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The Use of Explicit, Non-Evocative Print Referencing with Preschool Children At-Risk: Implications for Increasing Print Concept Knowledge

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THE USE OF EXPLICIT, NON-EVOCATIVE PRINT REFERENCING WITH PRESCHOOL CHILDREN AT-RISK: IMPLICATIONS FOR INCREASING PRINT CONCEPT KNOWLEDGE

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Health Sciences
at the University of Kentucky

By

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Lexington, Kentucky

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ABSTRACT OF THE DISSERTATION

THE USE OF EXPLICIT, NON-EVOCATIVE PRINT REFERENCING WITH PRESCHOOL CHILDREN AT-RISK: IMPLICATIONS FOR INCREASING PRINT CONCEPT KNOWLEDGE

The purpose of this research study was to investigate the learning of print concepts (PCs) by preschool children at risk for literacy problems using an experimental treatment: explicit, non-evocative print referencing. Children from low socio-economic status (SES) families have been determined to be at-risk for literacy learning problems including a reduced knowledge of print concepts.

The study incorporated a multiple group (experimental and control) time series design with persistent insertion of treatment to those subjects who were assigned to the experimental condition. Participants included 25 children at-risk, ages 4:0- 4:11 (years: months) who qualified for pre-school services and for subsidized childcare (low SES). Participants received eligibility pre-testing and a standardized test of print concept knowledge (PCK).The children were randomly assigned to the experimental or control condition. Children in the experimental condition received three treatment sequences of two illustrated story books read to them each day for three days with the adult reader using the experimental treatment of verbal descriptions and gestures to point out PCs. At the end of each treatment sequence the children were tested for PCK. This intermittent testing helped determine which concepts were learned using this treatment and at what level of dosage of the treatment. Children in the control condition were periodically tested for their PCK and only receive the "business as usual" class room references to print.

Results of data analysis indicated a significant increase in the learning of print concepts by the children enrolled in the experimental condition compared to those in the control condition and suggested that some print concepts were more easily learned using this intervention than others.

KEYWORDS: Print Concepts, Print Referencing, Emergent Literacy, Low SES

Susan Thomas Frank

Student's Signature

November 25, 2012

Date

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This work is dedicated to my father, Robert L. Thomas, who provided the inspiration and support for its completion and to my children, Leeza and Matthew who provide the inspiration and support for my life.

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CHAPTER ONE:

INTRODUCTION

It is now apparent that the fundamental origins of long-term literacy success occur during the preschool years (Adams,1994; Dickinson & Sprague, 2002; Hart & Risley,1995).The time from birth to formal instruction in reading and writing comprises a crucial developmental stage, termed the *emergent literacy* period, where a young child's exposure to listening, talking, reading and writing performs essential and interrelated roles in creating the foundation for literacy learning (Tracy & Morrow, 2006; Storch & Whitehurst, 2002; Whitehurst & Lonigan,1998). The fundamental skills included under the umbrella term "emergent literacy" include: phonological awareness, print awareness, alphabet knowledge, emergent writing and oral language (National Early Literacy Panel, 2004). Research has established that children who come to the "learning to read" experience without the necessary familiarity with oral language, phonological awareness, and print often encounter problems in the early stages of learning to read and write. Furthermore, these children often continue to have poor reading and writing skills in later grades (Juel, 1988; Lonigan, Bloomfield, Anthony, Bacon, Phillips & Samwell, 1999; Stanovich, 1986). With this knowledge comes the burden of ensuring that all young children have the experiences they need before formal literacy instruction takes place in kindergarten and first grade.

Outcomes research in emergent literacy intervention has focused on several areas known to promote literacy development including: the bolstering of oral language skills such as vocabulary (Hargrave & Senechal, 2000; Monroe, Lee, & Baker, 2007; Lovelace, 2006), the explicit teaching of phonological awareness skills (Dickenson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Majsterek, Shorr, & Erion, 2000; Storch

& Whitehurst, 2002; National Reading Panel, 2000), and the use of shared book reading to promote early literacy skills (Lonigan, Anthony, Bloomfield, Dyer, & Samwel, 1999; Wasik, & Bond, 2001). For example, in a study conducted by Monroe, et al. (2007) pre-school-aged children at risk for literacy problems demonstrated significantly improved expressive vocabulary skills following direct training on lexical-semantic features of words. Likewise, research, including two studies cited by the What Works Clearinghouse (U.S. Department of Education, 2006), shows that preschool children demonstrate growth in phonological awareness skills when given specific instruction in syllabification, rhyme, alliteration, sound segmentation and sound blending (Majsterek, Shorr, & Eron, 2000; O'Conner et al.,1993). Researchers have also examined the positive relationship that shared storybook reading has on emergent literacy (Lonigan et al., 1999; Whitehurst et al., 1994; Hargrave & Senechal, 2000). In a meta-analysis of studies related to intergenerational transmission of literacy, Bus, van IJzendoorn and Pelligrini (1995) concluded that parent-preschooler joint book reading can account for 8% of the variance in language growth, reading achievement and emergent literacy skills.

In addition, the development of *print concept knowledge (*also referred to as print awareness), has been shown to make an important contribution to later literacy development (Adams, 1994; Clay, 1972; van Kleeck, 1990; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Stewart and Lovelace (2006) describe print concept knowledge as an information set which includes *book conventions*, *print conventions*, and *print forms*. *Book conventions* are comprised of how books are handled and organized (e.g. front of book; top of page), *print conventions* refer to how print is arranged (e.g. top to bottom; left to right) and *print forms* have to do with specific print forms, such as

letters and words. As important as knowledge about print concepts appears to be, it is evident that not all preschool children have access to this information.

Print Concept Development and Intervention in Children from Low SES Backgrounds

Studies indicate that as a group, children from low socio-economic (SES) backgrounds have more difficulty learning how to read and write than children from middle- income backgrounds (Lonigan, Bloomfield, Anthony, Bacon, Phillips, & Samwell, 1999; Nichols, Rupley, Rickelman, & Algozzine, 2004). One factor that has been suggested as contributing to this difficulty is that children from low SES families develop fewer print concepts than their middle class peers (Neuman, 2006; Ramey & Ramey, 2006; Snow, Burns & Griffin, 1998).

Recently, research has been directed towards emergent literacy interventions that target print concepts and which are specifically aimed at low SES preschool children (Justice & Ezell, 2002; Justice, Chow, Capellini, Flanigan, & Colton, 2003; Justice, McGinty, Cabell, Kilday, Knighton, & Huffman, 2010; Frank, Stewart, & Gonzalez, 2010). For example, Justice and Ezell (2002) investigated the impact of shared reading with a print focus in a pretest-posttest study of 30 children enrolled in Head Start. Using a matched-pair experimental/control group design, the investigators studied the outcome of joint reading of storybooks with a *picture focus* (control group) versus a treatment using *verbal print referencing* behaviors. In the control group, the adult reader made verbal references to some aspect of illustrations in the storybook (e. g. color, size or shape of an object). In the experimental condition, the adult reader prompted the children to focus on the print of the storybook by making requests or asking questions (e.g., Show me which way I need to read; Where is the first word on this page?). Results of the study indicated

that the children in the print referencing condition performed better on print concept knowledge than their control-group peers at post-testing.

In a single-subject study, Frank, Stewart, and Gonzalez (2010) investigated the effect of *explicit, non-evocative print referencing* (ENPR) on three low SES preschool children who had phonological impairments. This study examined whether children with low SES who were at-risk for literacy problems could benefit from an intervention for print concept knowledge while at the same time receiving intervention for their phonological disorder. In the context of repeated, shared book reading, an explicit, non-evocative print referencing intervention was utilized. In this situation, the adult reader gave both a verbal cue ("I am going to read each word on this page") and a non-verbal cue (pointing to each word while they were being read), but no response was expected from the child. At the same time, the adult targeted phonological targets by requesting oral production of specific words from the child and giving evaluative feedback. The investigators focused on 14 specific print concepts. With an average of 18 exposures to each concept during the intervention, the participants knew an average of three print concepts at pre-testing and an average of eight at post-testing, more than doubling their knowledge of print concepts.

The Role of Vocabulary in Emergent Literacy Interventions

Research suggests that preschool children from low SES backgrounds know significantly fewer vocabulary words than do children from middle-class backgrounds (Hart & Risely, 1995). Furthermore, prediction studies have demonstrated on average a .45 correlation between expressive vocabulary and future reading scores (Snow, Burns, & Griffin, 1998). Therefore, children from low SES families may also be at risk for literacy problems due to their depressed vocabulary abilities.

Recent studies of emergent literacy interventions, specifically those investigating a print referencing intervention, have referred to the strong interrelationship between early emergent literacy skill development and other areas of language achievement, such as vocabulary (Justice & Ezell, 2000; Justice & Ezell, 2002; Lovelace & Stewart, 2007; Justice, Kaderavek, Fan, Sofka & Hunt, 2009). However, none of these studies have examined the particular relationship between receptive vocabulary level and a child's ability to profit from this type of intervention. Because a child's ability to learn a new word or concept from a limited number of exposures to it (as put forth in the current study) may be influenced by their underlying receptive skill level (McGregor, 2004), it is important that the relationship between receptive vocabulary and learning of print concepts be examined.

Summary

While research suggests that the print concept knowledge of preschool children at-risk increases when adults use an ENPR style, this intervention has only been limited to a few studies. Furthermore, the studies to date have been limited in scope and have not determined *which* print concepts are most amenable to being learned through this intervention. For example, in the Justice and Ezell study (2000) participants came from middle-class families and were reported to have age-appropriate preliteracy skills. While the second Justice and Ezell study (2002) examined the gain in print concept knowledge following intervention with low SES participants, it did so using informal, non-standardized measures developed by the researchers as did the Lovelace and Stewart study (2007). The Justice, Kaderavek, Fan, Sofka, and Hunt study (2009) compared the average gains in print knowledge of entire classrooms of students where teachers used a print referencing intervention compared to classrooms of students whose teachers did not

use this intervention. It did not examine the individual differences in terms of how many print concepts each participant learned. Therefore, one aim of the current study is to examine if at-risk children learn more print concepts using the experimental treatment of explicit, non-evocative, print referencing (ENPR) during shared book reading as compared to the "business as usual" type of shared book reading of their classroom and do so using a standardized measure (the *CAP*, Clay, 2000).

Furthermore, none of the aforementioned studies looked at *which* print concepts, or which category of print concepts (book conventions, print conventions or print forms) were most often learned by the participants when an experimental treatment (intervention) was applied. However, two studies (Lovelace & Stewart, 2007; Frank, Stewart & Gonzalez, 2010) suggested that some participants learned specific print concepts using the ENPR experimental treatment while other print concepts were not learned. Therefore, a second aim of the current study was to investigate which print concepts or types of print concepts are most easily learned by preschool children at-risk using the ENPR experimental treatment.

Lastly, the relationship between children's receptive vocabulary skill level and their ability to learn print concepts with this experimental treatment has not been explored. While lower vocabulary levels have been associated with children from low SES (Hart & Risley, 1995) and may contribute to difficulties with literacy learning (Snow, Burns, & Griffin, 1998), the specific relationship that receptive vocabulary level may have to the learning of print concepts has not been analyzed. Therefore, the third purpose of the current study was to examine if receptive vocabulary level contributes to the variance in performance on print concept knowledge of children enrolled in the

experimental treatment condition. Knowing if this particular treatment is efficacious, determining which print concepts might be most easily learned with this method, and discovering what particular language characteristics (such as vocabulary) contribute to this learning may be important to speech-language pathologists who desire to add an emergent literacy intervention to their treatment protocol for at-risk children enrolled in therapy.

Research Questions and Hypotheses

The study will seek to answer the following research questions:

Research Question 1

Do preschool children at-risk learn more print concepts using an explicit, non-evocative, print referencing treatment during shared book reading compared to "business as usual" classroom experiences? The research hypothesis was that preschool children at-risk would learn more print concepts through an explicit, non-evocative print referencing intervention than do preschool children at-risk who are receiving "business as usual" classroom instruction.

Research Question 2

Which of the following print concepts are more readily learned by preschool children at-risk through explicit, non- evocative, print referencing during shared storybook reading?

1. Print Concepts Related to Book Conventions:
    - Book orientation (Front of Book)
    - Top/Bottom (Page Orientation)
    - Print, not picture, carries the message
    - Print Orientation

2. Print Concepts Related to Print Conventions:

    - Directional rule: where to start,
    - Direction rule: which way to go (left to right)
    - Return sweep to left
    - Concept of first and last (letters of a word)
    - Line sequence
    - Left page before right

3. Print Concepts Related to Print Form:

    - Re-ordering of letters within a word (words can have the same letters but different order: was/saw)
    - Word by word matching
    - Concept of letter
    - Concept of capital letter, lower case letter
    - Concept of word

The research hypothesis was that some print concepts would be learned by a majority of the children enrolled in the treatment condition with minimal exposure to the treatment, some print concepts would be learned with more exposure, and that some concepts would not be learned.

Research Question 3

Does receptive vocabulary level contribute to the variance in performance on the learning of print concepts by preschool children at-risk when using this intervention? The research hypothesis was that receptive vocabulary would make a significant (positive) contribution to children's print concept performance using the experimental intervention.

Definition of Terms

At risk: Children with higher than normal probability of having difficulty with literacy learning. According to Snow, Burns, and Griffin (1998) factors associated with being at-risk for problems in learning how to read and write include: organic conditions (intellectual impairment, hearing disorders, visual impairment; specific language impairment), limited acquisition of pre-literacy and early literacy skills (overall language skills, phonological awareness, letter identification, concepts of print) and family-based factors (history of reading problems, home literacy environment, primary language other than English and low socio-economic status (SES). The at-risk factor for the children enrolled in this study will be low SES as determined by their families qualifying for public assistance to fund their child care services.

Emergent literacy: The perspective that there is a period of time, starting at birth and continuing to the time of formal instruction in reading and writing, when children are developing essential behaviors and affective states that will prepare them for such instruction (Clay, 1967).

Emergent literacy theory: The term emergent literacy has evolved into a theory (emergent literacy theory) that describes a child's listening, speaking, reading, and writing skills developing concurrently and in an interrelated manner (Morrow, 2005).

Emergent literacy skills: Described somewhat differently by different experts, these skills may include achievement in phonological awareness, print awareness, alphabet knowledge, oral language and emergent writing (National Early Literacy Panel, 2004; Tracey & Morrow, 2006). Specific emergent literacy skill sets encompass knowledge of book conventions (how a book is handled and organized; print contains the message), print conventions (how print is organized: left to right, top to bottom), print

form (letters, words), phonological processing skills, oral language skills, knowledge of the alphabetic principle, emergent writing and a positive attitude about reading and writing (Clay, 1966; Morrow, 2005; Stewart & Lovelace, 2006; Whitehurst & Lonigan, 1998).

Explicit print referencing: Verbal (e.g. questions, comments) and non-verbal (e g. gestures, pointing) prompts that direct attention to features, purposes and appearance of written language (Stewart & Lovelace, 2006). In the proposed study, both verbal and gestural cues will be used by the reader to reference print concepts.

Latin Square: A presentation design which allows for systematic, balanced, random, variation through assignment within rows and columns (Laywine & Mullen, 1998). In the proposed study, a Latin Square design will be used to randomize the presentation of the four parallel books used in the administration of the dependent variable (*Concepts About Print,* Clay, 2000), the six storybooks used in the experimental intervention, and the order of assignment of the readers to the children enrolled in the experimental condition.

Literacy: Defined by the National Literacy Act of 1991 (1992) as "an individual's ability to read, write, and speak in English and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals and to develop one's knowledge and potential (H.R. 751, sec. 3)." Literacy can be considered both a cognitive construct (encompassing reading, writing, computing and problem solving) and a socio-cultural construct (involving using text to engage in social communication) (Stone, 2004).

Non-evocative prompt: The presentation of information about a concept which does not require a response (Stewart & Lovelace, 2006). An example of a non-evocative prompt would be, "I will begin reading here." This can be contrasted to an *evocative* prompt which would suggest a response is expected, such as "Show me where I begin reading." In the proposed study, the print referencing prompts will be non-evocative.

Print concepts (PC): A wide range of constructs related to the form, use, content and organization of written language. Print concepts are also referred to as "conventions of print" and "concepts of print" (Adams, 1994; Clay, 1982; Justice & Ezell, 2000; Lonigan & Whitehurst, 1998; Lovelace & Stewart, 2006). For purposes of this study, fifteen particular PCs described by Marie Clay (1982) will be studied, including four print concepts related to *book conventions*: book orientation, page orientation (top/bottom), print (not picture) contains the message, print orientation, six print concepts related to *print conventions* : where to start, which way to go, return sweep to left, concept of first and last, line sequence, left page before right page, and five print concepts related to *print form:* reordering of letter within a word, word by word matching, concept of letter, concept of capital letter and lower case letter, and concept of word.

Pure tone audiometric screening: Gross measure of hearing ability through responses to sounds (pure tones) presented through earphones (ASHA, 1997). For the purposes of this study, participant's hearing will be screened at 25dB at 1000 Hertz (Hz), 2000 Hz and 4000 Hz which is a modification of ASHA's recommended practice of screening at 20 dB. This protocol has been used in previous studies of print concept interventions to account for the ambient noise that is present when children are screened in the non-sound treated environments of their schools (Justice & Ezell, 2001; 2002).

Receptive vocabulary: The words that a person understands (Paul, 2007). For the purposes of this study, receptive oral vocabulary levels will be determined by the administration of the *Peabody Picture Vocabulary Test-4* (Dunn & Dunn, 2007). In this test, the administrator speaks a word and the child is required to point to the picture, out of a field of four pictures, which represent that word.

Repeated storybook reading: The same book being read aloud to a child by an adult reader multiple times. Repeated story book reading is part of the book reading routine in mainstream culture and is thought to reduce the cognitive/linguistic load of the experience (van Kleek, 2004).

Scripts: written directions to the adult reader regarding the exact words and gestures that are to be used while reading aloud to the child the six storybooks used in the experimental intervention (see Appendices B-G).

Socio-economic status (SES): Includes the demographic factors of income, parents' education level, and occupation (Snow, Burns, & Griffin, 1998). For the purposes of this study, low SES level will be determined by the participants' families being enrolled in a state subsided program called LINK (this is not an acronym, but simply refers to the linking of families to child care services). LINK provides the means for families who fall at or above the 150% federal poverty level to receive financial assistance to pay for child care services while the parents seek employment or are enrolled in school or training.

Shared storybook reading: Being read aloud to in a fashion that allows access of the book to both the reader and the listener; a prevalent literacy behavior in mainstream

culture, it is also referred to in the literature of education as joint storybook reading or intergenerational read-alouds (van Kleek, 2004; Whitehurst et al.,1988)

Visual perceptual testing: Assessment of the ability to receive and understand what is seen; visual perception includes both the sensory and cognitive functions essential to a person's ability to recognize and understand what is seen (Schneck, 2010). Visual perception includes (but is not limited to) a person's ability to visually discriminate forms and objects, retain visual information in memory, distinguish visual-spatial relationships, and distinguish a form or object from other background visual information (Martin, 2006). To rule out visual perceptual difficulties as a confounding factor in learning print concepts with the experimental intervention in this study, all participants will be screened to determine that their visual perceptual skills are within expected limits.

CHAPTER TWO:

LITERATURE REVIEW

Chapter II provides a detailed analysis and synthesis of the literature that has informed this study, leading to the rationale for its importance. Content includes a review of literature which connects the importance of sensory perception (visual and auditory), oral language development, and socio-cultural issues to the processes of literacy acquisition. Studies which explored social constructivism and emergent literacy theory are examined for their foundational contribution. Finally, the current study is linked to research on emergent literacy interventions with respect to learning print concepts.

Literacy Learning and the Role of Sensory Perception

The National Literacy Act of 1991 (1992) defined literacy as "an individual's ability to read, write, and speak in English and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals and to develop one's knowledge and potential (p. 7)." As such, literacy can be understood as a cognitive paradigm including reading, writing, computing, and problem solving (UNESCO, 2008). Literacy is also recognized as a socio-cultural construct which encompasses how text is used in social communication (Stone, 2004). Foundational to the construct literacy is learning how to read and write.

In her seminal book, *Beginning To Read: Thinking and Learning About Print* (1994), Marilyn Jager Adams proposed that: "The reading process is driven by the visual recognition of individual letters in familiar ordered sequence and is critically supported by the translation of those strings of letters into their phonological correspondences" (p. 237 ". She, along with many reading theorists who preceded her (Atkinson, & Shiffrin, 1968; Ehri, 1991; Gough 1972; Stanovich, 1980, 1988; Venezky, 1984), acknowledged

the primary role of sensory perception (visual and auditory) in the reading process. Catts and Kamhi (2012) proposed a model for comparing the unique and shared components included in the comprehension of spoken and written language. They explained that while spoken language (speech) needs auditory analysis and contrastively, print requires visual analysis, the processes may share elements at the word recognition level. In their model, word recognition has interactive components of phonological representation, and perhaps visual representation, which lead to the understanding of word meaning, as well as the higher levels of sentence and text comprehension.

The Role of Visual Perception

While vision is the commonly used term that refers to the sensory process of seeing, it is actually the construct of *visual perception* that encompasses both the sensory-perceptual function of receiving visual stimuli (visual acuity) and the cognitive function of organizing and interpreting what is seen (Schneck, 2010).The visual perceptual skills of visual attention, visual discrimination and visual memory all appear to make significant contributions to the reading process (Fegans & Meriwether, 1990; Kulp & Schmidt, 1996; Matthews & Martin, 2009; Sortor, & Kulp, 2003).

Visual attention. Visual attention is described by visual neurophysiology experts as the "filter" that controls the amount of visual information that is managed by the visual pathways to the brain (Steinman & Steinman, 1998). As explained by Schneck (2010), there are four important elements that contribute to visual attention: alertness (the component of arousal), selective attention (the capacity to select more important visual information over less important), visual vigilance (the ability to focus on a visual task for a period of time), and shared attention (the capacity to react to more than one visual task simultaneously). As a child reads, she must be able to visually attend to text for a finite

period of time while both filtering out and monitoring other visual stimuli in her environment.

Research on visual attention and reading has pinpointed visual deficits in several areas that may contribute to reading disability (RD) including insufficiencies in the pathways important to the spatial-temporal attributes of visual attention (Matthews & Martin, 2009; Steinman, Steinman, & Garzia, 1998) and reduced ability in the rapid visual processing needed for fluent reading (Solan, Shelly-Tremblay, Hansen and Larson, 2007). In a study that directly linked visual attention to the development of the emergent literacy skill of print awareness, Justice, Skibbe, Canning and Lankford (2005) used eye-gaze analysis to reveal the visual attention of preschool children to print during shared storybook reading sessions. Ten typically developing children ages 4;2 to 5;9 (years; months) participated in the investigation using eye-gaze technology. Results indicated that only 2.7% of participants' eye gaze was on print in a picture salient book (a book with outstanding illustrations) and increased to merely 7% in a print salient book (where the artist illustrating the book used print in a visually interesting fashion). The authors concluded that preschool children visually attended to the pictures rather than the text (letters; words) during storybook reading.

Visual discrimination. Visual discrimination is the skill used to distinguish the features of visual stimuli, such as the particular shape and formation of the letters of the alphabet (Fegans & Merriwether, 1990; Schneck, 2010; Woodrome & Johnson, 2007). Visual discrimination, as it relates to reading, includes the ability to recognize the particular features of letters, match letter shapes to same/similar letter shapes and categorize similarities and differences among letters and words. It incorporates both the

visual constructs of the form of objects and how they relate spatially (Schneck, 2010). Studies have underscored the important role that visual discrimination plays in the facilitation of acquiring letter knowledge (Badian, 2005; Feagans & Merriwether, 1990; Woodrome & Johnson, 2007) which has been shown to have a strong correlation with success in learning to read (Baidian,1993; Catts, Fey, Zhang, & Tomblin, 2001; Ehri, 1991, National Early Literacy Panel, 2004).

Visual memory. According to Schneck (2010) visual memory "involves the integration of visual information with previous experiences" (p. 376) and includes the subcomponent of short-term visual memory (limited information for a very limited time; also called visual working memory) and long-term visual memory (infinite amounts of information which is permanent). Several recent studies have identified the unique contribution that visual memory makes to the reading process (Menghini, Finzi, Carlesimo, & Vicari, 2011; Menghini, Carlesimo, Marott, Finzi, & Vicari, 2010; Ram-Tsur, Faust, & Zivotofsky, 2008).

Conclusions from contemporary studies have enhanced Kavale's (1982) findings in his meta-analysis of 161 studies that investigated the involvement of a variety of visual perceptual skills in reading achievement (RA). The skills of visual discrimination, visual memory, visual closure, visual spatial relationships, visual motor integration, visual association, figure-ground discrimination and visual-auditory integration were all found to make a significant contribution to RA and accounted for 6%-20% of reading abilities (depending on the reading variable). Kavale's meta-analysis suggested that visual-perceptual skills had strong association with reading ability and that they needed to be considered among the complex set of factors related to reading achievement.

Relevance to study. Understanding the contribution of visual perception to the reading process is important to this study for two reasons. First, the dependent variable (*CAP*, Clay, 2001) used text and pictures to determine participants' print concept knowledge. In addition, in the experimental treatment, the adult reader employed gestures (pointing) to demonstrate the same visually oriented print concepts used in measuring the dependent variable. Learning the concepts of directionality of print, left page before right page, first and last, top and bottom and others is reliant on visual perceptual ability. In recognition of the importance that intact visual perceptual skills had to the validity of the results of this study, all participants had to pass a test of visual perception (Martin, 2006).

The Role of Auditory Perception in Understanding Speech

Although definitions of auditory perception differ across scholars, a general understanding is that it encompasses the ability to receive and understand the significance of sound (Gillet,1993). Some researchers have argued that literacy learning can be affected by more general auditory perceptual skills such as temporal processing (Tallal, 1980; Molfese, 2000; Ramus, 2003; Rosen & Manganari, 2001). Others agree that the auditory skills that affect *speech* perception (speech sounds and words) are those which are most important to the literacy learning process (Adlard & Hazan, 1998; Boets, Vandermosten, Poelmand, Luts, Wouters & Ghesquiere, 2011; Brady, Modt, Studdert-Kennedy & Brady, 1997; Shankweiler, & Mann, 1983; Troia, 2004) and include the skills of detection of frequency and formant differentials between phonemes. Finally, there are those who would contend that reading ability may be affected by auditory processing, speech perception or *both* (Zhang, & McBride- Chang, 2010). For the purposes of this study, with its concentration on the spoken and written word, investigation of speech perception and its relationship to literacy learning was explored.

Auditory acuity for speech perception. The development of language is dependent to a large extent on auditory input (Bess & Humes, 2008). While human hearing sensitivity continues across an extensive frequency range from 20 Hz to 20,000 Hz (Yost, 2006), it is the audibility (minimal sound pressure level) needed to detect the frequencies for speech that pertains to this study. Flexer (1994) described normal hearing in young children as the ability to hear the speech frequencies (500 Hz to 8000 Hz) at a level of -10 to + 15 dB.

Cognitive processing of acoustic information. In addition to perceiving speech sounds, the human brain must process and remember what has been heard. The auditory processes important for language learning include auditory attention and auditory short-term memory (Medwetksky, 2002). Auditory attention is the cognitive process by which one can focus on the auditory signal of interest while ignoring other sound sources (Yost, 2006). Auditory memory, on the other hand, is the acoustic information (in this case speech sounds), that has been processed "within an individual's conscious awareness" (Medwetsky, 2002, p.500). The important connection that auditory memory, and more specifically, phonological memory, has with emergent literacy will be discussed later in this paper.

Relevance to study. Because speech is the medium for delivering the stimulus for the testing as well as one of the ways the treatment is administered in this study, it is important to appreciate the contribution that auditory perception, more explicitly, speech perception makes to language learning. In addition, research has demonstrated that children with impaired speech perception abilities have difficulty in learning how to read (Goswami, 2000; Walley, 2005). While much still needs to be learned about the impact

of speech perception on learning in typically developing children (Walley, 2005), the literature on children with hearing impairment indicates that reduced hearing acuity negatively impacts speech perception and consequently overall speech and language development (*ASHA*, 2011; Flexer, 1994, Yoshinaga-Itano, 2003; Yoshinaga, Itano, Sedey, Coulter, & Mehl, 1998). In order to account for the possible confounding influence that hearing impairment might have on responses of the participants enrolled in this study, inclusion criteria included passing a hearing screening.

The Relationship Between Oral Language and Literacy Development

Historical Perspective

Theoretical models of literacy development can be traced back to the Mental Discipline Theory in 400 BC (which viewed the mind as essentially dormant until exercised for some specific purpose; Bigge & Shermis, 1992). More modern perspectives have examined the dynamic relationship between cognition and learning (Slavin,1997; Hennings, 2000 ;Tracey & Morrow, 2006). Piaget's theory of cognitive development (Slavin, 1997; Hennings, 2000), Morphett and Washburne's Maturation Theory (1931), Holdaway's Stage Models of Reading (Eri, 1991; Chall, 1983; Stahl & Murry, 1998) and the recent Family Literacy (Jordan, Snow, & Porche, 2000) and Emergent Literacy (Morrow, 2005) models have all contributed to current understanding. However, much of what is known about the relationship between oral language development and literacy development has been discovered from research related to developmental problems in early reading ability (Catts, Kamhi, & Adlof, 2012; Silliman, Wilkinson, & Brea-Spalin, 2004; Vellutino, 1979).

Thirty years ago, Vellutino (1979) summarized what had been discovered about the nature of dyslexia, a severe problem with reading that exists in the absence of

sensory, intelligence, socio-economic or instructional disadvantages. His own research (Vellutino, Steger & Kandel, 1972; Vellutino, Steger, Moyer, Harding, & Niles, 1977), along with that of others (Lieberman, 1971; Myklebust & Johnson, 1962) had considered and rejected the long-held notion that reading disorders were visually based and concluded that weaknesses in linguistic functioning were the underlying cause for most reading disorders. .Since that time, researchers have engaged in numerous studies which have attempted to uncover the elements of the relationship between reading and language as the proportion of language impairment (LI) who also experience reading failure is extremely high. According to Catts, Fey, Tomblin, and Zhang (2002), 53% of children with LI exhibit low reading scores in second grade and 48% of these children had depressed performance in fourth grade. With a specific focus on discovering the underlying correlates of reading impairment, studies demonstrating the relationship between literacy and the major components of language development (phonology, semantics, and morpho-syntax) are examined in the following sections.

Understanding the Relationship Between Phonological Processing and Literacy Development

The alphabetic orthnography of the English language encodes words at the level of the phoneme, which is the smallest unit of the spoken language that signals a difference in word meaning. In order to make sense of this encoding, a child needs to utilize phonological processing, which is a set of cognitive skills that incorporate the ability to detect (phonological awareness), remember (phonological memory), and retrieve (phonological retrieval) information at the phoneme level (Kamhi & Catts, 2012). Phonological processing has been determined to contribute significantly to literacy development (Catts, Gillispie, Leonard, Kail & Miller, 2002; Kamhi & Catts, 1986;

Kirby, Parrila, & Pfeiffer, 2003). In the early stages of learning to read and write, children are dependent on phonological processing to engage in "phonological recoding", that is, converting letter sequences into their matching phonemic representations (Torgesen, Wagner, & Rashotte, 1997; Torgesen, et al, 2001; Vellutino, & Scanlon, 1987).

Both correlational and intervention studies have indicated that the phonological processing skill of phonological awareness, in particular, makes a significant contribution to literacy learning (Blachman, 1991; Bryant, et. al., 1990; Bus & van IJzendoorn, 1999; Goswami, 2000; Mann, 1984; Perfetti et al., 1987;Torgesen, et al., 2001). Perfetti and his colleagues (Perfetti, Bell, Beck & Hughes, 1987) explored the impact of phonological awareness on reading by examining the reciprocal relationship of phonemic knowledge and reading ability. Their longitudinal study with 82 children who were assigned to either holistic reading instruction or direct training in phonemic awareness, suggested that children who received explicit instruction in phonemic awareness had greater gains in reading skill and that a reciprocal relationship between phonemic awareness and reading existed.

Phonological core deficit model. Researchers have also been interested in examining how deficits in one or more aspects of phonological processing are related to reading problems and much has been published on this *phonological core deficit model* (Kamhi & Catts, 1986; Stanovich, 1988; Stanovich & Seigel, 1994; Torgeson, Wagner & Rashotte, 1994; Vellutino & Scanlon, 1987). In 1988, Stanovich defined the phonological core deficit model as explaining the difference between children with dyslexia and what he referred to as "garden variety poor readers". He explained that those with dyslexia have a cognitive deficit, a difficulty in parsing out the individual sounds in words

compounded by short-term memory deficits that inhibit coding of the phonetic forms of words. In contrast, children who are "garden variety poor readers" have a developmental lag, which can best be treated with a longer, more intensive period of reading instruction. Torgesen and his colleagues (1994) concluded that phonological abilities are part of individual's cognitive skill set and not something that simply develop as an outcome of reading instruction. There appeared to be stability in these skills over time and a causal relationship with reading ability. This knowledge has led to recommendations that phonological awareness skills be a part of the early assessment of children at-risk for reading problems and that they be included in preventive and intervention training programs (Justice, 2006; Dickinson, McCawbe, & Clark-Chiarelli, 2004; Snow, Burns & Griffin, 1998).

Three decades of research support the position that reading, especially that aspect of beginning reading that has to do with word decoding and word identification, has its foundation in the phonological processing skills of phonemic awareness, phonemic memory, and phonemic retrieval. Twin studies have verified the genetic connection between deficient phonological processing skills and reading impairment (Byrne, Wadsworth, Corley , Samuelson, Corley, Quan, et al., 2005; Fischer & DeFries, 2002). Furthermore, evidence points to not only a causal, but a reciprocal relationship between these two skill sets (Snowling, & Haylou-Thomas, 2006). However, many of the studies dealing with language and reading impairment have also pointed to other aspects of language that contribute to both word identification and overall reading comprehension. Research is shows that weaknesses in phonological coding, as well as other factors, contribute to deficient semantic lexicons (vocabulary) which can impact both word

decoding and overall reading comprehension. The current study explored the relationship between receptive vocabulary and the learning of print concepts.

Understanding the Relationship Between Semantics and Literacy Development

Phonological distinctiveness theory. Vellutino and Scanlon (1987) concluded that word identification problems in poor readers "provide strong support for the idea that word identification, phonetic coding, and phonemic segmentation are intrinsically related skills" (p. 328). They defined *semantic coding* as the capacity to store in memory phonological codes (words) and the meanings connected to them. In terms of reading acquisition, this equates to vocabulary development and vocabulary retrieval. Further investigation into what was to be later known as the *phonological distinctness theory* (Chiappe, Chiappe, & Gattardo, 2004) was made by Vellutino and his colleagues in 1995 (Vellutino, Scanlon, & Spearing, 1995). According to this theory, poor readers are expected to show higher degrees of deficit in expressive vocabulary than receptive vocabulary because it places more demands on fully accessing the phonological code of a word. In a series of three related studies, Velluntino et al. (1995) examined semantic and phonological processing deficits as separate explanations for reading disability. Results of their studies showed that on semantic tasks, poor readers performed below the normal readers only in the sixth grade. On the rapid naming and pseudo-word reading measures poor readers performed below the normal readers in both second and sixth grades. Poor readers performed in a similar manner to normal readers on verbal memory and visual-verbal learning tasks that involved high meaning words, but performed more poorly than typical readers on low meaning words. The authors concluded that the phonological coding of words contributed to reading problems in young readers, but that semantic coding may play a role in deficits in older readers.

Laing and Hulme (1999) examined the phonological distinctness theory from a slightly different angle. They were interested in the influence of word cueing and how it illuminated the relationship between phonological and semantic processes in beginning readers. In the first part of a two-part investigation, the authors administered a battery of phonological tasks, measures of reading ability and an experimental novel word learning task on 60 children ages 4-6 years of age. In the experimental task the children were given 3-4 letter cues to associate with spoken words. The cues consisted of both phonetic and control prompts. In this portion of the study, results indicated that the phonological measures were significantly correlated to the children's ability to correctly identify the words. In the second experiment, 20 children in the same age range were examined by a learning task where the target words varied in a semantic variable: imagineability (the ability to have a mental picture of the referent of a word). The cues were therefore influenced by the phonetic makeup and the semantic properties of the words. In this case, results showed that the phonetic cues again assisted in word identification. However, the high imagineability words were learned more easily than the low imagineability words. Laing and Hulme concluded that children, in the early stages of reading, are sensitive to the relationship between the sounds of the letters in printed words and how they are pronounced. In their experiment, both the overall rate of learning the cues and the extent of learning the words were related to independent measures of phonological processing. The authors discovered that children find it easier to learn nouns (high imagineabilty) than other word forms, giving support for factors other than phonology supporting word identification.

Lexical restructuring model. Another theory concerning the relationship of semantics to reading is the *lexical restructuring model*. Researchers interested in investigating this theory (Walley, Metsala & Garlock , 2003; Chiappe, Chiappe, & Gottardo, 2004, Lonigan et al., 2009), proposed that representations of words begin as holistic units and become more refined as children grow older and their phonemic awareness skills increase. They also posited that the restructuring of words into their phonemic parts is dependent on vocabulary growth as children have to figure out the phonemic representations of different, but similar, words (bad versus bat). In this paradigm, it is a deficit in the skill of restructuring that is viewed as contributing to reading problems. The lexical restructuring model views reading as enhancing phonemic awareness rather than being its source.

In addition to its contribution to word recognition, semantic skill (word comprehension) is a large factor in reading comprehension (Nation & Snowling, 1999; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001; Ouellette, 2006). Simply put, children who have larger lexicons understand what they read better than those with smaller lexicons (Plaut, & Booth, 2000; Stahl & Fairbanks, 1986). While the semantic-literacy link is multifaceted it appears that word knowledge, both at the individual word level and at the related meanings level, contributes to successful reading comprehension (McGregor, 2004).

The studies investigating the early relationship of semantic development to reading achievement contain two important evidential pathways. First, there is an apparent connection with phonological processing skills and the development of a semantic lexicon. Words have to have a phonological representation that is encoded in

memory in order to be used in whole word identification and in reading comprehension. However, there are also data pointing to semantic factors that, above those connected to phonology, contribute to reading proficiency. Children learn simple whole word concepts (fast mapping) before they process word units (syllables and phonemes) and deeper word meanings. How they do this, and why some children have such great difficulty in doing so, remains open to further investigation. Furthermore, there is a mutual relation relationship between semantics and reading comprehension. Karla McGregor (2004) noted: "Because of the reciprocal relationship between the lexicon and reading, children with impairments in either domain are likely to demonstrate secondary impairments in the other" (p. 312). It remains to be seen if early intervention relating to concept and vocabulary development impacts later reading comprehension levels.

Understanding Literacy Impairment in Relation to the Double Deficit Theory

An important vein of research occurring in the late 1990's and early years of the 21st century explored an alternative conceptualization of the nature of the linguistic contribution to some types of reading impairment. Wolf and Bowers (1999) proposed that there were actually different types of the developmental reading disorder, dyslexia. Based on a review of correlational studies that linked naming speed deficits with severely impaired readers (Ackerman & Dykman, 1993; Badian, 1995; Denckla & Rudel, 1976) and the well known literature on the phonological core deficit model (Stanovich, 1988) these authors suggested that some children with dyslexia demonstrated impairments in phonological awareness which impeded word identification skill development. Other children showed a decisively slow ability to access and retrieve verbal labels (Denckla,1972) which impeded the fluency of word identification. In the poorest of readers, posited Wolf and Bowers, *both* of these deficits were present, thus supporting

their *double deficit hypothesis.* A subsequent study provided data to confirm their theory (Wolf, Bowers, & Biddle, 2000).

The Matthew effect. What is known about the relationship of semantics to reading may be best explained by Stanovich's (1986) concept of the Matthew effect where world knowledge (exposure) affects word knowledge (breadth and depth of semantic repertoire). In this view, children who have more exposure to oral and written language learn more about words. This, in turn, has a boot-strapping effect on further learning. The opposite, sadly, may also be true. Children who have limited semantic lexicons, in turn, struggle with word identification and deeper word meaning. Their vocabulary gap , compared to their peers with normal reading abilities, widens (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). This struggle may result in less reading and less learning.

Understanding the Relationship Between Morpho-Syntax and Literacy Development

The ability to understand the inflectional and derivational components of words (morphology) as well as the structure of phrases and sentences (syntax) is critical in language comprehension. It therefore makes sense that morpho-syntactic skills also play an important role in literacy. Surprisingly, despite this obvious relationship, the research on morpho-syntax and literacy development is somewhat sparse compared to the previously examined topics. The studies that have been conducted suggest a significant relationship exists between morpho-syntactic processing and literacy especially as it relates to reading comprehension (Carlisle, 2000; Carlisle & Fleming, 2003; Nation & Snowling, 1999; Waltzman & Cairns, 2000). The literature speaks to the importance of beginning readers' need to integrate word form and word meaning (Carlisle & Fleming,

2003) and points to a strong correlation between morphological processing and reading achievement (Carlisle, 1995; Carlisle, 2000; Singson et al., 2000). Similarly, research has suggested a strong association between children's syntactic abilities and their reading skills (Bentin, Deutch, & Liberman, 1990; Gaux, & Gombert, 1999; Nation & Snowling, 1999).

Most of what is known about morpho-syntax and literacy development has come from studies of children with oral language impairments. In 1999, Catts, Fey, Xhang, and Tomlin published the results of their longitudinal study of over six hundred students who were examined in kindergarten on phonological processing and receptive and expressive oral language skills. These scores were then compared to measures of written word recognition and reading comprehension in the second grade. The children were divided into groups of "good readers" and "poor readers". Results indicated that 73% of the poor readers had identified language problems in kindergarten: 14% had phonologic deficits, 22% had oral language deficits, and 37% demonstrated impairments in both phonology and language. The authors suggested that future theories of language-based reading problems must consider both phonological and other oral language processes. Later studies confirmed the strong association between language impairment and reading problems (Catts & Hogan, 2003; Catts, Adlof, Hogan & Weismer, 2005).

Relevance to study. The literature on language and literacy development informs this research in three important ways. First, it provides a framework for understanding the important contributions that each of the components of oral language make to the overall literacy learning process, which is the focus of the study. In addition, it illuminates the overall relationship between oral and written language which is important in

understanding the construct of "print concepts" . Finally, it suggests that there is much we still need to learn about the connection between language and literacy learning which is the premise for one of the research questions, "Does receptive vocabulary level contribute to the variance in performance on the learning of print concepts by preschool children at-risk using the experimental intervention?"

Poverty and Literacy Development

Living in a low SES household has been recognized as a threat to literacy success (Bowey, 1995; Dickinson & Snow, 1987; Justice et al., 2006; Snow Burns & Griffin, 1998; Whitehurst, 1996). According to Snow et al., "The association of poor reading outcomes with poverty and minority status no doubt reflects the accumulation of several….risk factors including lack of access to literacy-stimulating preschool experiences, and to excellent, coherent reading instruction (p. 4)". Both early and later developing literacy skills have been shown to be deficient in children in low income families compared to those children in middle or high income families (Chaney, 1994; Dickinson & Snow 1987; Lonigan et al., 1999). Of particular interest to the current study are the important abilities that children of poverty are lacking prior to formal reading instruction and during the time of emergent literacy development.

Hart and Risley (1995) discussed how young children raised in low SES homes may be impacted by familial stress factors which result in diminished quality in parental language and interest in literacy. Likewise, Dickinson and Snow (1987) examined the class related differences in emergent literacy skills in middle-class and working class children at the environmental level. The subjects in their study attended what the researchers described as excellent kindergarten classrooms which had a literacy emphasis. Using general, linear models ANOVAs, they determined that SES had a

significant and sizable influence on scores for several emergent literacy variables including print awareness. Because the two groups of children (15 higher SES; 18 lower SES) did not have significant differences in age or receptive vocabulary scores, the authors suggested that children from lower SES households (as a group) may have less exposure to and contact with print, resulting in limited acquisition of those concepts needed for thinking about print and developing an understanding of how print functions. This can be interpreted as adding what can be understood about SES and emergent literacy from an experiential level. The authors concluded that attendance at high-quality kindergarten was not sufficient for overcoming the difference in the two social groups in terms of developing important early literacy skills.

Finally, Cabell, Justice, Konold and McGinty (2011) examined the impact of low SES status in the emergent literacy development of preschool children, but did so by looking at child-level factors rather the impact of the environmental experiences. They discovered that there was variability in children from low SES households and were able to create "predictive clusters" of children. The researchers described five "clusters" of children with similar characteristics and subsequent literacy trajectories. Those children with the lowest oral language scores appeared to be inhibited from fully engaging and participating in classroom literacy activities. These children continued to lag in preschool emergent literacy and later kindergarten reading achievement. The authors made recommendations for early and intensive emergent literacy intervention with these children.

Social Constructivism and Emergent Literacy Theories

The principle theoretical foundations for the current study were social constructivism and emergent literacy theory. These socio-cultural paradigms describe the

reasoning behind communication-centered interventions and the importance of early print-related experiences related to literacy development. Socio-cultural theories of learning, in general, and literacy learning specifically, grew from the disciplines of anthropology, sociology, linguistics, and political science as scholars, beginning in the 1960's, became interested in the pivotal role of social interaction in learning and knowledge development (Paulston & Tucker, 2003; Tracey & Morrow, 2006).

Social Constructivism

The school of Social Constructivism posits that children learn through their interaction with others. Vygotsky (1978), the Russian "father" of social constructivism, added to the social nature of learning the importance of a culture's *sign system* which included all the forms of symbolic communication including counting, language, and writing (Cole, John-Steiner, Scribner, & Souberman, 1978). He argued that children learned the language or languages of their culture by interacting with others and that this language knowledge forms the basis for literacy learning.

In addition to stressing the importance of children mastering the sign system of their culture, Vygotsky (1978) put forth two important concepts that have influenced modern educational practice: the idea of the "zone of proximal development" and the construct of "scaffolding" in the learning process. Vygotsky defined the *zone of proximal development* (ZPD) as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky,1978, p. 86). The instructional paradigm that supported the child in his or her ZPD is that of *scaffolding*, which consisted of the actual cues,

reminders, or modeling that a teacher provided for successful task completion (Tracey & Morrow, 2006).

In Social Constructivism, it is assumed that children have the sign system needed to master reading and writing in their culture. What is suggested is that children have individual needs in terms of having literacy tasks presented to them in just the right fashion (developmental order) to challenge them to use what they know, and with the scaffolding of an adult or more proficient peer, reach the next level of difficulty (Vygotsky,1978). Emergent literacy practices have also benefited from this theory as parents and teachers are encouraged to select reading materials that are within a child's ZPD (from simple board picture-books with limited text to patterned story books that allow the child to "participate in the reading"), thereby encouraging higher and higher levels of pre-literacy skill achievement.

Emergent Literacy From a Sociocultural Perspective

Clay (1966) was the first theorist to coin the term "emergent literacy" to describe the period of time in child's life from birth up until the time that formal reading and writing instruction occurs. During this time, children are developing important concepts about listening, speaking, reading and writing that, in essence "primes" them for literacy learning (Morrow, 2005). Studies exploring emergent literacy from a sociocultural framework can be viewed as taking three pathways: 1) research into family literacy practices; 2) research into joint book reading experiences; and 3) research into preschool classroom approaches.

Research on Family Literacy Practices

In the 1995 ethnographic study, *Other People's Words: The Cycle of Low Literacy,* Purcell-Gates explored cultural identity in the process of literacy development,

both from the view of a non-literate parent (Jenny) and that of her preschool son (Donny). The purpose of the investigation was to look at "the phenomenon of low literacy achievement of peoples from poor, minority, low-literate communities" (p. 179) and to describe the role of cultural identity in the process of literacy development. Jenny and Donny were members of an urban Appalachian family; that is they lived in a large mid-western city, but had roots in rural Appalachia. Purcell-Gates explained:

> They never travel the mile of the city blocks from their home to the downtown area. . . . There are many reasons for this, but one is that no one in the family can read well enough to use the bus line that could take them there . . . [they cannot drive there because] . . . no one in the family can read well enough to read the street signs or store names. (p. 11)

The author described the family home as "print free" (p. 51). Donny completed both kindergarten and a year in a pre-first grade classroom. In spite of the usual emergent reading and early reading curricula of these experiences, when the researcher meets him, neither Donny or anyone in his family can read a word. Jenny requested assistance from Purcell-Gates in teaching both her and her son to read. The author engaged in a two-year study of the emergent and early literacy development of these two participants who came from a non-literate environment. At the conclusion of the two-year study, Purcell-Gates was able to assist Jenny in becoming a functional reader and writer but not Donny. He appeared to make a conscious choice to be a non-reader like his father: although he could read, unless pressed by an authority figure, he would not read. The author reported three major findings: 1) members of this community were viewed as failures by the educational system and little was done to support their different learning needs; 2) the difficulties that Jenny and Donny had in learning how to read and write may well be connected to the fact that the literate dialect of school was foreign to them; they were being taught using "other

people's words"; and, 3) Donny in particular, had a growing identification with his father who was not literate and chose to remain so.

In a later study, Purcell-Gates (1996) conducted a descriptive investigation whose purpose was two-fold: 1) to illustrate the use of print in low SES families and how this use impacted the emergent literacy skills of the children in the households; and, 2) to portray the consequences of *not* having shared book as part of the situated practice of a family or community. Participants included twenty low-income families and their twenty-four children, ages four to six years. Data were collected through direct observations of family members in their homes with the observations occurring during different parts of the day. Observers recorded all uses of print and functional uses of literacy within the home. These events were then coded along two domains: social use (daily living routines, entertainment, school related, religion, work, etc.) and test level (degree of writteness). The focal children were assessed for knowledge of intentionality of text, written register knowledge, alphabet principle knowledge, concepts of writing and concepts of print.

Study findings indicated a wide variability in the amount and types of literacy events occurring in the households. The frequencies of literacy events were calculated as proportions of total minutes observed and ranged from .17 to 5.17 events per hour. The proportion of literacy events that directly involved the focal children tended to increase the closer the child was to school entry. Children who were part of families with a greater degree of literacy events occurring, and who experienced more interactions with their mothers around print, had a greater degree of understanding about the function of print.

Purcell-Gates (1996) concluded that there is an under-appreciation of the variability in amounts and types of literacy events that go on in low SES homes: in some

homes it indeed is very low, but in others surprisingly high given the limited resources of the family. She also found that it was not so much the types of literacy events that were occurring, but the amount and functionality (with reference to "stories, coupons, and the *TV Guide*) that assisted the children in the household in gaining emergent literacy skills such as concepts of print. The author underscored the importance of language and literacy being a part of *situated dialog* (that is learning from others within a cultural framework), as suggested by Bakhtin (1986), Gee (1992) and Vygotsky (1978).

Storch and Whitehurst (2001) were also interested in the influence of family and home environment on the literacy development of children from low SES backgrounds as they sought to study children's emergent literacy skills from the age of four years old through second grade. They used a framework developed by Whitehurst and Lonigan (1998) that explained emergent literacy as occurring from two domains: an "outside-in" domain that covers skills related to comprehension and an "inside-out" domain that denotes those skills which lead to decoding abilities.

In this quantitative study, a sample of 347 four year old children who attended Head Start were assessed on memory, auditory processing, print concepts, emergent writing receptive and expressive vocabulary, and measures of early reading at four separate times: in the spring of their Head Start year, kindergarten, first grade and second grade. Using Structural Equation Modeling, the data from the children were compared to responses given by their primary caregiver on a survey of home literacy practices which included:

- Frequency of shared reading with the Head Start child
- Duration of shared-reading episodes

- Number of picture books in the home for the child's use
- Frequency of visits to the library with the Head Start Child
- Frequency with which the child asks to be read to
- Frequency with which the child looks at books alone
- Grade the caregiver expects the child to earn in reading
- Grade the caregiver expects the child to earn in spelling
- Caregiver's own enjoyment of reading
- Frequency with which the caregiver reads for pleasure
- Primary language spoken at home (pp. 60-61).

Results indicated that home and family literacy practices accounted for 40% variance in those emergent literacy skills associated with understanding the meaning of print. Storch and Whitehurst (2001) also found that outside-in (comprehension skills) and inside-out (decoding related) skills were highly correlated. Finally, these skills were maintained from preschool through kindergarten, although the influence of inside-out skills on reading became stronger as the children grew older. The investigators concluded that the relationship between home literacy practices and literacy success in school is very strong especially for outside-in emergent literacy domains. This puts children from homes with limited literacy practices behind their peers when they enter school and places them at risk for reading problems.

Research on Shared Reading Practices

Both qualitative and quantitative studies of literacy practices, in the cultural context of family, refer to shared (joint) reading practices (or the lack of them) as influencing emergent literacy skill development. There is, indeed, a rich body of

literature that explores the socio-cultural, intergenerational, influence of early shared reading experiences on later literacy proficiency.

A meta-analysis conducted by Bus, van IJzendoorn and Pellegrini (1995) examined the impact of parents reading to their preschool children. The purpose of the study was to test the conclusion of the Commission on Reading, National Academy of Education's report (1985) which alluded to early shared book reading experiences as the single most influential factor in children's later literacy development.

The authors examined 34 studies which they divided into two sets: studies that looked at the number of times parents read to their children per week and studies that had, in addition to book-reading frequency, more qualitative (descriptive) variables. Furthermore, they separated the studies according to three outcome measures: 1) language growth, 2) emergent literacy skills, and 3) reading achievement. The study used publication year, sample size, publication status (published or unpublished), socio-economic status of the participants, experimental design, measure of book reading frequency, and age of the child at outcome measurement as the moderating variables in the meta-analysis.

After adjusting for variance in sample sizes, Bus et al. (1995) determined that frequency of shared book reading between parents and their pre-school children was related to all three outcomes measured: language growth, emergent literacy, and reading achievement. The overall effect size, d=.59, indicated that intergenerational transmission of literacy, through frequency of joint book reading experiences, accounted for 8% of the variance in the outcome measures examined. With frequency of book reading being equal, socio-economic status was *not* a significant factor in outcome growth. While

concluding that joint book reading between parents and children provides strong support for literacy development, the authors cautioned that more investigation of types and conditions of shared book-reading needed to occur.

A particular protocol for adult-child book reading thought to promote oral language and early literacy skill development was proposed by Whitehurst and colleagues in the late 1980's and early 1990's called *dialogic reading* (Whitehurst, et al., 1988; Whitehurst, et al., 1994). With dialogic reading, the adult uses repeated readings of the same storybook, with varying levels of prompts from the adult, to engage children in the story to the extent that they eventually "become" the story-teller. The three principles of dialogic reading include: 1) the adult reader uses evocative prompts to encourage the child to talk about the pictures or the text; 2) the adult gives feedback about what the child is saying; and 3) the adult provides prompts and feedback with sensitivity to the child's developmental abilities (Whitehurst et al., 1988).

In a study of the impact of dialogic reading in the school setting, Lonigan and Whitehurst (1998) investigated the effects of this interactive shared-reading protocol with 114 children ages 3 to 4 years who came from low SES backgrounds. All the children were enrolled in subsidized day care centers. After being recruited for the study, the children were pretested on oral language skills known to be associated with literacy development and assigned to one of four treatment conditions: school dialogic reading (where children were read to in small groups); home dialogic reading; home and school dialogic reading; and a no-treatment condition (regular shared reading without dialogic components).

At the end of six weeks, the children were again tested on oral language measures. With some varying results (which were related to the compliance of the childcare centers regarding fidelity to the treatment procedures), it was determined that both the home and school dialogic reading interventions created positive oral language growth in the children. The largest effect size (1.19) was for the children receiving intervention individually in the home. Lonigan and Whitehurst (1998) concluded that group reading interactions may not be sufficient in giving children the individual probing and scaffolding they need for maximal development of their oral language skills. There have been a number of studies since which have explored the positive impact of dialogic reading on language and literacy development (Crain-Thoreson, & Dale, 1999; Hargrave, & Senechal, 2000; Lonigan, Anthony, Bloomfield, Dyer, & Samwel, 1999; Lonigan,& Whitehurst, 1998; Wasik & Bond, 2001).

Research on Emergent Literacy Skills in the Context of School

Bloome et al. (2000) were interested in the connection between family/community literacy practices and school literacy practices especially as they relate to young children. They noted that in terms of both research and educational practices, the emphasis has tended to be on getting home literacy practices more in line with those of school. What these researchers studied, however, was the use of multiple literacy centers within a community, "each with their own set of literacy and cultural practices" (p. 156).

In their two-pronged ethnographic study, Bloome and colleagues (2000) looked at both the adaptation of school practices within the context of diverse homes and the employment of community-based story-telling and literacy practices within the school setting. The first study described the book reading practices in "Plane Valley", an urban

housing project. Parents enrolled in the study were interviewed about their story-reading practices at home and were asked to keep a journal describing these events. The findings indicated that parents often misinterpreted suggestions from teachers that they read more to their children as asking them to "teach their children to read through shared book-reading (p. 157)". As a result, the parents took on an instructional role during literacy activities, sacrificing a pleasant exchange with their children. These were often very busy households where reading happened, not at the traditional (by mainstream standards) bedtime, but whenever the parents could fit it in. Siblings were frequently part of the process. Oral story-telling often replaced book reading. Bloome et al. concluded that "although storybook reading appeared on the surface to be similar to storybook reading in the classroom, parents adapted school storybook reading practices to fit into their lives and into the lives of their family" (p. 158). They recommended that teachers need to make certain that the practices of the classroom fit into the family culture in a positive way.

The social standing that literacy proficiency brings to children in the classroom was explored by Christian and Bloome (2004) in a study they reported as *Learning to Read is Who You Are.* They were interested in the social dynamics of classrooms where there were both English proficient students and students who were English Language Learners (ELL). The particular focus was on the symbolic capital (Bourdieu,1994) of literacy, with the mediating variables of linguistic and cultural background, that provided (or denied) social standing in a classroom of early readers. While not implicitly studying young children's emergent literacy skills, the study was illustrative of the classroom culture which can marginalize ELL at any age. Christian and Bloome (2004) concluded

that educators and other concerned professionals should not only be focused on the cultural/linguistic differences that ELLs have with their peers fro m the majority culture, but with the actual status (or lack thereof) ELLs hold in the community of the classroom.

Relevance to study. The Christian and Bloome study (2004) was conducted within the context of the participants' preschool/childcare environment. Researchers have illuminated the disconnect that often exists between mainstream school literacy routines and those which go on in a child's home. Therefore, while the results of the study may inform classroom and other intervention practices, they may, in fact have limited impact on home literacy practices.

Interventions for Emergent Literacy Development

Interventions for increasing the emergent literacy skills of preschool children have been suggested as means to prevent later literacy learning problems, especially in children who have known risk factors (ASHA, 2000; Justice, 2006; Justice & Pullen, 2003; Snow, Burns, & Griffin, 1998). The National Early Literacy Panel (2004), through meta-analysis, identified emergent literacy skills that were most strongly associated with literacy attainment, among which were phonological awareness and print knowledge (alphabet knowledge and print concepts). Studies demonstrating the impact of explicitly teaching these skills during the preschool years have added to our understanding of methods to provide prevention and early intervention to vulnerable populations.

One of the most thoroughly researched areas of emergent literacy intervention is that of phonological awareness training. Numerous studies have provided evidence for the robust relationship between phonological awareness and subsequent reading achievement (Catts, Fey, Zhang & Tomblin, 2001; Lonigan, Burgess & Anthony, 2000; Torgeson, Wagner, & Rashotte, 1994; Wagner et al., 1997). The U. S. Department of

Education (What Works Clearinghouse, WWC, 2006) identified phonological awareness training as having a significant, positive, impact on the phonological processing skills needed as a precursor to learning to read.

In addition to phonological awareness, alphabet knowledge has been shown to be a principal emergent literacy skill. The amount of knowledge a child has about the alphabet when they enter school has been cited as a vigorous predictor of reading success (Adams, 1994; Stevenson & Newman, 1986). However, interventions that only teach children letter names do not appear to influence reading ability (Adams; 1994). What the literature does suggest is that emergent literacy instruction which meshes letter knowledge with phonological awareness is a powerful influence on literacy acquisition (Bradley & Bryant, 1983; Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Lonigan, Burgess, & Anthony, 2000).

Print Concept Interventions

Oral language, phonological awareness, and alphabet knowledge have all been discussed as making important contributions to literacy learning. Understanding print concepts (PCs) has also been shown to be a significant factor. Stewart and Lovelace (2006) explained that print concepts encompass three domains: book conventions, print conventions, and print forms. Book conventions are comprised of how books are organized and physically managed (e.g. front of book; top of page). Print conventions describe how print is arranged (e.g. top to bottom; left to right). Print forms, on the other hand, constitute the attributes of letters and words. Recently, several studies have investigated emergent literacy interventions that target increasing children's PC knowledge (Justice & Eaell, 2002, Justice, Pullen & Pence, 2008; Justice, McGinty, Cabell, Kilday, Knighton, & Huffman, 2010; Frank, Stewart, & Gonzalez, 2010).

Justice and Ezell (2002) investigated the impact that shared storybook reading with print referencing had on children's learning of PCs. Print referencing occurs during the shared book reading experience between adult and child when the adult provides visual and/or verbal prompts that direct the child's attention to a particular characteristic of print (Ezell & Justice, 2000; Justice & Ezell, 2002; Stewart & Lovelace, 2006). In the Justice and Ezell (2002) study, 30 at-risk children (because of low SES), ages 41 to 64 months were age matched and randomly assigned to two conditions, experimental and control. In the experimental condition adult readers pointed out PCs as they read the story book; in the control condition, adult reader read without referencing PCs. In this pre-test/post-test study, gains made by the children enrolled in the experimental group on PCs were significantly higher than those children enrolled in the control condition. However, the authors questioned the reliability and validity of the measures of early literacy used in their study and urged replication of their results.

In 2008, Justice, Pullen and Pence sought to determine the extent to which adult references to print during shared storybook reading increased children's attention to print and to explore the effect of how verbal versus non-verbal references on this attention. They randomly assigned 40 four year olds to one of four conditions where the adult reader: 1) read the text verbatim; 2) read the text with explicit verbal references to the illustrations; 3) read the text with verbal references to the print; and 4) read the text with gestural references to the print. They conducted a correlational analysis of eye-gaze time and book reading condition for each child and then aggregated the proportional data. They were able to conclude that children's visual attention to print was significantly increased when adults explicitly referenced it either verbally or non-verbally and that

non-verbal references had a greater impact. They raised a question which bears on the current study: the need to explore the combination of verbal and non-verbal referencing to the learning of PCs.

A study conducted by Frank, Stewart, and Gonzalez in 2010 investigated the impact of using explicit (verbal and gestural), non-evocative (no response required from the child) print referencing on developing PCs in pre-school children being treated for severe phonological impairment. The results of this single subject, multiple probe across subjects design (Horner & Baer, 1978) suggested that the use of explicit, non-evocative print referencing during phonological treatment can improve the PC knowledge of children with language impairment. A question that remained unanswered was *which* print concepts might be most impacted with this intervention.

Summary

Children bring a host of skills to the complex process of learning to read and write. In addition to the sensory functions of visual and auditory perception, it has been determined that they need strong proficiency in oral language, phonological awareness, the alphabet and print concepts (Dickinson & McCabe, 2001; Mc Cardle, Scarborough & Catts, 2001; Schneck, 2010; Snow, Burns, & Griffin, 1998; Troia, 2004). While most preschoolers from middle and high SES households encounter the literacy learning process with adequate emergent literacy skills, children from low SES families (as a group) do not (Hart & Risley, 1995; Britto, Fuligni, & Brooks-Gunn, 2006; Snow, Burns, & Griffin, 1998).

Researchers interested in preventing literacy failure in low SES children have investigated interventions that can be used early in the development process to bolster emergent literacy skills (Justice & Pullen, 2003; Scarborough, 2002; Torgeson, Wagner,

& Rashotte, 1999). A particular emergent literacy intervention has targeted print concept knowledge, with particularly positive findings in the area of print referencing (Justice, Bowles, & Skibbe, 2006; Justice & Ezell, 2002; Lovelace and Stewart, 2007; Frank, Stewart, & Gonzales, 2010). To be effective, researchers have suggested that the prompts regarding print need to be *explicit*, that is specific, unambiguous, and deliberate (Justice, Chow, Capellini, Flanigan, & Colton, 2003; Justice & Kaderavek, 2004). It has been determined that without this directed attention, children's eye gaze remains on the illustrations in a storybook rather than the text (Justice, Pullen, & Pence, 2008; Justice, Skibbe, Cunning & Lankford, 2005) and that most adults do not provide prompts about print unless specifically instructed to do so (Justice & Ezell, 2000; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009). An important question that these studies has not addressed is *which* print concepts are most easily learning with this intervention.

CHAPTER THREE:

METHODOLOGY

This chapter presents the design of the study including participants (selection criteria and group assignment), dependent measures, general procedures, intervention procedures and data analysis. The study was reviewed and monitored by the University of Kentucky Institutional Review Board (UK IRB) and the Marshall University Institutional Review Board (MU IRB) to assure protection of the human subjects.

Research Design

This study incorporated a multiple group (experimental and control) time series design with persistent insertion of treatment to those subjects assigned to the treatment condition (Mason & Bramble, 1989). In this study, the dependent variable (O), Clay's (2000) *Concepts About Print (CAP),* was administered to both groups before introducing the independent variable to the treatment group, and periodically thereafter. The independent variable (X) for this study was the administration of Explicit, Non-Evocative Print Referencing (ENPR) during shared book reading with those participants assigned to the experimental treatment condition. Because the time series design demonstrates the level of the dependent variable both before and after treatment and compares change over time, it was a suitable design for answering the first two research questions: 1) Do preschool children at-risk learn print concepts using the ENPR treatment during shared book reading compared to "business as usual" classroom experiences; and 2) Which of the 15 targeted print concepts are most easily learned by preschool children at-risk using this experimental treatment?

A correlational analysis design (Hedge, 2003) was used post hoc to examine the relationship between the participants' receptive vocabulary skills, as measured by the

Peabody Picture Vocabulary Test -4th ed. (PPVT-4, 2007), and their learning of print concepts, as measured by the first and fourth administrations of the *CAP*, in order to answer the third research question: 3) Does receptive vocabulary level contribute to the variance in performance on the learning of print concepts by preschool children when using the experimental treatment?

The research design is described below using the graphic notations suggested by Campbell and Stanley (1963) and is detailed in subsequent sections:

G1 O1 X1X2X3 O2 X4X5X6O3 X7X8X9 O4 O9 (maintenance)

G2 O5 O6 O7 O8 O10

Participants

Selection Criteria

As was detailed in Chapter II, children from low socio-economic status (SES) families are particularly at-risk for literacy problems (Juel, Griffith, & Gough, 1996; Snow, Burns & Griffin, 1998; Whitehurst & Lonigan, 2002) and therefore, were the focus of this investigation.Twenty-seven pre-school aged children who qualified for pre-school services the year prior to enrolling in a public kindergarten program and who also qualified for public assistance to fund their childcare services were enrolled in this study. The children ranged in age from 4:0 to 4:11 (years:months). They were recruited from child care centers that serve low socio-economic status (SES) families living in a mid-size, urban, Appalachian city. SES level was determined by the family's participation in a state funded program (LINK) which provides childcare subsidies to families who are at 150% of the federal poverty threshold (West Virginia Department of Health and Human Resources, 2011) and who are employed, actively seeking employment or enrolled in an educational or training program.

Exclusion criteria. The at-risk factor for literacy learning that was being examined in this study was low SES. Because visual perceptual deficits, language disorders, hearing impairment, cognitive deficits, and learning English as a second language have also been identified as risk factors that contribute to literacy learning problems (Snow, Burn, & Griffin, 1998) they were considered as confounding variables. To reduce the threat that these confounding variables may have had on the internal validity of the study, those children who demonstrated atypical visual-perceptual skills, who revealed possible oral language deficits (as revealed by scores on the *PPVT-4)*, who did not pass the hearing screening, or who were not native English speakers were excluded from the study.

While a range of receptive vocabulary skill levels was desired in this experiment, low receptive vocabulary scores have been shown to be secondary to other developmental issues such as cognitive delays (Dunn & Dunn, 2007). Therefore, children who had standard scores below 80 on the *PPVT-4* were excluded from the study. Justice and Ezell (2000; 2002) used a minimum standard score of 85 (one standard deviation below the mean, considered to be within normal limits) on the *Peabody Picture Vocabulary Test - Revised* (Dunn & Dunn, 1981) to determine study eligibility. However, children from low SES families have been found to score lower than their middle class peers on measures of oral language (Lonnigan, Bloomfield, Anthony, Bacon, Phillips & Samwel, 1999), so a slightly lower cutoff score was chosen.

Children who had a history of developmental concerns, children whose families could not commit to regular, three days per week or more attendance, and children whose

families could not commit to keeping their children enrolled at the childcare center for the duration of the study were excluded from study enrollment.

Recruitment strategies. Participants were recruited from childcare centers that serve families receiving LINK services. Four childcare centers within a five mile radius of each other and of Marshall University agreed to participate in the study. Prior to the initiation of the study, the investigator met with each center director to explain the aims of the study, to describe inclusion and exclusion criteria for participants, and to clarify the setting requirements. Recruitment strategies included flyers posted in the childcare centers, flyers sent home in children's backpacks, and the posting of recruitment information on the childcare centers' websites. The investigator held an information meeting at each participating childcare center to give parents an overview of the study and answer general questions parents might have.

Group assignment. After study eligibility was established, participants were consented and randomly assigned to the treatment (N=21) or control (N=6) condition using a table of randomization.

Sample Size

The optimal sample size was determined by conducting a power analysis using group gain scores on print concept knowledge ranging from 3- 5 (gain score = posttest score - pretest score). Earlier studies using a print referencing treatment have reported average group gain scores of print concepts ranging from 3 to 4.6 (Justice & Ezell, 2000; Justice & Ezell, 2002). In a randomized control study with a similar focus (print concepts) and sample size (28 children) to the proposed study, Justice and Ezell (2000) described a large estimated effect size of d=1.23. Consequently, in consideration of using an independent 2 sample t-test for comparing the gain from two groups, a power analysis

with alpha at .05 and power of ≥.80, the target enrollment number was determined to be 24 participants in a 3:1 ratio of assignment to the treatment or control condition (N=18 for treatment group; N=6 for the control group). Estimated effect size for this sample was 1.5. To account for attrition, the researcher recruited several additional participants for a total N of 27.

Independent Variable

The independent variable for this study was the explicit (paired verbal and gestural prompts) non-evocative referencing of print concepts (ENPC) by the adult reader during shared storybook reading with each preschool participant enrolled in the treatment condition (see Table 1). With an *explicit verbal reference*, the adult used comments to draw the child's attention to the print (Stewart & Lovelace, 2006). An example of an explicit verbal reference is the adult reader saying, "I'm going to read the words at the top of this page." An *explicit gestural reference* involved the adult drawing the child's attention to print by pointing, tracking or otherwise motioning with her hand. For instance, the adult readers might point to each word on a page as they read it or glide their fingers along each line of text as they read from top to bottom.

Another aspect of the independent variable was that the prompt was *non-evocative*, that is, it did not require a response from the child (Stewart & Lovelace, 2006). Using a non-evocative strategy, the adult reader may simply label or comment on referenced print concepts: "I will start reading here, and then go this way" or "this is a big P; this is a little p". Such comments require no action from the child and are thus considered non-evocative. See table 3.1 for description of prompts for each of the 15 print concepts.

Table 3.1. Assessment Prompts and Treatment Prompts for Print Concepts

Print concept	Assessment prompts (used in Clay's CAP)	Treatment prompts	
		Oral	Gestural
Orientation of Book (front/back)	*"show me the front of the book"*	*"this is the front of the book"*	During verbal prompt hold book with front facing child. Sweep h and across front cover
Print contains message (page with print versus page with picture)	*"I'll read this story. You help me. Where do I begin to read?"*	*I'll begin reading here"*	During verbal prompt, mover fingertips across text from left to right. (then ready text)
Where to start	*"Show me where to start"*	*"I'll start reading here….."*	During verbal prompt, point to first word……
Left to right directionality	"*which way to I go"*	*" then go this way"*	…then trace one line of print from left to right.
Return sweep to left	"*where do I go after that?*	*"then I'll come back and read here"*	During verbal prompt move finger from last word of line to first word of next line.
Word-by-word matching	"*point to it while I read it"*	Before reading text say *"I'll point to these words while I read"*	Point to each word as text is read.
First and last concept	"*show me the first part of the story"* *"Show me the last part of the story"*	Before reading text say, *"Here is the first part of the story. Here is the last part."*	Point to the first word of text on page, then last word

Table 3.1 (continued)

Print concept	Assessment prompts (used in Clay's CAP)	Treatment prompts	
		Oral	Gestural
Orientation of page (picture)	"*show me the bottom of the picture"*	Before reading text say, *"Look at this picture. Here is the top of the picture; here is the bottom of the picture"*	Sweep hand across the top of the page with the illustration, then sweep hand across the bottom of the picture
Orientation of page (print)	*"Where do I start reading? Which way do I go? Where do I go after that?"*	After sentence regarding the picture say : *"I start here and go this way"*	During verbal prompt, point to the firs word and then trace line of print with finger from left to right
Line sequence	"What's wrong with this?"	Before reading text say: *"this line is first"* Read first line of text, then say: "this line is next" Continue reading.	Point to the first line of text when saying "this line is first" Point to the second line of text when saying "this line is next"
Reading left page then right page (print on both pages	"Where do I start reading"	Before reading test say: "I read this page first, then this page"	Place hand on left pager when saying "this page first". Place hand on right page when saying "then this page"
Capital and lower case letters	"Find a little letter like this (point to lower case letter as directed)"	"here is a big ___" and here is a little ___"	Point to a capital letter on the page and then to its corresponding lower case letter on the same page

Table 3.1 (continued)

Print concept	Assessment prompts (used in Clay's CAP)	Treatment prompts	
		Oral	Gestural
Words that have same letters but different orders	"*show me 'was'*" (contrast to saw) *"show me 'no'"* (contrast to on)	"here is ____and here is ___"	Point to a word that has a letter configuration and then to another word with the same letters but a different configuration
Concept of letter	(with two cards) "*push the cards across the story like this until all you can see is just one letter" "now show me two letters"*	"here is just one letter" "here are two letters"	With two cards show one letter then two letters within the bracketing of the cards
Concept of word	(with two cards) "*show me just one word" "Now show me two words"*	"here is just one word" "here are two words"	With two cards show one word then two words within the bracketing of the cards

Dependent Variables

The dependent variables were 15 print concepts used in a normed assessment protocol: *Concepts About Print* (Clay, 2000). Clay (1972) determined that 50% of typically developing European children ages 5:0 to 5: 6 were able to identify (without any specific intervention) the 15 PCs used as the dependent variable in this study. As Clay's research suggested (1985) that scores on the *CAP* differentiated children who were knowledgeable about print conventions at the age of 5 years (prior to beginning school) and those who knew little. While the children in Clay's study were of kindergarten age and the participants in the current study were preschool aged, there was not a normed test of PCs for this age that could be found in print. Furthermore, the four parallel

administration test booklets provided the control for the influence of repeated testing needed for the study's design. The following 15 PCs were used as dependent variables, listed here according to Print Concept type:

1. Print Concepts Related to Book Conventions-
    - Book orientation (front of book)
    - Page orientation (top to bottom)
    - Page orientation (print)
    - Print (not picture) contains the message
2. Print Concepts Related to Print Conventions-
    - Directional Rule (where to start)
    - Directional Rule (which way to go: left to right)
    - Return sweep to left
    - Concept of first and last (text, line, word, or letter)
    - Line sequence
    - Left page before right page
3. Print Concepts Related to Print Form-
    - Reordering of letters within a word
    - Word by word matching
    - Concept of letter
    - Concept of capital letter/lower case letter

Each participant could score from 1 to 15 during the assessment, one point for each print concept that was correctly identified.

Instrumentation and Measures

Assessment Measures

Visual perception. The *Test of Visual-Perceptual Skills (non-motor), Third Edition* (TVPS-3rd ed.) (Martin, 2006) was used to assess the visual-perceptual skills of potential participants. The *TVPS*-3rd ed. was normed on over 2000 children ages 4 to 18 who came from a total of 80 different cities in 38 states representing each of the major regions of the United States. This test examines a wide range of visual perceptual factors including: visual discrimination, visual memory, visual-spatial relationships, form constancy, visual sequential memory, visual figure-ground, and visual closure. It was developed to be used by a variety of professionals who work with children and is described in the literature as a current and useful assessment tool (Reed, 2010; Schneck, 2010). The *TVPS-3rd* ed. (Martin, 2006) reported sound psychometric properties including high coefficient alphas for internal consistency and strong criterion related validity when compared to like tests.

Print concept knowledge. As noted in Table 3.1, 15 items from *Concepts About Print* (*CAP*, Clay, 2000) were used as the dependent variable (s) to measure participants' print concept knowledge. The *CAP* provided a systematic way, through the use of scripted verbal stimuli, to determine what print concepts young children understand during shared book reading. This assessment measured 24 print concepts observed in typically developing children prior to their becoming readers (Clay, 1982). Administration of the *CAP* incorporated the oral reading of one of four simple storybooks to the child with intermittent (scripted) directions from the reader to the child to point out particular concepts. The child received one point for each concept correctly identified and raw scores were calculated.

The fact that this measure incorporated shared book reading to determine print concepts made it a particularly valid choice for the dependent measure of this study. The four parallel storybooks, balanced with respect to stimulus characteristics (parallel test form r=.89, Clay, 2005) helped to address the internal validity issue of repeated testing. The *CAP* was normed on 320 urban New Zealand Children aged 5:0-7:0 in 1968, 282 New Zealand urban children aged 6:0-7:3 in 1978 and 73 Ohio urban children in first grade in 1990-1991 (Clay, 2000). The *CAP* is reported as having concurrent validity of .79 (with the *Shovel R1*, a commonly used reading assessment in New Zealand), split-half reliability of .95, and internal consistency of .85 (Clay 2005). Because this assessment tool was being used with children who were younger than the norming sample, only raw scores were used as criterion measures. Even though the 15 concepts that Clay found 50% of 5:0 to 5:6-year-old European children passed were used as the dependent variables, all 24 items on the test were administered to the children for possible analysis at a later date.

Receptive vocabulary level. *The Peabody Picture Vocabulary Test -4* Form B (*PPVT-4*, Dunn & Dunn, 2007) was used to assess participants' receptive vocabulary level. The *PPVT-4* is a norm-referenced instrument that measures comprehension of Standard English spoken receptive vocabulary for children and adults ages 2:6 to 90 years. The normative sample for age consisted of 3,540 children and adults (2:6 through 90 years and older) and a subsample of 2,003 children for grade-level (from kindergarten through 12th grade). The norming sample matched the distribution of the 2000 population in the United States in terms of sex, race/ethnicity, geographic region, SES, and clinical/special education status (Dunn & Dunn, 2007). Because no reading or writing is

required to respond to test items, this tool was considered valuable in measuring participants' vocabulary development. The *PPVT-III* (earlier version of the PPVT-4, Dunn & Dunn, 1997) was used in previous studies of print referencing to describe participants' receptive vocabulary level (Justice & Ezell, 2001; Justice & Ezell, 2002).

Intervention Materials

Selection of storybooks. The storybooks chosen for treatment, *The Snowy Day* (Keats, 1962), *Olivia* (Falconer, 2000), *A Tree is Nice* (Simont, 1956), *Green Eyes* (Birnbaum, 1953), *Madeline* (Berneimans, 1939) and *The Paper Boy* (Pilkey, 1999) were determined to be age appropriate through publisher description and/or published book reviews. The books were similar in format. All selections were Caldecott Award or Caldecott Honors winners, with comparable number of words, number of lines on a page, and print type (see Table 3.2 for description of storybooks). To allow reference to all 15 of the PCs being considered independent variables, each book needed to have at least one instance of text on both the right and left sides of the page. In order to address the concept "words that contain the same letters in a different order" each book had its text slightly modified (see treatment scripts Appendices B-G).

Intervention scripts. Scripts were developed for each of the six storybooks so that the research assistants, who served as the adult readers, would be consistent in where and how they referenced the 15 print concepts (PCs) in each book. The scripts referenced the exact page of the book where each PC was depicted, the exact words the reader was to use for the verbal reference, and the exact gestural reference that was to accompany the words (see Appendices B-G for each storybook script). While all 15 PCs were referenced the same way in each book (see Table 3.1), the order of administration varied.

Table 3.2. Storybooks and Characteristics

Title/author	Publisher age range	Year / award	# Words	Font size	Range # lines
The Snowy Day (Ezra Jack Keats)	Puffin Preschool	1963 / Caldecott	318	5/8 " Caps 4/8" LC	1-5
Olivia (Ian Falconer)	Simon & Schuster Children's Publishing Ages 4-8	2001 / Caldecott Honor	321	5/8" Caps 4/8" LC	1-6
A Tree is Nice (Janice May Uldry)	Harper Collins Ages 4-8	1957 / Caldecott	346	5/8" Caps 4/8" LC	1-5
Green Eyes (A. Birnbaum)	Dragonfly Books Ages 4-8	1954 / Caldecott Honor	406	5/8" Caps 4/8" LC	1-5
Madeline (Ledwig Bernelmans)	Viking Juvenile Ages 4-8	1940 / Caldecott Honor	429	5/8" Caps 4/8" LC	1-8*
The Paperboy (Dave Pilkey)	Scholastic Ages 4-10	1997 / Caldecott Honor	374	5/8 " Caps 4/8" LC	1-5

Caps= Capital letters; LC= lower case letters; * 1-5 lines average with 8 lines only on last page of text;

Setting

Participants were tested and treated at their respective child care centers in a quiet, contained area away from their classrooms and free from interruption from teachers or other children. Each participant was seated in a child-sized chair to the right of the adult reader (research assistant who administered treatment or investigator who administered the dependent variable), who was also seated in a chair at the level of the child. The book

being read or used in testing was placed flat on the table in front of the child to allow the reader a free hand for gestural prompting.

Research Personnel

Treatment was administered by three students (research assistants) enrolled in the Communication Disorders Program at Marshall University who committed assist the team for the duration of the treatment phase of the study. Two research assistants were first year graduate students, and the third was a graduating senior who ranked at the top of her class. These students were members of the Community of Research Practice (CORP). As members of CORP, they met weekly with fellow students and faculty researchers to learn about methods of inquiry, report on their own research projects, and prepare for research presentations at the local, state, and national levels .Research assistants had CITI training in the protection of human subjects for both social/behavior and medical studies.

Prior to the start of the study, the research assistants had extensive training and practice on the intervention protocols (storybook scripts) and established fidelity to treatment with the Principal Investigator (see section on *Establishing Procedural Reliability* this chapter). Fidelity to treatment can be defined as the accuracy and consistency with which the treatment protocol is administered (Smith, Daunic, & Taylor, 2007).

General Procedures

Following recruitment for the study, individual sessions were held with a parent of each potential participant to review the purpose and procedures of the study and to gain informed consent (see Appendix A). Parents of potential participants provided the birth date of their child and contact information. Parents also answered qualifying

questions regarding vision, hearing, English as the child's native language, and overall development. The importance of regular attendance at the childcare center was stressed and information concerning particular risks to regular attendance (e.g. vacations, illnesses) was obtained. Parents were requested to commit to continuing their child's enrollment and minimal 3-day-per-week attendance at the childcare center throughout the duration of the study. The investigator explained that all identifying information would be kept separate from the coded data obtained from their child and that it would be destroyed at completion of the study at a time designated by participating IRBs. In addition, the investigator clarified that the child could be assigned to the experimental treatment condition or to the control condition. Those children assigned to the control condition were offered the experimental treatment by the investigator at the completion of the study.

After parental consent was obtained, children were screened for normal hearing at 25 dB HL at 1000 Hz, 2000 Hz, and 4000 Hz . While the American Speech-Language Hearing Association recommends screening at 20 dB, several studies that have screened children in their school settings have used 25 dB to account for ambient noise (Justice & Ezell, 2001; Justice & Ezell, 2002; Justice, Weber, Ezell, & Bakeman, 2002). Children were also screened for normal visual perceptual skills using the *Test of Visual Perceptual Skills 3rd ed.* (TVPS-3, Martin, 2006).Children who passed these screenings were administered the *Peabody Picture Vocabulary Test—4* (PPVT-4; Dunn & Dunn, 2007) to determine receptive vocabulary level. Each participant met who all inclusion criteria, was assigned to either the experimental treatment condition (G1) or the control condition (G2) using a table of randomization.

Sequence of Events for Treatment Group

After being assigned to the treatment group (G1), each participant was administered the *CAP* (O1) to determine the print concepts they could identify at the onset of the study. They then had three individually administered experimental treatment sessions. During treatment, two storybooks were read to them each day for three days using the ENPR experimental treatment protocol (X1, X2, X3). Following the end of this first phase of treatment, they received a second administration of the *CAP* (O2). They then engaged in three additional treatment sessions (X4, X5, X6) and were tested a third time using the *CAP* (O3). Participants received a final phase of three sessions of treatment (X7, X8, X9) and were tested a fourth time using the CAP (O4). After a period of eight to fifteen days following the fourth administration of the *CAP*, they were tested a final time to determine if their skill level had been maintained. Each experimental treatment phase lasted approximately one week and the entire treatment sequence required approximately three weeks. Children could complete the *CAP* (the dependent variable) on the same day *prior* to a treatment session or on a different day. Children never completed the *CAP* immediately following a treatment session due to the possibility of interference. Children received one treatment session in a day. There was a maximum of three treatment sessions in any one calendar week.

Order of Treatment Book Reading

The six books read to the children assigned to the experimental treatment condition were repeated using a Latin Square design for counterbalancing order of readings (Table 3.3).

Table 3.3. Sample Counterbalancing of Reading Order for Storybooks

Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9
Olivia	*The Paper Boy*	*Madeline*	*Green Eyes*	*A Tree is Nice*	*The Snowy Day*	*The Paper Boy*	*Madeline*	*Olivia*
Green Eyes	*A Tree is Nice*	*The Snowy Day*	*The Paper Boy*	*Madeline*	*Olivia*	*A Tree is Nice*	*The Snowy Day*	*Green Eyes*

Protocol for Timing the Delivery of Testing and Experimental Treatment Sessions

The following protocol, which allowed for some flexibility for absences, was used. If a participant presented with circumstances that fell outside this protocol, discussion with the doctoral committee ensued regarding how to proceed.

1. First administration of the *CAP* (O1).

2. First treatment phase (X1) was initiated within three school days following O1 and completed within 5 consecutive school days.

3. Second administration of the *CAP* (O2) occurred within three school days of completion of the first treatment phase.

4. Second treatment phase (X2) was initiated within three school days following O2 and completed within 5 consecutive school days.

5. Third administration of the *CAP* (O3) occurred within three school days of completion of second treatment phase.

6. Third treatment phase (X3) was initiated within 3 consecutive school days and completed within 5 consecutive school days.

7. Fourth administration of the *CAP* (O4) occurred within three school days after completion of third treatment phase.

8. Fifth administration of the *CAP* (05) (maintenance) occurred two to three weeks later.

9. The number of school days for each participant who successfully completed the rotation of Observation and Treatment sequences ranged from 25-35 days depending on participant attendance and the timing of the administration of the *CAP*.

Protocol for Rotation of Readers

To control for any differences that the delivery of the treatment (enthusiasm, stress) might have on outcomes, the research assistants (readers) alternated treatment sessions for each participant using a Latin Square rotation. When a research assistant had to miss a session with a participant, the next available research assistant acted as a substitute and administered the treatment.

Sequence of Events for Control Group

Children enrolled in the control condition (G2) had the *CAP* administered on a day following the completion of screening/pre-testing, then received administration of the *CAP* on the same schedule as those participants enrolled in the treatment condition.

Compensation

All children completing the study received a small set of children's books and small prizes from the treasure box after each session.

Procedures for Individual Sessions

Pre-Testing Sessions

All assessment procedures were conducted by the investigator at the participants' childcare centers. After obtaining informed consent, the investigator interviewed the parents to obtain demographic information and to ascertain any known exclusion criteria. As previously mentioned, each participant was screened for normal hearing and for normal visual perceptual skills. All participants were administered the *PPVT-4* (Dunn & Dunn, 2007). Normal development was determined through parent interview and through the *Creative Curriculum Assessment* (developmental checklist used by LINK childcare centers). Children who participated in the pre-treatment assessment but did not meet all

inclusion criteria were given a children's book in appreciation for their willingness to participate.

Assessment Sessions

The *CAP* (Clay, 2000) was administered a total of five times to participants to measure knowledge of PCs. The entire 24 item test was given; however, only the 15 PCs being measured in the study were used to establish the raw score for each participant.

The following protocol was used for each assessment session. The investigator located the child at the childcare center and escorted him/her to the testing area. The child was seated to the right of the investigator. Per the instructions outlined in the *CAP's* administration manual (Clay, 2000), after the first item was administered (e.g. passing the book to the child, holding it vertically by its outside edge with the spine towards the child and saying 'show me the front of the book'), the book was placed flat on the table between the administrator and the child. The score sheet for the *CAP* was placed to the administrator's left in a position unobtrusive to the child. The items were administered using the exact wording in the administration guide. At the conclusion of each assessment session, the child chose a small prize from the treasure chest and was escorted back to the classroom.

Intervention Sessions

The following protocol was used for each intervention session. The reader located the child at the childcare center and escorted him to the intervention area. After being seated, the reader placed the first book to be read in front of the child saying, "We are going to read 'book name' ". The reader then read aloud the first book for the session including the exact words and gestures in the script for that book. After the first book was read, the reader put that book away, placed the second book to be read on the table in

front of the child, and said: “Now we are going to read ‘book name ’ ”. The reader read aloud the second book incorporating the exact words and gestures in the script for that book. After the second book was finished, the reader put that book away. The child was invited to choose a small prize from the “treasure box” after which the reader escorted him back to the classroom.

Reliability

Establishing Procedural Reliability

To insure that the intervention was delivered according to the protocol to all participants in the treatment condition, the research assistants took part in training which led to procedural fidelity. The readers met a minimum of twice a week to practice reading the six storybooks utilizing the scripted verbal and gestural references to the 15 PCs. First, they practiced with each other to identify any problems related to coordination of the verbal and gestural cues. Then, the reader established point by point fidelity to the treatment protocol while reading to each other. Finally, they established point by point fidelity to treatment while reading the six books to another reader, with the investigator acting as reliability coder. Readers then practiced reading the scripted books with preschool children of classmates and faculty members. The readers established 100% point by point procedural fidelity for reading each of the six books to a preschool-aged child over two consecutive readings before beginning treatment with study participants. Actual treatment sessions were video recorded using a FLIP-Ultra camcorder. Per the procedures used in previous studies using a print referencing intervention, fidelity to procedure over time was determined by the investigator’s review of 25% the videos. Procedural fidelity was calculated by dividing the number of observations of the verbal and non-verbal references to print by the total number of scripted behaviors and

multiplying by 100 (see Table 3.1 for scripted behaviors). Average procedural fidelity was 94% for verbal reference and 96% for non verbal reference.

Interrater Reliability

All sessions of administration of the *CAP* were video recorded using a Flip-Ultra camcorder. Interrater reliability was determined for scoring to control for potential experimenter bias. An experienced speech language pathologist, familiar with the *CAP* (Clay, 2001), acted as reliability coder by observing and independently scoring 25% of the dependant variable administrations (per Justice & Ezell, 2000). Differences in scoring were discussed and resolved during periodic meetings between the two coders. The reliability scores on individual tests ranged from 92% to 100%. The overall reliability score was 98.6%.

Validity

Specific Considerations for Threats to Internal and External Validity

Campbell and Stanley (1963) listed eight specific threats to the internal validity of a research study (history, maturation, testing, instrumentation, statistical regression, selection bias, experimental mortality selection-maturation interaction) and four threats to external validity of a study (interaction effect of testing, interaction effects of selection bias and the experimental variable, reactive effects of experimental arrangements, and multiple treatment interference). This study controlled for *history* by having a randomly assigned control group whose members were exposed to the "business as usual" type of shared reading done in the classrooms. *Maturation* was addressed by keeping the study to a limited time frame, no longer than 35 consecutive school days. Using the four, counterbalanced versions of the *CAP* and having a control group controlled for the possible effects of *testing.* The investigator was the only person administering the

dependent variable with reliability of scoring determined by a second speech-language pathologist, thereby controlling for *instrumentation*. Having data from a control group addressed the threat of *statistical regression.* Random assignment to the treatment and control condition and performing *t*-tests addressed *selection bias*. The researcher recruited more than the suggested number of participants necessary to determine statistical power (N=24) to account for *mortality*.

To account for possible *interaction effect of testing* the texts (books) used for observations of knowledge of print concepts were different from the texts used for intervention. *Interaction effects of selection bias and the experimental treatment* were not completely controlled for as participation in the study was voluntary. However, random assignment to the treatment group or the control group allowed for the comparison of those exposed to the independent variable versus those who were not exposed. *Reactive effects of experimental arrangements* was addressed by having all testing and intervention sessions conducted in the child's own childcare center in the normally occurring context of shared storybook reading. Finally, *multiple treatment interference* was not controlled for as the study was examining the cumulative effect of multiple doses of the treatment.

Data Collection and Analysis

Descriptive data, including age, sex, scores on *PPVT-4* and scores on administration of the *CAP,* were collected in an Excel data base and imported into the *Statistical Analysis System* (*SAS*®, Version 9.2). Two sample *t*-tests and chi-square test of independence were conducted to determine the presence of significant differences

between the treatment group and control group for age, sex, receptive vocabulary skill level and entering level of print concept knowledge.

Data Analysis for Specific Research Questions

Research question 1. Do preschool children at-risk learn more print concepts using an explicit, non-evocative print referencing experimental treatment during shared book reading compared to "business as usual" classroom experiences*? Hypothesis*: Preschool children at-risk will learn significantly more print concepts through an explicit, non-evocative print referencing intervention than do preschool children at-risk who are receiving "business as usual" classroom instruction.

To answer question #1, a two sample *t*-test was used to examine gain scores from the treatment group (G1) compared to gain scored of the control group (G2). In addition a 4 X 2 ANOVA, with repeated measures on the within subject variable, was conducted with time (observations 1- 4) as the within subjects variable and group (experimental/control) as the between subjects variable in order to examine any trends that might be averaged out by looking at only the pre- and post-data results.

Research question 2. Which PCs are most easily learned by at-risk children with this experimental treatment? *Hypothesis:* Some print concepts will be learned earlier by a majority of the children enrolled in the treatment condition, some concepts will be learned later and some print concepts will not be learned by a majority of the students.

Descriptive statistics were used to demonstrate at which administration of the *CAP* (O2, O3, O4) each of the 15 PCs (dependent variables) was learned. The proportion of children who exhibited knowledge of the concept at each time was examined to determine the proportional change for each print concept over time. For the experimental treatment subjects only, a logistical regression for repeated measures model with time as

the variable of interest was fit for each print concept. Finally, a factor analysis was conducted to determine if there was a relationship between variables associated with particular PCs.

Research question 3. Does receptive vocabulary contribute to the variance in performance on learning PCs by at-risk children using this experimental treatment? *Hypothesis:* Receptive vocabulary will make a significant (positive) contribution to children's learning PCs through an explicit, non-evocative print referencing treatment.

Linear regression analysis was used post hoc to determine if a relationship between receptive vocabulary level and the learning of PCs with this treatment existed and to what degree.

CHAPTER FOUR:

RESULTS

This chapter discusses participant demographic information and includes a description of data on measures of receptive vocabulary and visual perceptual skills. The demographic analysis is followed by results of the data which pertain to the three research questions discussed in chapters one and three.

Participant Demographics

Twenty-seven at-risk children, ranging in age from 49 to 60 months, were enrolled in this study including 17 males and 10 females. Pre-experimental testing consisted of administration of the *PPVT-IV* (Dunn & Dunn, 2007) and the *TVPS-3* (Martin, 2006). This information was documented on an excel data-base and imported into the *Statistical Analysis System* (*SAS*®, Version 9.2). Two groups were formed: treatment and control. Table 4.1 shows the means, standard deviations (SD) and range of scores on the *PPVT-IV and TVPS-3.*, as well as participant characteristics of age and gender by group assignment. A two-sample *t*-test revealed no statistically significant difference in mean age for the control and treatment groups (P= 0.287). A two-sample *t*-test also demonstrated no statistically significant difference in the mean scores for the two groups on the *PPVT-IV* (P =0 .733) and the *TVPS-3 (*P = 0.537). The range in scores on the *PPVT-IV* was 85-118 for the treatment group and 83-113 for the control group. The range in scores on the *TVPS- 3* was 83-110 for the treatment group and 87-99 for the controls. Because of the small sample sizes, a Fisher's exact test was used instead of a large sample two-proportion z-test to detect differences in sex proportions between the two groups and at P =0.363, no statistically significant difference was found.

Table 4.1. Demographic counts, means, standard deviations (SD) and ranges for each group. Ranges are reported in parentheses.

Group	Number	Sex M/F	Age (Mos.) *M/SD* (Range)	PPVT *M/SD* (Range)	TVPS *M/SD* (Range)
Treatment	21	12 / 9	54.05/3.75 (49-60)	102.00 /9.88 (85-118)	94.43/7.45 (83-110)
Control	6	5/1	56/3.69 (49-59)	100.3 /12.5 (83-113)	92.83/4.71 (87-99)

Research Questions

Research Question 1

Do preschool children at-risk learn more print concepts using an explicit, non-evocative print referencing experimental treatment during shared book reading compared to "business as usual" classroom experiences? The research hypothesis was that preschool children at-risk would learn significantly more print concepts through the experimental treatment than their peers assigned to the control condition.

A descriptive analysis showed that children in the experimental treatment group entered the study (time 1) knowing an average of 3.4 PCs and left the study knowing an average of 6.68 PCs, demonstrating an average gain of 3.28 PCs for the 15 PCs addressed. The range in learned PCs in the treatment group was from 0-6. Children in the control group entered the study knowing an average of 3.7 PCs and left the study knowing an average of 3.5 PCs. The range in known PCs in the control group ranged from 1-6 at time 1 and 2-6 at time 4. An inferential analysis using a two sample *t*-test determined with 95% confidence that the treatment group gained on average at least 1.3 and at most 5.5 PCs more than the control group (P=0.006) from time 1 to time 4.

Effect size. The reporting of effect size has been determined to be useful in understanding the results of a study and for comparing findings across studies (Fan, 2001). The effect size for the two sample *t*-test to compare the mean gains of the treatment and control groups was computed using Cohen's *d* (Cohen, 1988). Cohen advised that values for the effect size measured by Cohen's *d* be interpreted as $d \leq 0.20$ as having small effect , $d \leq 0.50$ as having medium effect, and $d \leq 0.80$ as having large effect. The effect size for the two sample *t*-test to compare the mean gains of the treatment and control groups using Cohen's *d resulted in* d=1.8573. Therefore, a very large effect size was suggested at the 96.4 percentile with 77.4% of overlap between the two groups.

To examine the observed print concept knowledge for each group across time and between groups for each of the four points in time, a 4 X 2 ANOVA with repeated measures was applied with time (observations 1-4) as the within subjects variable and group (treatment/control) as the between subjects variable. This model was analyzed using the SAS software MIXED procedure with compound symmetry covariance structure and Satterthwaite approximation of the dominator degrees of freedom (see Table 4.2).

The overall model was statistically significant ($P < 0.0001$). The group × time interaction term was significant ($P= 0.0002$) which can be easily seen in the Figure 4.1 due to the lack of parallel lines between the groups. Given the statistically significant interaction term, the groups were compared for a given time and each group across the times. Results demonstrated in Figure 4.1 show that at times 1-3 there were no significant differences in the mean number of concepts learned between groups with p-values of 0

Table 4.2. 4 × 2 ANOVA with repeated measures with time (observations 1-4) as the within subjects variable and group (treatment/control) as the between subjects variable

Test			Results			
Null model likelihood ratio test			***df***		***χ²***	***p***
			1		**85.05**	**< .0001**
Type 3 tests of fixed effects	**Effect**		***df num***	***df den***	***f***	***p***
	Group		**1**	**24.0**	**2.08**	**0.1622**
	Time		**3**	**69.3**	**6.26**	**0.0008**
	Group × Time		**3**	**69.3**	**7.32**	**0.0002**
Tests of effect slices (Group × Time)	**Group**	**Time**	***df num***	***df den***	***f***	***p***
	C		**3**	**69.2**	**0.09**	**0.9659**
	E		**3**	**69.5**	**28.14**	**< .0001**
		1	**1**	**32.6**	**0.05**	**0.8213**
		2	**1**	**32.8**	**1.70**	**0.2018**
		3	**1**	**32.8**	**2.35**	**0.1345**
		4	**1**	**32.8**	**7.33**	**0.0107**

Note. Significant Differences at the $p < .05$ level.

.8213, 0.2018, and 0.1345 respectively. However, at time 4 there was a significant difference in the mean number of print concepts learned between the two groups (P=0.0107). When comparing each group over time there was no significant difference in the mean number of print concepts learned by the control group ($F_{(3, 69.2)} = 0.09$, P=0.9659). However, there were significant differences in the times for the treatment group ($F_{(3, 69.5)} = 28.14$, P< 0.0001). The experimental treatment group showed significant gains in the mean number of concepts learned from time one to time two (P< 0.0001) and time three to time four (P = 0.0014).

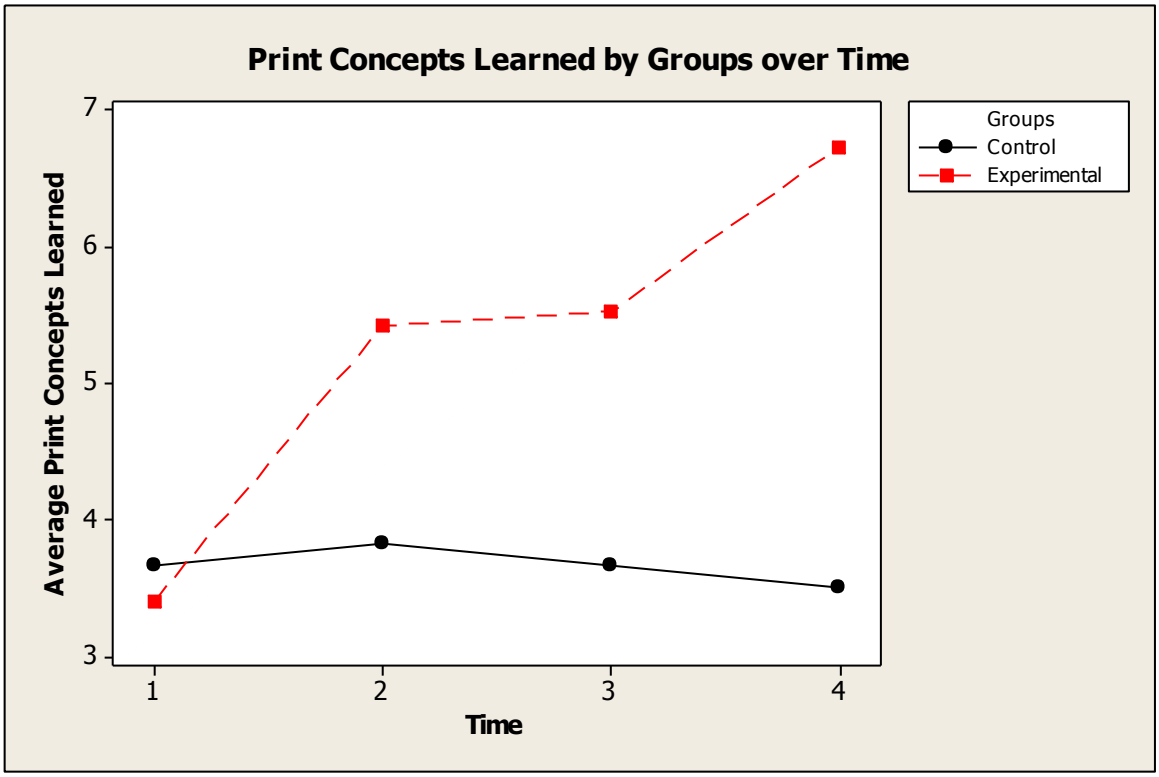

Figure 4.1. Comparing average number of print concepts learned by each group over time. $p < .0002$ for overall model. $p = .8213$, .2018, and .1345 between groups times 1–3. $p = .0107$ between groups at time 4. The experimental treatment group showed significant gains from time 1 to time 2 ($p < .0001$) and from time 3 to time 4 ($p = .0014$).

Research Question 2

Which Print Concepts are most easily learned by children with this experimental treatment? The research hypothesis was that some print concepts would be learned by a majority of the children enrolled in the experimental treatment condition and that some print concepts would not be learned by a majority of the children. A description of the Print Concepts is provided in table 4.3.

Due to the smaller sample sizes and the large overall error rate by performing the needed 120 statistical tests, inferential statistics such as a one proportion z-tests to test if more than the majority of students learned the print concept in each of the groups at a given time were not computed. However, much insight can be gained by looking at the data using descriptive statistics. The data were first analyzed using descriptive statistics to determine the proportion of children who learned the print concepts at each of the four administrations of the dependent variable (*CAP*, 2000). The results are given in Table 4.3.

It should be noted that children in both the experimental condition and control condition entered the study already knowing some targeted print concepts. For example, 75% of the children in the experimental group and 50% of the children in the control group entered the study knowing PC1 (front of book). Similarly, 60% of the children in the experimental group and 50% of the children in the control group entered the study knowing PC 11 (left page before right page). In addition, some PCs were not known by a majority of the children entering the study and were not learned by children in the experimental treatment condition by the end of the study. A case in point was PC 12 (small case, upper case letter match) where 0% of the preschool children enrolled in the

study (both conditions) knew this concept at the beginning of the study and 115 at the end of the study.

The data reflect that both the treatment and control groups have ≥ 50% mastery of four PCs at time one: PC 1 (front of book), PC2 (print contains message), PC 8 (page orientation of illustration), and PC 11 (left page before right page). While these four PCs (and additional fifth, PC 14 concept of letter) were the same mastered by both groups, the proportion of those in the experimental group knowing the PC at time 4 was higher than those in the control group. For PC 8, the experimental group had just below 50% after time three and four, but had 50% or greater than at time one and time two which is most likely due to random variability. For PC 3 (where to start), PC 4 (which way to go), PC 5 (return sweep to left) and PC 7 (first and last concept) only the experimental group had at least 50% mastery by time four.

Inferential statistics were also used to compare the proportion of children in the groups at time 4 that had learned the given PC. Due to the small sample sizes, a Fisher's exact test, as opposed to a two-proportion z-test, was used to determine if the proportion of students who learned a given print concept at time 4 was significantly different for the experimental and control groups. The proportions for the two groups were significantly different at the 5% significance level for PC 1 (Front of book). However, PC 4 (Which way to go) and PC 5 (Return sweep left) had P-values of 0.056 and 0.051 respectively, which barely missed being significant at the 5% significance level (see table 4.4).

For the experimental treatment subjects only, a logistical regression for repeated measures model with time as the variable of interest was fit for each print concept. SAS Genmod procedure was used to analyze the data. Table 4.6 gives the P-value to determine

Table 4.3. Descriptive Analysis of the Proportion of Children Who Learned PCs at 4 Given Times

	Time of administration of test of PC knowledge							
	1	1	2	2	3	3	4	4
Group	Control	Exp	Control	Exp	Control	Exp	Control	Exp
PC1: Front of book	0.50	0.75	0.67	0.74	0.50	0.74	0.50	0.95
PC2: Print contains message	0.50	0.50	0.67	0.68	0.50	0.68	0.50	0.79
PC3: Where to start	0.33	0.20	.0	0.47	0.17	0.26	0.17	0.53
PC4: Which way to go	0.33	0.10	0.17	0.63	0.33	0.58	0.17	0.69
PC5: Return sweep left	0.33	0.15	0.33	0.42	0.17	0.42	.0	0.53
PC6: Word by word matching	.0	.0	0.17	0.05	.0	0.05	.0	0.05
PC7: First and last concept	0.17	0.15	0.17	0.32	.0	0.53	0.33	0.58
PC8: Page orientation (illustration)	0.50	0.50	0.67	0.53	0.50	0.37	0.50	0.47
PC9: Page orientation (print)	.0	0.05	.0	.0	.0	0.16	.0	0.05
PC10: Line order sequence	.0	0.05	.0	.0	.0	.0	.0	.0
PC11: Left page before right page	0.50	0.60	0.50	0.63	0.67	0.68	0.50	0.74
PC12: Small case/upper case letter match	.0	.0	.0	0.05	.0	0.11	.0	0.11
PC13: Reordering of letters	.0	0.05	.0	0.11	.0	0.05	.0	0.05
PC14: Concept of letter	0.17	0.25	0.50	0.63	0.67	0.58	0.67	0.79
PC15: Concept of word	0.33	0.05	.0	0.16	.0	0.32	.0	0.26

Note. Green highlighted areas reflect where ≥50% or greater of the children in the control group know a concept; yellow highlighted areas reflect where ≥50% or greater of the children in the experimental treatment group knew a concept.

Table 4.4. Fisher's Exact Test P-Values Comparing Proportion of Children Who Learned PCs at Time 4

Print concept	Proportions control $N = 6$	Proportions experimental $N = 21$	p
PC1: Front of book	0.50	0.95	0.03
PC2: Print contains message	0.50	0.79	0.30
PC3: Where to start	0.17	0.53	0.18
PC4: Which way to go	0.17	0.69	0.06
PC5: Return sweep to left	.00	0.53	0.05
PC6: Word by word matching	.00	0.05	1.00
PC7: First and last concept	0.33	0.58	0.38
PC8: Page orientation (illustration)	0.50	0.47	1.00
PC9: Page orientation (print)	.00	0.05	1.00
PC10: Line order sequence	.00	.00	1.00
PC11: Left page before right page	0.50	0.74	0.34
PC12: Small case/upper case letter match	.00	0.11	1.00
PC13: Reordering of letters	.00	0.05	1.00
PC14: Concept of letter	0.67	0.79	0.61
PC15: Concept of word	.00	0.26	0.29

Note. Green highlighted areas reflect where ≥50% of children in the control group knew a concept at time 4; yellow highlighted areas reflect where ≥50% of children in the experimental treatment knew a concept at time 4; orange highlighted areas reflect where children in the experimental treatment barely missed knowing a concept at ≥50%.

if the proportion of children who learned each PC varied over time. Examination of table 4.5 reveals that the overall models for PC 4 (which way to go), PC 7 (first and last) and PC 14 (concept of letter) were significantly different at the 5% significance level. It is also worth noting that PC 1 (front of book), PC 3 (where to start) and PC 5 (return sweep left) would have been declared significant at a 10% significance level.

For the significant times, it is reasonable to predict the proportion of children who will learn the print concept using the experimental treatment at each of the given times (Table 4.6). For PC 4 (which way to go), it could be predicted with 95% confidence the proportion of children who learned PC 4 was at least 3% and at most 32% at time 1. In

addition, the proportion of children who learned PC4 was between 40% and 81% at time 2, between 35% to 77% at time 3 and between 45% to 85 % at time 4 using the experimental treatment. For PC 14 (concept of letter), it could be predicted with 95% confidence that at time 1 between 11% to 48% of the children in the experimental group have learned the concept, between 40% to 81% at time 2, between 35% to 77% at time 3 and between 50% and 88% at time 4. For PC 7 (first and last concept) it can be predicted with 95% confidence that at time 1 between 5% to 38% of the children in the experimental group have learned the concept, between 15% to 54% at time 2, between 31% to 73% at time 3, and between 35% to 77% at time 4.

Factor analysis. A factor analysis was performed to determine if there were a number of unobserved factors that accounted for the correlations among the fifteen variables that represented whether or not a print concept was learned for the children in the experimental treatment group. It is generally unwise to perform a factor analysis on a sample of fewer than 50 observations. In addition, it was recommended the minimum number of observations per variable be within five to ten. The sample size for this data set was only n=21 and only 19 of those observations were used in the analysis. In addition, these minimum sample size recommendations were based on continuous variables. The variables in our dataset were dichotomous which suggested that even a larger minimum sample size was needed to provide reliable estimations of the correlations between the variables. Therefore these results should only be viewed as preliminary and further analysis based on much larger sample sizes should be conducted in order to validate these results. The FACTOR procedure of SAS with options METHOD=PRINCIPAL, PRIORS=SMC, ROTATE=VARIMAX,MINEIGEN=1,

Table 4.5. Results of Logistic Regression for Repeated Measures With Time as the Variable of Interest to Predict the Proportion of Children Who Will Learn Each PC Using the Experimental Treatment at Each of 4 Given Times

		Time 1	Time 2	Time 3	Time 4
	Across time (*p*)	95% CI predicted	95% CI predicted	95% CI predicted	95% CI predicted
PC 1: Front of book	0.07	(.52, .89)	(.51, .89)	(.51, .89)	(.70, .99)
PC 2: Print contains message	0.10	(.29, .71)	(.44, .84)	(.44, .84)	(.54, .91)
PC 3: Where to start	0.05	(.08, .43)	(.26, .68)	(.11, .49)	(.31, .73)
PC 4: Which way to go	0.01	(.03, .32)	(.40, .81)	(.35, .77)	(.45, .85)
PC 5: Return sweep left	0.05	(.05, .38)	(.22, .64)	(.22, .64)	(.31, . 73)
PC 6: Word by word matching	*	*	*	*	*
PC 7: First and last concept	0.04	(.05, .38)	(.15, .54)	(.31, .73)	(.35, .77)
PC 8: Page orientation (illustration)	0.60	(.29, .71)	(.32, .74)	(.20, .61)	(.28, .70)
PC 9: Page orientation (print)	*	*	*	*	*
PC 10: Line order sequence	*	*	*	*	*
PC 11: Left page before right page	0.82	(.38, .79)	(.40, .81)	(.45, .85)	(.50, .88)
PC 12: Small case, upper case letter match	*	*	*	*	*
PC 13: Reordering of letters	0.69	(0, .28)	(.03, .33)	(0, . 28)	(0, .28)
PC 14: Concept of letter	0.01	(.11, .48)	(.40, .81)	(.35, .77)	(.55, .91)
PC 15: Concept of word	0.28	(0, .28)	(.05, .39)	(.15, .55)	(.11, .50)

Note. Yellow highlighted areas denote learned PCs at the statistically significant level; Orange highlighted area denote near significant levels (rounded down).

REORDER was used to perform a factor analysis. The variable for CAP IV #10 was omitted due to being constant.

Five factors were retained due to having eigenvalues greater than 1 which explain 81.5% of the total variability (see table 4.6). The final communality estimates give the proportions of each variables' variance that can be explained by the factors. The smallest communality is 0.561, which suggests that each of these variables are nicely represented by the common factor space. PC 6 (word by word matching), PC 9 (page orientation, print) and PC13 (reordering of letters) load high on Factor 1; PC 2 (print contains message), PC 4 (which way to go), PC 5 (return sweep left) and #7 (first and last concept) load high on Factor 2; PC 11 (left page before right page) and PC 14 (concept of letter) load high on factor 3; PC 1 (front of book), PC 3 (where to start reading), PC 12 (small case, upper case, letter match), and PC 15 (concept of word) load high on Factor 4; and PC 8 (page orientation illustration) loads high on Factor 5..

The FACTOR procedure of SAS was also used to perform a principal component analysis (METHOD=PRINCIPAL, PRIORS = one, ROTATE = VAIRMAX, MINIEIGEN =1, REORDER. This analysis also produced five principal components with the same print concepts loading on the principal components. This does give some validity to the factor analysis presented (Statistical Consulting Group, 2012). The relationship of the variables contained in the print concepts and/or print referencing techniques which formed the basis of each factor can only be hypothetical at this juncture. However, several possibilities are discussed in Chapter V.

Skill maintenance. Children in both the experimental and control groups received a fifth administration of the *CAP* (dependent variable) several weeks after

Table 4.6. Grouping of PCs Following Factor Analysis

Factor	PCs by number	PCs by definition
Factor 1	Print Concept 6	Word by word matching
	Print Concept 9	Page orientation (print)
	Print Concept 13	Reordering of letters
Factor 2	Print Concept 2	Print Contains message
	Print Concept 4	Which way to go
	Print Concept 5	Return sweep left
	Print Concept 7	First and last concept
Factor 3	Print Concept 11	Left page before right page
	Print Concept 14	Concept of letter
Factor 4	Print Concept 1	Front of book
	Print Concept 3	Where to start reading
	Print Concept 12	Small case/upper case letter match
	Print Concept 15	Concept of word
Factor 5	Print Concept 8	Page orientation (illustration)

completion of their treatment/testing cycles (in the case of children assigned to the experimental group) or testing cycles (in the case of children enrolled in the control group) to determine if skill level was maintained (see Table 4.7 for comparison of groups). There were no significant differences in the mean *CAP* scores for the two groups at time five (P=0.177). There were no significant changes in the mean scores from time four to time five for the control group (P=.842). The mean *CAP* score from time four to time five decreased significantly for the experimental group (P=.042). It can be said with 95% confidence that the mean number of print concepts learned at time five is at least .046 and at most 2.1 lower than the mean number of concepts learned at time four. The implication for these findings are discussed in Chapter V.

Table 4.7 Comparison of print concept knowledge of experimental and control group at time 4 and time 5: means, standard deviations (SD) and range of scores.

Group	CAP IV *M/SD* (Range)	CAP V *M/SD* (Range)
Treatment	6.68/1.6 (2-13)	5/1.75 (0-12)
Control	3.5 (1-6)	3.8/1.81 (1-9)

Research Question 2

Does receptive vocabulary contribute to the variance in performance on learning PCs by at-risk children using this experimental treatment? The research hypothesis was that receptive vocabulary would make a significant, positive contribution to children's learning of print concepts using the experimental treatment. The first part of the analysis fit simple linear regression models to predict number of PCs learned by children at time four using the explanatory variables PPVT (P=0.195, R^2 = 7.2%) and TVPS (P=0.028, R^2 = 19.3%). The models are shown in Figures 4.2 and 4.3, respectively.

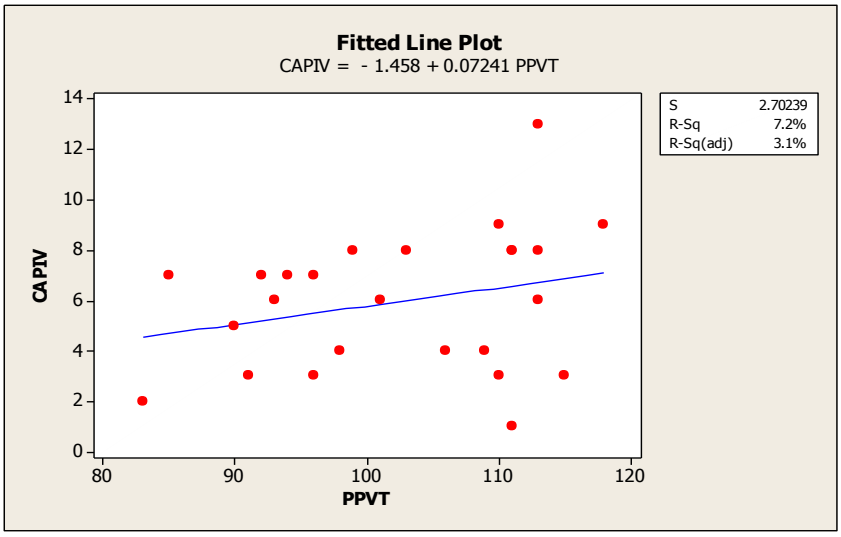

Figure 4.2. Regression line of CAP IV and PPVT.

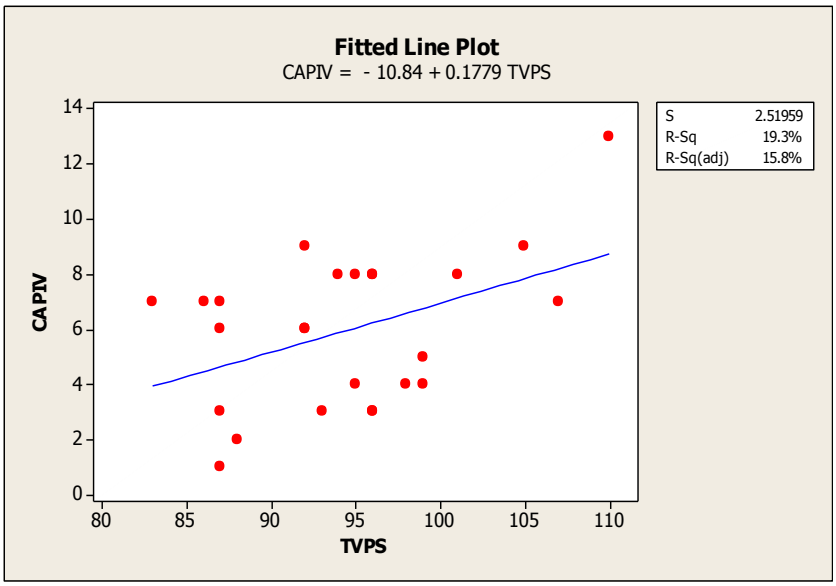

Figure 4.3. Regression line of CAP IV and TVPS.

Next, a multiple regression model was used to explain the number of PCs learned by children at time four (y) was fit using the following explanatory variables: age (x_1), TVPS (x_2), group (x_3), PPVT (x_4) and sex (x_5). The variables for sex and PPVT were removed due to insignificance. Therefore, using both of these models it was found that there was insufficient evidence to conclude that receptive vocabulary, as measured by the *PPVT-IV*, makes a significant, positive contribution to children's learning of print concepts (see table 4.7).

The fitted model for the remaining variables (age, scores on the TVPS and group) was: $y = -35.8403+0.341978\ x_1+0.217482\ x_2+3.47903\ x_3$ which explains 57% of the variation in the number of print concepts learned at time 4 and that these variables are highly significant. This yields the following models for each group:

Control: $y = -35.8403 + 0.341978\ x_1 + 0.217482\ x_2$

Experimental: $y = -32.3613 + 0.341978\ x_1 + 0.217482\ x_2$

Table 4.8. Correlation of PCs Learned in Relation to Age, TVPS and Group

	Coefficient	95% CI
Constant	−35.8403	(−57.4623, −14.2184)
Age	0.3420	(0.0926, 0.5914)
TVPS	0.2175	(0.0869, 0.3480)
Group_E	3.4790	(1.5422, 5.4159)

It can be said with 95% confidence that the mean number of print concepts learned for the experimental group is at least 1.5 and at most 5.4 more than the average number of print concepts learned by the control group with all the other variables (age, TVPS) held constant. Furthermore, for each additional point on the TVPS, the average number of print concepts increased by at least .09 and at most .35 when the group and age are held constant. Similarly, for each additional month in age of the child, the average number of print concepts learned increases by at least .09 and at most .59 when the TVPS and Group is held constant.

CHAPTER FIVE:

DISCUSSION

Learning to read and write is a complex developmental process. A code related precursor to this process is an appreciation of print concepts. One activity that appears to promote the learning of print concepts in preschool children is explicitly pointing out particular forms, functions, and conventions of print during shared storybook reading. This study had three aims: 1) to determine if a particular intervention (explicit, non-evocative print referencing) was effective in teaching print concepts to children from low SES households, 2) to explore which concepts appeared to be most easily learned through this method, and 3) to investigate the relationship that receptive vocabulary might have to the process. This chapter will discuss the findings for each of the research questions posed in the study as well as implications for practice, study limitations, and suggestions for future research.

The Research Questions

Research Question 1

Do preschool children at-risk learn more print concepts using an explicit, non-evocative print referencing experimental treatment during shared book reading compared to "business as usual" classroom experiences? The research hypothesis was that preschool children at-risk assigned to the treatment group would learn significantly more print concepts than their peers who were assigned to the control group. Data analysis supported the hypothesis. The results from the two-sample *t*-test and ANOVA with repeated measures demonstrated that, by time four, children in the treatment group displayed significant learning of print concepts compared to children in the control group by the fourth observation.

Results from this investigation reinforced those from similar studies and suggested that print referencing during shared book reading is an effective intervention for teaching print concepts to preschool children (Frank, Stewart, & Gonzalez, 2010; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009; Justice & Ezell, 2002; Lovelace & Stewart, 2007; Zucker, Justice & Piasta, 2009). These results also added to what previous studies have discovered. For instance, in the 2002 study by Justice and Ezell, 30 preschool children at-risk were assigned to either a treatment condition or a control condition but the experimental print referencing treatment was administered to small groups with prompts which required a response from the children. The Lovelace and Stewart (2007) study had the limitation of being a single subject design with only five participants. The current study was able to replicate and strengthen results of both of these studies by using a randomized control design applied to a larger sample (N=27) and confirmed that the intervention had impact on learning over and above what children received in "business as usual" classroom instruction.

The study enhanced and strengthened the developing evidence for how children develop critical emergent literacy skills, especially those who have known developmental risk factors. Furthermore, the results illustrated the findings of Senechal (2001) regarding children's code related skills being strengthened by explicit teaching. In this case, the findings added to the theoretical conversations about learning print concepts through adult/child interactions such as shared book reading (Justice & Ezell, 2004; Lovelace & Stewart, 2007; Zucker, Justice & Piasta, 2009).

Research Question 2

Which print concepts are most easily learned by at-risk children with this experimental treatment? The research hypothesis was that some print concepts would be

learned by a majority of the children enrolled in the treatment condition and some print concepts would not be learned by a majority of the children. The results of data analysis supported this hypothesis. The children in the treatment condition showed an average increase of approximately two print concepts at the end of the first treatment sequence. Interestingly, as a group, they did not display a significant increase in PCs from the second treatment sequence to end of the third sequence but again demonstrated an increase from the third treatment sequence to the end of the fourth sequence (see table 5.1). The learning plateau from time two to time three may be explained by the increased doses of treatment needed for the later learned PCs.

Lovelace and Stewart's (2007) study suggested that some print concepts may be more affected by non-evocative print referencing than others. The current study substantiated this idea by providing evidence that some concepts were more quickly (easily) learned than others by the children assigned to the experimental group. As discussed in the Lovelace and Stewart (2007) study, those print concepts which were demonstrated with clear, unmistakable, gestures and wording (such as waving the hand across the cover of the book and saying "this is the front of the book") were more easily learned than those presented with a more vague cue (such as simply point to the first and second line of text and saying "this line is first" "this line is next") In the later case the gesture was "smaller" (less obvious) and the child would have had to have comprehended the text concept of "line" as well as the concepts of "first" and "next".

The findings of this study imply that the frequency and intensity of print referencing has important consequences as proposed in a discussion by Breit-Smith, Justice, McGinty and Kaderavek (2009) and may play a role in the learning of particular

types of print concepts. Breit-Smith et al. (2009) observed a considerable variation in the intensity of delivery of print referencing treatment in the six studies which they investigated. For example, in one study (Justice, Kaderavek, Fan, Sofka & Hunt, 2009), children had up to 120 exposures to PCs presented in a large group format over a 30 week period of time. In another study (Justice & Ezell, 2002), 30 children had 24 exposures in a small group setting over an eight week time span. The 21 children enrolled in the experimental condition of the current study had a precise and equal delivery of exposures to the PCs (18 exposures) in a relatively short period of time (approximately 3 weeks) which allowed for observation of dosage impact across PCs.

Table 5.1. Average Number of PCs Learned at Each Time for the Experimental Group

Test Time	1	2	3	4
Avg. PCs	3.4	5.36	5.47	6.68

Observations on individual print concepts. Due to the relatively small data set, statistical significance for when (at what time) learning of individual PCs by the majority of children could not be determined with much precision (prediction intervals given in Table 4.5 are too wide to be informative). However, examination of the proportion of children in the treatment group who learned each PC over time (see Table 4.3) revealed some interesting trends. The majority of children (≥ 50%) knew PC 1 (front of book), PC 2 (print contains message), PC 8 (page orientation, picture) and PC 11 (left page before right page) going into the study. There was no increase in the proportion of children who learned PC 8 (page orientation illustration) over time. However, with additional exposures, PC 1 (front of book) and to a lesser degree PC 2 (print contains message) and PC 11 (left page before right page) showed an increase by time 4. Learning of PC 4

(which way to go) showed an increase by time 2 (i.e. more easily learned) while PC 7 demonstrated growth by time 3. It appears that PC 3 (where to start) and PC 5 (return sweep left) were not learned by a majority of the children until time 4, making these less easily learned. No significant learning occurred for PC 6 (word by word matching), PC 9 (page orientation/print), PC 10 (line order sequence), PC 12 (small case upper case letter match) or PC 15 (concept of word). Interestingly, both the experimental group *and* control group displayed learning of PC 14 (concept of letter). It can be hypothesized that the letters of the alphabet are an important curricular emphasis in preschool classrooms and therefore learning was occurring with both groups of children through this venue.

While descriptive statistics revealed information regarding overall learning of PCs by the children enrolled in the experimental treatment condition, field notes concerning individual responses to particular print concepts were also illuminating. For example, while participants enrolled in the experimental treatment did not have significant growth in knowledge of PC 12 (small case, upper case letter match) as measured by the dependant variable, it was noted that several children were able to match one pair of letters but not two (as required by the test) by Time 4. The matching of upper and lower case letters is highly dependent on well developed visual perceptual skills, and in this case, visual scanning ability. Some children appeared to "give up" on the task by responding "I can't find it" for the second trial. It could be with a higher dose (more practice) this PC could have been mastered with this technique. An additional comment by two children exposed confusion in the use of a concept label regarding upper and lower case letter match. In the test, the administrator points to a capital letter and says "Find a *little* letter like this." These children responded with "do you mean *lower case*?"

Because it was not part of the testing protocol, the administrator did not respond, and therefore may have negated a potentially correct response.

Another interesting observation was for PC 4 (which way to go) and PC 5 (return sweep to left) where several children did not meet the criteria for getting the concept correct but went from saying "I don't know" at Time 1 to using a back and forth finger sweep (indicating an emerging understanding of print directionality) by Time 3 or Time 4. It could be hypothesized that children need to have a more highly developed sense of the concept of "word" before print directionality is completely understood. That is, they may need a developed concept of word in order to recognize the first and last word of a line of print and to accurately track (point to) the left to right and return sweep to left as required by the test of PCs.

Stability of learning. Results of a fifth administration of the *CAP* to the children enrolled in the experimental group demonstrated that the learning of new PCs is not maintained over time without continued "treatment" or reminders about the concepts.

Summary of findings for research question 2. In summary, the mean number of print concepts known by the experimental treatment group at Time 1 was significantly lower than at all other times, there was no difference in the mean number of print concepts known for times 2 and 3, and the mean number of print concepts known at time 4 was significantly higher than at all other times. Furthermore, some PCs appear to be learned by some children with a smaller dose of the treatment. Most notably PC 4 (which way to go) was learned by a majority of the children after one treatment sequence and PC 3 (where to start), PC 5 (return sweep to left) and PC 7 (first and last concept) were learned by the majority of the students by the conclusion of the fourth treatment sequence

(eg. learned at a higher treatment dosage). For PC 1 (front of book), by the end of the fourth treatment sequence 95% of the children had mastered the concept, up from 75% at baseline and for PC 2 (print contains message) 79% of the children had learned the concept at the end of the fourth treatment sequence, up from 50% at baseline.

Some concepts were not learned by a majority of participants at the maximum dose delivered in this study including PC 6 (word by word matching), PC 9 (page orientation print), PC 10 (Line order sequence), PC 12 (small case upper case letter match), PC 13 (reordering of letters) and PC 15 (concept of word) or were already mastered by a majority of the participants at the beginning of the study such as PC 2 (print contains message), PC 8 (page orientation illustration) and PC 11 (left page before right page). The amount of dosing for some concepts, developmental exposure to particular concepts, and the limitations of the experimental treatment itself may all have contributed to variance in the learning of PCs. The limited carryover stability of the learning of PCs over time suggests that booster sessions (more exposures) are needed to ensure learning endurance.

Observations of classes of print concepts. As discussed in Chapter I and Chapter III, PCs can be classified as being those related to *book conventions, print conventions,* or *print form.* It is interesting to note that four out of the six PCs for which the children in the experimental group demonstrated significant or near significant learning (compared to those in the control group) were PCs related to *print conventions:* PC 3 (where to start), PC 4 (which way to go), PC 5 (return sweep to left), and PC 7 (concept of first and last). In addition, each of these print concepts had a simple, obvious, and explicit match between the verbal and gestural (visual spatial) prompt. There was

also this type of transparency in the administration of the PC 1 (front of book) prompt which is a PC related to book conventions.

Furthermore, PCs related to *print form*, with the exception of PC 14 (concept of letter) seemed to be least impacted by the experimental treatment, most notably PC 6 (word by word matching), PC 13 (reordering of letters within a word), and PC 15 (concept of word). This could be a developmental phenomenon as research has suggested that most 4 year-olds do not demonstrate "word awareness" (Justice & Ezell, 2001; Mason, 1980; Roberts, B., 1992; Tunmer, Bowey & Grieve, 1983). For example Roberts (1992) demonstrated that before children can explicitly point out or describe what a "word" is in its written form, they must have a tacit (functional) understanding of what a word is in both its spoken form (what a word sounds like) and written form (what a word looks like). While the youngest children in her study (aged 5:5) did demonstrate a tacit understanding of the concept of word, the children in the current study were a full year younger, and therefore may not have the developmental skills (cognitively and experientially) to be able to fully appreciate and identify print form.

Research Question 3

Does receptive vocabulary contribute to the variance in performance on learning PCs by at-risk children using this experimental treatment? The research hypothesis was that receptive vocabulary would make a significant (positive) contribution to children's learning PCs through an explicit, non-evocative print referencing treatment. The hypothesis was not supported. Multiple regression analysis did not detect a significant correlation between receptive vocabulary as measured by the PPVT-IV and PC learning. However, the relatively small sample size may not have been powerful enough to detect a relationship. In addition, the study design utilized a relatively limited vocabulary range

(children with SS below 80 on the PPVT-IV were excluded from the study due to the possibility of introducing a confounding variable). It could be that with a sample exhibiting a broader vocabulary range a relationship could have been detected.

Of interest was the significant association between visual perceptual skills, as measured by the *TVPS-3rd ed.*, and gain in PC knowledge by children enrolled in the experimental treatment group. As reported in Chapter IV, for each additional point on the *TVPS 3rd ed.*, the average number of print concepts increased by at least .09 and at most .35 when the group and age were held constant. It may be that a very explicit relationship between the verbal cue/concept and the visual cue is especially important. The particular treatment used in this study, explicit, non-evocative print referencing, appeared to have the most impact on six PCs with relatively straight forward matching of a visual cue with a verbal cue: PC 1 (front of book), PC 3 (where to start), PC 4 (which way to go), PC 5 (return sweep left), PC 7 (first and last), and PC 14 (concept of letter). In contrast, several of the targeted concepts seemed to rely on the participants having already developed, or at least have emerging knowledge of the concept of what a word is, more specifically what a word "looks like". This was true of PC 6 (word by word matching), PC 9 (orientation of print), and PC 15 (concept of word). These concepts were not significantly impacted by the experimental treatment.

Implications for Practice

The results of this study support the use of explicit, non-evocative print referencing as an intervention for teaching preschool children at-risk about print concepts. Use of this type of print referencing is a quick and non-invasive way to cue children both verbally and visually to pay attention to the text in storybooks during shared reading. It appears that some print concepts may be more sensitive to this

technique than others and that the visual perceptual skill development of children may contribute to individual achievement. Preschool children at-risk for later literacy failure may benefit from having print referencing added to their learning environment from both prevention and intervention perspectives. Results of this study suggested that, in a broad sense, concepts related to book conventions might be more easily taught to the youngest of children, that concepts related to print conventions might be easily taught to slightly older children and that the concepts related to print form might be reinforced after explicit understanding of these concepts had been achieved during formal classroom instruction.

Prevention

Emergent literacy interventions which are provided during the preschool period may be regarded as preventive in nature, intended to reduce the possibility of later literacy failure in at-risk populations (Heibert, 1981). The specific emergent literacy intervention of explicit print referencing has been effectively taught to adults who interact with pre-school children including parents (Justice, Skibbe, & McGinty, 2011), educators (Justice, Kaderavek, Fan, Sofka, & Hunt, 2009) and graduate students in communication sciences and disorders (Ezell & Justice, 2000). Therefore, it can potentially have a significant impact on the prevention of later literacy failure in at-risk populations. Specialists working with preschool aged children including occupational therapists, developmental specialists and speech-language pathologists share in the responsibility of the prevention of literacy problems and therefore may choose to incorporate print referencing into their practice. Ongoing exposure to the PCs that lend themselves best to this intervention may support maintenance of learning.

For example, in the discipline of speech-language pathology, the role of speech-language pathologists (SLPs) has been defined by the American Speech-Language hearing Association (2001) as "preventing written language problems by fostering language acquisition and emergent literacy" (p. 2). SLPs working with children enrolled in public preschool programs who demonstrate a risk for literacy failure may be impacted by a tiered approach to prevention/intervention known as Response to Intervention (RTI; Justice, 2006). In this model, print referencing can be taught to preschool teachers as part of Tier I which mandates evidence-based educational practices. It can also be utilized by teachers and specialists within the classroom for more intensive, Tier II intervention. Justice (2006) suggested that

> the initiative for systematic and sustained pre-referral activities such as [print referencing] will ultimately reduce the number of pupils requiring special education service in reading and related areas. SLPs who adhere to the principle that prevention is more powerful than remediation have important roles to play in organizing and supporting reading interventions with an RTI model. (p. 294)

Direct Intervention

Those who provide direct services to children at-risk for literacy problems due to specific language impairment, sensory impairment or more global concerns, can play a significant role in their later literacy development by incorporating evidence-based emergent literacy interventions, such as explicit, non-evocative print referencing (ENPR) into their individual therapy plans. For example, despite ASHA's (2000) position that "speech-language pathologists (SLPs) play a critical and direct role in the development of literacy for children and adolescents with communication disorders (p.1)", traditional speech-language intervention has had little direct effect on literacy skills (Gillon & Dodd, 1995). Incorporating explicit, non-evocative print referencing into literature based

activities targeted at speech and language remediation, occupational therapy, or early intervention, may provide a value added component to therapy in terms of emergent literacy instruction. In addition, training parents to use ENPR as part the home program of at-risk children can also be an important part of therapy plans. The lack of maintenance of newly learned PCs in this study underscores the importance of ongoing exposure (reference) to these concepts over an extended period of time to ensure that knowledge is retained.

Limitations of the Study

Study Participants

There were several limitations related to participants in this study. The relatively small N, while adequate for answering question #1 (Do at-risk children learn more print concepts using the ENPR experimental treatment than children exposed to the "business as usual" methods of the classroom?), did not give clear indication of whether or not receptive vocabulary level contributed to this learning (question #3). In addition, the subjects were recruited from four different child care centers with different teachers and different classroom environments which created threats to the internal validity of the study. Lastly, while all participants were enrolled in a program which subsidized their child care expenses (because of low SES), other important SES factors (maternal education, employment, family constitution) were not taken into consideration.

Methods and Procedures

There were also several limitations of this study related to methods and procedures. There has been relatively little research on print concept learning with children this young (4:0-4:11; years: months). The dependent variable measure (*CAP; Clay, 2001)* was normed on older children (5:0-7:0). It may be that children as young as

those in the study are not developmentally ready for mastering some of the print concepts examined, such as concept of word. Furthermore, there was no control of what occurred regarding print referencing by teachers or parents of the children during the time of the study, which was a threat to internal validity. Finally, the participants assigned to the experimental treatment condition all received nine treatment sessions for a total of 18 referencing of each of the 15 concepts. While this was adequate exposure (dose) for learning of some of the PCs, it could be that other PCs would have been learned, and those learned would have been maintained, with more frequent or more intense exposure or more exposures over a longer period of time. Finally, a significant limitation to this study was the range in the transparency (or lack thereof) of both the verbal and gestural prompts used to reference the 15 prints concepts. Some prompts were very literal and direct (saying "this is the front of the book" and waving a hand over the front of the book to reference front of book). However, others where more abstract and vague (saying "here is the top of the picture; here is the bottom of the picture" while pointing to the top and bottom of an illustration to reference page orientation). This may have influenced the ease or difficulty in learning certain print concepts and was not controlled for in the study.

Future Research

This study added to the growing evidence in support of explicit print referencing as an effective intervention for teaching print concepts to young children. However, there is much that still needs to be known regarding the effectiveness of this method for particular print concepts. Future studies will need to further define the type(s) of print concepts that are best suited for this intervention method. The factor analysis conducted on the data of the current study suggested that certain print concepts may have additional

relationships (other than type) which could be explored. An alternative explanation for why certain PCs factored together may have to do with how they were linguistically and physically cued during the treatment. The visual/spatial clarity of the gestural reference to PCs needs further investigation.

Additionally, studies need to include a larger sample in order to determine particular aspects of language (such as receptive vocabulary level) that might contribute to learning. Because results of this study suggested that visual perceptual skills make an important contribution to PC learning, further investigation into the relationship between visual perception and the learning of PCs, delineating which aspects of visual perception have the strongest relationship, is imperative. In addition, more attention needs to be paid to the frequency and intensity (dosing) of ENPR in terms of stabilization of learning over time.

Finally, the role of socio-cultural practices in relation to emergent literacy activities and materials needs to be a focus of study. The middle-class practice of shared story-book reading and what it has to offer children in terms of developing vocabulary and print awareness has received attention during the past two decades. However, it is evident that there are other traditions and cultures which may have very different experiences and activities relating to print that may be well suited to developing PC awareness in preschool children. This is certainly an area which lends itself to future examination.

APPENDIX A

INFORMED CONSENT

Consent to Participate in a Research Study

USE OF EXPLICIT, NON-EVOCATIVE PRINT REFERENCING WITH AT RISK PRESCHOOL CHILDREN: IMPLICATIONS FOR INCREASING PRINT CONCEPT KNOWLEDGE

WHY ARE YOU BEING INVITED TO TAKE PART IN THIS RESEARCH?

Your child is being invited (with your permission) to be in a research study. Research studies are designed to gain scientific knowledge that may help other people in the future. Your child is being invited to take part in this research study because he or she is a preschool-age child whose family participates in the West Virginia LINK program. If you agree to allow your child to be in this study, he or she will be one of about 30 children who participate. Your child may or may not receive any benefit from being a part of the study. There may also be risks associated with being part of research studies. If there are any risks involved in this study then they will be described in this consent. Participation is voluntary so please take your time to make your decision, and ask your research investigator or research staff to explain any words or information that you do not understand.

WHO IS DOING THE STUDY?

The person in charge of this study is Susan Thomas Frank, an assistant professor at Marshall University and a doctoral student in the Rehabilitation Sciences Program at the University of Kentucky. She is being guided in this research by Dr. Sharon Stewart who is the Associate Dean for Academic Affairs in the University of Kentucky's College of Health Sciences. There may be other people on the research team assisting at different times during the study.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of the study is to find out if pointing out certain reading concepts to children while reading storybooks to them helps them learn these concepts. By doing this study we hope to learn which reading concepts are most easily learned by children with this method.

ARE THERE REASONS WHY YOUR CHILD SHOULD NOT TAKE PART IN THIS STUDY?

Children who have trouble hearing, understanding what they see, may have developmental problems or who do not know many words should not take part in this study.

HOW MANY CHILDREN WILL TAKE PART IN THIS STUDY?

Approximately 30 children will take part in this study.

WHAT ABOUT ALTERNATIVE PROCEDURES?

Your child will continue to be read storybooks in the usual manner as part of his or her preschool and child care program.

THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?

The research procedures will take place at your child's child care center. Your child will need to attend child care at least three days a week while they are in the study. Your child will receive several tests to find out if they qualify for the study. These tests will take about 20 minutes each and may be conducted on the same day or on different days. Children who qualify for the study will be randomly (by chance) divided into two groups. One group of children will receive testing for reading concepts and will receive the experimental storybook reading sessions. The second group of children will only receive the testing for reading concepts. If your child is in the testing only group, we will offer the experimental storybook reading sessions to you after the study is completed.

If your child is in the experimental story book reading group, he or she will have three story book reading sessions each week. During these sessions, an adult will read two books to your child and point out reading concepts while they read. The reading session will take about 15 minutes each. After every third reading session, you child will receive testing for reading concepts. Your child will have a final test for reading concepts two to three weeks following the final reading session. The testing sessions will take about ten minutes. Children in the experimental story book reading group will have a total of nine reading sessions and five testing sessions.

If your child is in the testing only group, he or she will receive testing for reading concepts. Then they will again have the reading concepts test once a week for three weeks, and again about two weeks later, for a total of five testing sessions. Each testing session takes about ten minutes.

Your child will be in the study for a total of four to six weeks.

WHAT WILL YOUR CHILD BE ASKED TO DO?

In order for us to tell if your child qualifies for the study, he or she will need to take three tests: a hearing screening test, a visual-perception test, and a receptive (understanding) vocabulary test. For the hearing screening test, head phones will be placed over your child's ears. The researcher will press buttons on a machine which will cause a soft sound to be delivered through the head phones. Your child will be asked to raise his or her hand when they hear the sounds. For the visual-perception test, your child will look at pictures and point to parts of the pictures as directed by the researcher. On the vocabulary test, your child will be asked to point to the picture of the word that the researcher is saying.If your child is in the experimental storybook reading group, he or she will be tested for

reading concepts five times. For this test, the researcher will read a special story book with your child and ask them to show her 15 reading concepts at different point in the story. During the experimental story book reading sessions, your child will have two story books read to them each session. The reader will point out 15 reading concepts as she is reading the story. Your child will not need to respond during these sessions. If your child is in the testing only group, the researcher will read a special story book with your child and ask them to show her 15 reading concepts..All testing and experimental reading sessions will be video-tape recorded so that we can check that all information is accurate

The following table shows the schedule for children in the experimental story book reading group:

T= test for reading concepts

R= experimental story book reading (2 books)

Sessions (Days)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Testing or Reading	T	R	R	R	T	R	R	R	T	R	R	R	T	T

If your child is in the testing only group, he or she will be tested for reading concepts five times. For this test the researcher will read a special story book to your child and ask them to show her 15 reading concepts. The following table shows the schedule for the children in the testing only group. The tests will occur approximately one week apart.

T=test for reading concepts

Sessions (Days)	1	2	3	4	5
Testing	T	T	T	T	T

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

There are no known risks to those who take part in this study.

WILL YOU BENEFIT FROM TAKING PART IN THIS STUDY?

There is no guarantee that your child will get any benefit from taking part in this study. However, they may learn new reading concepts. We hope the information learned from this study will be of benefit to other children in the future.

DO YOU HAVE TO TAKE PART IN THE STUDY?

If you decide to let your child take part in the study, it should be because you really want him or her to. You will not lose any benefits or rights you would normally have if you

choose not to volunteer. You can decide to stop having your child participate at any time during the study and they will still keep the benefits and rights they had before the study

IF YOU DON'T WANT YOUR CHILD TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

If you do not want your child to be in the study, there are no other choices except not to have them take part in the study.

WHAT WILL IT COST YOU FOR YOUR CHILD TO PARTICIPATE?

There are no costs to you for allowing your child to be a part of this study.

WHO WILL SEE THE INFORMATION THAT YOU GIVE?

We will make every effort to keep private all research records that identify your child to the extent allowed by law.

The information about your child will be combined with information from other children taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. Your child will not be personally identified in these written materials. We may publish the results of this study; however, we will keep your child's name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. Hard copies of data will be kept in coded folders in a locked file cabinet in the PI's office. Assessment and treatment sessions will be video-tape recorded in order to achieve reliability and check for procedural fidelity. The video tapes will be maintained in a secured (locked) cabinet within the Marshall University Speech and Hearing Center for up to three years, after which they will be destroyed. The Principal Researcher will retain the signed consent documents and for six years after termination of IRB approval.

All tests, information forms, video-tapes and information on stored on computers will be numbered to protect your child's privacy. Forms, jump drives and video tapes will be kept in a locked file cabinet in the researcher's office at Marshall University. The key code that connects your child's name to their numbered forms will be kept in a separate locked file cabinet.

You should know, however, that there are some circumstances in which we may have to show your information to other people. For example, the law may require us to show your information to a court or to tell authorities if you report information about a child being abused or if you pose a danger to yourself or someone else. Officials of the University of Kentucky and Marshall University may look at or copy pertinent portions of records that identify you.

CAN YOUR CHILD'S TAKING PART IN THE STUDY END EARLY?

If you decide to let your child take part in the study you still have the right to decide at any time that you no longer want your child to continue. Your child will not be treated differently if you decide to stop them from taking part in the study.

The individuals conducting the study may need to withdraw your child from the study. This may occur if your child is not able to follow the directions in the study.

ARE YOU PARTICIPATING OR CAN YOU PARTICIPATE IN ANOTHER RESEARCH STUDY AT THE SAME TIME AS PARTICIPATING IN THIS ONE?

You may have your child take part in this study if he or she is currently involved in another research study. It is important to let the researcher know if your child is in another research study. You should also discuss with the researcher before you agree to let your child participate in another research study while he or she is enrolled in this study.

WHAT HAPPENS IF YOUR CHILD GETS HURT OR SICK DURING THE STUDY?

If you believe your child is hurt or sick because of something that is due to the study, you should call Susan Thomas Frank at 304-697-2966 immediately. She will help you determine what type of treatment, if any, that is best for your child at that time.

It is important for you to understand that neither the University of Kentucky or Marshall University have funds set aside to pay for the cost of any care or treatment that might be necessary because your child gets hurt or sick while taking part in this study.

The medical costs related to your child's care and treatment because of research related harm will be your responsibility or may be paid by your insurer if you are insured by a health insurance company (you should ask your insurer if you have any questions regarding your insurer's willingness to pay under these circumstances); **or** may be paid by Medicare or Medicaid if you are covered by Medicare, or Medicaid (if you have any questions regarding Medicare/Medicaid coverage you should contact Medicare by calling 1-800-Medicare (1-800-633-4227) or Medicaid 1-800-635-2570.

A co-payment/deductible from you may be required by your insurer or Medicare/Medicaid even if your insurer or Medicare/Medicaid has agreed to pay the costs). The amount of this co-payment/deductible may be substantial.

You do not give up your legal rights by signing this form.

WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY?

Your child will receive a story book for taking part in this study. If they qualify and complete the study, they will be given a set of story books.

WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS, CONCERNS, OR COMPLAINTS?

Before you decide whether to accept this invitation for your child to take part in the study, please ask any questions that might come to mind now. Later, if you have questions, suggestions, concerns, or complaints about the study, you can contact the researcher at 304-697-2966. If you have any questions about your child's rights as a volunteer in this research, contact the staff in the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at 1-866-400-9428. We will give you a signed copy of this consent form to take with you.

WHAT IF NEW INFORMATION IS LEARNED DURING THE STUDY THAT MIGHT AFFECT YOUR DECISION FOR YOUR CHILD TO PARTICIPATE?

If the researcher learns of new information in regards to this study, and it might change your willingness to have your child stay in this study, the information will be provided to you. You may be asked to sign a new informed consent form if the information is provided to you after your child has joined the study.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

_____ _____

Name of [authorized] person obtaining informed consent Date

_____

Signature of Investigator

APPENDIX B

SCRIPT FOR MADELINE

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
9	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left to right. Remove fingers.
10		Read text	No gestures
11		Read text	No gestures
12		Read text	No gestures
13		Read text	No gestures
14	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
15		Read text	No gestures
16		Read text	No gestures
17	Where to start Left to right directionality Return sweep to left	Before reading text, say, "I'll start *here* and move *this* way." "Then, we come back *here*." Then read text.	During verbal prompt, point to first word, then trace one line of print from left to right. Then move finger from 'woods' to 'They'. Remove finger.
18		Read text	No gestures
19		Read text	No gestures
20		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
21	Capital and lower-case letter	After reading text, say, "Here is a big 'S'. Here is a little 's'".	Point to 'S' in She', then point to 's' in 'was' as they are said.
22		Read text	No gestures
23	Words that have same letters but in reverse order	After reading text, say, "Here is 'pooh', and here is 'hoop'".	Point to 'pooh' and 'hoop' as they are said.
24		Read text	No gestures
25	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part."	Underline first two words with index finger on 'first', and then underline last two words on 'last'.
26	Orientation of page (picture) Orientation of page (print)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture." After sentence regarding picture, say, "We begin here and go this way."	Sweep hand across top of the page on '*top'*. Sweep hand across bottom of the picture on '*bottom*'. Then point to 'Little' and trace line of print from left to right. Remove hand.
27		Read text	No gestures
28		Read text	No gestures
29		Read text	No gestures
30	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text.	Underline first line of text when saying, "This line is first." Underline second line of text on left side when saying, "This line is next." Remove hand.

Text page	Concept	Verbal prompt	Gestural prompt
31		Read text	No gestures
32-33	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying "*this*". Touch text on right page when saying "this page".
34		Read text	No gestures
35		Read text	No gestures
36		Read text	No gestures
37		Read text	No gestures
38		Read text	No gestures
39	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two note cards to occlude all but one letter. Move note card to show two letters.
40		Read text	No gestures
41		Read text	No gestures
42		Read text	No gestures
43		Read text	No gestures
44		Read text	No gestures
45		Read text	No gestures
46	Concept of *word*	After reading text, say, "This is one word. Here are two words."	Use two note cards to occlude all but one word, then open note cards to reveal two words.
47		Read text	No gestures
48		Read text	No gestures
49		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
50		Read text	No gestures
51		Read text	No gestures
52		Read text	No gestures

APPENDIX C

SCRIPT FOR OLIVIA

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
1	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left-right. Remove fingers.
2		Read text	No gestures
3		Read text	No gestures
4–5	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying "*this*". Touch text on right page when saying "this page". Remove hand.
6	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
7		Read text	No gestures
8		Read text	No gestures
9		No text	
10		Read text	No gestures
11	Words that have same letters but in reverse order	After reading text, say, "Here is 'pat', and here is 'tap'".	Point to 'pat' and 'tap as they are said.
12		No text	

Text page	Concept	Verbal prompt	Gestural prompt
13	Concept of *word*	After reading text, say, "This is one word. Here are two words."	Use two notecards to occlude all but one word, then open notecards to show two words.
14	Where to start Left to right directionality Return sweep to left	Before reading text, say, "I'll start *here* and move *this* way Then, we come back *here*." Continue reading.	During verbal prompt, point to first word, and then trace one line of print from left to right. Then move finger from "Olivia" to "likes". Remove finger.
15	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text.	Underline first line of text when saying, "This line is first." Underline second line of text on left side when saying. "This line is next." Remove hand.
16		Read text	No gestures
17		No text	
18		Read text	No gestures
19	Orientation of page (picture) Orientation of page (print)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture." After sentence regarding picture, say, "We *begin* here and go this way."	Sweep hand across top of picture on "*top*". Sweep hand across bottom of picture on "*bottom*". Then point to "Olivia" and trace line of print from left to right. Remove hand.
20		No text	
21		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
22	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two notecards to occlude all but one letter. Move notecard to show two letters.
23		No text	
24		Read text	No gestures
25		Read text	No gestures
26		Read text	No gestures
27	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part." Continue reading.	Underline first two words with index finger on "first", and then underline last two words on "last". Remove finger.
28	Capital and lower-case letters	After reading text, say, "Here is a big "O". Here is a little "o".	Point to "O" in "Olivia", then point to "o" in "mother" (both in first line) as they are said.

APPENDIX D

SCRIPT FOR THE SNOWY DAY

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
6		No text	
7	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left-right. Remove fingertips
8		No text	
9		Read text	No gestures
10–11	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying "*this*". Touch text on right page when saying "this page". Remove hand.
12	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
13		Read text	No gestures
14		Read text	No gestures
15		Read text	No gestures
16	Where to start Left to right directionality Return sweep to left	Before reading text, say, "I'll start *here* and move *this* way Then, we come back *here*." Continue reading.	During verbal prompt, point to first word, and then trace one line of print form left to right. Then move finger from "snow" to "Plop!"
17		No text	

Text page	Concept	Verbal prompt	Gestural prompt
18		No text	
19	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part." Continue reading.	Underline first two words with index finger on "first", and then underline last two words on "last". Remove finger.
20		Read text	No gestures
21	Concept of *word*	After reading text, say, "This is one word. Here are two words."	Use two notecards to occlude all but one word, then open notecards to show two words.
22		Read text	No gestures
23		Read text	No gestures
24	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text.	Underline first line of text when saying, "This line is first." Underline second line of text on left side when saying, "This line is next." Remove hand.
25	Orientation of page (picture) Orientation of page (print)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture." After sentence regarding picture, say, "We *begin* here and go this way."	Sweep hand across top of picture on "*top*". Sweep hand across bottom of picture on "*bottom*". Then point to "He" and trace line of print from left to right. Remove hand.
26	Words that have same letters but different orders	After reading text, say, "Here is 'tub', and here is 'but'."	Point to 'tub' and 'but' as they are said.

Text page	Concept	Verbal prompt	Gestural prompt
27		No text	
28		Read text	No gestures
29		No text	
30	Capital and lower-case letters	After reading text, say, "Here is a big "W". Here is a little "w".	Point to "W" in "While", then point to "w" in "snow" as they are said.
31	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two notecards to occlude all but one letter. Move notecards to show two letters.
32		Read text	No gestures

APPENDIX E

SCRIPT FOR GREEN EYES

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
3	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left to right. Remove fingers.
4		No text	
5		Read text	No gestures
6	Where to start Left to right directionally Return sweep to left	Before reading text, say, "I'll start *here* and move *this* way." After reading first line, say, "Then, we come back *here*." Continue reading.	During verbal prompt, point to first word, then trace one line of print from left to right. Then move finger from "house" to "Sometimes". Remove finger.
7		No text	
8		No text	
9	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two notecards to occlude all but one letter. Move notecard to show two letters.
10		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
11	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text.	Underline first line of text when saying, "This line is first." Underline second line of text on left side when saying. "This line is next." Remove hand.
12	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
13		Read text	No gestures
14		Read text	No gestures
15	Concept of *word*	After reading text, say, "This is one word. Here are two words."	Use to notecards to occlude all but one word, then move notecards to show two words.
16	Capital and lower- case letter	After reading text, say, "Here is a big "S." Here is a little "s."	Point to "S" in "Sometimes," then point to "s" in "sit" as they are said.
17		No text	
18		No text	
19		Read text	No gestures
20	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part."	Underline first two words with index finger on "first," and then underline last two words in "last."
21		No text	
22		Read text	No gestures
23		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
24		Read text	No gestures
25		No text	
26–27	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying, "*this*." Touch text on right page when saying, "this page."
28		No text	
29		Read text	No gestures
30	Words that have same letters but in reverse order	After reading text, say, "Here is 'not', and here is 'ton'."	Point to 'not' and 'ton' as they are said.
31		No text	
32		No text	
33		Read text	No gestures
34–35	Orientation to page (picture) Orientation to page (print)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture." After sentence regarding picture, say, "We begin here and go this way."	Sweep hand across top of two pages on "*top*." Sweep hand across bottom of picture on both pages on "*bottom*." During verbal prompt, point to "And," and then trace line of print from left to right. Remove hand.
36		Read text	No gestures
37		No text	
38		Read text	No gestures
39		Read text	No gestures
40		Read text	No gestures

APPENDIX F

SCRIPT FOR A TREE IS NICE

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
5	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left to right. Remove finger.
6		Read text	No gestures
7		No text	
8		No text	
9	Where to start Left to right directionality Return sweep to left	Before reading text, say, "I'll start *here* and move *this* way Then, we come back *here*." Continue reading.	During verbal prompt, point to first word, then trace one line of print form left to right. Then move finger from "woods" to "They". Remove finger.
10		Read text	No gestures
11		No text	
12	Capital and lower-case letter	After reading text, say, "Here is a big "W". Here is a little "w".	Point to "W" in "We", then point to "w" in "walk" as they are said.
13	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
14		No text	

Text page	Concept	Verbal prompt	Gestural prompt
15	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part." Continue reading.	Underline first two words with index finger on "first", and then underline last two words on "last". Remove finger.
16		No text	
17		Read text	No gestures
18–19	Orientation of page (picture) Orientation of page (print)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture." After sentence regarding picture, say, "We *begin* here and go this way."	Sweep hand across top of two pages on "*top*". Sweep hand across bottom of picture on both pages on "*bottom*". During verbal prompt, point to "Cats", and then trace line of print from left to right. Remove hand.
20	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text.	Trace first line of text when saying, "This line is first. Trace second line of text on left side when saying, "This line is next." Remove hand.
21		No text	
22–23	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying "*this*". Touch text on right page when saying "this page". Remove hand.
24		Read text	No gestures
25		No text	
26		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
27		No text	
28	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two notecards to occlude all but one letter. Move notecard to show two letters.
29		No text	
30	Words with same letters but different order	After reading text, say, "Here is 'pat', and here is 'tap'."	Point to 'pat' and 'tap' as they are said.
31	Concept of *word*	After reading text, say, "This is one word. Here are two words.	Use two notecards to occlude all but one word, then open notecards to show two words.
32		Read text	No gestures

APPENDIX G

THE PAPERBOY

Text page	Concept	Verbal prompt	Gestural prompt
	Book Orientation	"This is the front of the book."	During verbal prompt, hold book with front facing child. Sweep hand across front cover.
6	Print contains message	Before reading text, say, "This is where we *begin* reading." Read text.	During verbal prompt, move fingertips across text from left to right. Remove fingers.
7		Read text	No gestures
8		No text	
9		Read text	No gestures
10	Words that have same letters but in reverse order	After reading text, say, "Here is 'pets', and here is 'step'."	Point to 'pets' and 'step' as they are said.
11	Concept of *letter*	After reading text, say, "I'm going to show you just one letter. Here are two letters."	Use two notecards to occlude all but one letter. Move notecard to show two letters.
12	Where to start Left to right directionally Return sweep to left	Before reading text, say, "I'll start reading *here* and move *this* way." "Then, we come back to *here*." Read text	During verbal prompt, point to the first word, then trace one line of print from left to right. Then move finger from "kitchen" to "where." Remove finger.
13		No text	
14	Capital and lower case letter	After reading text, say, "Here is a big "A." Here is a little "a."	Point to "A" in "And" then point to "a" in "garage" as they are said.

Text page	Concept	Verbal prompt	Gestural prompt
15		No text	
16		Read text	No gestures
17		No text	
18	Word-by-word matching	Before reading text, say, "I'll point to these words while we read."	Point to each word as text is read.
19		Read text	No gestures
20–21	Orientation of page (picture)	Before reading text, say, "Look at this picture. Here is the *top* of the picture; here is the *bottom* of the picture."	Sweep hand across top of two pages on "*top.*" Sweep hand across bottom of picture on both pages on "*bottom.*"
20–21	Orientation of page (print)	After sentence regarding picture, say, "We begin reading here and go this way."	During verbal prompt, point to "His," and then trace line of print from left to right. Remove hand.
22	First and last concept	Before reading text, say, "This is the *first* part of the story. This is the *last* part."	Underline first two words with index finger on "first," and then underline last two words on "last."
23		No text	
24		Read text	No gestures
25	Line sequence	Before reading text, say, "*This* line is first. *This* line is next." Read text	Underline first line of text when saying, "This line is first." Underline second line of text on left side when saying, "This line is next." Remove hand.
26		Read text	No gestures

Text page	Concept	Verbal prompt	Gestural prompt
27	Concept of *word*	After reading text, say, "This is one word. Here are two words."	Use two notecards to occlude all but one word, then open notecards to show two letters.
28		Read text	No gestures
29		Read text	No gestures
30–31	Reading left page, then right page (print on both pages)	Before reading text, say, "We read *this* page first, and then this page."	Touch text on left page when saying "*this.*" Touch text on right page when saying, "this page."
32		Read text	No gestures

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VITA

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Date of Birth: January 27, 1954 Place of Birth: Norton, Virginia

EDUCATION

M. A. 1977 The George Washington University, Washington D.C., Speech Pathology

B. A. 1976 Marshall University, Huntington, WV, Speech Pathology

PROFESSIONAL EXPERIENCE

Marshall University, August 2003 to present, Assistant Professor, Department of Communication Disorders

The University of Akron, Akron, OH, August 1998 to July 2003, Director, Audiology and Speech Center and Assistant Professor

Summit County Community Partnership, Akron OH, 1991–1998 Executive Director

The University of Akron, Akron, OH, 1993–1998, Part-Clinical Instructor

The Easter Seal Society of Mahoning, Trumbull and Columbiana Counties, Youngstown, OH, 1986–1991, Program Coordinator Trumbull County Office

Private Practice, Speech-Language Pathology, Glackey Associates, Inc., Winston-Salem, NC, 1985–1996, President and Co-Owner

Family Services, Inc., Winston Salem, NC, 1980–1985, Speech-Language Pathologist

Ohio County Public Schools, Wheeling, WV, 1977–1980, Speech-Language Pathologist

SCHOLARLY PUBLICATIONS

McComas, K. L., Fry, L., Frank, S. T., & Fraley, N. (2010, October). Community of research practice: A model for student research. *Perspectives on issues in higher education , 13,* 63–68.doi:10.1044/ihe13.2.63.http://div10perspectives.asha.org

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Lesner, Sharon A., Frank, Susan T., Klingler, M. S., (2002). Assessment of the effectiveness of an adult audiologic rehabilitation program using a knowledge-based test and a measure of hearing aid satisfaction. *Journal of Audiologic Rehabilitation, 26*, 29–39.

Frank, S. T., Cook, M., Slater, L, (2002). Assessing use of managed care in graduate training programs. *Contemporary Issues in Communication Science and Disorders*, 30, 107–113.

Frank, S. T., Klingler, M. S. (2001). Managed care and clinical training: approaching an evolving concern. Contemporary Issues in Communication Science and Disorders, *28*, 91–97.

Frank, S. T., Helm, B., (Spring, 1998). Therapeutic language intervention with post-institutionalized children: a case study. HEARSAY, The Journal of the Ohio Speech and Hearing Association, 66–68.

SELECTED NATIONAL REFEREED PRESENTATIONS

McComas, K. L., Frank, S. T., & Miller, B. A. (November, 2011). *Entering, engaging, and exciting: Sustaining a community of practice*. Paper presented at the annual convention of the American Speech-Language Hearing Association, San Diego, CA.

Counts, C., Reynolds, B. & Frank, S. T. (November, 2011). *Fidelity to procedure: Low stakes student involvement in research*. Poster session presented at the annual convention of the American Speech-Language Hearing Association, San Diego, CA.

Frank, S.T. & Clemins, S. (2010, November). *A phenomenological study of Appalachian adults with low literacy levels.* Poster session presented at the annual convention of the American Speech-Language Hearing Association, Philadelphia, PA.

Frank, S. T., Stewart, S. R., & Gonzalez, L.S. (2010, November). *Using print referencing strategies and phonological intervention during storybook reading.* Poster session presented at the annual convention of the American Speech-Language Hearing Association. Philadelphia, PA.

McComas, K. L., Frank, S. T., Miller, B. A., Gardner, G., & Fraley, A. (2010, November). *Student and faculty experiences in a community of research practice.* Seminar presented at the American Speech-Language Hearing Association Annual Convention, Philadelphia, PA.

Frank, S. T. (2010, February). *Using written language development to support oral language development: Intervention strategies for pediatric clients*. Workshop presented at the annual convention of the Kentucky Speech-Language Hearing Association, Lexington, KY. Invited.

Gardner, G., & Frank, S. T. (2009, November*). Exploring language and literacy skills of children with hearing impairment.* Poster session presented at the annual convention of the American Speech-Language Hearing Association. New Orleans, LA.

McComas, K.L., Thomas, L.B., Frank, S.T., McNealy,K.K., Reynolds, M.E., & Miller, B.A. (2009, November). *Community of research practice: A story of cultural change*. Seminar presented at the American Speech-Language-Hearing Association Annual Convention, New Orleans, LA.

Reynolds, M. E., & Frank, S. T. (2007, November). Does melody help young children learn vocabulary more easily? Poster session presented at the annual convention of the American Speech-Language Hearing Association, Boston, MA.

SELECTED STATE REFEREED PRESENTATIONS

Gardner, G. & Frank, S. T. (2009, April). Dialogic reading and children with hearing impairments: Exploratory study with children at Marshall University's "L". Poster presented at the West Virginia Speech-Language Hearing Association, Huntington, WV.

Thomas, L., Banks, C., Casey-Heatherman, W., Clark, M., Ellis, K., Frank, S. T., Gardner, G., Jones, A., McComas, K., McNealy, K., & Renolds, M. (2009, April). A community of research practice: Fostering scholarship among students and faculty. Poster presented at the West Virginia Speech-Language Hearing Association, Huntington, WV.

Frank, S. T. (2008, March). Self-determination in young children: Application to children at-risk for reading impairment. Poster presented at the West Virginia Speech-Language Hearing Association, Flatwood, WV.

Frank, S. T. & Dew, K. (2006, March). The early identification of children at risk for reading impairment: The use of rapid automatized naming and non-word repetition as useful and non-biased assessment techniques. Poster presented at the West Virginia Speech-Language Hearing Association, Charleston WV.

Frank, S. T. & Linville, J. B. (2006, March). Use of literature scripts with children in day care settings: A service learning approach to preventive intervention. Poster presentation at the West Virginia Speech-Language Hearing Association Annual Convention, Charleston, WV.

Reynolds, M. E., Lewis, M-M., Daniel, M., & Frank, S. T., (April, 2005). Is the level of a mother's education related to her children's language and working memory skills? Poster presented at the 2005 spring meeting of the West Virginia Speech-Language Hearing Association. Morgantown, WV.

Reynolds, M. E., Lewis, M.-M., Maury, J., Daniel, M., Frank, S. T. (2006, November). Phonological working_memory and SES: Is there a relationship? Poster session presented at the annual convention of the American Speech-Language Hearing Association, Miami, FL.

PROFESSIONAL CERTIFICATIONS

The Certificate of Clinical Competence in Speech-Language Pathology from the

American Speech-Language Hearing Association

Licensed Speech-Language Pathologist in the State of WV

PROFESSIONAL ASSOCIATION MEMBERSHIPS

American Speech-Language Hearing Association

West Virginia Speech-Language Hearing Association

PROFESSIONAL SERVICE

Speech-Language Hearing Association Advisory Council of the American Speech-

Language Hearing Association

West Virginia Speech-Language Hearing Association Executive Board Member

Tri-State Literacy Council Executive Board Member

SELECTED UNIVERSITY SERVICE

Graduate School Council member

Honors College Curriculum Committee member

Research Advisory Committee College of Health Professions member

Graduate Admissions Committee Department of Communication Disorders member

Community of Research Practice Department of Communication Disorders member