the intervention period. Modifications were made in the other three classrooms by the third week of LiPS instruction. Despite the intentions of the instructors at the outset of the intervention, the changes made in

grouping arrangements suggest the difficulty in adapting the program to meet the needs of classrooms of students.

As mentioned previously, the instructors in the clinical setting demonstrated high levels of treatment integrity. Overall, differences in levels of treatment integrity between the instructors in the school setting and those in the clinical setting can be explained by two factors: grouping arrangements and instructor skill. First, regarding grouping arrangements, the LiPS program is an intricate program and working with larger groups of students requires some modifications to the instruction. On the other hand, the lower levels of treatment integrity demonstrated by the instructors in the schools could be a result of instructors with limited training or experience in the program and their facility in adapting it. Instructor 2 had never previously completed the LiPS program in its entirety with a student, even at the individual level, and this is probably not unlike many school settings in which the program is employed.

Ultimately, however, there is evidence to suggest that the arrangements of the groups (e.g., larger numbers of students) affected the treatment integrity. Previous research has demonstrated that, when highly qualified teachers implement a well-designed intervention, the academic benefit to students is the same for students taught individually or in small groups of two to six students (Elbaum, Vaughn, Hughes, & Moody, 2000). Unfortunately, for the instructors at the schools in this study, instructional groups were rarely (for Instructor 1) or never (for Instructor 2) less than six students. In their interviews, both instructors recognized and acknowledged that they would have approached the LiPS program differently had they been working with students one-on-one (e.g., use of individual mouth pictures). Yet, from this research, what is unknown is

whether these instructors possessed the skills to implement the program as it was designed (i.e., higher treatment integrity) in a one-on-one setting, or whether they simply had the content knowledge but less practical skill. In other words, the instructors identified, through the interviews, specific aspects of the program that they would have executed differently in an individual setting. However, it is unknown whether these instructors possessed the skillfulness to accomplish these tasks in practice.

Student Outcomes

Statistical analyses

As stated previously, across all students, significantly greater gains were noted on the LAC than on the tasks of the CTOPP and WJ-III, and no significant difference was noted between LAC and DIBELS performance. The LAC is closely aligned with the LiPS program, and the skills necessary to complete the tasks on the LAC are virtually identical to the Tracking task using colored blocks within the LiPS program. Therefore, at the outset of this research, it was hypothesized that students would achieve greater gains on this measure since direct instruction in this process would be offered to students during the traditional LiPS instruction. Interestingly, however, neither instructor included Tracking with the colored blocks in their instruction. Regardless, students performed statistically better on the LAC measure than the tasks of the CTOPP and WJ-III even though similar phonemic awareness skills were required by some tasks of the CTOPP and WJ-III. This may be attributed to the level of difficulty of the items on these various measures. On the first two parts of the LAC, the items are primarily assessing phonological awareness at the phoneme level, and identifying number and sameness or difference of up to three sounds in isolation is all that is required. According to the scoring system on the LAC, performing well on these items puts a kindergarten student at

approximately grade level. However, on the CTOPP and WJ-III tasks, some of the skills

required are slightly more complex. In fact, some phonological awareness demands at the

word level are required on the tasks of these measures – blending several sounds together

to form words or nonsense words of several sounds. No statistically significant

differences were noted in student performance between the LAC and DIBELS measures,

and these tasks assessed reading abilities at more similar skill levels. For example, the

DIBELS tasks measured such skills as identifying letters in isolation and segmenting

simple words of two to three phonemes.

Benchmarks

To further investigate student outcomes related to the LAC and DIBELS,

benchmarks were considered. When analyzing benchmarks of student progress, the

results differed somewhat – students demonstrated greater growth as measured by the

DIBELS. As stated previously, the skills assessed on the LAC (e.g., tracking sounds

using colored blocks) were never taught directly by either instructor at the school sites.

Therefore, while the two measures assessed similar reading skills, the incorporation of

manipulatives on the LAC added a visual-motor component to the assessment task that

may have made it more difficult and thus affected scores.

Furthermore, regarding student benchmark performance, phonemic awareness and

letter knowledge are considered the two best school-entry predictors of children's reading

acquisition during the first two years of instruction (Ehri, 2004). These were two

components of early literacy skills that were assessed in participants at the schools at

pretesting and posttesting through the DIBELS and LAC measures. At pretesting, the

percentages of students considered "at-risk" varied greatly by assessment tool. No

students were considered "at-risk," or below the 20th percentile, for Instructor 2 on the

DIBELS Letter Naming task, and as many as 48 percent of the same instructor's students fell in the at-risk range on the DIBELS Phoneme Segmentation measure. Judging from DIBELS benchmark performance at posttesting, percentages of students considered "at-risk" were minimal, and most of these students were not predicted to have later reading difficulties based on these tasks alone. Actual percentages of students persisting with at least "some risk" at posttesting ranged from 5 to 18 percent. Based on LAC data, however, 24 to 32 percent of students remained below the recommended minimum score at posttesting.

What remains unclear, unfortunately, are the specific percentiles or criteria established to determine the benchmark cut scores for the LAC. The LAC manual does not provide information regarding how the recommended minimum scores correspond with percentiles in such a way as the DIBELS measures. Regardless, if one were to use these benchmarks as presented to determine which students should receive more intensive interventions, different decisions would be made based on the data from the two measures. Therefore, schools should consider the implications of choosing each measure to make intervention decisions for students. The LAC, yielding slightly more students considered "at risk," would serve to place more students in intensive interventions. If one were to consider DIBELS data alone, the results may produce false negatives, meaning students would not be considered most at risk for reading failure when they truly should be receiving more intensive interventions. In other words, if decisions are based on DIBELS data alone, schools may be missing students that should receive some type of intervention. The LAC may serve as a more sensitive measure in this way, however, potentially providing more false positives. Thus, if decisions were made using the LAC

data alone, some students may be deemed in need of more intensive interventions when they do not necessarily require them.

Lastly, once data-based decisions have been made, according to Torgesen (2004), there are two ways to increase the intensity of reading instruction for the struggling readers or those most at risk for developing later reading difficulties: increase instructional time or provide instruction individually or in small groups. For the kindergarten students in the schools participating in this study, their instructional time was increased with the incorporation of the LiPS program in addition to the core reading curriculum. What remains unclear is whether the increase in instructional time (due to the addition of the LiPS program) affected benchmark performance at posttesting and potentially prevented later reading struggles.

Implications for Practice

Ultimately, to prevent future reading difficulties, some type of phonological awareness training should be included in the academic curricula of kindergarten students as phonological awareness is the key to beginning reading acquisition (Smith, Simmons, & Kame'enui, 1995). The inclusion of the LiPS instruction at the two school sites increased the intensity of reading instruction and the amount of student engaged time, and this is especially important for struggling readers or those most at risk for later reading failure. Because the LiPS program is empirically supported in the reading research literature (Kennedy & Backman, 1993; Torgesen et al., 2001), schools choose to use this program. However, the LiPS program may not be the best choice of a phonological awareness training program for all students or for large groups of students. While this study may not be representative of all LiPS instruction in the schools, treatment integrity when using a one-on-one designed program with large groups of students was low.

Furthermore, neither instructor in the schools managed to move beyond the oral-motor awareness component of this program, and the narrow scope of focus on the articulatory features of individual sounds as compared to the orthographic level may not have been the best use of time for all students.

Reading instruction must be taught better and more broadly than ever before (Adams, 1990). In considering phonological awareness instruction in the schools, the qualities and qualifications of the provider are as important as the type of program. The instructors participating in this study had graduate level training in speech and language pathology and experience teaching a variety of reading and language intervention programs. However, they still delivered the LiPS program to classrooms of kindergarten students with low treatment integrity. The LiPS program is extremely intricate and complex, and schools should select a program that may be easier to implement with groups of students and focuses on the same phonological awareness principles cited in the literature as necessary and relevant.

As mentioned previously, a significant portion the LiPS program is devoted to developing oral-motor awareness and focuses on the articulatory features of individual sounds. This program should only be used with students who have severe reading disabilities or those students who have been unsuccessful with other broader-based phonological awareness programs beginning at the orthographic level. Furthermore, regarding grouping arrangements, the LiPS program is best suited for one-on-one or small group (ideally four or fewer) use. Instructors employing this program in the schools should undergo formal training in the program and receive adequate supervision by a

trained professional prior to implementing the LiPS program independently with students.

Limitations of the Current Study

This research offered insights into what the LiPS program looked like when it was delivered to large groups of students in the schools. However, some limitations of the current study affect the interpretation and generalizability of findings. These include threats to internal and external validity.

Internal Validity

The critical question regarding internal validity relates to the extent to which the research design reduces uncertainty about the relationship of cause and effect (Fletcher & Francis, 2004). In other words, internal validity is related to the extent to which one can be certain that the variable of interest (e.g., treatment) is responsible for the measured outcomes. Educational research in an applied or naturalistic setting makes threats to internal validity problematic in interpreting cause and effect relationships. This study was no exception.

First, the participants involved in this research were unique. The sample of students most likely differed, at least to some extent, from students in typical public schools. One participating school was a parochial school with generally higher achieving students, and the other was a developmental laboratory school affiliated with the local public university. Parents of students at both schools chose to have their children at these sites, sometimes involving lengthy waiting lists to do so. Additionally, both participating schools valued reading instruction so much as to include the LiPS program for all students as additional reading instruction above and beyond the core reading curricula. Furthermore, the history of these students and the kinds of experiences they had outside

of school and above and beyond what was measured could have accounted for some of the differences in outcomes. These factors make it difficult to attribute student outcomes directly to student exposure to the LiPS program.

Second, while employing LiPS as a supplemental reading program benefited the students by offering them more time engaged in reading instruction, this factor also served as a limitation to this study. The student outcomes achieved from pretesting to posttesting cannot be attributed solely to their exposure to the LiPS program. Scores may have improved due to the reading curricula used concurrently with the LiPS instruction. Of course, maturation should also be considered, and a control group was not included in this study for comparative purposes.

External Validity

External validity relates to the generalizability of findings. As mentioned previously, the participating schools were unique in that students were probably achieving higher academically as well as overall parent participation being at higher levels than those in many public schools in this region. Therefore, student outcomes, or performance achieved at posttesting, may have been greater than for other schools employing similar reading methods.

Additionally, both instructors had unique training and experiences that may differ from other instructors utilizing the LiPS program in school settings. Due to their training in speech language pathology and numerous years of clinical experience, the two instructors participating in this study likely had considerably more background knowledge and experience than others teaching this program in the schools. Furthermore, because these instructors agreed to participate in the study, they were aware that they were being observed and were willing to submit weekly lesson plans to the primary

investigator. Therefore, their delivery of instruction may have been different than it otherwise would have been. Any of these above-mentioned factors offer threats to the external validity of this research.

Directions for Future Research

Results of this study suggest that the treatment integrity of the LiPS program can be compromised when it is adapted to serve larger groups of students in the schools. In this study, the instructors employing this program in the schools omitted several key program components, and LiPS implementation in the kindergarten classrooms differed greatly from observations conducted in a clinical setting. Regardless of this, reading achievement gains were noted across students and schools on several reading assessment measures.

While previous research has compared student outcomes in the LiPS programs with other reading curricula and methods, this study was the first of its kind to detail what the LiPS program looked like in a school setting with large groups of students. Furthermore, this study was the first of its kind to compare specific program elements that are included or excluded from LiPS program implementation in a classroom and clinical setting.

Future research of the LiPS program should consider several things related to treatment integrity. First, treatment integrity of the LiPS program with larger groups of students should be considered in other more traditional school settings. Findings may differ in public schools with children of more diverse learning potentials in this region and elsewhere. Second, in this study, the instructors teaching LiPS in the schools had training and experience in speech and language pathology. Researchers should consider LiPS instructors with differing levels of training and experience, including those with general and special education backgrounds. Additionally, this study investigated program implementation for kindergarten students. Future research should explore how LiPS

implementation differs in a school setting for instructors employing this program with older elementary students or beyond. Lastly, reading researchers should consider the treatment fidelity of other reading curricula and the decisions instructors make when adapting various programs to meet the needs of larger groups of students at varying achievement levels in the schools.

Related to student outcomes, future experimental research should be conducted to make direct comparisons of various grouping arrangements. For example, studies should be conducted to assess student outcomes of distinct samples when LiPS is delivered one-on-one, in small groups, and in large groups. Furthermore, empirical research should be conducted to compare outcomes for students receiving LiPS small group instruction versus other small group phonological awareness instruction. Finally, it is important to better understand which specific components of the LiPS program contribute to positive student reading gains, and studies should be designed to experimentally manipulate the various aspects of the program to determine their relative effectiveness and contribution to student reading gains.

APPENDIX A
RECORD OF PROGRAM DELIVERY

Instructor: _____ School/Class: _____ Date: _____ Length of Observation: _____

GENERAL	YES	NO	N/A
T. reviews previously introduced material at beginning of session			
S. provided with/encouraged to use mirror when introduced to or practicing new sounds (pg. 47)			
All Ss. observed to be actively engaged in learning process (pg. 418)			

TRACKING, READING, SPELLING	YES	NO	N/A
S. instructed to follow 3 steps in Tracking-repeat words, touch & say, make change (pg. 169)			
T. questions S. about label of sounds during Tracking (pg. 434)			
Real and nonsense words used in Tracking/Reading/Spelling (pg. 161)			
T. assesses S. mastery on T/R/S chains before new material introduced (e.g., pg. 46)			

ERROR HANDLING	YES	NO	N/A
T. incorporates *responding-to-response* (allows student to self-correct – pg. 14)			
T. uses line of questioning to lead S. to desired response (Socratic – pg. 419)			
T. avoids use of word "no" when student's answer is not expected one (pg. 418)			
T. questions S. even when correct response provided (pg. 419)			
T. avoids providing correct answer for S. having difficulty (pg. 14)			

APPENDIX B
CLASSROOM OBSERVATION-ERROR HANDLING

Instructor: _____ School/Class: _____ Date/Time: _____

T. uses line of questioning to lead S. to desired response (from RPD)

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T. questions S. even when correct response provided (from RPD)

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*Tally for each instance

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Instructor: _____ School/Class: _____ Date/Time: _____

T. uses line of questioning to lead S. to desired response (from RPD)

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T. questions S. even when correct response provided (from RPD)

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APPENDIX C
CLASSROOM OBSERVATION-STUDENT OPPORTUNITY TO RESPOND

(Measure of Students' Active Engagement in Learning Process from RPD)

Instructor: _____   School/Class: _____   Date/Time: _____

Name	Frequency

*One tally mark for each instance in which individual student responds to instructor
**Circle tallies to indicate back-forth dialogue between individual student and instructor

APPENDIX D
STUDENT ENGAGEMENT/ON-TASK BEHAVIOR

(Measure of Students' Active Engagement in Learning Process from RPD)

Instructor: _____   School/Class: _____   Date/Time: _____

	5 minutes	**5 minutes**	**5 minutes**	**5 minutes**
Students Engaged*				

 *Number of students looking at instructor at end of 5-minute period

**Number of students in attendance: _____

- -

Instructor: _____   School/Class: _____   Date/Time: _____

	5 minutes	**5 minutes**	**5 minutes**	**5 minutes**
Students Engaged*				

*Number of students looking at instructor at end of 5-minute period

**Number of students in attendance: _____

- -

Instructor: _____   School/Class: _____   Date/Time: _____

	5 minutes	**5 minutes**	**5 minutes**	**5 minutes**
Students Engaged*				

*Number of students looking at instructor at end of 5-minute period

**Number of students in attendance: _____

APPENDIX E
INITIAL INSTRUCTOR INTERVIEW

(Prior to treatment implementation)

1. **Describe the initial training you received in the LiPS program.** When were you trained? Where and by whom? How many hours of initial training did you receive?

2. **Did you receive any additional training subsequent to the initial training in the LiPS program?**

3. **Describe your experience with the LiPS program – both clinical and in the schools.** Does this experience include work with individuals or groups? Describe the populations you've worked with using the LiPS program (child/adolescent/adult, LD, etc.).

4. **Approximately how many hours have you logged teaching the LiPS program?**

5. **Describe the LiPS program.**

6. **Describe your other experiences teaching large groups of students.**

INSTRUCTOR INTERVIEW – PERSPECTIVES

(beginning, middle, end)

1. **What strategies have you found to be most effective during the LiPS instruction?**

2. **What specific adaptations have you made to the LiPS program and why?**

3. **What specific student accommodations have you made during your LiPS instruction and why?**

4. **At this point, would your LiPS instruction look different if you were implementing it in a one-on-one setting? If so, how?**

5. **At this point, is there anything you wish you could do differently?**

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BIOGRAPHICAL SKETCH

Elayne Proesel Colón was born and raised in Orlando, Florida. She was the only child of Carol and Glenn Proesel. She attended the University of Central Florida (UCF) for her undergraduate studies in psychology and graduated with a Bachelor of Arts (B.A.) degree from UCF in 1998. Upon graduation, she and her husband, Jorge Colón, moved to Gainesville, Florida, to continue their studies.

In the fall of 2000, Elayne entered the School Psychology Program (SPP) in the Department of Educational Psychology at the University of Florida. She received her Master of Arts in Education (M.A.E.) degree in December of 2002. During the 2004-2005 academic year, Elayne completed her internship at the Multidisciplinary Diagnostic and Training Program (MDTP) at the University of Florida. Upon completing her internship, Elayne was hired by MDTP and currently serves as an Educational Consultant. After five and one-half years in the SPP program, she intends to graduate with her Doctor of Philosophy (Ph.D.) degree in school psychology in December, 2005 from the University of Florida.

Elayne and Jorge have one beautiful son, Avery Ryan, who was born in December of 2003.