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Evidence based practice for emergent literacy intervention for children who use AAC

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Evidence based practice for emergent literacy intervention for children who use AAC

Abstract
A review of emergent literacy interventions for children who use augmentative and alternative communication (AAC) and for those who do not was completed to examine availability of evidence for professionals making decisions for intervention. Evidence was analyzed based on quality of the research, and ranked according to Schlosser and Raghavendra’s (2004) hierarchy of research designs. Findings reported include that there is a minimal amount of research available for professionals to employ evidence based practice in emergent literacy intervention for children who use AAC. Future directions are suggested for researching emergent literacy interventions for children who use AAC.

Keywords
Health Sciences, Speech Pathology
EVIDENCE BASED PRACTICE FOR EMERGENT LITERACY INTERVENTION FOR CHILDREN WHO USE AAC

BY

KRISTEN GRACE DORAN
Bachelor of Science, University of New Hampshire, 2005

THESIS
Submitted to the University of New Hampshire
In Partial Fulfillment of
The Requirements for the Degree of

Master of Science
in
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August 9, 2007
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DEDICATION

This work is dedicated to my “kiddos,” who taught me what it truly meant to communicate.
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This thesis would not have been possible without the tremendous amount of support, guidance, and assistance given to me by my thesis committee. I am eternally grateful to them for all of their help. When I arrived at their doors with a thesis idea at the last possible minute, they accepted, encouraged, and pushed me to do the best possible work I could. I also wish to extend thanks to Dr. Justice and Dr. Schlosser for their contributions.

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ABSTRACT

EVIDENCE BASED PRACTICE FOR EMERGENT LITERACY INTERVENTION FOR CHILDREN WHO USE AAC

by

Kristen Grace Doran

University of New Hampshire, September 2007

A review of emergent literacy interventions for children who use augmentative and alternative communication (AAC) and for those who do not was completed to examine availability of evidence for professionals making decisions for intervention. Evidence was analyzed based on quality of the research, and ranked according to Schlosser and Raghavendra's (2004) hierarchy of research designs. Findings reported include that there is a minimal amount of research available for professionals to employ evidence based practice in emergent literacy intervention for children who use AAC. Future directions are suggested for researching emergent literacy interventions for children who use AAC.
Evidence based practice (EBP) is defined by the American Speech Language and Hearing Association (ASHA) as "an approach in which current, high-quality research evidence is integrated with practitioner expertise and client preferences and values into the process of making clinical decisions" (ASHA 2005, Position Statement). In short, EBP is a three-fold approach that requires professionals to balance their personal clinical skills with current, high quality research, and individual client values in order to provide the best possible evaluation and treatment for their clients.

EBP is not a new phenomenon, with the first known discussions of it tracing back to 10th century Bagdad in one of the earliest written comprehensive medical books. The author and physician, al-Razi, stated in his works that he refused to accept medicinal remedies on word alone, as was common practice at the time, and would require seeing the evidence of effectiveness before using them on his own patients (Tibi, 2005).
In recent times, EBP has experienced a resurgence of popularity, especially in the area of research. With the 2001 passage of the No Child Left Behind Act (2001, NCLB Act, PL 107-110) and other federal requirements, professionals in education and health related fields have had to become more accountable and research-based in their practices (Schlosser & Raghavendra, 2004). For example, providing therapy that has a strong evidence base is very often required for funding or insurance reimbursement, as well as for supporting and integrating family choices with research. Most importantly, utilizing EBP improves therapy outcomes (Schlosser, 2003). For example, in a meta-analysis of studies conducted by nurses to examine the contribution of research-based practice on patient outcomes, it was found that patients who received research-based treatment achieved significantly better outcomes then those who received routine nursing care (Heater, Becker, & Olson, 1988).

One major challenge faced by individuals wishing to incorporate EBP into their practice is finding and evaluating new research. While most professional groups, such as the American Speech-Language Hearing Association (ASHA) and the American Occupational Therapy Association (AOTA), produce research journals, research is also available through other journals. Access to these journals is often incorporated into group membership, or are available at local university libraries. Once individuals locate a study that they may find appropriate for their topic, they must
analyze the information. This process can be extremely time consuming, and requires a firm understanding of research methods and statistics.

Schlosser (2003) described an outline for developing and finding evidence based research. The steps, as follows, are designed to help organize, evaluate, and utilize the research available. The first step, developing a question, starts the search for evidence, and requires the individual to be aware of current practices and applications, as well as all of the stakeholders, or individuals involved in the client and their life, wishes (Schlosser, 2003). In addition, having a good question helps to narrow the research search (Schlosser & Raghavendra, 2004; Sackett, Richardson, Rosenberg, & Haynes, 1997). The next step involves selecting where one will search for evidence. While textbooks may provide a good starting point to a research question (Schlosser, 2003), they should not be relied on for the most current and comprehensive research, as they can become outdated quickly. Online databases and hand searches of available research, while time consuming, provide the most resent published research. Once one has found where they will search, they must choose appropriate search terms and keywords (Schlosser & Raghavendra, 2004).

After an individual has found appropriate research studies based on their question, the research must be read and analyzed. Here, an individual must be confident in understanding statistical analysis and
research design. While a study that has numerous participants may appear to be an excellent case, there are other factors, such as control groups, pre and post testing, validity, and integrity, which must be examined (Schlosser & Raghavendra, 2004). Once an individual has analyzed all the research, they now must discuss research and findings with relevant stakeholders and incorporate their viewpoints or concerns. It is important to ensure that stakeholders understand the research and information available (Schlosser & Raghavendra, 2004). An important step in EBP that professionals should be practicing is evaluation of their application of evidence. This gathering of evidence and data not only helps to revise any applications if necessary, but also adds to the evidence available (Schlosser, 1999). The last step in the process is disseminating the findings, which allows for further research and information gathering to be completed (Schlosser & Raghavendra, 2004).

Various hierarchies have been developed to help define quality research (Agency for Healthcare Research and Quality [AHRQ], 2002), including one designed by ASHA to help guide SLP’s in their research (ASHA, 2004). The hierarchies often differ on what they rate; whether it’s the type of study (e.g. randomized controls trials and single subject studies) the effect sizes of studies (i.e. how effective an intervention may be), or sample sizes. However, they all try to qualitatively rate what are
seen to be the most important factors in research (Robey, 2004), and assist individuals in categorizing research.

However, various difficulties lie in categorizing research related to individuals with disabilities. One of the highest ranked designs, randomized control trials (RCT's), may not necessarily be appropriate for individuals with disabilities (Iacono, 2003; Schlosser & Raghavendra 2003). RCT's require a generally homogeneous group, with strict controls to the intervention, something difficult to obtain in a group of individuals with disabilities, largely due to the variability of and low incidence of individuals with complex communication needs (Iacono, 2003). In addition, an RCT may pose ethical dilemmas, as it would not be ethical to withhold therapy, or require an individual to change a routine or therapy process thought to be helpful due to controls in the study. In order to alleviate these barriers, a specific hierarchy was designed to incorporate more prevalent and realistic research designs (Schlosser & Raghavendra 2004).

This review will utilize Schlosser and Raghavendra's (2004) hierarchy as a means to help evaluate and determine best evidence in emergent literacy instruction for AAC users. This hierarchy was chosen as it provides an in-depth review system, with numerous categories for research designs, allowing for a more accurate rating system. To allow for comparison, the same hierarchy will be used for the review involving emergent literacy
intervention for children who do not use AAC. While only some research in that area includes children with disabilities (O'Connor et al., 1996), keeping the same hierarchy will allow for a comparative review between groups.

While hierarchies are useful in evaluating evidence, and can provide a more tangible way to disseminate findings (e.g. comparing two studies with two different ratings), clinicians should be examining all parts of research, and ensuring that it is not only evidence based, but fits within their scope of practice and goals. For instance, professionals must balance efficacy and effectiveness. Efficacy is the general measure of a treatment's efficiency in promoting change in an individual and the general effect of that treatment on an individual (ASHA, 1996). There are many ways to measure efficacy, from specific IEP goals in a school system or written goals in an outpatient rehabilitation center, to more flexible and individually focused parameters such as an individualized family service plan (IFSP). Therefore, it can be difficult to apply similar measures to different individuals, making measurement of treatment efficacy highly personalized. Effectiveness is how likely it is that a desired outcome will be achieved (Justice & Fey, 2004). For example, an intervention that takes twice as long as a comparable intervention and shows no significant difference in outcome would not be EBP. This knowledge is part of professional’s clinical skills, the second part of EBP. When new research is
done and new techniques are developed, it does not mean that professionals should disregard what may have worked and been proven before. Individual clinical skills are what differentiate clinicians, making them persons and not just structured, scripted, computers.

The third part of EBP is incorporating client and other stakeholders’ values. If an SLP were to attempt an intervention that goes completely against an individual’s values, then motivation and compliance would be extremely difficult to implement. Ensuring that clients understand and agree to what the SLP is doing, and why the SLP is doing it, is as important as ensuring there is evidence to support the methods, as well as being ethical.

EBP is a valuable tool for professionals in an environment that demands scientifically based research and measurable results. While it may seem to be an extremely consuming undertaking, the benefits to understanding and applying evidence should not be underestimated (Schlosser & Raghavendra, 2004).

One area that contains a variety of research is that of emergent literacy intervention for children who use AAC. While there is not a large amount of research available, it is still important to review and understand. This paper will review evidence available for emergent literacy intervention for children who use AAC, compare it to the emergent literacy intervention research that is available for children who
do not use AAC, and examine any gaps in research that may appear. It is hoped that this review will begin the EBP process for emergent literacy intervention for children who use AAC, providing research information and future directions.
CHAPTER II

EMERGENT LITERACY

What is Emergent Literacy?

Emergent literacy, or pre-literacy, refers to the behaviors that precede and then develop into conventional literacy (Sulzby & Teale, 1991; Koppenhaver, 2000; Roth & Baden, 2001). Children in the emergent literacy stage are learning about form, content, and the use of literacy, but may not yet be applying this knowledge to conventional literacy skills (van Kleeck, 2004). For instance, drawing or “writing” in pretend play, or understanding how to turn the pages of a storybook are both concepts that can be seen as foundational skills before formal reading instruction even begins (Ezell & Justice, 2005).

Before the development of emergent literacy theories, it was thought that children could only begin to read once they had mastered all the “reading readiness” skills (Whitehurst & Lonigan, 1998), or had reached an approximate mental age of 6.5 (Erickson, 2000). This theory led to the exclusion of many children from literacy intervention, as it was
felt that they did not have those readiness skills or prerequisite mental age, and therefore, could not learn to read.

However, emergent literacy theories began to develop in the 1970s, when Clay (1972) observed children's reading behaviors, seeing that literacy skills began to develop before and during the preschool years. In fact, in their definition of emergent literacy, Teale and Sulzby (1986) suggest that the cognitive work critical to literacy development begins at birth, and that children learn literacy skills through active engagement with materials. Instead of literacy skills developing in a standardized set and schedule of skills, emergent literacy theorists believe that literacy skills develop concurrently and interrelatedly, with increased skill in one set influencing skill in a different set (Erickson, 2000).

In the reading readiness perspective, the importance of the forms of print was highlighted, while in the emergent literacy perspective, the functions of print take importance (Erickson, 2000). The emergent literacy perspective allows for analysis of skills in both conventional measures (e.g. standardized testing) and unconventional measures (e.g. pointing to text, indicating answers through AAC, or clapping out syllables and sounds in a word), which allow for every child to demonstrate skill (Erickson, 2000). The understanding, that there are no prerequisites (e.g. mental age) for children to benefit from any meaningful interactions with text, allowed children with all abilities to be exposed to literacy (Erickson, 2000).
Finally, it is believed that these skills are influenced by both home literacy environments and parent child interactions, rather than being an event that only occurs during the school years (Wasik & Hendrickson, 2004; Sulzby & Teale, 1991). The early exposure to literacy materials that can lead to emergent literacy skills can be as simple as a shopping list, or as complex as a shared reading session with discussion of a story and the parts of a book. The amount and quality of home literacy experiences vary along a continuum, from having extensive exposure to literacy artifacts, to being from a low print home, where the value of literacy may be placed behind more immediate needs (Catts & Kamhi, 2005).

Cultural aspects may also affect the amount of literacy exposure. For example, Heath (1983) and Vernon-Feagans (1996) found that African-American families had a rich tradition of oral narratives, and parents routinely encouraged their young children to use those traditional oral narratives versus the use of printed stories.

**Components of Emergent Literacy**

Emergent literacy skills have two major components: print awareness and phonological awareness. Both have been identified as having strong correlations to later literacy skills (Bernhardt & Major, 2005, Justice & Pullen 2003; Boudreau & Hedburg, 1999; Roth & Baden, 2001, van Kleeck, 1998). For example, Bernhardt and Major (2005) found that
children who received a phonological intervention program as preschoolers significantly outperformed peers in a control group three years later on literacy skills, including spelling. In addition, they found that the children with impaired phonological memory, even after the intervention period, experienced delays in reading skills as compared with the control group and the intervention peers who did not have impaired phonological memory (Bernhardt & Major, 2005). Cheney (1992), in an investigation of three year old children, examined print concepts and phonological awareness in relation to literacy skills, and found strong positive correlations between them in the follow up study. While some authors have broken down these skills into smaller components (Whitehurst & Lonigan, 1998), these two major skills are most prominent in contemporary research.

Print awareness, also researched as written language awareness and print knowledge, refers to the understanding and development of forms of written language, including alphabetic forms, print organization, and print conventions (Ezell & Justice, 2005). Print awareness includes numerous skills, such as individuals' awareness of print in their everyday lives and environment, as well as understanding book and print orientation, or how print flows from left to right, top to bottom, and front to back. Print awareness also includes knowledge of letters of the alphabet, knowledge of how to use writing utensils and write their own name, and
understanding how units of language relate to each other (e.g. that sentences have words and spaces, and that letters make up words, Ezell & Justice 2005).

Print awareness incorporates writing and reading skills. While both are generally mastered in a similar order from child to child, there is no definitive stage between each skill. Theorist Yetta Goodman (1986) developed a list of five general stages of print awareness that include both writing and reading. The first stage begins around age two, and starts when children begin to respond and interact with print in their environment, such as "reading" logos or signs with the assistance of pictures. For example, a child may see a McDonald's sign and tell adults that they can read it, and that it says "happy meal." This child has made the connection between the sign and the action that occurs there. The second stage begins as children interact with print in a non-environmental way, such as recognizing print in storybooks or newspapers. They also begin to understand vocabulary concerning print, such as when a parent asks them if they want to pick a story to "read," and how to hold a book correctly.

The third stage in print awareness starts as children begin to experiment with print, such as "writing" their names or their own stories. In the fourth stage, children can use oral language skills that they have been developing to talk about print and written language. As their vocabulary
grows, children may have the words to describe print concepts (e.g. page, word, people, pictures, etc). Children also may begin to use more conventional writing symbols (e.g. copying letters or names more accurately). Finally, the most complex stage involves children demonstrating an advanced knowledge of writing and reading. Children begin to notice similarities between words and sounds. Children who have reached this stage are usually ready to begin more formalized reading instruction, as they can begin to understand more abstract concepts of print with their new found vocabulary and skills (Ezell & Justice, 2005).

The second component of emergent literacy is phonological awareness. Phonological awareness (PA) describes the child’s ability to both implicitly and explicitly recognize spoken language as having separate and reoccurring sound elements, smaller than a syllable, and that those sounds can be manipulated (Apel, Masterson, Niessen, 2004; Catts & Kamhi, 2005; Justice, Chow, Capellini, Flanigan, Cotton, 2003). Phonological awareness is vital for individuals learning to read (Torgensen, Wagner, & Rashotte, 1994; Whitehurst & Lonigan, 1998). Children with weak PA skills have difficulty understanding that words can be broken down into smaller segments, called decoding, a skill necessary for conventional reading (Leafstedt, Richards, & Gerber, 2004; Whitehurst & Lonigan, 1998; van Kleeck, 1998). Children who have stronger PA skills are
quicker to learn how to decode words than their peers who do not have strong PA skills (Whitehurst and Lonigan, 1998).

The development of phonological awareness encompasses different interrelated skills. These skills develop over an extended period, beginning with a child's earliest sound, word, and language play (Whitehurst & Lonigan, 1998). Phonological awareness encompasses different levels of difficulty, starting with shallower levels of skills (e.g. rhyme awareness, alliteration) and progressing to more difficult, deep processing skills (e.g. phoneme awareness) (Ezell & Justice, 2005; Justice, 2007).

Rhyme awareness, one of the earlier and shallower skills, is the ability to produce and recognize patterns of rhyme across different words (Ezell & Justice, 2005; Hempenstall, 1997). While rhyming awareness has not been strongly correlated with later reading skills, it does show a child's ability to notice structure of words and how they can relate, and is a precursor to phoneme awareness, a later developing PA skill (Ezell & Justice, 2005).

As early as three years of age, children develop alliteration awareness, or knowledge that two words share a common initial sound. As with rhyming, it helps children realize how language is organized, that sounds generally remain the same even in different words (Chaney, 1994; Ezell & Justice, 2005).
Word awareness, the ability to identify separate words in language (e.g., “the dog barks” has three words) also begins to develop quite early, and shows that children understand word boundaries, which can help later decoding skills and identification of individual words in print (Ezell & Justice, 2005).

Once a child has begun to develop knowledge of how individual sounds relate, they move into developing knowledge of syllables and phonemes. Syllable awareness, typically earlier developing than phoneme awareness, allows a child to identify the boundaries of syllables in spoken words (e.g. the word “bottle” has two syllables, “bot” and “tle”), and correlates to later phoneme-grapheme correspondence. Phoneme-grapheme correspondence is the knowledge that printed letters make certain sounds (e.g., the /f/ sound in the printed graphemes “f” and “ph”), another skill important in decoding and blending words (Whitehurst & Lonigan, 1998).

Phoneme awareness, the ability to identify a particular phoneme in a word (Justice & Pullen, 2003) is the final stage of phonological awareness. Phoneme awareness allows a child to focus on a single sound within a word, for example, identifying that the word “mat” begins with the sound /m/. Three sub-skills can reflect an understanding of phoneme awareness, from shallow to deep understanding. Segmentation is the breaking up of words into individual sounds, for instance, understanding
that the word “cat” has three sounds: /k/, /æ/, and /t/. Other words, such as those with consonant clusters (e.g. "stop") can be a challenge to segment, and that skill is usually not achieved until later (Ezell & Justice, 2005; Treiman, 1985). In this stage, children are able to identify that different individual sounds exist, but unable to identify them in isolation, such as asking them what “c-a-t” spells.

The next sub-skill, elision, is the ability to delete individual sounds within a word. For example, asking a child to say “meat,” then to say the word without the /m/, to form the word “eat” (Ezell & Justice, 2005). Elision is another developmental step towards phoneme awareness and is an early decoding skill. The final skill, called blending or substitution, entails a child taking individual phonemes and joining them together to form segments or words (Calfee, 1977). Blending can be recognized as a child attempts to “sound out” a word by slowly pronouncing each letter, then gradually connecting them together, or recoding the words (Whitehurst & Lonigan, 1998). This final skill is what demonstrates an individual’s knowledge of phonological awareness and grapheme-phoneme correspondence, in that graphemes can be put together to form printed words. While this skill may not always develop during the emergent literacy stage, it is an important part of literacy development as children begin to explore print and understand it independently.
Phonological awareness and print awareness come together to help children learn to decode printed words, through phoneme-grapheme correspondence (Ezell & Justice, 2005; Whitehurst & Lonigan, 1998). While advanced readers use "chunking" skills to break down words, beginning readers must decode sound by sound (Ezell & Justice, 2005). For example, a beginning reader may see the word "hearing" and decode the word by connecting each printed grapheme to its corresponding sound, while a more advanced reader may be able to break the word into two segments, "hear-" and "-ing."

The terms emergent literacy and pre-literacy have been used interchangeably, with some researchers contending that the term emergent literacy does not encompass phonological awareness or other print conventions (van Kleeck, 2004). For this paper, the term emergent literacy, encompassing phonological awareness as well as print convention, will be used, as it appears more often in literacy research. However, pre-literacy was also used as a key word in the literacy search in order to examine all available research. An appendix is available for the reader at the end of this work to reference applicable definitions for aspects of emergent literacy, as well as print and phonological awareness.
What Puts Children at Risk for Not Developing Emergent Literacy Skills?

Not all children develop the emergent literacy skills that are needed for conventional literacy later in life. Children who do not experience the exposure to print and literacy needed to develop emergent literacy skills often are at risk for reading disabilities later in life, and have difficulty catching up with their peers in later literacy skills. Children who do not develop the skills in the emergent literacy period must learn them at a later point, such as through an intervention program in the school years. (Catts, Fey, Zhang, & Tromblin, 1999, 2000; Juel, 1998).

Risk factors for not developing emergent literacy skills may fall under intrinsic or extrinsic circumstances. Intrinsic factors include those that are developmental characteristics of a child, such as general language impairment, hearing loss, or the child's temperament (Justice, 2007). While some aspects, such as language delay, may be addressed in various forms of therapy, other aspects, such as a reluctance to read, may never be addressed academically. Approximately 10% of children are reluctant readers (Teale, 1986), not wanting to participate in literacy activities due to lack of interest or prior failures (Canady & Krantz, 1996; Ezell & Justice, 2005).

Extrinsic factors are environmental circumstances, such as frequency of exposure to literary materials and the quality of those interactions. Extrinsic factors may be influenced by characteristics of
individuals in the child's environment, such as educational level of the primary caregivers, or socioeconomic status (SES) of the family. SES has been studied extensively in literacy development literature. In an examination of print concept awareness in four groups of children, Justice, Bowles, and Skibbe (2006) found that children from lower SES homes or children with language impairment scored lower than both children from middle SES homes and children from middle SES homes without language impairment. In addition, performance on PA measures for children has been shown to be influenced by SES (Chaney, 1994). Families with a low SES often have more immediate priorities, such as employment, monetary issues, or childcare, leaving less time for providing quality interactions with literacy artifacts (Justice & Ezell, 2001; Teale, 1986).

Finally, extrinsic and intrinsic factors may interact, causing a complex situation for educators and families. For example, a child with a hearing impairment, an intrinsic risk, in a family with caregivers who never finished high school, an extrinsic risk, may face extra difficulties in obtaining quality and a high quantity of literature exposure. Kamps, Wills, Greenwood et al. (2004) examined risk factors in kindergarteners and followed their academic progress through the second grade. Their screening looked for both academic and behavioral risk factors. By the end of second grade, the researchers found that children presenting with
a single risk, either academic (intrinsic) or behavioral (intrinsic or extrinsic), progressed more slowly than their peers without risk factors. Children with a behavioral risk factor performed better than their peers with an academic risk factor in reading fluency. Children with both academic and behavioral risk factors made the least amount of progress with therapy (Kamps, et al., 2004).

The risk factors above are not the only reasons why children fail to develop emergent literacy skills. However, they do give a good idea of what interventionists should be looking for during assessments. It is vital to remember that nearly 50% of children enter kindergarten with at least one serious risk factor (Rimm-Kaufman, Pianta, & Cox, 2000), putting those children at risk for a reading disability.

**Children Who Use AAC and Their Emergent Literacy Skills**

Augmentative and alternative communication (AAC) for children can be prescribed for a number of reasons. In a recent study of professionals in Pennsylvania who serve preschoolers, Binger and Light (2006) found approximately 14% of their caseloads used AAC in some form. The reasons for prescription of AAC and primary diagnosis of the children included developmental delay, autism, speech/language delays, multiple disabilities, deaf-blindness, and TBI. Cerebral palsy was the most frequently reported secondary disability (Binger & Light, 2006).
Of the subjects reported, many used more than one form of AAC, such as gestures and communication boards, or signs and voice output systems (VOCA). The authors concluded that a wide array of diagnoses may require AAC, and that many of the individuals have complex communication needs (Binger & Light, 2006).

Many of these children fall under the category of severe speech and physical impairments (SSPI). SSPI is defined as children who “have a severe speech problem that is due primarily to physical, neuromuscular, cognitive, or emotional deficits and not to hearing impairment, and who cannot, at the present time, use speech independently as their primary communication” (Koppenhaver & Yoder, 1992). Individuals with SSPI characteristically require the use of AAC for their everyday communication (Koppenhaver, Hendrix, & Williams, 2007). In addition, children with SSPI, especially those with severe cognitive involvement, often require greater time to learn and more supports to their environment (Westling & Fox, 2000). However, research centered on literacy learning for children who have SSPI is lacking, with most research centered on self-help or functional living skills. While those skills are very important, literacy learning is also important to allow all individuals the opportunities to achieve success later in life (Browder, Wakeman, Spooner, Ahlgrim-Delzell, Algozzine, 2006).
Children with SSPI who use AAC may not only face the risk factors to emergent literacy development as described above but must also face other barriers to emergent literacy skills. It has been recognized that children who use AAC, whether they rely on more low tech systems, such as The Picture Exchange Communication System (PECS) (Bondy & Frost, 1994), or high tech computer based systems, such as the Vantage Vanguard (Prentke Romich Company), Tango! (Ablenet™), or DynaVoxV (Dynavox Technologies), often experience difficulty in developing emergent literacy skills (Hetzroni, 2004; Koppenhaver & Yoder, 1992; Light & McNaughton, 1993). For example, Koppenhaver and Yoder (1992) found that the vast majority of individuals who use AAC cannot read or write at the most basic level. In addition, it has been found that of children with only physical impairments and not cognitive impairments, only 50% read at grade level (Berninger & Gans, 1986; Koppenhaver and Yoder, 1992), potentially due to access and different literacy instruction. Literacy instruction in special education settings has been examined and described as “inefficient” (Koppenhaver, Hendrix, and Williams, 2007), as little time is devoted to literacy activities which can be generalized to outside of academic settings (Koppenhaver & Yoder, 1992). In addition, children who do use AAC often compose their messages very slowly, and do so with great difficulty (Smith, Thurston, Light, Parnes, & O'Keefe, 1989),
putting them at a disadvantage compared to their peers without disabilities (Juel, 1998).

However, children who use AAC are often those who will require strong literacy skills most in their lives, due to physical and social barriers. For individuals who use AAC, literacy allows face-to-face communication, self-expression, and independence (Blackstone & Cassatt-James, 1988; DeCoste, 1997). For example, if they experience physical disabilities, careers in manual labor are often less accessible to them than their peers without disabilities, making literacy an extremely important aspect in their lives, providing possibilities for employment and social interaction (Light & Kelford Smith, 1993; Smith and Blischak, 1997).

Literacy for individuals who use AAC is not an impossible quest. Koppenhaver, Evans, and Yoder (1991) conducted a retrospective study of literate adults with motor impairments who utilized AAC. A variety of methods and modifications of literacy materials were discussed as effective in developing literacy skills for these individuals, helping to show that individuals with physical disabilities, such as CP, are capable of achieving typical reading skills. The most frequently reported methods that assisted individuals in achieving literacy skills included being read to as a child, being able to see the text when read to, and the social interaction involved in reading. In addition, modifications such as technological involvement, the change of print size, and the number of
available books were reported as beneficial to literacy learning. The two most common responses when questioned as to why an individual had achieved successful literacy skills were that the parents had high expectations, and the respondents own persistence at achieving reading success. In addition, school based literacy learning was reported by 38.1% of individuals as being an unhappy or frustrating experience, (Koppenhaver, Evans, & Yoder, 1991) highlighting the importance of literacy involvement at home, rather than only at school.

Children who use AAC can still develop the emergent literacy skills necessary for future conventional reading. PA skills are trainable, as shown by Van Kleeck, Gillam, and McFadden (1998). The authors examined PA in preschoolers with speech and language impairment, finding that a rhyming and phoneme awareness program improved skills compared to a control group. PA skills have also been trained in individuals with cognitive delays, as demonstrated in a study by Al Otaiba and Hosp (2004), who worked with children with Down syndrome. Through an individualized, 10 week program, three of the four individuals demonstrated gains in PA skills. In addition, shared reading to encourage print awareness is a skill that parents can generally learn and utilize with their children who use AAC with relatively few training sessions (Koppenhaver, Erickson, Harris, et al., 2001). Emergent literacy is an appropriate goal for all children, including those who use AAC, even if the
literacy experiences are qualitatively different (Koppenhaver, 2000; Koppenhaver, Coleman, Kalman, & Yoder, 1991).

In light of this knowledge, several theories as to why children who use AAC do not typically develop emergent or later literacy skills have been proposed in the research. One potential theory includes access issues, where children who use AAC do not have access to it during book reading or other communication interactions (Light & Kelford Smith, 1993; Pebly & Koppenhaver, 2001). When children who use AAC are involved in literacy activities, it can be difficult for them to utilize the materials as easily as their peers without disabilities. For example, if the materials require physical movements, such as reaching for a book or turning pages, or they do not have access to their communication devices during the story reading, which would not be an issue for children without disabilities (Light & Kelford Smith, 1993; Pebly & Koppenhaver, 2001).

Other authors hypothesize that motivational issues may affect emergent literacy. It can be frustrating for children to participate in literacy activities due to differences in communication. Continuous drills or reading materials that are not representative of the students' interests can make it difficult to achieve and maintain motivation, just as they can for their peers without disabilities (Nippold, Duthie, & Larsen, 2005; Pebly & Koppenhaver, 2001).
Finally, parental and teacher priorities for learning have also been explored. Light and Kelford-Smith (1993) examined the priorities of parents of children with physical disabilities who used AAC. They found that children who used AAC had less opportunity than their peers without disabilities to use printed materials and writing activities. Parents often rated immediate issues, such as feeding and toileting as more urgent issues that required their attention. For example, children in the AAC group often required three to four hours a day to eat, while children without disabilities only required 90 minutes (Light & Kelford-Smith, 1993). In addition, the ability to interact with individuals, especially with someone who may be reading to them, is limited by what is available for options in their AAC systems, which are generally controlled by adults in their environments with their own motivations (Light & Kelford-Smith 1993).

However, it has been shown that the cognitive processes involved in reading and writing are the same for children who use AAC and those who do not, and therefore, do not effect the acquisition of these skills (Koppenhaver, 2000). In addition, testing a child who uses AAC is difficult to determine, as standardized procedures cannot be followed and scoring norms are based on children without disabilities (Lacono, 2004). While some children who use AAC may experience cognitive involvement as a result of a disability, it is important to ensure that assessment of cognitive abilities extend beyond traditional measures of intelligence.
(Loyd, Fuller, & Arvidson, 1997). Finally, in an examination of intellectual levels in children with cerebral palsy, Koppenhaver, Pierce, Steelman, et al (1994) found that 50% of children with average or above average intelligence still experienced literacy difficulties. While cognition may play a factor in emergent literacy skills, one should not deny intervention due to those difficulties.

In general, children who use AAC typically receive a less consistent or limited literacy experiences in both the home and school due to the various barriers in place (Koppenhaver, Evans & Yoder, 1991; Light & Kelford-Smith, 1993; Light, Binger, Kelford-Smith, 1994). Light and Kelford-Smith (1993) surveyed parents of preschoolers who did and did not use AAC, and found that the parents of children who used AAC rated the activities required to achieve independence higher than reading and writing. Light, Koppenhaver, Lee, and Riffle (1992) surveyed parents and teachers of children who use AAC, and asked about priorities of literacy achievement. Similarly, parents rated literacy learning lower than self-help skills, while teachers rated communication and literacy higher.

Low expectations may have a self-fulfilling prophecy for children who use AAC, who may then have reduced exposure to literacy related activities (Light & McNaughton; 1993). All of these issues can influence augmented communicators' emergent literacy development, making it
difficult to achieve the same emergent literacy skills as their peers without disabilities.

**What Should Emergent Literacy Intervention Entail?**

Emergent literacy intervention for children who are at risk for not developing on track has been researched, and several evidence based approaches and techniques have been suggested. In 2004, the National Early Literacy Panel was formed to find interventions and practices that promote positive literacy experiences in preschool children. In reviewing research concerning emergent literacy skills, over 300 studies were analyzed to find correlations between early literacy experiences and later literacy skills. Five major areas were found to correlate: (1) oral language skills, (2) emergent writing, (3) alphabetic knowledge, (4) print awareness, and (5) phonological awareness (NELP, 2004).

In the realm of oral language skills, NELP cited the importance of a well-developed lexicon and ease of acquiring new words. In the area of emergent writing, they found that the representation of graphemes (knowledge of printed letters) was most correlated to later literacy skills. In alphabetic knowledge, receptive and expressive knowledge of letters, as well as rapid access to letter names have been correlated most strongly with later literacy skills. In the areas of print awareness and phonological
awareness, the skills, which were previously discussed, were found to be most correlated to later literacy skills (NELP, 2004).

In a review by Justice (2006), the author utilized the NELP (2004) information to lay out what an evidence-based intervention for emergent literacy should entail. Intervention practices should emphasize prevention and not view the child's status as disordered. In addition, intervention should address all five major targets based on NELP (2004) predictors of later literacy skills. Finally, interventions should use a variety of explicit instructional techniques (Justice, 2006).

For children who use AAC, many of these areas of emergent literacy practices could be difficult to achieve. For example, children who use AAC may have difficulty producing oral language, so their expressive lexicon must be developed with access to their device. Other children who use AAC may be able to use oral language, but have difficulty writing or participating in shared reading due to motor problems, such as independent page turning. In addition, phonological awareness may be difficult to obtain if their AAC systems do not have a method to encourage sound or letter play. While the use of voice output communication aid (VOCA) devices can help provide an individual with a "voice," it still may not allow a child to alter words or sounds as their peers who do not use AAC do. If a child uses a low-tech AAC device,
such as a picture board, their ability to sound play may be reduced further.

Therefore, emergent literacy interventions cannot be used without any adaptations for children who use AAC, and it is possible that entirely different methods of emergent literacy intervention for children who use AAC are necessary. No matter which course research takes, a cursory review shows that there is little available for emergent literacy intervention for children who use AAC in comparison with children who do not use AAC. This paper will review studies available for both populations, comparing evidence based practices and validity measures of emergent literacy instruction for children who use AAC and those who do not.

**Hypothesis and Conclusions**

As professionals, we are aware of the intrinsic (e.g. motor difficulties, motivation) and extrinsic (e.g. parental education, availability of literacy materials) factors that may place children at risk for acquiring emergent literacy skills and subsequent literacy (Justice, 2006). These risks are especially prevalent in children who use AAC, who face greater barriers to literacy acquisition than their peers who do not use AAC. However, individuals who utilize AAC often require future employment or educational environments that rely on literacy more than their peers who do not use AAC (Koppenhaver, Hendrix, & Williams, 2007). Additionally,
children who use AAC may often experience difficulty in developing emergent literacy skills (Hetzroni, 2004; Koppenhaver & Yoder, 1992; Light & McNaughton, 1993), leading to later difficulty in conventional literacy (Juel, 1998).

Evidence based research for emergent literacy instruction for children who use AAC is lacking. Cursory review reveals that most practices are based on studies of children without disabilities or children with language disorders who do not use AAC. However, one cannot assume that children who use AAC experience literacy learning in exactly the same ways as other populations do, as that mindset may encourage professionals to miss individual differences or adaptations (Koppenhaver, 2000). In order to provide the best services we must have appropriate and evidence based research on effective intervention approaches for emergent literacy instruction for children who use AAC.
CHAPTER III

PROCEDURES

Purpose

The purpose of this study was to provide a comprehensive review of literature related to emergent literacy instruction for typically developing children in relation to children who do not speak and use AAC as their primary method of communication. Information gathered will assist professionals in choosing appropriate, evidence-based emergent literacy intervention methods for children who use AAC. In addition, the information will provide researchers with knowledge of what is lacking in terms of evidence for emergent literacy intervention for children who use AAC.

Specific research objectives included:

- Identify/verify evidence-based practices for emergent literacy intervention for children who do not use AAC.
- Identify and evaluate evidence-based practices for emergent literacy intervention for children who use AAC.
- Identify gaps in research for emergent literacy interventions for children who use AAC.
Methods

To examine research available, a combination of peer reviewed journal searches and electronic database searches were completed. Electronic searches were conducted with various databases, including those indexed for the journal *Augmentative and Alternative Communication*. MEDLINE, CINHAL (Cumulative Index of Nursing and Allied Health), PsycINFO, ERIC (Educational Resources Information Center), Dissertations Abstracts International, and LLBA (Linguistic and Language Behavior Abstracts) were all searched using the same key words. Using the keyword index of *Augmentative and Alternative Communication*, hand searches were completed of the journal as well as other peer reviewed journals.

Key topic words and phrases were chosen based on prevalence in the research. The key words were chosen through an initial review of literature and definitions of early reading, with the most prominent terms chosen. Separate searches had to be undertaken for emergent literacy interventions, emergent literacy interventions for children who use AAC and emergent literacy in general. Searches were completed with individual key words and key word phrases. Some of the key words chosen were:

- Early literacy
- Emergent literacy
In order for studies to be included in the review, certain criteria had to be met. For those reviewing basic emergent literacy interventions and emergent literacy interventions for children who use AAC, the studies had to be published in English and published between 1975 and May of 2007. For the emergent literacy intervention for children who use AAC section, the studies had to include at least one participant who was exposed to a specific emergent literacy intervention technique. The study also had to include pre-intervention and post-intervention data in some form.

For the review of studies examining emergent literacy intervention for children who utilized AAC, the AAC device, either low or high tech, had to be specified. In addition, the specific technique for emergent literacy intervention had to be specified and corresponding data on effectiveness presented.

Once studies were located, they were each analyzed in terms of supporting levels of evidence. Research was analyzed on several dimensions, including internal, external, and social validity.
Internal validity is the extent to which alternative explanations of given results in an experiment are ruled out (Schaivetti & Metz, 20002). For example, by involving a control group in an intervention study, such as the one employed by Neuman and Roskos (1993), the authors ensured that parental involvement in a preschool program did not affect the intervention effects. External validity is the extent to which the results of a study can be generalized beyond controlled conditions and participants (Schaivetti & Metz, 2002). An example of external validity, as demonstrated by O'Connor, Notari-Syverson, and Vadasy (1996), was their examination of teachers ability to implement a phonological awareness program. By comparing the teachers successes with the success of the authors in implementing the same program, they were able to judge the external validity of the program. Social validity, ensuring that research and techniques used are socially acceptable to the public (Wolf, 1978), relates well to the third aspect of EBP, maintaining stakeholder's perspectives.

In order to accurately and consistently define levels of evidence, a rating hierarchy was applied (see table 1). Schlosser and Raghavendra (2004) designed this hierarchy specifically for individuals with disabilities. It allows for studies more applicable to individuals with disabilities to be rated higher than normally would by compensating for different group designs. For example, it includes more diverse single subject studies than
other proposed hierarchies. These designs are generally more available
and applicable to individuals with disabilities due to heterogeneous
populations (Schlosser & Raghavendra, 2004).

### TABLE 1

*Hierarchy of evidence to inform intervention development and selection: participants with disabilities*

<table>
<thead>
<tr>
<th>Rank</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Meta-analyses</strong></td>
</tr>
<tr>
<td>1a</td>
<td>single-subject experimental designs</td>
</tr>
<tr>
<td>1b</td>
<td>quasi-experimental group designs</td>
</tr>
<tr>
<td>2</td>
<td><strong>Non-randomized control trials (Non-RCTs)</strong></td>
</tr>
<tr>
<td>2a</td>
<td>One Non-RCT</td>
</tr>
<tr>
<td>2b</td>
<td>One SSED – one intervention</td>
</tr>
<tr>
<td>2c</td>
<td>One SSED – multiple interventions</td>
</tr>
<tr>
<td>2ai</td>
<td>Multi-group pretest-posttest design without control group</td>
</tr>
<tr>
<td>2bi</td>
<td>Multiple baseline design</td>
</tr>
<tr>
<td>2ci</td>
<td>Parallel treatments design</td>
</tr>
<tr>
<td>2a(ii)</td>
<td>Basic within-group design, crossover design, complex counter-balanced design</td>
</tr>
<tr>
<td>2bii</td>
<td>Multiple probe design</td>
</tr>
<tr>
<td>2cii</td>
<td>Adapted alternating treatments design</td>
</tr>
<tr>
<td>2a(iii)</td>
<td>Multi-group time series designs</td>
</tr>
<tr>
<td>2b(iii)</td>
<td>ABAB design</td>
</tr>
</tbody>
</table>
### TABLE 1 (continued)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ciii</td>
<td>Alternating treatments design</td>
</tr>
<tr>
<td>2aiv</td>
<td>Factorial designs</td>
</tr>
<tr>
<td>2biv</td>
<td>ABA design</td>
</tr>
<tr>
<td>2civ</td>
<td>ABACA/ACAB design</td>
</tr>
<tr>
<td>2av</td>
<td>Latin square designs</td>
</tr>
<tr>
<td>2bv</td>
<td>Non-concurrent multiple baseline design</td>
</tr>
<tr>
<td>2cv</td>
<td>A-B-BC-B-BC/A-BC-B-BC design</td>
</tr>
<tr>
<td>2avi</td>
<td>Posttest-only control group design, multi-group posttest only design</td>
</tr>
<tr>
<td>2cvi</td>
<td>ABAB design</td>
</tr>
<tr>
<td>2avii</td>
<td>Single-group time series design</td>
</tr>
<tr>
<td>2aviii</td>
<td>Separate sample pretest-posttest design</td>
</tr>
</tbody>
</table>

### Non-meta-analytic reviews

3a Quantitative reviews that are non meta-analytic

3b Narrative reviews

### Pre-experimental designs

Pre-experimental group designs (e.g., one-shot case study, one-group pretest-posttest design, and the static group comparison) and single-case studies (e.g., AB designs, case studies)
The studies that have been analyzed will be discussed and compared using the rating hierarchy. Procedures followed in the studies will also be examined for evidence. Information gathered will assist investigators in future studies in examining gaps in research between emergent literacy intervention and emergent literacy intervention for children who use AAC.

TABLE 1 (continued)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td><strong>Non-experimental designs</strong></td>
</tr>
</tbody>
</table>

Research in emergent literacy has centered on three primary approaches: adult-child shared storybook reading, literacy enriched play settings, and teacher directed explicit phonological awareness instruction (Justice and Pullen, 2003; International Reading Association and the National Association for the Education of Young Children [IRA & NAEYC], 1998). Each of these areas are thought to play vital parts in emergent literacy skills.

Adult-child shared storybook reading is one of the most researched methods of emergent literacy intervention (Bus, Van Ijendorn, & Pellegrini, 1995; Justice & Pullen, 2003). While providing access to storybooks to children has resulted in increased alphabetic knowledge and print concepts (Neuman, 1999), the quality of the experience is also very important to the benefits derived (Justice & Pullen, 2003). In addition, Flood (1977) found that a child’s behaviors during shared book reading correlated with developing reading skills, such as total number of words.
spoken, the number of questions answered by the child, and the number of questions asked by the child. Two types of adult-child shared storybook reading have been identified in the research, dialogic reading and print referencing.

**Adult-Child Shared Storybook Reading: Dialogic Reading**

Dialogic reading was first described and studied by Whitehurst and colleagues (1988), and refers to the adult in the dyad or group using interactive behaviors to direct children's attention to words, pictures, and actions on the page (Whitehurst & Lonigan, 1998). For example, instead of a child listening passively to a story read to them by an adult, the adult becomes the listener, probing for information, asking questions, and prompting interaction (Whitehurst & Lonigan, 1998). This technique is designed to increase children's participation and to create a dialogue between reader and child. The adult should continually encourage the child to say just a little more than they naturally would. This scaffolding technique, based on the principle of zone of proximal development (Vygotsky, 1978) is thought to accelerate development in children's language skills (Zevenbergen & Whitehurst, 2003). The zone of proximal development involves developing skills that a child can complete with assistance, having not yet mastered (Vygotsky, 1978). For example, a child who is learning how to brush their teeth may need an adult to help guide them if they forget a step in the sequence. While this is a simplified
example, it applies to language as well. When a child is learning to speak, they may produce an approximation of a word (e.g. "baba" for baby) and the parents may interpret it for them (e.g. “oh, you want the baby”). While this technique has been studied extensively in improving other language skills, such as vocabulary and mean length of utterance, the effects on emergent literacy skills are less known (Crain-Thoreson, C., Dale, P.S., 1999; Justice & Ezell, 2004; van Kleeck, Woude & Hammett, 2006; Whitehurst, Falco, Lonigan, et al., 1988; Whitehurst & Lonigan, 1998).

Whitehurst, Epstein, Angell et al. (1994) examined the use of a dialogic reading intervention combined with a phonological awareness program in Head Start Centers in New York. A total of 167 four-year-old children were randomly placed into intervention and control conditions in their classrooms. Children were pre-tested before the beginning of intervention. Post-testing included the same tests, with varying forms if available. Graduate students who were blind to the intervention completed all testing.

Intervention included two major components, the first being an interactive book reading program for children at home and at school based on dialogic reading principles. The program called for small group reading in the classroom and one-on-one reading at home. Parents and teachers were trained using the same video (Whitehurst, 1992), which was followed with a brief role-playing session and discussion. Eventually, 89%
of primary caretakers underwent training. The authors provided a lending library of 30 different books to be rotated throughout the school year. Each book was altered with prompts for appropriate questions to ask the child as the book was read. By rotating the books through the seven classrooms, each child had the opportunity to take each book home.

The second portion of the intervention was the implementation of an adapted program, Sound Foundations, which is a phonemic awareness curriculum developed in Australia (Byrne & Fielding-Barnsley, 1991b). The program began halfway through the school year and dialogic reading intervention. Teachers introduced seven consonant sounds (s, m, p, g, l, t, sh) and utilized each in activities throughout the week. The activities focused on using the sound in the initial and final positions of words. To check on compliance, teachers filled out weekly logs indicating activities completed, and parents filled out questionnaires regarding the books that were sent home to the children.

The results of this combination program indicated that girls performed better than boys in reading factors. In addition, all children in the intervention group performed at a significantly higher level in writing and print concepts than those in the control groups. There were no significant differences in language and linguistic awareness. While there was a phonological portion to the intervention, an effect was not seen on children’s phonological awareness.
In terms of levels of evidence, the internal validity rated at a 1b level on the Schlosser and Raghavendra (2004) scale, as a quasi-experimental group design. Assignments of children to classrooms was randomized for control and intervention, and pre- and post-test information was completed on each child. External validity proved to be high, as the procedure was easy to teach and relatively inexpensive. Social validity may be more difficult to replicate, as parents were paid to participate in surveys, and teachers reported some resistance to change in the curriculum.

Fielding-Barnsley and Purdie (2003) based their own dialogic reading study on Whitehurst et al's (1994) work, and applied the concept to a home based program. Their study examined a dialogic reading program with a group of at risk children in the year prior to formal schooling, and compared their results to a control group. Twenty-six children took part in the intervention group, comprised of 9 girls and 17 boys with a mean age of 70.2 months. The children came from 17 different schools, and were nominated by families who were judged to be at risk. The authors defined a child at risk if one or more members of the family experienced a diagnosed reading disability. The control group was taken from three of the 17 intervention schools, and was composed of twenty-three children, six girls, and 17 boys, with a mean age of 70.6 months. The control and intervention groups were matched based on
initial testing. The first round of testing, occurring before the intervention began, included *The Peabody Picture Vocabulary Test* (PPVT-III) (Dunn and Dunn, 1997), *Concepts about Print Test* (CAP) (Clay, 1979), as well as tests measuring phonological awareness and rhyme recognition. The CAP measures knowledge of print concepts.

Intervention began with a meeting at the families' homes. The families were shown a video depicting good dialogic reading practice, designed by the author in a previous study (Fielding-Barnsley, 2000). The families also received written directions in the form of an instructional pamphlet. Once they had reviewed the information, the families received a selection of eight picture books and a record keeping form to help keep track of data. The authors requested that the families read each book with their child at least five times during the eight-week intervention. The average readings per book at the end of the intervention was 6.5, easily meeting the requested amount. At the end of the intervention, the groups were administered the same tests as before, with the addition of a spelling and formalized reading measure.

The results of testing revealed that the intervention group had significantly higher scores on the final consonant scores and the CAP. While the authors concluded that a dialogic reading intervention from home would be advantageous to children who are at risk for reading disabilities, some cautions need to be taken in interpreting the results. The
groups were relatively small, which may make levels of significance artificially elevated, and difficult to judge (Cohen, 1988). However, the authors followed the intervention group to analyze carryover and found that they were ahead of the control group in tests of reading and spelling a year later (Fielding-Barnsley & Purdie, 2003).

In terms of validity, this study rates at a level of 2ai on the Schlosser and Raghavendra (2004) scale, or a multi-group pretest-posttest design without control group. The groups were not randomized, and parents recruited their own children. In addition, the small sample size and repeated testing may have affected the results. However, in terms of external and social validity, the study rates higher, as it is inexpensive to implement and easy to instruct parents on the techniques (Fielding-Barnsley & Purdie, 2003).

In summary, dialogic reading appears to be an appropriate shared reading intervention that can positively influence emergent literacy skills of children, and has been found to be appropriate for families from all SES levels (Zevenberg & Whitehurst, 2003).

**Adult – Child Shared Storybook Reading: Print Referencing**

Print referencing refers to an adult’s use of nonverbal and verbal cues to direct a child’s attention to the referent (Justice & Ezell, 2004). Nonverbal cues include pointing or tracking while reading, and verbal cues include asking questions, commenting, or making requests centered
on the print (Justice & Ezell, 2004). The theoretical basis for print referencing is similar to that of dialogic reading – that children’s skills are developed through assistance from the reader, typically the parent (Justice & Ezell, 2004). This perspective is similarly derived from Vygotsky’s theories (1978, 1986), and was exemplified by Justice and Ezell (1999). They feel that emergent literacy, as well as other developmental skills, follows two stages: a social interactive stage, and then an internal stage (Justice & Ezell, 1999). It is felt that the print referencing by an adult helps to scaffold information from the social interactive stage to the internal stage by helping the child understand why these concepts are important, and then gradually reducing input as the child internalizes the skills (Justice & Ezell, 1999, 2004). As print referencing is instructional in nature, cues to referents should be in the child’s zone of proximal development, (Justice & Ezell, 2004). Therefore, each cue should be tailored to the individual child, and can be explicit or implicit.

Lovelace and Stewart (2007) examined the use of explicit print referencing cues in three and four year olds during speech and language intervention and its effect on print awareness. Children who had IEP’s which specified semantic goals were identified by school SLP’s. The children met qualifying criteria including normal corrected vision, hearing abilities within normal abilities, and the ability to attend to a task for at least 30 minutes with appropriate reinforcers. Eleven children were found,
and then were administered the Concepts of Print Assessment (CPA) by the first author. The CPA is an adaptation of Clay’s (1979) Concepts About Print task, and measures knowledge of print concepts. Children had to score below 35% accuracy on this test to be included in the intervention. Five children returned consent forms and completed the entire intervention.

Intervention took place over a period of 13 weeks in the spring. All of the children had IEPs which called for 30 minutes two times a week of speech language therapy in class. Once baseline information was gathered two students began intervention while the rest remained at baseline. Probes were administered every four intervention sessions, and when a student in the intervention met the criteria of six concepts learned, another student was brought into the intervention group.

For children in the experimental condition, treatment included explicit, scripted input on concepts of print in addition to their targeted IEP concepts. The script included 20 print related concepts found on the CPA. Probes from the CPA were conducted every 4 sessions. The same storybooks were used for each child, with a different story per week. To measure reliability, the second author conducted procedural reliability for 23% of the sessions. The reliability rating was found to be at 100% for the baseline sessions and 96% for the experimental sessions.
Due to the high variability in number of probes conducted for each participant, analysis is difficult to complete. In addition, participants were involved in the experimental condition for variable amounts of time, and performance varied from 35% to 80%. However, the number of correctly identified concepts per session increased for each child, and the number of incorrectly identified remained level throughout. The author concluded, while identifying the limitations of the study, that the use of non-evocative, explicit print referencing cues would facilitate print concept knowledge. However, the limitations of the study may interfere with the results. Many of the students experienced numerous absences and were administered the same testing probe each time, possibly leading to a learning curve. Finally, the author completed all the interventions, possibly violating reliability.

In terms of the Schlosser and Raghavendra (2004) scale, this study was technically a single subject, multiple probe design, rating at 2bii, as the children were evaluated individually, and as a group. In addition, the children were recruited by SLP’s who were familiar with the children, and served as their own controls, which did not account for personal growth.

In a second examination of print referencing, Justice and Ezell (2000) examined the use of parent directed print referencing behaviors during shared book reading, and how those behaviors influenced the word and print awareness skills of preschoolers with typically developing
skills. Twenty-eight parents were recruited through the use of fliers advertising the study posted at daycares, preschools, and libraries. Sixteen girls and twelve boys were found, and all passed two major criteria to be included in the study: passing a hearing screening at 25dB and a score of 85 or higher on the PPVT-R (Dunn & Dunn, 1981) and the Expressive One-Word Picture Vocabulary Test – revised (EOWPVT-R; Gardner, 1990). At the start of the study, the mean age of the children was 3;11, and at the conclusion, the mean age had increased to 4;6.

Children were placed into either a control group or an intervention group based on matching qualifications on the PPVT-R and EOWPVT-R. Once children were placed into groups, a non-specified early literacy test containing five subtests was administered as a pre-test measure. An additional pre-test measure was a videotaped recording of the parents reading to the child.

The experimental group received training in print referencing behaviors in their home. They watched a video showing appropriate behaviors and had the opportunity to practice and receive feedback. Once the training was completed, they were provided with eight children's books and instructions on frequency of reading. Specifically, they were to read two books, four times per week. Parents in the control groups received the same books, but did not receive any training and were asked to read them as they normally would to their children. At the
end of the four week home program, the dyads returned to complete post testing which included a second video taped session, and the same early literacy assessment.

Results of the intervention group showed that parents significantly increased their usage of print referencing behaviors. For children's emergent literacy skills, they found significant increases in three areas: words in print, print concepts, and word segmentation. In addition, all children performed well on the pretest of alphabetic knowledge, which may have indicated a ceiling effect for growth in that area. Finally, all children increased skills in print recognition, which were the largest gains for both control and intervention groups at post-test. The authors concluded that regardless of exposure to print referencing behaviors, exposure to print through repeated readings increased a child's ability to recognize contextualized print.

In terms of the Schlosser and Raghavendra (2003) scale, Justice and Ezell (2000) ranked as a 1b, as the groups were randomized and received pretest and posttests. However, it is important to remember that dyads were recruited through parents, and no longitudinal effects were studied. Overall, it was a study that rated high in internal validity and external validity, as the training was not extensive or expensive, and was socially appropriate for this age group.
**Literacy Enriched Play Environments**

Play is a natural setting for young learners at home and at school. Social scientists who research early childhood classrooms suggest that the variety of materials (toys and writing materials) and settings (inside, outside, play groups, and activity specific centers) exert a strong pull on nature and quality of children’s play (Vandenberg, 1981). With this information, and by observing children’s dramatic play with literacy based activities (Schrader, 1990), hypotheses have been formed concerning the importance of those artifacts in emergent literacy (Christie & Enz, 1992; Roskos, 1988). In addition, a child’s ability to recognize print from familiar products in their environment (Mason, 1980), while not considered true reading (Masonheimer, Drum, & Ehri, 1984), is thought to be an important precursor to full literacy skills (Goodman, 1986). Children use these skills as they begin to recognize text in their environment and extrapolate meaning with the support of social cues and interaction (Schickedanz & Sullivan, 1984).

In addition, it is hypothesized that the manner in which children use objects in their environment may reflect how they create symbols. This leads to how those symbols become representational of the events to which they correspond (Werner & Kaplan, 1963). Researchers hypothesize that a natural play environment with a variety of literacy artifacts can offer these contextual uses and exposure to literacy, enhancing emergent
literacy development (Teale & Sulzby, 1987). These play related literacy activities, while they may not resemble conventional reading, can help develop emergent literacy skills and allow them to experiment with these skills (Masonheimer, Drum, & Ehri, 1984). In play, children are free to experiment with new items without restriction, to explore what they may do, and how they may be used in play. In addition, during play children can be around literacy items without pressure to perform, which may cause unnecessary stress or a dislike of the item.

Neuman and Roskos (1992) examined the use of a literacy enhanced play environment in spontaneous free play, and how that setting influenced the frequency and duration of literacy demonstrations. Ninety-one preschoolers, 3 to 5 years of age, and enrolled in two different day care centers were the subjects of this study. Both daycares were run by the same individual and utilized similar learning areas and activities. Day care centers were randomly placed into intervention and control groups. The control group kept their play and activity areas as they were, and the intervention group added literacy artifacts to all existing centers and added a completely new center, the dramatic play office.

Prior to starting intervention, both groups were videotaped and interactions coded for literacy play. Within 3 months, a mid-enrichment videotape session occurred, and 3 months later, a final recording session occurred. In each session, the number and variety of literacy based play
frames were tallied and coded into verbal and nonverbal literacy interactions. These final transcriptions were used for data collection and result analysis.

Results of the study indicated that children in the intervention group handled, read, and wrote significantly more frequently than those in the control groups. In addition, children in the intervention group engaged in 10 times the amount of literacy based play than their peers. The effect of the new objects was maintained late into the enrichment period, after novelty effects wore off. Finally, children in the intervention group used literacy objects in a more contextual manner than their peers, such as "to write valentines, to record library rules, and to write down directions" (Neuman & Roskos, 1992). The authors concluded that "deliberate enrichment of the play environment with familiar literacy objects in equally familiar contexts of literacy use enhanced young children's literacy activities in play" (Neuman & Roskos, 1992).

A second study by Neuman and Roskos (1993) once again examined the use of play environments in emergent literacy development, and added the variable of adult involvement. The authors wished to examine how two different styles of adult mediation in an office play setting affected differences in environmental and functional print knowledge. Subjects included 177 children from eight different Head Start classrooms, who were divided into three different groups. One group
served as a control group (N = 37), one group had parents of children serving in the play area to assist the children in their play (N = 65), and the last group had parents in the play area. The latter were there to only mediate if necessary, and not to directly interact with the children (N = 65). Pre-testing of each group was completed with the Test of Early Reading Ability (TERA; Reid, Hresko, & Hammill, 1981) with no significant differences in reading behaviors found (Neuman and Roskos, 1993).

Prior to the start of intervention, observations were made of the children's play behaviors, six times over two days. Once children were observed, intervention began, and each intervention room had a new play office area with literacy-enriched materials. In the first control group, parents were trained how to interact with the children and assist them in their literacy related play. In the second group, the parents helped to monitor the new area, occasionally cleaning or reorganizing, avoiding direct involvement unless necessary. The control group experienced no changes to their environment. The intervention was carried out for 5 months, during which 7.5 hours of videotaped observations were conducted. At the end of the intervention period, each child's spontaneous play was observed again. Each child was also administered environmental word reading and functional print tasks.

At eight weeks, the data revealed that children in the first group, with adult intervention, spent a significantly greater amount of time
involved in literacy related activities. This outcome extended over the five-month period of intervention, with the authors concluding that any novelty effects would have worn off.

By the end of the intervention, they found that the new office play setting, with or without adult involvement, increased environmental print knowledge. In addition, the group with adult involvement showed the most significant gains in environmental print knowledge. However, neither of the intervention groups scored significantly different than the control group on functional print tests.

Both of these studies (Neuman and Roskos, 1992; 1993), rated on the Schlosser and Raghavendra (2004) scale for validity, as posttest-only control group designs. Both studies were randomized and had control groups; however, neither reported posttest data that correlated with pretest data. While the number of literacy interactions was tabulated for both pre- and post-test data, a controlled examination did not take place. As for external and social validity, both were acceptable. In each case, novelty effects were controlled for. In addition, neither study would be extremely difficult or expensive to undertake. However, in some social situations, the use of an "office" may not be wholly appropriate. For example, an "office" setting may not be the most suitable setting for some individuals. The authors themselves concluded that a more culturally conducive area, such as a grocery store, might offer the adults...
similar opportunities to build on children's literacy levels (Neuman and Roskos, 1993). However, in general, the intervention settings were generally appropriate for the study and for further examination.

**Teacher Directed Explicit Phonological Awareness Instruction**

Phonological awareness is the ability to blend, segment, rhyme, or in other ways manipulate the sounds of spoken words (Apel, Masterson & Niessen, 2004; Catts & Kamhi, 2005; Justice, Chow, Capellini, Flanigan & Colton, 2003). Phonological awareness (PA), specifically blending and segmenting, is vital for individuals learning to read, as it allows readers to understand and be aware of the internal structure of words (Lundburg, Frost & Petersen, 1988; Torgerson, Wagner, & Rashotte, 1994; Whitehurst & Lonigan, 1998). For a review of phonological awareness terms, please see the appendix at the end of the paper.

Lundberg, Frost, & Petersen (1988) completed one of the earliest examinations of explicit phonological awareness intervention, studying if phonological awareness can be developed before formal reading instruction. In the author's home country, Denmark, children did not typically start formal literacy education until seven years of age; therefore, using a new program to examine phonological awareness was possible as there would be no confounding variables. After following a formal and structured phonological awareness curriculum over a period of 6 months in preschool, the authors did post tests at the end of first and second
grade. Compared with a control group, the intervention group did significantly better on reading and spelling than their controls. This successful separation of phonological awareness curriculum from emergent literacy intervention indicates there is potential in phonological awareness intervention for young children in preschool and kindergarten to improve PA skills (Ehri, Nunes, Willows, et al. 200; Lundberg, Frost, & Petersen, 1988).

However, in a 2005 survey of 273 Head Start preschool teachers, Hawken, Johnston, & McDonnell (2005) found that phonological awareness was the least frequently used emergent literacy strategy addressed in classrooms. When phonological awareness was used, there was more focus on rhyming and alliteration, and not on blending and segmenting, which are the most predictive skills of later literacy success (Juel, 1988; Lundberg, Frost, & Peterson, 1988). A formal, comprehensive phonological awareness curriculum can lead to more consistent and explicit phonological awareness skills in emergent readers, especially as spontaneous transfer of trained phonological awareness abilities to untrained abilities is rare (e.g., Slocum, O’Connor, & Jenkins, 1993).

Three prominent programs are commercially available and have been researched: Stepping Stones to Literacy, Sound Foundations, and Ladders to Literacy. More informal interventions that utilize some phonological awareness skills are available. However, these programs will
not be included, as they only use some of the PA skills necessary for reading, rather than acting as a cohesive program. These programs may prove valuable for some children who only need assistance in those skills, but will not be included in this review.

_Stepping Stones to Literacy_ (Nelson, Cooper, & Gonzales, 2004) is an emergent literacy curriculum designed to build on the main features of emergent literacy. One of its key strengths is that the number and frequency of lessons is short, and it is not obtrusive to the regular curriculum (Nelson, Benner, & Gonzales, 2005). Nelson and associates (2005) used thirty-six children, who were drawn from high-risk elementary schools in a Midwest city, to serve as subjects. Children were nominated by their teachers, and were screened in three stages to identify students who were at risk for reading and behavior problems as well as phonological awareness problems. Children were randomly assigned to control and intervention conditions. Tutors were trained in the _Stepping Stones_ protocol and administered each of the 25 lessons in school. At post-testing, children involved in the intervention condition showed significant growth in phonological awareness skills relative to those in the control condition (Nelson, Benner, & Gonzales, 2005)

While this study did reveal positive effects on phonological awareness growth, there are some limitations to validity to be taken into account. The authors of the program designed and ran this study, which

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may indicate some validity issues, as they knew what results would be needed for success. While they hired tutors to administer the lessons, those tutors were also trained by the authors, so they may not have necessarily been blind to the needs of the study. However, overall validity was supported by the use of a randomized control group, and the study rated at a level of 1b on the Schlosser and Raghavendra (2004) scale.

Ladders to Literacy (O'Connor, Notari-Syverson, Vadasy, 1998) is a comprehensive emergent literacy intervention that is available in preschool and kindergarten editions. Various authors have analyzed the efficacy of the phonological awareness portion of the program. O'Connor, Notari-Syverson, and Vadasy (1996) examined the program in three groups of kindergarteners: those with disabilities (N = 31), those without (N = 57), and those who were repeating kindergarten (N = 19). Each group of classes were placed into treatment or control conditions.

Research assistants completed pre-testing in the beginning of the kindergarten year. The children completed the PPVT-R and various phonological measures examining syllable deletion, blending, segmenting, rhyming, and identification of sound positions. They also completed the letter word identification and dictation subtests of the Woodcock-Johnson Tests of Achievement (WJ: Woodcock & Johnson, 1990). Teacher training began the first week in December and continued every three weeks through May with in-services. At these sessions, staff
learned to conduct the same activities in each classroom at the same pace all year. The authors also visited each classroom at least weekly and provided suggestions and cues to the staff.

The class staff provided intervention, and the phonological activities consisted of at least 25 different activities over six months. In the first two months, activities were aimed at stimulating word and syllable awareness. In the third and fourth months, the activities aimed at stimulating rhyming, first sound isolation, and blending with the use of Elkonin boxes (Elkonin, 1973). The last two months letters and sounds were added to the program. Teachers kept logs to help measure fidelity, or how well they continued with the designed program. The control classrooms used the same district-wide reading program originally in place. Post-testing took place in May by a research assistant who was blind to the status of each child.

The results of this study were analyzed in relation to the three original groups. Significant effects were observed for treatment groups in both blending and segmenting, but not for syllable deletion. However, group effects were found. The children without disabilities generally scored highest, followed by repeating kindergarteners, and last by children with disabilities. In addition, while children with disabilities did show significant improvements in phonological abilities and reading measures, they did not reach the levels of their peers without disabilities. However, children
across abilities made significant gains on skills as compared to their peers in control groups.

In terms of validity, this study equaled a level of 2a on the Schlosser and Raghavendra (2004) scale. The groups were not randomized in their placement; however, controls were made for equivalent classrooms. Teachers reported that most of the activities were appropriate for their children. However, some teachers skipped some of the "lower level" activities that they felt were inappropriate for certain children, which may affect the validity. In general, the activities were socially appropriate and easy to implement.

A second study involving Ladders to Literacy was completed by Fuchs, Fuchs, Thompson, et al. (2001), and examined the use of the program in combination with a decoding protocol, without the decoding, and with a control group. The decoding program was an initial evaluation of the Peer Assisted Learning Strategies (PALS) program. The PALS program had been studied in grades 1-5 (Fuchs, et al., 2001) and the authors of this program wanted to see if this program may strengthen kindergarteners early reading development by teaching decoding skills in addition to the phonological awareness skills taught in Ladders to Literacy.

A large number of students were recruited (N = 404) and randomly placed in their classrooms to different treatment groups. One group received just the Ladders intervention, one was called Ladders + Pals, who
received the ladders program and the PALS program, and the final group was a control group. Four of the eight schools were Title I, and four of the schools were not. Teachers initially attended a full day training session that gave the background for the study and program. Ladders + Pal groups received an additional half day training session. Staff members conducted the trainings, and then visited each teacher twice a week at the beginning of the study, then once a week near the conclusion. These visits were to help teachers through questions or difficult activities and help gather data on fidelity and frequency of treatment.

In comparing the teachers’ usage of the programs, the authors found that seven out of the 11 Ladders’ teachers used the program as a supplement to their curriculum, while only one of the 11 Ladders + Pals teachers used the programs as a supplement, the rest substituting the programs for their traditional language arts time. The students’ results were evaluated at post-testing the next year. The authors found that the Ladders + Pals and the Ladders groups made significant gains in phonological awareness skills, and the Ladders + Pals group made additional significant gains in alphabetic measures. The authors concluded that the use of phonological awareness training along with a decoding program strengthens phonological awareness training alone. However, a comprehensive phonological awareness curriculum has a
positive influence on emergent literacy skills (Fuchs, Fuchs, Thompson, et al., 2001).

In terms of validity, the study rated as a 1b on the Schlosser and Raghavendra (2004) scale, as the groups were controlled and randomized and pretest as well as posttest data were reported. However, the group raters did not conduct interrater reliability measures, and testers were aware of treatment groups. Finally, as only portions of the Ladders to Literacy program were used in each class, a whole effect is impossible to tell. However, in general, the intervention program Ladders to Literacy did show positive and significant effects on phonological awareness skills (Fuchs, Fuchs, Thompson, et al., 2001).

*Sound Foundations* (Byrne & Fielding-Barnsley, 1991) is another phonemic awareness intervention curriculum, and includes letter knowledge as well as phonemic awareness interventions. The authors hypothesized that the ability to segment phonemes, such as removing the /f/ from “fall” produces the word “all,” does not necessarily indicate that a child has knowledge of the identity of that sound (Byrne & Fielding-Barnsley, 1990). They felt that both knowledge of orthographic code is needed in addition to phonemic awareness for acquisition of alphabetic principles for emergent literacy. Therefore, their program focuses on nine key phonemes, which are illustrated and placed on large pictorial posters throughout the room. In addition, the nine key phonemes and remainder
of phonemes are presented on worksheets and card games (Byrne & Fielding-Barnsley, 1990; 1991).

Byrne and Fielding-Barnsley completed a three year study following children who received the Sound Foundations program while enrolled in preschool. The authors then completed follow-up testing at kindergarten, first, and second grades. In this examination, 126 children were sampled from four different preschools, with 64 in the experimental group and 62 in the control. Based on equivalent mean scores on the PPVT-R, the CAP, rhyme recognition, an examination of common environmental signs (such as Exit and McDonalds'), letter identification, and phonemic awareness, the children were randomly placed into control and intervention groups. The intervention groups were trained in the Sound Foundations program for twelve weeks, and the control group received 12 weeks of a semantically based literacy program. The post-testing consisted of the same pre-tests and included a reading of key words test.

The results of the 12-week intervention found that children in the intervention group showed a substantial overall performance increase in phoneme identity and awareness. In addition, the children in the experimental group scored higher on specific phonemes that were not focused upon during the intervention period. In the 1-year follow up, several children left both groups, leaving 63 in the experimental group and 56 in the control group (Byrne & Fielding-Barnsley, 1993). In addition,
children had dispersed to 19 different classes and any additional control measures were lost. The authors conducted six follow up tests: phoneme identity, elision, alphabet knowledge, word identification, pseudo word identification (decoding), and spelling. Once again, the experimental group received significantly higher scores than the control group on phonemic awareness tasks, specifically in decoding. In addition, the children in the control group scored significantly higher in reading comprehension.

The authors also conducted a final two and three year follow up (Byrne & Fielding-Barnsley, 1995), which corresponded with the end of first and second grades. The results were consistent with the direct results and the first year follow up in that children in the experimental condition were superior in decoding and in comprehension. The children in the experimental group also demonstrated modest effects on training of regular words.

In addition to the follow up study, the authors examined the effects of the Sound Foundations program as administered by the preschool teachers working from the manuals. The teachers were found to follow the manual in a moderate fashion, following some of the lessons but ignoring others. In addition, the post-testing took place over a longer period than in the original experiment (Byrne & Fielding-Barnsley, 1990). Post-testing and surveys of the work completed found that children in the
experimental groups showed significant improvements in phonemic awareness. However, they did not achieve the same level of results as the first experiment. The authors concluded that the program would be effective for teachers to utilize in preschool programs, with future focus on teacher training.

The initial program with its two additional follow up studies rated as a 1b on the Schlosser and Raghavendra (2004) scale. The groups were controlled and randomized well. While they could not have controlled the future movements of students, they used conservative statistical techniques in analyzing the data. The second study examining teacher involvement (Byrne & Fielding-Barnsley, 1990) showed that the external and social validity were adequate, and did not violate any social norms. However, more teacher training in order to follow the program’s protocols were recommended by the authors to obtain significant results for the children (Byrne & Fielding-Barnsley, 1995).

Whitehurst, et al. (1994), which has been previously reviewed, also utilized the Sound Foundations (Byrne & Fielding-Barnsley, 1991a) program in conjunction with a dialogic reading program. While the data on the utilization of the Sound Foundations program was mostly anecdotal, most of the teachers involved utilized a majority of the activities, posters, and worksheets. In addition, the time requirements of the program were minimal at about 45 minutes per week. However, some teachers
reported that they did not use the materials that they personally felt appropriate and often skipped activities or created their own. While this program usage was part of a larger study, and no formal statistics were available, the authors concluded that the inclusion of a phonological awareness program was a valuable portion of an emergent literacy program.

Emergent literacy intervention for children who may be at risk for developing literacy disabilities and who do not use AAC has been widely researched. These studies help to bolster our use of EBP in our decision making process for emergent literacy intervention, allowing SLP’s and other educators to choose efficacious and effective interventions (Justice & Pullen, 2003). While some areas, such as specific phonemic awareness approaches, and the focus of shared reading, may still have topics to discuss and research, evidence has been found that intervention can help children develop emergent literacy skills and those skills can later transfer to conventional literacy.
CHAPTER V

EMERGENT LITERACY INTERVENTION FOR CHILDREN WHO USE AAC

Children with severe speech and physical impairments (SSPI) who require the use of AAC may experience literacy in a substantially different way than their peers without disabilities (Koppenhaver, Coleman, Kalman, & Yoder, 1991). Children with SSPI may not have the same level of access to reading and writing materials (Koppenhaver, Evans, & Yoder, 1991; Light, Kelford-Smith, & McNaughton, 1990). For example, some children may not have access to writing materials due to the unavailability of adaptive equipment (Light, Kelford-Smith, 1993). In addition, families of children with SSPI may not rate literacy higher in priorities when extensive medical, physical, or nutritional issues are prominent in their child's life (Erickson & Upshur, 1989; Light, Kelford-Smith, 1993). Finally, caretaker and teacher's perceptions of the child's abilities may influence the quality and quantity of their literacy interactions, for they may underestimate abilities due to the academic label applied to them (Hiebert & Adams, 1987; Light, Koppenhaver, Lee, & Riffle, 1992).
While these barriers may exist in the lives of children with SSPI, individual reports of successful achievement of literacy skills have been reported in the literature. Koppenhaver, Evans, and Yoder (1991) surveyed a group of literate adults who used AAC and had a diagnosis of SSPI. The authors found that self-persistence, encouragement, support, and persistence of their caretakers, teachers, and peers helped them to achieve their literacy success. Given (2002) reports her own experiences in literacy education from preschool through university level as an individual with SSPI and who uses AAC. She managed to successfully complete high school, and begin pursuing her law degree with support from her school system and family. Her schooling was supported with additional adaptations to the curriculum for literacy activities, with extra time and instruction (Given, 2002).

However, while some individual reports have been published concerning literacy success for individuals with SSPI who use AAC, approximately 70-90% of these school aged children lag significantly behind their peers without disabilities in measures of reading (Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). The population of children with SSPI who use AAC number approximately 100,000 in the public school system (Kirk, Gallagher, Anastasiow, 2003). Therefore, it is vital to find evidence based approaches to emergent literacy instruction for children who use AAC. The majority of research available has followed the same
characteristic categories as emergent literacy instruction for children who
do not use AAC: shared storybook reading and direct instruction
(Koppenhaver, Hendrix, Williams, 2007).

**Adult – Child Shared Storybook Reading**

Research on shared storybook reading with children who use AAC is
not as diverse as the research available for children without disabilities,
with fewer variations on research questions (Bedrosian, 1999). However,
the same concepts apply: that an adult will give the child opportunities to
use and learn vocabulary, and acquire information concerning print
awareness skills (Neuman, 1999; Justice & Pullen, 2003). Some authors
have suggested adaptations for storybook reading, such as adding
additional picture graphics, modifying AAC systems to include key or
repetitive phrases in the books, and keeping the AAC device available
during reading for the child (King-Debaun & Musselwhite, 1994;
Koppenhaver, Coleman, Kalman, Yoder, 1991; Light, Binger, Kelford-Smith,
1994; Pierce & McWilliam, 1993). However, in order to provide efficacy
information to support EBP, formal studies that systematically examine
effects of intervention are needed (Bedrosian, 1997).

Previous research into shared storybook reading with children who
use AAC has shown that opportunity to view natural (e.g. shopping lists,
cookbooks, and messages) and environmental (e.g. signs and directions)
literacy, physical barriers to print conventions (e.g. page turning, reaching, and access to AAC device), and time constraints on caregivers (Light, Binger, and Kelford-Smith, 1994; Light & Kelford-Smith, 1993), can limit the experiences. However, there is some research available demonstrating the positive effects of the shared storybook reading experience.

In a single subject, multiple baseline study of a five-year-old child with SSPI, O'Rourke, Bedrosian, and Light (1994), examined facilitator training and its effect on the child's contributions to shared storybook reading. Over 15 weeks, the child's father and teacher were taught a five step-prompting model incorporating time delay and mand-model techniques to elicit responses from the child. The child was taught to make responses via both a communication board with graphic symbols or through speech to be judged intelligible by the facilitator. The five step prompting technique began with (1) a 10-second pause, (2) a verbal designation of the child's turn to respond, (3) a verbal request for the child to respond, (4) providing a model, and finally (5) a request for the child to imitate the model.

For each facilitator, there was a marked increase in the opportunities for the child to participate in the storybook reading experience. The authors measured generalization and found the skills were able to transfer successfully to others, such as other teachers and
adults in his life. This training was relatively inexpensive, although slightly
time consuming and required strict adherence to the prompting
schedule. In terms of the Schlosser and Raghavendra (2004) validity
scale, this study rates as a 2bi, a single subject experimental, multiple
baseline study. Replication of this study would be a positive move
towards confirming the effectiveness of the prompting technique.

Koppenhaver, Erickson, Harris, et al. (2001) examined the effects of
including access to AAC devices and assistive technologies, as well as
parent training, on the nature and frequency of a child’s communication
during shared book reading. Rett syndrome is a pervasive developmental
disability that is found almost exclusively in girls, and in about 1 out of
10,000 to 15,000 births. It is characterized by a gradual deterioration of
functional hand usage and language loss (American Psychiatric
Association, 2000; National Institute of Neurological Disorders and Stroke,
2007). Some researchers feel that girls with Rett Syndrome rarely
communicate beyond a pre-intentional level, where caregivers assign
meaning to the girls’ vocalizations and gestures (Woodyatt & Ozanne,
1992, 1993, 1994). However, recent research suggested that girls with Rett
syndrome have more communication potential than previously thought,
including abilities to eye-point and make requests with a single switch
(Hetzroni, Rubin, & Konkol, 2002; Weiss, 1996).
Six girls with a primary diagnosis of Rett syndrome, along with their mothers, were participants in a study conducted by Koppenhaver, Erickson, Harris, et al. (2001). The girls ranged in age from 3.6 to 7 years of age and all exhibited severely limited speech. Two of the dyads participating had used a Big Mack switch (Ablenet) and various picture communication systems. The authors used a multiple baseline design to evaluate the use of basic AAC, assistive technologies, and parent training on the girls’ communication during shared storybook reading.

Through five different training sessions, the girls were observed reading with their mothers. Different AAC devices and techniques were introduced, and mothers were taught how to utilize the technology appropriately during shared storybook reading. The families chose two books to use during the study, one they were familiar with and one they had not read in the past. Mothers were given a set of communication symbols, a single message Big Mack (Ablenet), a larger multi-message AAC device, and a variety of stands made from PVC pipe to support the devices. The symbols provided correlated with the books the families chose, and represented repeated lines and concepts.

Following initial review of the parent child reading, four specific intervention strategies were designed and taught to each family. Each intervention strategy aimed at increasing communication during shared
storybook reading utilizing the natural communication between mother and child, and the AAC devices.

Results of the study showed significant increases in the frequency of communication between mothers and daughters, including labeling and commenting, across all six dyads. As mothers became more aware of the existence of the technology and how it could be adapted or utilized with each book, they increased the frequency of those alternative modes. The daughters responded by demonstrating their own significant increases in communication, including labeling and commenting. The authors concluded that storybook reading interactions between mothers and their daughters with Rett syndrome can provide language and communication development if supports are made available.

Koppenhaver, Erickson, Harris, et al.'s (2001) study rated at a level of 2ci on the Schlosser and Raghavendra's scale (2003). There were multiple interventions studied separately over time, without the benefit of a control group (Koppenhaver, Erickson, Harris, et al., 2001). In addition, the girls gains were measured individually, and their own preferred AAC device or technique varied. The authors discussed some barriers to the study, including the mother's ability to wait for their daughter's response. However, the time it took to train the mothers and the time each day it took to read were minimal, and the techniques could be taught to other
professionals in the child’s life, furthering the effect of shared storybook reading.

These two studies show that literacy interactions between caregiver sand children can be cultivated and expanded upon during shared storybook reading. However, unlike research centered on children without disabilities, little can be inferred about the effects of the shared reading on later literacy skills. Control groups were not made available for either study, pre and post testing was not completed, and while generalization was found in the first study, longitudinal effects have not been examined.

One further adaptation to shared storybook reading is the integration of adapted computer technology and interactive storybooks. The use of computers in promoting literacy for children with SSPI has been researched in the past, and they have been found to provide greater flexibility in meeting the demands of children with SSPI. Two areas have been specifically examined as being successful for children with SSPI: physical access (e.g. the technology can be adapted to use different switches or access techniques) and in addressing differing learning styles (e.g. computers can have the flow of information reduced or increased in speed, and duration of visual information can be extended) (Kinsley, Langone, 1995; Steelman, Pierce, Koppenhaver, 1993).
In order to address the potential of interactive storybook reading through computers, Hetzroni and Schanin (2002) used a multimedia interactive storybook software program with five children with SSPI to investigate any potential effect on literacy skills. The authors measured in pre- and post-testing the children's ability to recognize repeated words, independence in page turning via switch access, using switches to activate vocalized words, and overall interest in literacy activities. Five children were able to participate in this study, one from a specialized treatment center and four from a separate school for children with CP. All of the children had experience with the two Jelly-Bean (Ablenet) switches used in the program and did not require training before the intervention began. Each of the children demonstrated age appropriate receptive language skills yet experienced limited skills in expressive language.

The authors chose a popular book from the center that was used by many children and parents. The 30 pages of the book were scanned, and then fit to the 15 screens available in the program, depicting all of the original pictures and text. Voice was added to the program and the literature was made available through one of the Jelly-Bean (Ablenet) switches. The other switch allowed for page turning and highlighting of individual text. The recorded voice corresponded to the activation of the page turning switch. Data were collected in six main areas: (1)
directionality of the text demonstrated by the child's activation of the correct switch to turn pages, (2) identification of the main characters, (3) recognition of high frequency words, (4) ability to turn pages independently, (5) use of the switch to independently cue to voice over, and (6) overall interest in using the literacy activity in comparison with other activities available.

Results of the intervention were reported in two groups, one for the girl, named Sharon, who came from the separate specialized center, as she was able to attend more often, and another set for the four children at the school. In terms of words learned, Sharon was able to reach mastery of the new words from each set introduced, and maintained the accuracy at a level of 75% following the intervention. She was consistently able to identify the main characters, and her accuracy with page turning changed from 0% during the first sessions to 100% by the last five sessions. Sharon also began to anticipate certain events in the story and made associations with other stories and events in her life.

For the children from the school, health problems resulting in numerous absences made reaching mastery of target words a longer process. However, they all made significant increases in their word identification abilities. In addition, their preference to go to the storybook activities increased from 25% to 75% of the time by the end of the intervention. Children from this group also demonstrated gains in use of
the switches to activate the voice and page turning. In addition, when
the interface to power the switches was broken, the children were able to
genitalize the skill to a regular keyboard by hitting "space" and "enter."
The children were also able to identify main characters and
demonstrated anticipatory behaviors centered on events in the book.

The authors concluded that the use of computer assisted
interactive storybook reading exhibited a positive influence on the
emergent reading skills of the children in the study. This study, on the
Schlosser and Raghavendra (2004) scale of validity, rated as a 2ai – or a
multi-group pretest-posttest design without group control. Probes of
literacy activities centered on the computer assisted activities were
conducted throughout the experiment to analyze ongoing results.
External validity was high, with generalization measures indicating that all
of the children maintained a significant level of emergent literacy skills.
Social validity and applicability to mainstreamed or integrated classrooms
may be more difficult, as it requires teachers to have a great deal of
knowledge of computers to adapt the books and switch interfaces.
However, this study on shared storybook reading shows the most
significant results for children with SSPI who use AAC, an excellent starting
point for further research in EBP.
Literacy Enriched Play Environments

Currently, no formal research is available examining the effect of literacy-enriched play environments for children who use AAC. In fact, while children who use AAC have play environments similar to their peers who do not use AAC (Light and Kelford-Smith, 1993), their independent access to those environments can be severely restricted due to physical barriers (Light and Kelford-Smith, 1993). For example, a child who experiences SSPI may not be able to request access to play writing materials, books, or literacy artifacts with the ease that their peers without SSPI may. If they are able to access them, opportunities to interact independently with others centering on those play items may be substantially different (Light, 1997; Pierce and McWilliam, 1993). In addition, research on literacy and play with aided AAC usage by children found that routines focused on either play or reading, not both (Light, Collier, & Parnes, 1985a, b, c). When parents did read to their children, the experience was focused more on the social aspect (e.g. sitting together and enjoying each other’s company in a quiet environment) than on language and literacy learning (Light, Binger, & Kelford-Smith, 1994). While this social closeness is essential to children’s development, availability of functional contexts to learning should be capitalized on while allowing for this parent-child bonding (von Tetzchner & Martinsen, 1992).
Parent-child dyads are not the only play interactions that a child encounters in their development, especially as more children are integrated into classrooms with peers without disabilities. However, when working with adults, children have less opportunity to control the interactions (Light, Binger, & Kelford-Smith, 1994). In addition, adults typically design AAC vocabularies with topics set for very specific interactions. These interactions are typically academically based, with little vocabulary for general play with age appropriate peers (Banajee, Dicarlo, Buras Stricklin, 2003).

Development of play skills for all children is essential and can provide natural and realistic settings for language and literacy learning (Wells Rowe, 1998; Roskos, 1988). Play with peers has been studied with children who use AAC as a way to examine generalization of learned skills as a more natural context to display newly developed skills successfully (Wilkinson, Heibert, & Rembold, 1981). Further examination of child-directed literacy play should be examined to help provide a research basis for emergent literacy intervention.

Teacher Directed Explicit Phonological Awareness Instruction

Phonological awareness (PA) abilities in individuals with SSPI has been the subject of much debate, with many individuals previously believing that the inability to speak indicated that phonological
awareness skills could not be developed. PA requires the manipulation of individual and groups of sounds, a skill previously thought impossible for individuals who do not speak or rely on AAC (Light & McNaughton, 1993). In addition, the ability to examine skills for PA requires adaptation of testing for individuals who use AAC, (Bilshack, 1994). For example, providing a word that rhymes requires substantially more time and working memory for an individual with SSPI. The person must remember the word while searching through (potential) pages of vocabulary to find a specific symbol. See the appendix for a review of phonological awareness terms.

However, in a study comparing preschool children who can speak versus those who cannot, Dahlgren Sandberg, and Hjelmquist (1996) found that children who can and cannot speak scored comparably on four tests of phonological awareness: rhyme, phoneme addition, sound identification, and word length, even when matched for intellectual level. The measures were adapted to provide appropriate support for the children who used AAC, who all had a diagnosis of cerebral palsy. However, the children who used AAC did differ significantly from the children who did not in the area of spelling, scoring significantly lower than the control group. The authors stated that while the children who used AAC had phonological awareness skills, they did not apply them (Dahlgren Sandberg & Hjelmquist, 1996). The information gathered in the study indicates that acquiring PA skills is quite possible for children who use
AAC. However, they may require more instruction on how to apply those skills to their literacy development in order to acquire the later developing literacy skills. The authors also hypothesized that just having PA skills is not enough to develop literacy skills (Dahlgren Sandberg & Hjelmquist, 1996).

Research with individuals with prelingual deafness found that children using oral communication developed phonological skills. However, children who were raised using sign language did not develop true phonological skills; instead, they recoded words in a non-phonological manner. Both groups were able to develop reading skills with support for literacy abilities (Miller, 2001, 2002). While further research is ongoing centered on phonological awareness in individuals who do not speak, it has been demonstrated in research that phonological awareness skills can be trained (Hetzroni, 2004; Miller, 2001, 2002). Therefore, a formalized intervention program to instruct children who use AAC on phonological awareness skills would be beneficial (Sturm & Clendon, 2004).

Even in light of previous research of the importance of PA in literacy skills, no formalized programs aimed specifically at PA skills for children with SSI who use AAC are available. However, a program has been researched which takes a comprehensive view of emergent literacy skills, MEville to WEville (Erickson, 2004), was designed for children from grades Kindergarten to six. While some of the activities are well beyond
emergent literacy skills, some activities do focus on emergent literacy. The program is divided into three parts centered on the child, emotions, and family. Within each part, different lessons focus on key words, which are used repetitively, incorporated into songs, and practiced through clapping or chanting, writing, and identification, and environmental print (e.g. using literature in choice making or giving directions). (Erickson, 2004).

Erickson, Clendon, Abraham, Roy, and Van de Carr, (2005) studied the MEville to WEville (Erickson, 2004) program in three classrooms with children who experienced SSPI and used AAC. The program was implemented for a period of twelve weeks, with two weeks of pre- and post-testing occurring before and after the program. While there was no formalized implementation of the program, teachers in each of the classrooms agreed to use the program every day for 30 minutes. Five researchers conducted pre- and post-testing, as well as weekly observations to collect data and support the teachers in implementing the program. The pre- and post-testing consisted of tests in writing, letter identification, parts of the Concepts About Print Test (Clay, 1979), and phonological awareness. Each test was adapted to the child's communication mode.

Results of testing revealed no statistically significant differences in any of the four major areas measured. However, the authors stated that
there were positive individual differences, as all but one test score was higher, and the number of students who were able to complete the testing doubled. For example, in the pre-test for PA, only 12% of students were able to attempt the whole test. For the post-testing, that number increased to 29% of students able to complete the testing. The authors concluded that the program allowed children to attempt activities they had not done so previously, and show some success in them.

While no significant testing results were found during the program implementation, observations were made during the children's involvement in the program, and found very positive changes. For example, by the end of the program, students were initiating communication more frequently and spontaneously with adults and peers. The teachers also began including more scripted conversations for the children to use around the school, allowing children to communicate without adult support. The authors concluded that while there were no statistically significant gains, the students in the classrooms had experienced up to nine years of schooling with little to no literacy success, so a program that yielded any measurable positive outcomes should be further researched (Erickson, Clendon, Abraham, Roy, Van de Carr, 2005).

In terms of validity, Erickson, Clendon, Abraham, Roy, and Van de Carr's (2005) study is rated at a level of 2avii, or a single-group time-series design. The students underwent pre and post testing, but there was no
control group. The program, while nationally published (Ablenet), may be associated with some barriers when being adopted by schools. It requires a great amount of flexibility to adapt to current curriculums, and knowledge of use of assistive technology and computers. However, by providing a steady curriculum, teachers do not have to design their own. In addition, the inclusion of homework keeps parents and caregivers up to date on what is happening concerning literacy in the class, increasing social validity for the program and research.

While several authors have composed how-to guides or guidelines for emergent literacy instruction for children who use AAC (Erickson & Koppenhaver, 1995; Koppenhaver, Coleman, Kalman, and Yoder, 1992; Pierce and McWilliam, 1993), empirical evidence is necessary to balance the clinical knowledge portion of EBP. While it can be difficult to find large enough groups of children who use AAC to provide emergent literacy intervention, it is necessary to complete the research. We are responsible for ensuring that children develop the proper literacy skills in order to be successful in school, home, and later in life. Providing emergent literacy intervention as a young child helps to prevent later literacy struggles (Light, Binger, & Kelford-Smith 1994).
This review was completed in order to examine evidence available for emergent literacy interventions for children who use AAC. It began with a review of evidence-based practice (EBP), its definition, and application to our role as Speech Language Pathologists (SLPs). Following that, an examination of what emergent literacy entails, and what current research says are best practices for intervention was completed. A chapter on emergent literacy intervention for children who do not use AAC followed, examining how best practices are translated into current practices. Finally, a review of research for emergent literacy intervention for children who use AAC was completed, demonstrating that while children who use AAC can acquire emergent literacy skills, there is little research supporting intervention techniques, both in quantity and quality.

One of the most prominent points brought about by this review is the sheer lack of research on emergent literacy intervention for children who use AAC. While it was previously thought that children who could not demonstrate certain reading readiness skills could not be taught to read,
the concept of emergent literacy development has certainly been available in the literature long enough for studies examining emergent literacy in children who use AAC. Numerous articles are available which give guidelines or hints for parents and teachers as to how to support emergent literacy skills for children who use AAC (Erickson & Koppenhaver, 1995; Koppenhaver, Coleman, Kalman, & Yoder, 1992; Pierce & McWilliam, 1993).

However, based on current trends involving evidence-based practice, SLPs need more than clinical expertise to make intervention judgments. In comparing each aspect of emergent literacy (shared reading, literacy-enhanced play environments, and phonological awareness), the amount of research available for children without disabilities outnumbered research for children who used AAC by a ratio of 2:1, demonstrating a disparity in quantity of research (see table 2). In addition, the number of subjects involved in research studies available for children who do not use AAC was 1,127, compared to the 35 subjects who participated in emergent literacy intervention for children who do use AAC. However, one area where emergent literacy intervention for children who use AAC was comparable to intervention for children who do not use AAC was in length of intervention (see table 2), as their average length of intervention was 15.8 and 13 weeks, respectively. In
addition, the shortest length of intervention time of the studies for children who use AAC was twice the minimum for children who do not use AAC.

In terms of quality of research, fewer subjects, shorter intervention, and a lack of control groups characterized emergent literacy intervention for children who use AAC. While there were studies using pre- and post-testing, the statistical significance of findings was much lower than in emergent literacy intervention for children who do not use AAC.

TABLE 2

Comparison of Evidence Indicators Reviewed for Emergent Literacy Intervention

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Non-AAC Users</th>
<th>AAC Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Studies</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Total Number of Subjects</td>
<td>1127</td>
<td>35</td>
</tr>
<tr>
<td>Mean</td>
<td>112.7</td>
<td>8.75</td>
</tr>
<tr>
<td>Minimum</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Maximum</td>
<td>404</td>
<td>23</td>
</tr>
<tr>
<td>Length of Intervention in Weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>15.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Minimum</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Maximum</td>
<td>28</td>
<td>16</td>
</tr>
</tbody>
</table>

<sup>a</sup> Mean does not include Nelson, J. R., Benner, G. J., & Gonzalez, J. (2005), as no intervention length was reported by the authors

<sup>b</sup> Mean does not include Hetzroni, O.E., Schanin, M. (2002), as no intervention length was reported by the authors.

Finally, the ability to generalize treatments for children who do not use AAC is typically much easier, as it does not involve as much
adaptation as for children who use AAC. In shared storybook reading, for example, a child who does not use AAC can often initiate the interaction with adults, move to an area to pick out a book, then sit and read with their parents who can use print referencing or dialogic reading behaviors. However, a child who uses AAC may not be able to ambulate to where books are located, may not have a consistent means of communication to indicate a preferred book, and may need vocabulary added to a communication device to discuss the book and concepts, a time consuming event in an otherwise busy day (Light & Kelford-Smith, 1993). While SLP's can help assist parents and caregivers in adapting reading activities, it can still be a time consuming event, and detract from the reading experience.

Emergent literacy for children who do not use AAC has been studied and strong correlations between emergent literacy skills and later conventional literacy skills have been found. Emergent literacy interventions, including shared storybook reading, phonological awareness activities, and literacy enriched play activities have been examined and found to be helpful in developing the emergent literacy skills needed for later literacy development. Even in light of this knowledge, little evidence is available for emergent literacy interventions for children who use AAC.
Limitations of Review

In completing this review, the author chose not to include emergent literacy interventions for children who use AAC who have a diagnosis on the autism spectrum, as many of these children retain some level of speech. In addition, just as many individuals with SSPI have complex physical, cognitive, or language involvement requiring different supports, children with autism present along a spectrum of involvement, making both populations heterogonous and variable, requiring different supports, and displaying different skills.

However, there is research available for emergent literacy intervention for children with autism who use AAC, especially as the ability to diagnose autism at a younger age improves. For example, Koppenhaver and McLellan (1996) examined storybook reading and guided exploration of literacy materials with three children who had autism. They found that through a supportive intervention, the children all demonstrated increased engagement in emergent reading activities and one child increased their ability to identify printed names. As more children are diagnosed with autism each year, and more are being diagnosed earlier in life, we must have a firm understanding of emergent literacy intervention to successfully support their learning, whether they use AAC as a primary means to communicate or not.
**Future Research Directions**

In terms of evidence-based practice, this review brings various aspects of emergent literacy into the forefront for future research directions. While there is an array of information available which falls under personal clinical expertise for emergent literacy intervention for children who use AAC (Erickson & Koppenhaver, 1995; Koppenhaver, Coleman, Kalman, and Yoder, 1992; Pierce & McWilliam, 1993), professionals need solid, research-based evidence to support personal skills and knowledge (Schlosser & Raghavendra, 2004).

Research designs and interventions for children who use AAC can be qualitatively different from children who do not use AAC. For example, using a group design with participants who use AAC is difficult, due to the wide variety of diagnoses, devices, and communication needs (Iacono, 2003). In addition, standardized testing may often not be available due to modifications that may be needed for children who use AAC to complete the test (Bilshack, 1994). However, that does not mean that quality research cannot be completed with proper documentation and validity supports. Including as many children as possible allows for more information about possible adaptations for interventions. Pre- and post-testing, even if adapted, is an excellent measurable way to help provide evidence.
Finally, when analyzing emergent literacy intervention research for children who use AAC, it is important to include variables such as monetary cost, time cost, general benefit to student learning, independence, and social-emotional development. When considering cost, it is important to remember that while schools are required to provide supports for children who use AAC, funding is not endless, and teams may encounter road blocks when applying for funds to support children. Time cost is extremely important in a world full of deadlines. Families have less and less time, and priorities may get lost when weighing the importance of reading to a child versus feeding, toileting, or cleaning (Light & Kelford-Smith, 1993; Koppenhaver, Hendrix, Williams, 2007).

Developing independence for children who use AAC is a large part of literacy. Research has shown that it can be very easy for children who use AAC to become passive learners (Light, Binger, Kelford-Smith, 1994). Increasing their ability to initiate interactions with adults and peers, especially centered on a motivating literacy activity, can prove to be an internally rewarding benefit (Pebly & Koppenhaver, 2001).

Emergent literacy activities not only help support future conventional literacy, but can also support the social emotional bonding between children and their caregivers (Bus & Ijzendoorn, 1988). Children who use AAC are at risk for not developing emergent literacy skills due to different forms of interactions between themselves and caregivers.
Children who use AAC can have difficulty learning to read communication signals, which can result in less verbal input and interaction with caregivers (Dunst & Wortman-Lowe, 1986). As observed by Pierce and McWilliam (1993), some of the most impressive interactions between children and adults occur while reading, even if the AAC device is not available for communication. They described reading as "an intimate activity filled with laughter, conversation, and physical affection" (Pierce & McWilliam, 1993), highlighting the importance of family wishes in our EBP. Sometimes, a "snuggle" on the sofa by a parent may be more beneficial to a child than a fully adapted, complex, storybook reading session with goals and cues.

Various research areas can be addressed concerning emergent literacy intervention for children who use AAC based on the information that has been gathered.

- How does the type (e.g. low-tech picture board vs. high-tech VOCA device) affect emergent literacy skill acquisition?
- How does the use of graphic representation of vocabulary in AAC affect development of phonological awareness during the emergent literacy stage?
- How do children who use AAC as a primary mode of communication experience literacy enhanced play environments? Furthermore, how can environments be
appropriately adapted to allow all children, regardless of ability, to experience literacy enhanced play?

- How can stakeholders work together to form a consistent, reliable, and effective emergent literacy intervention that includes all members of a child's team?
- How can shared reading be adapted to provide an environment for emergent literacy development while providing a natural, comfortable setting and sufficient exposure to literacy concepts?
- What affect does long-term emergent literacy intervention have on later conventional literacy skills in children who use AAC?

These questions will become more important as more children who use AAC as a primary mode of communication enter school with peers who do not use AAC. In addition, as technological advances make AAC more complex and adaptable, these emergent literacy interventions need to be re-examined and updated.

It is important to remember that emergent literacy intervention for all children is a relatively “low stakes” mission, especially as success in later, conventional literacy is so vital for individuals who use AAC (Koppenhaver, 2000). Literacy affects not only academics, but also a child’s entire life. Children who experience literacy difficulties early in life
tend to experience them throughout their school years (Juel, 1998), and as adults, are likely to be restricted in their vocational opportunities (Richardson, Koller, & Katz, 1988). As educators and SLP's we share the responsibility to ensure that every child achieves growth and development in literacy. Currently, little evidence is available for emergent literacy intervention for children who use AAC, and further research is needed to provide appropriate intervention. Research will help to develop EBP for children who use AAC. By beginning with solid, evidence-based practices in emergent literacy intervention, we can help every child, including those who use AAC, to communicate and be successful.
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APPENDIX

KEY TERMS

**Phonological Awareness**: explicit awareness of the sound structure of spoken words. Incorporates various aspects listed in order of typical acquisition: (Torgensen, Wagner, & Rachotte, 1994).

**Rhyming**: ability to produce and recognize patterns of rhyme across words (Ezell & Justice, 2004; Hempenstall, 1997).

**Alliteration**: the sharing of a sound across two words in initial, medial, or final position (Ezell & Justices, 2005)

**Phoneme awareness**: knowledge that words comprise individual speech sounds (Ezell & Justice, 2005).

**Syllable Awareness**: Knowledge that words can be divided into something larger then individual phonemes (Ezell & Justices, 2005)

**Segmenting or Ellision**: splitting a word into individual phonemes (Ezell & Justice, 2005)

**Blending**: blending two or more phonemes together to form a word (Calfee, 1977).

**Emergent Literacy**: behaviors that precede, and then develop into conventional literacy (Sulzby & Teale, 1991; Koppenhaver, 2000; Roth & Baden, 2001).

**Dialogic reading**: adult-child interaction centered on storybooks that consists of the adult eliciting and expanding upon the child’s language (Whitehurst et al, 1988).

**Print referencing**: adult child interaction centered on storybooks that consists of the adult bringing concepts of print (words, pages, letters) to the attention of the child (Justice & Ezell, 2004).

**Evidence based practice**: “An approach in which current, high-quality research evidence is integrated with practitioner expertise and client preferences and values into the process of making clinical decisions” (ASHA, 2005).