ABSTRACT

COMMUNICATION OF STUDENTS WITH SEVERE SPEECH AND MOTOR IMPAIRMENTS DURING HOME-BASED LITERACY ACTIVITIES

By Amy Swartz Cox

The present study examined the effects of emergent literacy experiences on the communication of four students with severe speech and motor impairments who ranged in age from seven to eighteen. Specifically, the intervention brought students together with a family member or caregiver to videotape themselves reading familiar and unfamiliar storybooks in their own homes. Through a multiple baseline intervention the researchers examined the effects of (a) calming procedures and (b) the application of supportive communication strategies and augmentative and alternative communication on the quantity and quality of interactions between the student and adult partner. Readers were provided basic training, adapted reading materials, communication devices, and video equipment. Examination of recorded readings revealed that, by the completion of the study, three of four students demonstrated increases in their overall rates of identified communication. Further, three of four students successfully integrated communication device use into the reading process. These results support the idea that students with severe disabilities can benefit from emergent literacy instruction.
ASSESSING THE COMMUNICATION OF STUDENTS WITH SEVERE DISABILITIES AND MOTOR IMPAIRMENTS DURING HOME-BASED LITERACY ACTIVITIES

by

Amy S. Cox

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COMMITTEE APPROVAL

[Signature]
Advisor

05-19-05 Date Approved

[Signature]
Member

05-01-05 Date Approved
To Ron, Andy, Mom, and Dad, for your ever-present support and encouragement.
To Aaron for being the inspiration.
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CHAPTER I
INTRODUCTION

Literacy skills have the power to dramatically affect the lives of students who, for a variety of reasons, rely upon the use of augmentative and alternative communication (AAC). Light and Kent-Walsh (2003) offered the following benefits:

Literacy skills are extremely important to these individuals because these skills provide a channel for educational assessment and learning, enhance vocational opportunities, promote self-expression, and facilitate independent living. Literacy skills also provide access to increased generative capacity and vocabulary access via AAC systems such as alphabet boards and computer-based speech-generating devices. Finally, literacy skills facilitate access to mainstream technologies such as the Internet that may be used to bypass communication limitations in face-to-face conversations, enhance education and expand employment opportunities. (p. 4)

Indeed, Mirenda (1993) claims that, through reading or being read to, people with severe disabilities including those with little or no functional speech (a) learn about the world around them, (b) broaden their range of experiences, and (c) experience pleasurable activities and social closeness.

However, students with severe disabilities, including those with autism (Mirenda, 2003), severe mental retardation (MR) (Kliwer & Biklen, 2001; Ryndak, Morrison, & Sommerstein, 1999), and severe speech and physical impairments (Erickson & Koppenhaver, 1995) often find themselves excluded from literacy instruction because educators consider them unable or unready to learn. Kliwer and Landis (1999) suggested that many educators consider exclusion from literacy logical, because they assume all
children with the common label “severely disabled” (a) experience an intrinsic lack of intelligence, (b) share the same educational needs, (c) require segregated learning environments, and (d) need specialized programming distinctly different from their peers.

Researchers have long questioned the validity of criteria utilized to estimate the capacity of students with severe disabilities to become literate (Brown, Jones, Troccolo, Heiser, Belleman, & Sontag, 1972; Dorman, 1987). Citing an earlier work by Butterfield (1961) entitled “A Provocative Case of Over-Achievement by a Mongoloid,” Brown et al. (1972) described a young man with Down syndrome and a measured intelligence quotient (IQ) of 26 whom, through the efforts of his mother, learned to read and spell at the fifth grade level. As the title of the original study suggests, educators considered the man’s accomplishments at least abnormal, if not a fluke. Tragically, Kliewer and Biklen (2001) related that educators often hold this belief. As a result, when individuals with severe disabilities attain a level of literacy success uncharacteristic of their developmental level and presumed IQ, educators may assume that the student has been mislabeled and subsequently remove educational supports. Fortunately, however, many educators have begun to realize that individuals like the “provocative over-achiever” pose a challenge to reduce their reliance on test scores and predetermined expectations and focus instead on providing appropriate, innovative instruction aimed at teaching reading and writing (Koppenhaver, 2000; Mirenda, 1993).

When literacy instruction occurs for students with severe disabilities, it frequently emphasizes functional skills, including mastery of routine sight words (Joseph & Seery, 2004). Many of the functional reading approaches utilized with these students follow rigid hierarchical programs that dictate the order of introduction of new skills. Educational researchers compare these approaches to a ladder, whereby a child’s journey to literacy derails immediately when he or she appears unable to climb to the next rung.
As a result, many students with severe disabilities fail to progress to meaningful literacy because their teachers believe them unable to adequately pay attention or master the many other prerequisites (Kliwer & Landis, 1999). Ryndak et al. (1999) disputed the value of these readiness-based approaches, reporting that they accentuated the student’s differences from the norm, and as such, overemphasized the disability.

According to Mirenda (2003), students with severe speech impairments, who lack functional speech and thereby require the use of AAC, face an extremely high risk of failure to develop literacy skills when taught via readiness programs. She attributes this to the supposition, held by many educators and families, that “reading is impossible in the absence of the ability to sound out words phonetically” (p. 272). More recently, however, research has begun to emphasize the value of whole language-based approaches to literacy instruction for students with severe disabilities (Katims, 2000). These approaches (a) build upon best practice strategies utilized with students without disabilities, (b) encourage meaningful participation in authentic literacy activities, and (c) focus on the cognitive processes supporting the development of reading and writing (Koppenhaver, 2000).

Many other factors influence students’ development of literacy skills. Low expectations of parents and teachers (Light & McNaughton, 1993), reduced ability to communicate (Sturm & Clendon, 2004), lessened use of reading and writing materials (Marvin & Mirenda, 1993), and infrequent opportunities to actively participate in literacy (Koppenhaver, Evans, & Yoder, 1991; Light & Kelford Smith, 1993) may further restrict the progress of students with severe disabilities who require the use of AAC hiding their underlying learning potential. Students’ lack of attention to task, influenced by difficulties self-regulating their level of alertness, can also hamper learning (Yack,
Aquilla, and Sutton, 1998). Regardless of the reasons for their failure, Erickson (2003) suggested that only 10% of the students who require the use of AAC can read with comprehension. Koppenhaver, Coleman, Kalman, and Yoder (1991) indicated that this lack of literacy learning hampers students with developmental disabilities, including those with severe speech impairments, into adulthood, affecting their ability to achieve competency in (a) literacy, (b) social interactions, and (c) employment. To better prepare students for their future, the authors suggested that families and educators integrate print into the child’s daily life, providing frequent opportunities to meaningfully participate in authentic literacy activities, using real tools, as part of daily routines.

Researchers working to include students with severe disabilities in meaningful reading and writing activities have developed new understandings of literacy (Katims, 2001; Katims & Pierce, 1995). The foundations of many of these ideas come from regular education and the body of emergent literacy research and build upon the idea that children with and without disabilities have similar needs when learning to read and write (Mirenda, 2003). Emergent literacy researchers define literacy learning as a life-long process, beginning at birth, and supported by natural explorations in the environment (Koppenhaver, 2000; Saint-Laurent, Giasson, & Couture, 1998). For them literacy means more than just reading and writing; it also includes listening and communicating (Koppenhaver, Coleman, et al, 1991; Koppenhaver & Erickson, 2003). Studies examining children without disabilities suggest that the development of emergent literacy, or “the reading and writing behaviors that precede and develop into conventional literacy,” (Sulzby, 1989, p. 85) appears to foster later school success (Koppenhaver & Erickson, 2003). Children begin to become literate by applying an understanding of the uses of language to the process of experimenting with spoken language, reading, and writing (Katims & Pierce, 1995). Through an introduction to books and the uses of print,
children develop language and phonological awareness skills and become better prepared to learn more complex reading and writing behaviors (Light & Kent-Walsh, 2003). The presence of literate models and the tools of reading and writing provide a literacy-rich environment that supports the process (Saint-Laurent, et al, 1998).

To increase their preparedness for more advanced reading and writing, children with severe disabilities who use AAC must also experience emergent literacy (Light & Kent-Walsh, 2003). However, because of the unique needs of children with disabilities, they often find their progress hampered by “physical, sensory, communicative, behavioral, or cognitive differences” (Koppenhaver, 2000, p. 272). While these students frequently live in homes with literate models and appropriate materials (a) their access to these supports remains limited and (b) their early educational programs often fail to provide literacy-rich experiences (Light & Kent-Walsh, 2003). Further, even in stimulating homes and classrooms, tending to the physical, self-care, and health related needs of students with severe disabilities leaves little additional time to explore literacy (Marvin, 1994). These barriers to literacy skill development drastically lessen the progress of these students when compared to their peers without disabilities (Light & Kent-Walsh, 2003). Additionally, as Mirenda (2003) related, teachers and others often misinterpret the emergent literacy behaviors of young children with severe disabilities, for example labeling a young boy’s repeated examination of a picture “stimming.” To allow for the possibility of literate potential, researchers suggest that educators and families presume competence in order to foster skill development (Skotko, Koppenhaver, & Erickson, 2004).

Despite this, Koppenhaver (2000) documented several examples of successful emergent literacy interventions involving young students with severe speech, motor, and cognitive impairments. These studies confirmed the benefits of literacy-rich
environments, guided story-book reading, independent exploration of reading and writing materials, and simple parent-child story-book reading interactions in fostering emergent literacy and increased communication. They also suggested that the ability to benefit from emergent literacy related activities depends less on cognitive ability than on “learning opportunity, modeling of possible uses of print and communication symbols, and access to supportive texts and technologies” (p. 273).

Koppenhaver (2000) cautioned readers, however, to view emergent literacy as a starting point. Through emergent literacy individuals who require the use of AAC move closer to conventional reading and writing, but they do not achieve it. For example, the scribbles of an emergent writer may look like the letters TIY to an unfamiliar reader, yet, without an internal knowledge of the author’s thoughts, deciphering this unconventional representation of the word “karate” proves difficult. Describing this problem Koppenhaver (2000) stated, “Emergent literacy demonstrations can represent powerful statements of growing communicative competence to familiar listeners and readers, but often they are not sufficiently conventional enough in form to reveal that competence to others” (p. 273). As students build increasing competence in literacy the long-term benefits increase. For students who use AAC, the ability to comprehend while silently reading affects their overall (a) level of success in school, (b) quality of communication, and (c) attainment of autonomy and employability (Erickson, 2003).

While recognizing the importance of emergent literacy to students with severe disabilities who use AAC, research has focused primarily on its benefits to preschool-aged children, overlooking its importance to older students, including those who have previously received minimal literacy instruction. Skotko et al. (2004) recognized this in their study of three to seven year old girls with Rett syndrome and proposed that researchers begin to examine the emergent literacy needs of older students. Founded
upon that recommendation, the current research followed elements of the original study design and its basic format (Koppenhaver, Erickson, Harris, McLellan, Skotko, & Newton, 2001; Koppenhaver, Erickson, & Skotko, 2001; Skotko et al., 2004).

For a variety of reasons many elementary through high school aged students with severe disabilities have lacked targeted exposure to reading and writing in literacy-rich environments. For many of these students literacy remains out of reach. Failure to become literate has dramatic consequences for students who regularly experience communication deficits. Stemming from this, individuals may experience life-long difficulties that globally affect their quality of life. To date research has also overlooked the emergent literacy needs of students with severe disabilities.

The present study examined the effects of emergent literacy experiences on the communication of students with severe speech and motor impairments (SSMI) who ranged in age from 7 to 12. The author attempted to learn whether shared reading methods typically employed with younger students could benefit the elementary through high school aged population. Specifically, the intervention brought students together with a family member or caregiver to read and talk about simple storybooks. Through a multiple baseline intervention the researchers examined the effects of (a) the use of AAC and (b) the application of supportive communication strategies on the quantity and type of interactions between the student and adult partner. The researchers compared the interactions of students with SSMI and their reading partners before and after intervention and asked the following questions:

1. Does the use of sensory and control-based calming procedures prior to reading improve the quantity or quality of students’ communication during shared story-book reading interactions?
2. Does the use of AAC and supportive communication strategies during story-book reading interactions improve the quantity or quality of students’ communication during shared story-book reading interactions?
CHAPTER II
REVIEW OF THE LITERATURE

The Nature of Literacy and Instruction

Individuals who use augmentative and alternative communication (AAC) commonly have difficulty mastering language, hampering their ability to communicate effectively (Sturm & Clendon, 2004). Failure to develop adequate communication skills in turn limits their progress toward achieving conventional literacy (Koppenhaver, 2000). Problems with language skills intertwine with various other factors including potential cognitive deficits, secondary impairments, and physical access issues to exasperate this situation (Koppenhaver & Pierce, 1994). Illiteracy often results from a combination of language and learning problems inherent to the student and characteristics of the instructional environment including (a) inadequate exposure to emergent experiences, (b) unsatisfactory preparation for conventional reading and writing, (c) insufficient development of language and phonological awareness skills, (d) meager provision of instruction (Iacono, 2004), and incomplete provision of AAC (Koppenhaver & Pierce, 1994). Recognizing these challenges and the potential value of literacy learning, educators have attempted to teach reading and writing to students who use AAC. Educators engaged in this process have employed teaching strategies based upon research conducted with students with MR and best-practice strategies from general education (Koppenhaver, Pierce, Steelman, & Yoder, 1995; Mirenda, 2003; Sturm, 2003).

Research on reading and writing for students with moderate to severe mental retardation (MR) began in earnest in the late 1960’s (Conners, 1992, Pufpaff, Blischak, & Lloyd, 2000). However, ideologies and methods employed in research studies and the targeted outcomes have varied widely (Katims, 2000). In addition to disagreement over
the literacy learning capacity of students classified as having MR, authors’ represented in
the published literature often held divergent opinions of the value of literacy for these
students, and, as such, subscribed to different definitions (Mirenda, 2003; Sturm,
Erickson, & Yoder, 2002).

Reductionist Models in Literacy Research

Much of the early research on literacy for students with severe speech and motor
impairments (SSMI) focused predominately on teaching functional skills through word
level instruction including (a) sight-word recognition, (b) word-analysis or phonics, and
(c) error correction based reading methods (Conners, 1992; Mirenda, 2003). Additional
work examined the use of symbols in place of words or modified lettering systems
(Pufpaff, et al., 2000). In these studies definitions of reading and writing characterized
literacy as the mastery of a prerequisite set of skills in a prescribed order (Kliewer, 1998;
Kliewer & Biklen, 2001; Mirenda, 2003; Ryndak, Morrison, & Sommerstein, 1999).
Katims (2000) labeled these skill-based instructional beliefs as reductionist models. This
philosophy and those described by researchers as developmental, connectionist, or
behavioral typically prescribe the exclusion of most students classified as severely or
profoundly MR from many literacy-based experiences because of their perceived level of
incompetence (Kliewer & Biklen, 2001).

Sight Words

Researchers cited an assortment of advantages to the utilization of sight word
instruction for students with MR. Studies focused primarily on those individuals in the
mild to moderate categories. Sight word methods teach students to recognize a whole
word, as a unit, without specifically attending to the letters and their sounds (Conners,
1992). Browder and Xin (1998), as part of a meta-analysis on sight word research,
suggested that sight word knowledge improved students’ daily living skills at home and in the community by providing tools to use while shopping, completing chores, following instructions, reading labels, and interpreting signs. Sight word knowledge also promoted the acquisition of functional academic skills and increased general education access. Further, many sight word methods appeared successful in achieving their targeted outcomes (Browder & Xin, 1998; Conners, 1992).

Students with MR learned sight words through a range of strategies. Several studies manipulated picture, verbal, or written prompts looking at the benefits of prompting and confirmation strategies (Hawker, 1968; Hawker, Geertz, & Shrago, 1964). Brown, Hermanson, Klemme, Haubrich, & Ora (1970) tested the assumption that initial learning requires the most effort and employed learning sets to demonstrate that students learned subsequent related words more efficiently. Miller (1975) taught children to read sets of abstract and concrete words, concluding that learning progressed more rapidly when using phonetically similar word pairs and teaching the concrete word first.

Researchers also recommended viewing reading as “a series of observable responses to printed stimuli” (Brown & Perlmutter, 1971, p.75; Brown, Huppler, Pierce, York, & Sontag, 1974).

Feedback provided to students during training also appeared as a subject in the research literature. Studies suggested that students with MR may learn sight words incidentally, when shown words after talking about their meaning or seeing a related picture. Oral repetition of the word, repeated tracing, or carefully executed praise also appeared to foster learning (Browder & Xin, 1998). Similarly, researchers applied fading procedures to provide gradually decreasing visual feedback to the learner by (a) pairing words with pictures or rebus symbols (Barudin & Hourcade, 1990; Broun, 2004; Dorry, 1976; Dorry & Zeaman, 1973; Dorry & Zeaman, 1975; Worrall & Singh, 1983),
utilizing representational objects (Brown, Jones, Troccolo, Heiser, Belleman, & Sontag, 1972), or (c) incorporating altered or emphasized letters (Barudin & Hourcade, 1990; Sheehy, 2002; Worrall & Singh, 1983). These studies suggested that the presence of visual feedback effectively supported the students’ learning of sight words (Sheehy, 2002).

Errorless learning tactics, including various time delay procedures, appeared more successful in teaching sight words than most other strategies (Browder & Xin, 1998; Rohena, Jitendra, & Browder, 2002). Studies explored the value of constant and progressive time delay methods when teaching community sign words (Ault, Gast, & Wolery, 1988) and grocery store words (Gast, Ault, Wolery, Doyle, & Belanger, 1988). They also examined problems encountered when teaching sight words to non-English speaking students (Rohena, Jitendra, & Browder, 2002) and generalizing learned words into community settings (Mosely, Flynt, & Morton, 1997). In contradiction to these findings, however, other researchers successfully taught sight words by providing the prompt with the stimulus sight word prior to mastery (Schuster, Griffen, and Wolery, 1992). Browder and Xin (1998) conclude that various procedures produce satisfactory sight word learning.

Early sight word studies, however, revealed problems with singular reliance upon these methods (Barudin and Hourcade, 1990; Brown, et al., 1974; Domnie and Brown, 1977; Mirenda, 2003). Sight word-based instructional strategies limited the number of words taught and frequently failed to consider the students’ need for generalization of reading skills to other environments, situations, and materials (Barudin & Hourcade, 1990). Many ignored the need for teaching students word attack skills (Domnie & Brown, 1977). Low expectations for students, inadequate goals, and lack of
individualization also appeared to block students’ progress (Brown, Jones, Troccolo, Heiser, Belleman, & Sontag, 1972).

**Phonics**

Word-analysis or phonics based reading programs emphasized the correspondence between individual letters and their sounds to successfully teach students with moderate MR to sound out words (Conners, 1992; Joseph & Seery, 2004). Various studies generally supported the use of phonics with these learners (Barudin & Hourcade, 1990; Gottardo & Rubin, 1991). Instructional programs occasionally integrated phonics with other strategies including picture fading and tactile-kinesthetic cues (Barudin & Hourcade, 1990) and error correction procedures (Barbetta, Heward, & Bradley, 1993). Conners, Atwell, Rosenquist, and Sligh (2001) compared the decoding abilities of 65 students with MR. The ability to “rehearse or refresh phonological codes in working memory” (p. 292) and thereby sound out words distinguished stronger decoders, while language ability, phonemic awareness, and IQ appeared less critical. According to Calhoon (2001) the text processing abilities of students with and without MR appeared “more similar than different” (p. 499). Amongst both groups, students read with greater accuracy from connected text. Further, students with MR seemed to benefit from the use of word-analogy strategies including word families and word walls and the presence of many rimes. Joseph and Seery (2004) concluded that, despite prevailing views to the contrary, students with MR benefit from phonics instruction and have the capacity to generalize learned skills to other contexts.

**Error-Correction**

Domnie and Brown (1977) recognized the insufficiency of students’ sight word knowledge base for reading and responding to simple texts. To remedy the problem subsequent researchers taught students phonics and generalization skills. Students’
required additional instruction geared to teach analytical or phonics based methods for correcting oral reading errors (Conners, 1992). Singh and Singh (1984) found that student’s reading errors decreased after previewing the text, however, the results lacked statistical significance. Other studies explored students’ use of (a) error-correction (Singh & Singh, 1985), (b) overcorrection, (c) phonetic analysis (Singh & Singh, 1988), and (d) behavioral strategies (Singh & Singh, 1986), and found the later two approaches especially effective. Research also examined teacher responses to student errors (Singh, 1989).

Symbol Systems

Questions about the aptitude of students with moderate to severe MR for learning to read and write via complex letter based orthography sparked researchers to examine the use of alternative systems (House, Hanley, & Magid, 1980). In prior research involving preschool-aged students without disabilities, children learned words faster when represented using Rebus, Bliss, or Carrier symbol systems rather than traditional alphabetic letters. Rebus and Bliss symbols tended to represent words with a single picture or stylized symbol and appeared the most readily learned (Clark, 1981). Other studies supported the use of abstract lexigrams involving symbols made up of superimposed elements. Researchers speculated that students processed and matched the superimposed elements more readily than sequential letters (Brady & McLean, 1996; Romski, Sevcik, Pate, & Rumbaugh, 1985), perhaps because the symbols acted as a visual cue (Pufpaff, et al., 2000). Additionally, Romski and Sevcik (1996) found that 3 of 13 youth with moderate to severe MR participating in a language intervention incidentally learned to recognize the word labels printed above individual and sentence-like groups of lexigrams and maintained this skill for two years. Six other participants increased their word recognition as well, however not with the same degree of success.
Studies in the published literature offer contradictory conclusions regarding the value of symbol usage to the literacy learning of students with severe speech and motor impairments (SSMI) who use AAC (Koppenhaver & Pierce, 1994). Sheehy (2002) and Pufpaff, et al. (2000) disagree over the benefits of modified orthography which integrates picture symbols into written words. Sheehy (2002) developed customized handles consisting of a simple line or symbol judged especially salient to the learner’s understanding of the word. The researcher then incorporated the handle into the printed word. These mnemonic elements appeared to help students identify modified words and generalize this skill to unmodified print. To the contrary, given superimposed line drawings over printed words and standard print, Pufpaff, et al. (2000) found that learners more readily learned to read alphabetic text.

Finally, researchers questioned the value of symbol system use both for sight word instruction and as communication or literacy symbols in a larger context. Students who use AAC systems often engage in symbol use to facilitate communication prior to the development of spelling (Buekelman, Mirenda, Cumley, & Jones, 1992). Authors doubted whether research sufficiently supports symbol use (Pufpaff, et al., 2000; Sheehy, 2002). Further, several raised questions about the relationship between symbol usage and more traditional forms of language development (McNaughton, 1993) including reading (Bishop, Rankin, & Mirenda, 1994). The saliency of symbols may interfere with the maintenance of focus on text (Sheehy, 2002), and symbols may prove difficult for unfamiliar partners to understand (Romski, Sevcik, Pate, & Rumbaugh, 1985). Additionally, Koppenhaver (2000) challenges the construct that learners who use picture symbols for communication rather than speech require inherently different approaches to reading instruction. Instead, he suggests that, whether an individual has a disability or not, he or she learns to read in a similar manner, following the same basic processes.
Inclusionary or Integrated Models in Literacy Research

During the 1990's research studies began to explore sentence and text level strategies as well as (a) the simultaneous and related development of spoken and written language (Erickson, Koppenhaver, & Yoder, 1994) and (b) the coordinated use of a combination of methods (Katims, 2000). Definitions of literacy found in these research studies frequently included reading and writing for the purpose of gaining meaning from or expressing meaning through print (Kliwer, 1998) and incorporated speaking and listening (Sturm, 2003; Teale & Sulzby, 1986). These ideological frameworks sought to establish a broader, more inclusive standard for instruction and included methods considered best-practice in general education models (Kliwer & Biklen, 2001; Koppenhaver, 2000; Mirenda, 2003). Developing periodically evolving individualized definitions of literacy for each student also helps goal setting, individual engagement, and progress monitoring (Katims, 2001).

Katims (2000) described the philosophical framework behind this perspective as “integrated, contextualized, or constructionist.” Inclusionary strategies such as these valued the contributions of all learners and eliminated the concept of exclusionary prerequisite steps. Literacy instead embraced a complex and interrelated set of interactive processes through which readers built upon their own experiences and understandings to create meaning. Instruction included teaching specific skills, providing models and opportunities for authentic practice, and facilitating participation by adapting tools, tasks, and other variables to meet individual needs (Mirenda, 2003). Mirenda (1993) provided early insight into the extended value of the inclusionary viewpoint when she wrote:

First of all, literacy is more than learning to read, write, and spell proficiently. It is learning to enjoy words and stories when someone else is reading them. It is
learning to love books. It is a way of achieving social closeness through sharing literacy experiences with friends or classmates. It is finding out about the way things are in places we have never visited or in places that have never existed. (p. 7)

Similarly, proponents of this philosophy stressed the critical support literacy skills provide to students with communication difficulties, resulting in increases in independence, self-determination, and access to a wide range of environments and activities (Mirenda, 2003).

**Case Studies and Ethnographies**

Using a case study or ethnography format, various authors have examined the characteristics of learners, environments, and prevailing attitudes surrounding literacy and students with severe disabilities. Ryndak, Morrison, and Sommerstein (1999) described the path of Melinda, a young adult labeled moderately to severely disabled, over a seven year period through early stages of literacy to inclusion in college. The conclusions drawn from Melinda’s story shed light on the need for (a) broad definitions of literacy, (b) increased staff expectations, (c) highly motivating literacy goals, (d) inclusive educational settings, (e) increased access to literacy materials and experiences, (f) individualized modifications to support skill development, and (g) acceptance that behavior problems may indicate learning problems. These ideas are further supported in separate studies (Kliwer, 1998; Kliwer & Biklen, 2001; Kliwer & Landis, 1999; Koppenhaver & Pierce, 1994; Smith, 1992).

Several other factors contribute to students’ learning at school and at home, including (a) text-rich instructional environments, (b) autonomous reading-related decision making, (c) frequent classroom read-aloud sessions, and (d) adequate assistive technology (AT). Recurrent absences, intensive time requirements of therapies (Iacono,
lack of experiences with print (Koppenhaver & Pierce, 1994), limited instructional opportunities, excessive reliance on individual instruction, and insufficient opportunities for student’s literacy-based communication interactions impede students’ literacy learning (Mike, 1995). Further, students typically play only passive roles in reading activities, often due to insufficient vocabulary or integration of AAC and interpreted as disinterest or incapacity (Koppenhaver & Pierce, 1994). Sadly, Beukelman, et al. (1992) confirmed these problems, reporting that students with SSMI observed for 45 days in a classroom setting rarely read for more than 2 minutes of each hour of instruction and had fewer than 9 opportunities to write more than one word at a time.

Eclectic Approaches

Pershey and Gilbert (2002) reported on the literacy learning progress of an adult with developmental disabilities and an IQ reportedly in the low 40’s. A 35 year old woman, Christine, with no previous literacy instruction learned basic reading and writing through a combined strategy comprised of:

- Reading in unison, echo reading, language-experience stories (stories dictated by Christine to Tom for him to scribe), recognizing letters and words on sight, writing by copying model sentences, writing to dictation, and using invented writing for communicative purposes (e.g., notes, greeting cards). (p. 223)

The student’s success using this whole-to part and part-to whole approach demonstrated the benefits of (a) eclectic and highly individualized literacy programs, (b) socially stimulating learning conditions, and (c) self-motivated, self-directing, and symbolically aware learners.

Four Blocks Programs

Built from the model described by Cunningham, Hall, and Deffee (1998) for use in regular education classrooms, The Four Blocks instructional programs also finds utility
in classrooms for students with severe disabilities (Hedrick, Katims, & Carr, 1999). The Four Blocks system of \textit{balanced literacy instruction} (Erickson & Koppenhaver, 1997), attempts to allow students of any level to enter the program without the need for ability grouping. It also teaches to individual differences and avoids strict adherence to educational trends by providing a planned range of learning opportunities. Proponents divide instructional time into sections, for a total of 2 ¼ to 2 ½ hours of reading instruction daily. These blocks consist of \textit{working with words}, \textit{guided reading}, \textit{self-selected reading}, and \textit{writing} (Cunningham, Hall, and Deffee, 1998). Hedrick, Katims, and Carr (1999) implemented an adapted Four Blocks program in a classroom with nine students with mild to moderate MR. Students receiving instruction demonstrated improvement in reading comprehension, word identification, written language, and student confidence and understanding of the reading process. Other authors support these conclusions and thereby the viability of the Four Blocks program in special education settings (Fossett, Smith, & Mirenda, 2002).

\textbf{Literacy and Learners with SSMI}

Even in the presence of other complex and recurrent problems which inhibit literacy learning, students with SSMI who use AAC for communication develop reading and writing skills through the same cognitive processes as any other child. Their unconventional modes of communication, however, often cast them into learning environments that inherently limit their exposure to and interactions with literacy (Sturm, Erickson, & Yoder, 2002). Echoing Mike (1995) other researchers (Foley, 1993; Koppenhaver, 2000; Sturm & Clendon, 2004; Sturm, Erickson, & Yoder, 2002) suggest students need instruction that (a) recognizes the relationship between communication and literacy, (b) employs the strategies considered best practice in regular education, (c)
harnesses the benefits of available and appropriate assistive technology (AT), and (d) occurs in a supportive environment. Researchers who examined classroom education for students with SSMI, however, uncovered persistent problems with delivery of instruction. Looking at conventional literacy, Koppenhaver and Yoder (1993) found that, even when teachers believed in the student’s learning ability, students spent little classroom time involved in activities which promoted literacy development, including cooperative instruction with peers. Even when integrating AAC into literacy, activities lacked a purposeful continuity and seldom connected to the general curriculum (Sturm, Erickson, & Yoder, 2002). Further, few teachers observed had received training on literacy or AAC for students with SSMI. Recommendations include practicing better time management, using wait time for independent literacy related activities, planning for a balance of instructional opportunities, teaching students to participate in and take control of their own learning, and utilizing available resources more fully (Koppenhaver & Yoder, 1993).

**Experiences of Literate Adults**

Surveying literate adults with SSMI about childhood factors that promoted their development of literacy skills, Koppenhaver, Evans, and Yoder (1991) confirmed many crucial recommendations made by other researchers. Accessible, literacy-rich environments where students received individualized assistance and interacted with literate peers supported their learning. Additionally, students benefited from education in traditional style classrooms that utilized best-practice based instructional strategies. Adults strongly confirmed the importance of the social aspects of literacy, but admitted to (a) difficulties learning to write, (b) problems discussing reading and writing with others, and (c) frustration with instructional content and interest level. Finally, adult respondents cited strong family support and personal persistence as the main dynamics influencing success.
The Integration of Communication and Literacy

Berninger (2000) described language learning as a multilingual process. She wrote that children first learn to process what they hear. Next they learn to speak. After that they begin to process and interpret meanings from written text. Finally, they start learning how to write. Recognizing the dynamic nature of the literacy learning process, Berninger writes, “these four language systems develop in overlapping, parallel waves rather than in discrete, sequential stages” (p. 66).

Language, as Sturm and Clendon (2004) aptly identified, appears foundational to literacy learning. Conversely, the development of literacy skills also seems to promote access to AAC, fostering improved communication and language (Foley, 1993). Learning to spell, for example, increases a student’s ability to generate novel and situationally appropriate messages when using an AAC system for communication or word processing (Blischak & Schlosser, 2003). Unfortunately, while evidence of the critical relationship between communication and language development and literacy learning often appears in the literature, students who use AAC rarely develop adequate language and communication skills to support more complex forms of literacy learning (Sturm, 2003). It seems that students’ opportunity to develop conventional literacy skills appears to hinge on the quality and effectiveness of their AAC based access tools (Sturm & Clendon, 2004) balanced with the provision of ample amounts of effectively managed instructional time. Further, to maximize their ability to participate with peers in academics, authors recommend that students develop these skills as early as possible (Beukelman, et al., 1992).

Sturm and Clendon (2004) identified a wide range of causes for language learning difficulties in children who use AAC including: (a) limited background experience, (b) physical or learning difficulties, (c) lack of symmetry between an individual’s modes of
receiving receptive language and producing expressive language, (d) added burden of learning traditional receptive language skills and augmented and unnatural expressive modes simultaneously, (e) difficulty learning to communicate effectively through AAC without exposure to competent models of AAC use, (f) problems translating AAC use into non-structured settings, and (g) limits on vocabulary imposed by the AAC system. Other barriers include: (a) atypical reliance on nonverbal modes of communication after typically developing children have faded out their importance, (b) restricted expressive language abilities due to insufficient vocabulary and inaccessibility of their AAC system, (c) inability to add new words to their vocabulary like their peers who do not use AAC (other children hear words, store them, and use them at a later time when interacting with an environment, reflecting their personal likes and their own determination about a word's value), and (d) limited access to vocabulary needed to talk about diverse concepts.

Regular classroom environments place extraordinary challenges on the vocabulary needs of students with SSMI who require the use of AAC; however, they also appear to support the development of communication and literacy skills for these individuals. Because of the (a) diversity in subject matter, (b) varying formats for individual and group involvement in learning, and (c) differing lesson formats encountered in a regular classroom, students require wide-ranging and accessible vocabulary. Full participation in the classroom conversation depends upon a student’s ability to spontaneously and autonomously interact via his or her AAC systems in situationally appropriate ways for a wide variety of purposes. Successful inclusive literacy and communication instruction occurs only when teachers (a) understand the needs and learning characteristics of the student, (b) explore the curriculum and available tools to fortify instruction, (c) allow adequate time for detailed and ongoing planning, and (d) create a highly supportive learning environment (Sturm, Erickson, & Yoder, 2002).
AAC in Conventional Literacy

Typically, the teaching of conventional language, communication, and literacy figure prominently in a child’s early school years (Sturm & Clendon, 2004, p.80). Defined by Koppenhaver (2000) as the autonomous construction of a message through reading and writing, conventional literacy often appears unreachable for students with SSMI. Despite this, several researchers have investigated methods of providing conventional literacy instruction that meets these learners’ individual needs (Iacono, 2004; Koppenhaver, 2000; Mirenda, 2003). Koppenhaver (2000) makes several recommendations regarding conventional literacy instruction for students who use AAC. To facilitate needed access to the tools of reading and writing he suggests providing specialized adaptations, geared to the needs of the learner. While use of technology integrally supports reading and writing, proper accommodations allow many students to construct their own meanings through and from text. Further, Koppenhaver advocates for the application of cognitive models, adapted from regular education research, as guides for literacy instruction and assessment. Urging educators to teach cognition rather than skills, he supports the assertion of utility stating that cognitive strategies:

Allow us to focus on a relative strength of AAC users (i.e. cognition) while considering ways of reducing emphasis on areas of relative weakness (e.g., overt motor behaviors that are required for conversation or writing). Only additional research will show whether they are not only useful but also accurate. (p. 275)

Specifically Koppenhaver suggests educators examine Cunningham’s “Whole-To-Part Reading Diagnosis” (Cunningham, 1993) model of reading and Flower and Hayes’ “Cognitive Process Theory of Writing” (Flower & Hayes, 1981) to understand the cognitive processes that underlie literacy learning.
Silent reading comprehension, asserted Cunningham (1993), is the central goal of learning to read. Yet, in 2003 Erickson estimated that less than 10% of students who utilize AAC learn to read and comprehend above the second-grade level. When reading silently readers need to comprehend the meaning of the text and apply it to the world around them. (Koppenhaver, 2000). Silent reading comprehension depends upon three essential factors. **Word identification**, or the process of orally, subvocally, or silently creating *print-to-sound links* (Cunningham, 1993, p. 32) for words in a text, requires both rapid recognition of sight words and mediated recognition through application of decoding and phonics. **Language comprehension** embodies understanding the meaning of text and its structure (Erickson, 2003), whether working in the listening or silent reading modality. **Print processing** includes the (a) use of “cognitively strategic” (p. 37) eye movements that occur during reading, (b) application of *print-to-meaning links* that allow a reader to comprehend a word without first deciphering the sounds, (c) reliance on inner speech as a venue for silently practicing word identification strategies (Cunningham, 1993) and rehearsing the prosodic structure of text (Erickson, 2003), and (d) simultaneous or parallel integration of word identification, language comprehension, and eye movement (Cunningham, 1993; Erickson, 2003; Koppenhaver, 2000). Erickson (2003) provided suggestions to inform those interested in utilizing this model with students with who use AAC.

Similarly, Flower and Hayes, in their *cognitive model of writing*, described written composition as the main goal of writing instruction (Koppenhaver, 2000). Writers, they theorized, proceed through three phases when composing text. **Planning** includes events before and during writing including generating topics and accessing related memories, ordering and grouping ideas, developing and clarifying goals for the finished composition. Next an author *translates* his or her plans into a written text
conforming to the formal demands of the written language. Finally, an author reviews the manuscript, examining it from the perspective of the intended audience, revising as needed for clarity, and evaluating its success at achieving the author’s goals and adhering to language conventions (Flower & Hayes, 1981; Koppenhaver, 2000; Sturm, 2003).

Sturm (2003) provides illustrations of the implementation of this model. Speech and language therapists can support the development of writing skills by (a) accurately assessing and supporting the student’s language needs and abilities, (b) learning about successful writing methods used in general education and ways to support writing via AAC, and (c) matching students needs to an appropriate AAC system and facilitating its use. Further, therapists can improve student success by assisting the student in the classroom and (a) working with the home and school to develop topic ideas through accessing experiences and background knowledge, (b) identifying points of access within the general curriculum and developing materials to support the students’ interactive inclusion, and (c) teaching the student ways to interact with others during writing.

**AAC in Emergent Literacy**

Emergent literacy precedes conventional literacy and begins almost incidentally, through exposure to, and interaction with, the tools and artifacts of reading and writing (Pierce & McWilliam, 1993). Children gain valuable insight into the foundations of literacy by working with print through (a) interacting in spontaneous drama inspired by a picture book, (b) using text based props while engaged in imaginary play or for communication (Kliwer, Fitzgerald, & Raschke, 2001), (c) observing and participating in a literacy-rich environment (Koppenhaver, Coleman, Kalman, & Yoder, 1991), (d) scribbling stories and illustrations, (e) looking at picture books (Koppenhaver & Erickson, 2003), (f) listening to stories, and (g) viewing literate models engrossed in authentic reading and writing tasks (Pierce & McWilliam, 1993). Integrating AAC into...
emergent experiences (Beck, 2002) and assuring accessibility (Light & Kent-Walsh, 2003) further aids students’ skill building.

Emergent literacy plays a critical role preparing students to transition into more inclusive environments and developing more conventional academic, reading, and writing skills (Katims & Pierce, 1995). Koppenhaver (2000) states that perceived cognitive ability proves less of a barrier to emergent literacy success than does a lack of learning opportunities, including exposure to individuals modeling the uses of print and symbols, and access to print and other literacy tools. Educators find emergent literacy activities easier to incorporate into daily plans for students who require the use of AAC. These interventions require little specialized knowledge or equipment. Emergent literacy, however, remains a first step, rather than an end goal. Koppenhaver elaborated on this writing:

However, their importance lies not in the emergent achievement but rather in the closer proximity to conventional literacy—reading and writing that will open the world to AAC users by enabling them to communicate with unfamiliar literate listeners and readers (Koppenhaver, 2000). (p. 273)

Children with severe disabilities including SSMI appear to benefit from early exposure to literacy. Katims (1991), Koppenhaver and Erickson (2003), and Kliewer (1995) examined the experiences of students with MR in literacy-rich early childhood special education classrooms. During their period of attendance students’ test scores and reading abilities improved and their pretend reading behaviors increased. Children also became more prolific early writers, and many showed a preference during independent reading for books previously read by the teacher (Katims, 1991). Students in Katims’ study and later research by Koppenhaver and Erickson (2003) demonstrated increasingly sophisticated exploration of books, and participants in the later study showed documented
improvements in (a) time spent engaged in literacy activities and (b) emergent writing behaviors. Surprisingly, one student who previously had not spoken began reading occasional words and letters aloud, and another demonstrated the ability to match students' printed names with their pictures. Kliwer (1995) suggested that young children appeared to interact with print when it served a useful purpose, and the researchers observed students retelling stories, flipping through books systematically, and employing early word attack skills. However, students who could not speak failed to take an active role in these environments. Similar findings were reported for preschool aged students involved in home-based emergent literacy stimulation (Saint-Laurent, Giasson, & Couture, 1998).

AAC in Literacy in Practice

Implementation of reading methods combining AAC and literacy typically result in student progress. One of the earliest studies, described by Erickson and Koppenhaver (1995) involved a trial program used with eight students with severe disabilities. While none of the children demonstrated significant progress in prior educational placements, all responded to the literacy program and demonstrated the emergence of literacy skills and the need for further, more expansive instruction. Additionally, the use of AT allowed the learners to communicate, participate in literacy activities, and access to regular curriculum.

Two case studies (Erickson & Koppenhaver, 1998; Erickson, Koppenhaver, Yoder, & Nance, 1997; see also Sturm, Erickson, & Yoder, 2002) examined the benefits of an inclusive literacy program for a preteen boy with SSMI. Through these accounts the reader learns how Jordan, also referred to as Patrick, progresses from emergent literacy toward independent participation and more conventional literacy forms. The authors cite various factors as contributors to Jordan's success, including the (a) dedication of a
knowledgeable and committed educational team including family members, (b) application and continual adaptation of appropriate assistive technology, and (c) implementation of a multi-faced and individualized curriculum based upon Jordan’s strengths, needs, and interests (Erickson & Koppenhaver, 1997). Additionally, the authors credited daily opportunities to develop, master, and maintain literacy skills, Jordan’s growing self-confidence, and influences from the regular classroom environment (Erickson, Koppenhaver, Yoder, & Nance, 1995). A similar work, by Blischak (1995) looks at the progress made by Thomas, a boy with SSMI and severe visual impairments, from birth to second grade. Through intervention and the use of AAC Thomas passed grade level spelling tests and learned to dictate stories and complete homework.

**AAC in Literacy for Adolescents and Adults**

Unfortunately, little evidence currently exists supporting the practicality of conventional literacy instruction for adolescents and adults with SSMI and other severe disabilities. Only a meager supply of age appropriate materials exist for teenagers or adults who read and write like beginners. Additionally, teachers have few materials or references available to guide instructional decision making. Consequently, rather than developing literacy skills that could improve their quality of life, these students typically “receive the least coherent, least consistent literacy instruction of any students in school” (Sturm & Koppenhaver, 2000, p. 74).

Two studies describe interventions for adolescent and adult students with SSMI. Bedrosian, Lasker, Speidel, and Politsch (2003) paired a student with autism and mild MR with a typical peer during writing activities, finding that, over the course of writing three stories, the contributions of the student who used AAC increased considerably during planning and writing phases. Further, both participants reported that they felt their
writing skills improved through the partnership, and expressed satisfaction and
enjoyment related to the process. Foley & Staples (2003) implemented a two year long
balanced literacy program with five adults with mild to severe disabilities. All
participants demonstrated progress as the result of the intervention and appeared highly
motivated to learn. In addition to the factors identified in studies with younger learners,
the authors credit the program’s relevance when speculating on the causes of its success.

_Dyadic Storybook Reading_

Several studies explore the communication that occurs when parents read to their
sons or daughters with SSMI. Bellon and Ogletree (2000) promoted repeated storybook
reading as an especially appealing intervention strategy, requiring few materials and
relatively little training. Further, they reported it was generally considered a pleasurable
experience by both adult and child participants. Building from this, several explorations
tracked the communication and emergent literacy learning that results from parents
repeatedly reading to their children. Three studies, the first involving children without
disabilities, helped illuminate the value of adults reading to children. Listening to stories
read aloud as a member of a parent-child dyad, young children without disabilities
learned about text structures and the differing conventions of written and spoken
language. Regardless of socioeconomic status, young children who frequently read with
an adult entered school better prepared to learn literacy and more excited about reading
and writing (Bus, van Ijzendoorn, & Pellegrini, 1995). Researchers specifically assessed
the value of repetitive readings of familiar text in supporting communication skill
taught mothers to follow a _complete reading cycle_ during reading interactions. This
involved the adult establishing mutual focus and verbally asking a question or in some
way prompting the child to communicate. Following the prompt the child responded and
the adult provided feedback. When repeatedly hearing a favorite book over time children played a progressively more active role in the process, inquiring and commenting about the text and illustrations in increasing detail and with greater complexity of language (Crowe et al., 2000). Finally, through simple participation in shared storybook reading, children with disabilities began to imitate language patterns from the text and move toward independent reading (Arnold, Lonigan, Whitehurst, & Epstein, 1994).

Research shows that the behavior and communication of adult dyad members during storybook reading also fosters the child's participation and learning. Adult readers (a) follow predictable interaction patterns, (b) utilize gestures and vocal cues to foster focus and understanding, (c) expound on related details to build background knowledge, and (d) ask questions to encourage participation. During repeated readings of a text, the adult typically adjusts his or her commenting strategies and patterns as the child demonstrates competency (Crowe et al., 2000).

Despite a growing interest in the effects of early dyadic storybook reading on the progress of young students, little research exists relating to dyadic reading and students with SSMI including older students with minimal literacy competence. Researchers working with students with SSMI have examined the strategies mothers used to facilitate children's communication and their children's responses. Light, Binger, & Kelford Smith (1994) videotaped mothers reading to their children with severe disabilities, including SSMI, to examine communication patterns. While both members of the dyad often shared a common focus, mothers were seen to dominate the exchanges with children serving primarily as passive or minor partners. Recognizing the importance of a parent's interaction style, Arnold et al. (1994) taught mothers dialogic reading, a strategy for improving interactions and supporting children's language development. Mothers learned to (a) model desired language, (b) ask questions that provoke more a variety of forms of
answers, (c) provide supportive feedback, and (d) elicit increasingly detailed retellings of elements of the story.

Building from Light et al. (1994), researchers followed a multiple baseline intervention protocol to examine the communication of girls with Rett syndrome while reading stories with their mothers. During successive phases dyads began to employ resting hand splints, utilize AAC and AT devices, and receive instruction in use of AAC and interaction building strategies to help minimize the interfering effects of Rett syndrome while maximizing each child’s ability to participate. Over the course of a four month period researchers documented increases in the girls’ (a) quantity of communication attempts and (b) types of interactions (Koppenhaver, Erickson, & Skotko, 2001; Koppenhaver, Erickson, Harris, et al., 2001; Skotko, et al, 2004).

*Rational for Current Research*

Research suggests that AAC users with SSMI typically fail to develop adequate reading and writing skills, partially as the result of poor literacy instruction (Koppenhaver, 2000). For many years concerned educators have attempted to remedy this situation through the application of a variety of educational approaches, yet learning problems persist. While researchers have examined the communication that occurs between parents and children during dyadic storybook reading, the needs of older learners with severe disabilities have received little attention.
CHAPTER III
METHODOLOGY

Participants

Selection Criteria

The researcher recognized the difficulty of finding a homogenous sample amongst the population of children and adolescents with severe disabilities and the corresponding importance of controlling the subject selection process to promote accurate analysis and generalization of the results (Bedrosian, 1999; Higginbotham & Bedrosian, 1995). As such, students participating in this study met several pre-established criteria:

1. All participants lived in a north central state within several miles of each other. All attended schools in the same district. None, however, attended the same school.

2. Students selected were elementary through high school aged, older than those typically studied in paired reading research.

3. Participating students were all in the emergent stage of literacy.

4. Every student participant was considered by their school to have severe cognitive and speech impairments.

5. Participants also had physical or motor impairments including difficulties with motor planning, apraxia, and sensory processing with varying etiologies.

6. Participants’ were not diagnosed with visual or auditory problems that would impact listening to storybooks and attending to illustrations and communication symbols.
7. Participants’ enjoyed looking at, manipulating, or listening to picture books, but had difficulty participating in understandable communication during shared reading.

8. Students had routine access to books and other text in the home and reportedly were read to by their parents or caregivers.

9. Generally, parents or caregivers considered communication important to their student and, while recognizing the challenges presented by the student’s disability, sought ways to encourage learning.

10. Additionally, all families (a) identified a parent or other willing adult to serve as a reading partner throughout the entire study period and (b) allowed the intervention to occur in their homes.

Students

The research sample originally included five students, two girls (Rebecca and Kyla) and three boys (Adam, Patrick, and Timothy). All participants were Caucasian. Students’ ages ranged from 6 to 18 and their diagnosed disabilities varied. The public school system which they attended considered all of the students to have severe cognitive disabilities. One student, Kyla, dropped out of the study early in the baseline period due to a family emergency. The remaining four students participated in all study phases (see Tables 1, 2, and 3).

According to the reports of the adult readers, the researcher’s in-home observations, and information gathered during the baseline period, three of the four students lacked intelligible, verbal communication. Resultantly, throughout their lives these students developed primary modes of communication based upon their own unique needs. The fourth student, Rebecca, primarily used repetitive perseverative speech. As a result of their disabilities, all participating students were unable to communicate
effectively, especially when the referent was abstract or inaccessible. All adult readers expressed frustration with the student’s current communication ability.

Table 1
Characteristics of Student Readers as Reported by Their Parent or Caregiver

<table>
<thead>
<tr>
<th>Student (Age, Gender)</th>
<th>Educational Placement</th>
<th>Communication Modes</th>
<th>School-Based Literacy Instruction?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam (13, M)</td>
<td>Self-contained, Cognitive disabilities - Severe (CD-S), Middle school</td>
<td>Gestures, modified signs, pointing and leading, picture exchange communication system (PECS), simple augmentative and alternative communication (AAC), and facial expression</td>
<td>No</td>
</tr>
<tr>
<td>Patrick (12, M)</td>
<td>Self-contained, CD-S, elementary</td>
<td>Gestures, sounds, leading, and demonstrating</td>
<td>No</td>
</tr>
<tr>
<td>Timothy (7, M)</td>
<td>Self-contained, CD-S, elementary</td>
<td>Limited AAC, behavior, facial expression, and vocalizations (&quot;coos&quot;)</td>
<td>No</td>
</tr>
<tr>
<td>Rebecca (18, F)</td>
<td>Self-contained, CD-S, high school</td>
<td>Verbalizations, and physical/behavioral means</td>
<td>No</td>
</tr>
<tr>
<td>Student</td>
<td>Characteristics</td>
<td></td>
<td></td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>Adam</td>
<td>Adam was an active adolescent who seemed to enjoy interacting with others. While fully ambulatory, he demonstrated apparent difficulties with motor planning, fine motor skills, and apraxia. Adam seemed easily distracted and often sought out small toys, cars, or other objects to hold and spin when engaged in reading and other activities. Adam required constant supervision and high levels of assistance with many daily tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrick</td>
<td>Walking with an unsteady gait, Patrick seemed at once charming and easily annoyed. He often resisted new activities and the onset of familiar ones, sometimes resorting to mildly self-injurious forms of behavior, but typically responded more favorably once he became accustomed to the situation. Like Adam, Patrick typically was seen spinning object in his hands. Patrick, however, preferred rolled magazines, books, and cups. Adults in Patrick’s life also provided constant supervision and high levels of support.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3
Brief Physical Descriptions of Student Readers- Timothy and Rebecca

<table>
<thead>
<tr>
<th>Student</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timothy</td>
<td>Timothy had the most significant physical limitations of any student in the study. His arms and legs were often in a state of seemingly perpetual motion, yet he had little control over his body movements. Involuntary thrashing made the intentionality of his communication difficult to interpret. He required significant assistance to sit, stand, or walk and required pervasive support to meet all of his daily needs. His primary caregiver appeared to be his mother, but his father and other family members provided high levels of support. Timothy was responsive to others, smiling and tracking their movements visually, and appeared to enjoy interactions even if he could not act as a full participant.</td>
</tr>
<tr>
<td>Rebecca</td>
<td>At 18, Rebecca was a strong but slight young woman. Like Adam and Patrick, Rebecca walked independently. Her gait was occasionally unsteady, and she demonstrated some deficits in fine motor skills. During the course of the study, seizure activity substantially affected Rebecca’s life. In the periods immediately prior to and following a seizure Rebecca appeared lethargic and less responsive. At other times she seemed very active and highly engaged in the world around her. Similar to the other students Rebecca required high levels of support throughout the day.</td>
</tr>
</tbody>
</table>
Students’ Physical and Sensory Impairments

All student participants experienced some degree of physical and sensory impairments. The exact nature of these conditions was not examined as part of this study. Physical impairments appeared the most pronounced in two students, Timothy and Patrick. Timothy had no purposeful use of his arms or legs and limited control of his head. As a result he used a wheelchair for mobility and relied upon others to provide for most of his daily needs. Patrick’s mobility was also limited by physical impairments; however he could walk unattended for short distances and for longer periods of time with direct supervision.

Adam’s and Patrick’s Communication

Adam and Patrick primarily relied upon a combination of gestures, vocalizations, idiosyncratic sign, behavior, picture symbols, and physical leading. Aided by their mobility these student’s often resorted to the easiest form of communication in a given situation. During baseline Adam’s primary communication mode during reading was pointing and gesturing, followed by manipulating the book, and vocalizing. Patrick’s baseline communication was similar to Adam’s, however he most commonly manipulated the book, with the use of vocalizations and points and gestures following in that order. Adam and Patrick also occasionally communicated via moving away from the reader. In most cases this appeared to communicate their intent to terminate the reading activity.

Timothy’s Communication

Timothy’s disability affected his range of possible communicative behaviors. Timothy’s mother reported that his communication primarily consisted of “cooing” and facial expressions. Due to his inability to perform many of the types of communication analyzed in the present study, Timothy was the only student for whom eyepointing was
considered a valid communication mode. In baseline he was observed twice responding to the readers’ questions through a simple gesture. Further, because of his physical limitations and relatively constant uncontrollable body movements, researchers confined their analysis of Timothy’s fine and gross motor-based communication during the initial study phases to acts that occurred after adult prompting. Concurrently, despite the fact that Timothy’s mother occasionally responded to his vocalizations as valid communication attempts, researchers could not accurately determine whether these occurrences represented intentionality and communicative purpose. To the contrary, his vocalizations often appeared to be associated with the overflow of motion characteristic of Timothy’s body movements. As a result, vocalizations were counted only if prompted. Researchers determined these guidelines necessary in order to minimize the effects of observer’s biases on the data collection process.

Rebecca’s Communication

Like Adam and Patrick, Rebecca, utilized physical leading and behavior to communicate. However, Rebecca also used simple, and frequently repetitive, verbalizations. Rebecca’s baseline communication primarily took the form of vocalizations and manipulating the book. At times Rebecca also communicated through moving away from her caregiver. Amongst the sample only Rebecca independently spoke more than 5 understandable words. Frequently Rebecca’s speech took on a perseverative nature. At these times she repeatedly uttered known words or phrases. During reading this behavior was often triggered by the auditory presentation of text or her perception of the illustrations. While Rebecca’s perseverative speech appears to serve both social and communicative functions, its purpose remains unclear and the volume of speech produced interferes with other, more socially appropriate forms of communication. Additionally, Rebecca’s caregiver reported that her vocalizations lacked the
characteristics needed to discuss abstractions, including feelings, and her spoken words served little purpose for independent expressive language. A seizure disorder complicated Rebecca’s communication and literacy, at times noticeably affecting her level of attention and involvement in reading related activities.

Students’ Prior Use of Augmentative and Alternative Forms of Communication

All students had experience using a variety of communication modes at school with most adults reporting at least experimental use of picture symbol-based augmentative and alternative communication (AAC) communication at some point in the student’s education. In a few cases use of these modes was attempted in the student’s home. For example, while Adam’s father reported that his son used the Picture Exchange Communication System (PECS), family reports indicated the secondary nature of these modes of communication. The communication devices reportedly used by students at sometime included a (a) GoTalk, Hiptalker, and Step-by-Step (Adam), (b) Cheap Talk (Timothy), (c) BigMack (Adam, Patrick, and Timothy), and (d) Jelly Bean (Timothy). Several students demonstrated emergent skills when using alternative means of communication including picture and voice output based systems, however, despite these experiences each primarily relied upon idiosyncratic sign, gestures and body movement to convey messages.

Students’ Prior Literacy Experiences

Adult readers reported that all students enjoyed looking at or manipulating books. None appeared to read books on their own or received school-based instruction. According to their adult readers, two students (Timothy and Rebecca) were known to recognize printed words beyond their own name. Timothy’s mother stated that he could recognize approximately five simple words. By holding two word cards in front of him she said he could use eyegaze to make a choice. Rebecca orally read many single words
in isolation. While she could often select the referent object for recognized words, Rebecca predominantly used this ability when prompted by an adult or the presence of her word cards. When she occasionally identified a word in a simple story, she did not appear aware that the meaning of the word related to the story itself. Resultantly, her reading provided little benefit to her besides enjoyment. One other student, Adam, was also thought to recognize a few words. Adam’s father reported that Adam could identify logos in a variety of contexts, but he was unsure if he could read the names included in the logo in isolation.

**Adult Readers**

Students were paired with a parent or, in Rebecca’s case, a family-selected caregiver to form a reading dyad. The adult member of the dyad was at least 20 years of age and, prior to the study, regularly read with the student in his or her home environment. Only one regular reader was male, this being Adam’s father. In another case, Timothy’s family allowed various individuals, including his father and brother, to read to the student during baseline. During all subsequent phases of intervention, Timothy’s mother served as his adult reader. Adult readers possessed varying levels of training prior to beginning the study with two specifically reporting that they took college courses in regular and special education while working toward teacher certification (see Table 4).
<table>
<thead>
<tr>
<th>Adult</th>
<th>Adult’s Experience/Background</th>
<th>Communication Goals for the Student</th>
<th>Literacy Goals for the Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam’s Father</td>
<td>Workshops and classes on regular and special education, reading, sensory integration. Observation of therapy.</td>
<td>Unsure</td>
<td>Use text to identify wants and needs. Use text in the community.</td>
</tr>
<tr>
<td>Patrick’s Mother</td>
<td>Workshops, articles and books on special education and communication. Observation of therapy.</td>
<td>Learn more signs.</td>
<td>Point at illustrations. Remain engaged during a short book.</td>
</tr>
<tr>
<td>Timothy’s Mother</td>
<td>Observation of therapy</td>
<td>Consistency in instruction and communication between home and school environments.</td>
<td>Communicate sufficiently to have a service dog.</td>
</tr>
<tr>
<td>Rebecca’s Caregiver</td>
<td>Classes and training in regular and special education, reading, assistive technology, and sensory integration.</td>
<td>Ability to talk about abstract concepts and feelings.</td>
<td>Recognize words in context (environment and connected text).</td>
</tr>
</tbody>
</table>
Students' and Adult Readers' Participation in Shared Reading

Seeking to avoid the “broccoli effect,” (Kaderavek & Justice, 2002; Scarborough and Dobrich, 1994), that predicts negative results of shared storybook reading for children who do not enjoy reading, researchers specifically examined each dyad’s likes and dislikes related to reading topics. Further, adult readers selected all storybooks for their own student from a sample provided by the researchers. According to the reports of the adult readers, all participants enjoyed book reading for short periods of time, and several independently used books during leisure time. Characteristics of several of the students, including sensory impairments, behavioral issues, and seizure disorders, reportedly hampered their ability to maintain focus on a task and interact during reading. Additionally, environmental factors relating to other individuals in the home, pets, and sounds also affected the quality and length of students’ interactions. Unfortunately, students typically had short attention spans and were easily distracted.

Experimental Design

The intervention followed a multiple baseline across treatments design (Koppenhaver, Erickson, & Skotko, 2001). A multiple baseline design permitted the author to examine the combined effects of a two part treatment program. Bedrosian (1999) recommended single-subject multiple baseline designs because they (a) avoid the need for a control group of similar students, (b) allow for greater control of extraneous or confounding variables, and (c) require fewer participants to ensure generalizability and external validity of findings. Additionally, they circumvent ethical problems related to the withdrawal of treatment (Kazden, 1982).

For this study the intervention included a baseline period, followed by the introduction of two treatments. Research was modeled after studies described by
Bedrosian (1999), Koppenhaver, Erickson, and Skotko (2001), and Light, Binger, and Kelford Smith (1994). A training session in which the members of the dyad interacted with the research team preceded each phase. Researchers videotaped the student training sessions and audio taped the adult sessions for later reference. After the final study phase researchers conducted a follow-up home visit (see Tables 5 and 6).

Table 5
Overview of the Pre- and Post-Study Periods

<table>
<thead>
<tr>
<th>Period</th>
<th>Goals</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-study</td>
<td>Recruit participants, secure permissions and collect signed consent</td>
<td>IRB approved</td>
</tr>
<tr>
<td></td>
<td>documents, provide basic study information and answer questions,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>allow readers to begin book selection process</td>
<td></td>
</tr>
<tr>
<td>Post-study</td>
<td>Conduct a follow-up survey with adult participants, provide</td>
<td>Follow-up</td>
</tr>
<tr>
<td></td>
<td>additional information to help dyads continue to use study procedures,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>videotape final readings, collect loaned equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student participant: read Phase 3 books using AAC with a researcher</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Overall Goals</td>
<td>Training Focus</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Phase 1/</td>
<td>No intervention- Gain</td>
<td>Teach adults to use the camera, gather information</td>
</tr>
<tr>
<td>Baseline-</td>
<td>insight into the dyad’s</td>
<td>about the student and his or her reading related</td>
</tr>
<tr>
<td>(2 weeks)</td>
<td>typical storybook reading</td>
<td>calming behaviors through the analysis of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>videotaped readings and sensory needs</td>
</tr>
<tr>
<td>Phase 2-</td>
<td>Calming procedures</td>
<td>Teach adults calming strategies to use in reading,</td>
</tr>
<tr>
<td>(1 month)</td>
<td>intervention- Evaluate</td>
<td>the effectiveness of calming procedures through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>analysis of videotaped readings students’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>communication needs</td>
</tr>
<tr>
<td>Phase 3-</td>
<td>AAC Intervention-</td>
<td>Teach adults to use AAC materials and strategies,</td>
</tr>
<tr>
<td>(1 month)</td>
<td></td>
<td>use of augmentative and alternative forms of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine-tune AAC applications through observation of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students’ use of the reading materials and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>repeated lines</td>
</tr>
</tbody>
</table>
During treatment phases adult readers were provided with instruction and materials designed to foster improvements in the student’s (a) attention to task and (b) interactions in the context of storybook reading. Adult participants videotaped the dyad’s reading interactions three times per week throughout each phase. Tapings included one reading each of two study books plus one reading of any book chosen by the dyad. Several times during the study phase the adult reader returned the tapes to the researchers either through direct contact or using prepaid envelopes. Annotation and analysis of recorded readings for each dyad allowed researchers to (a) measure specific aspects of student and adult communication, (b) track the success of interventions, and (c) fine tune future phases.

Recruiting Participants

During recruitment, families were contacted in writing or via email to alert them to the upcoming study and provide basic information. Subsequently, the principal researcher contacted all families via telephone or email and provided a brief overview of the program, answered questions, described the role of the University of Wisconsin Oshkosh Institutional Review Board (IRB) in project approval and discussed the IRB’s mandated consent process (see Appendix A). Finally, the principal researcher made a short home visit to each participating family to complete consent forms and select books for the baseline period. For samples of contact materials see Appendix B.

Book Selection

Kaderavek and Justice (2002) and others (Musselwhite & King-DeBaun, 1997; Saint-Laurent, Giasson, & Couture, 1997) described qualities in books that appear to support reading-based social interactions. In most cases readers can enhance children’s participation by choosing familiar or favorite books of mutual interest to the child and adult which allow for the child’s verbal or nonverbal participation. Further, Bellon and
Ogletree (2000) recommend using books with (a) a predictable structure, (b) relevance to the child's life experiences or daily routine, (c) attractive, pertinent illustrations, and (d) between 15 and 35 pages. Books should also be complicated enough to teach the child something new while describing (a) a sequence of events, (b) the unexpected results of an action Bellon, Ogletree, & Harn, 2000), or (c) "cause/effect relationships or goal behavior" (Bellon & Ogletree, 2000, p. 77) yet not so sophisticated as to hinder his or her interaction. Additionally, authors support the use of books with a small number of words per page, large print, and repeated or redundant words in the text (Justice and Kaderavek, 2002). Other researchers recommend the use of books with repeated lines (Koppenhaver, Erickson, & Skotko, 2001). These recommendations also find support in the literature relating to students with disabilities who use AAC (Musselwhite & King-DeBaun, 1997).

For the present study, the principal researcher selected 45 books for participants to choose from, based upon many of these research-based characteristics. Specifically, the researcher sought books that featured short text, relevant or age-appropriate plots, engaging and clear illustrations, and repeated lines or rhyming words. Recognizing the diverse interests, preferences, and needs of students of various ages, the researcher specifically attempted to assemble a collection of books amongst which any participant might find several appealing titles. Accordingly, various titles in the grouping included illustrations and storylines appropriate for elementary through high school aged students and relevant subject matter. To assure that everyone found personally interesting books, both categories featured a wide variety of topics and formats.

The researcher also divided books into one of two categories, trade books (TB) or modified books (MDB). Participants selected from 28 trade books and 17 adapted books (see Appendix C, for a list of titles and sources). Trade books included picture books available through bookstores or libraries. Although typically geared for younger children,
the researcher attempted to select off the shelf TBs that broadly appealed to students of various ages. In so doing, care was taken to avoid books featuring anthropomorphized animals, immature language, or subject matter irrelevant to the life of adolescents. During baseline families received these books without any modifications. In Phases 2 and 3 page fluffers were added to aid in students’ ability to interact with the book. For the final study phase members of the research team adapted the trade books to include picture symbols and cues indicating repeated lines.

To produce MDBs the principal researcher began by studying stories from the *Storytime* series (King-DeBaun, 1990a; King-DeBaun, 1990b; King-DeBaun, 1990c) and from the book *Reading activities project for older students: R.A.P.S.* by Musselwhite (1995). Created specifically for students who use AAC, these stories include picture symbols, repeated lines, and highly predictable text. The researcher then selected several texts, and with the help of a research assistant, photocopied, hand colored, laminated, and bound them to produce MDBs specifically for the targeted audience, the study participants. Illustrations primarily took the form of hand-colored line drawings or photographs and themes reflected the experience of older elementary aged students and adolescents. Also, for the purpose of fostering communication, MDBs always included at least one repeated line. Further, during baseline and Phase 2 of the study, picture symbols in these books were obscured with self-adhesive paper. Only during the AAC phase of the study did students have the ability to access these symbols. As with the TBs, for the two intervention phases of the study, researchers added page fluffers to the MDBs.

To allow for the timely procurement and production of study books, readers browsed through a sample library and pre-selected titles for each intervention phase during the pre-study visit and the first two inter-phase training sessions. Books were then received, two at a time, during the inter-phase training sessions. Specifically, the readers
received one TB and one MDB at the onset of each study phase. Research involving students with less severe disabilities showed that redundancy, or the repeated reading of the same storybook, promoted increasingly complex and specialized forms of communication as well as a greater understanding of aspects of the story (Bellon & Ogletree, 2000; Kaderavek & Justice, 2002). For that reason, while dyads received new books at the onset of each study phase, they also kept, and were encouraged to continue reading, all previous books. As a result, by study’s end each participant’s collection included six books. For the third reading of the week the readers were allowed to read any book, including books from previous study phases.

*Phase 1*

The first phase of research collected baseline data to document the pre-intervention reading behaviors and communication of the members of each dyad. This phase lasted approximately two weeks. Researchers believed two weeks would allow students sufficient time to overcome temporary performance enhancements related to the Hawthorne effect. Before beginning intervention dyads scheduled a time to meet with the members of the research team. During this baseline training session the principal investigator talked to the adult participant to (a) discuss the study and answer questions, (b) complete a basic information survey (see Appendix D), (c) train the family in the use of the camera, and (d) gather any additional information needed to plan for subsequent phases. Also, during this session adult readers received a binder with basic information to use as a reference and organizer throughout the study (see Appendix E) for samples of materials distributed during baseline).

Further, the dyads received the two books previously selected for the baseline period and a book bag for storing study materials. Adults were (a) loaned a digital video camera (unless they preferred to use their own), (b) provided videotapes, and (c)
instructed to videotape themselves reading both books with the student one time per week. Additionally, they were asked to select one book of their own choosing to tape each week. Dyads received no specific directions regarding strategies to use during baseline readings; rather, they followed their own pre-established reading routines. Further, they were encouraged to read each book as often as they liked, noting the total number of readings on a tally sheet. Finally, the researcher informed adult readers of the staggered treatment schedule involved in multiple baseline designs and provided an estimate of when the first treatment would begin.

While adult training occurred, a faculty member from the University of Wisconsin-Oshkosh, in most cases aided by an assistant familiar with the education of students with severe disabilities, used play and reading based methods to (a) assess present level of functioning, (b) determine the student’s likes and dislikes in reading material, and (c) identify physical, sensory, and environmental challenges to address in subsequent phases. During this session the faculty member also read both of the current books to the student to collect video taped evidence of baseline performance when reading with an atypical partner. These sessions lasted approximately one hour.

**Phase 2**

Following baseline, the researchers explored the effects of a sensory and control-based calming intervention addressing the students’ ability to (a) focus on the text and the adult partner and (b) exert appropriate choice and control related to reading. Occupational therapy research suggests that, for many children, especially those with sensory-motor impairments, participation in activities that meet the child’s underlying sensory needs can concomitantly increase their comfort level and improve (a) attention, (b) auditory and visual perception, (c) coordination, and (d) speech and language skills (Kranowitz, 2003). Similarly, providing opportunities for a student to actively control portions of the reading
process appears to foster additional self-confidence and self-regulation in literacy activities. Despite this, however, research demonstrates that parents of children with disabilities tend to overcompensate for their student’s needs by assuming a dominant, suppressive role in the reading process (Justice and Kaderavek, 2002). Intervention during this phase encouraged adult reading partners to use calming procedures, decrease their own autonomy during shared reading, and promote adult/student collaboration. Based upon observations of reading interactions in the baseline video recordings the researchers also made suggestions designed to improve the student’s positioning and choice of reading environment or minimize distractions. In all cases, the instruction provided purposefully excluded communication specific issues including the use of AAC.

The inter-phase training session for this four-week phase again split the dyads. The principal researcher met individually with the adults to (a) address any problems or questions that had arisen during the baseline period, (b) gather information about the participants AAC or speech related background knowledge, and (c) train the adult dyad members in the use of intervention related strategies. The researchers also documented any previous AAC use by either member of the dyad, including a brief description in the research report, and, as appropriate, considering the effects of this usage when examining the results (Koppenhaver, et al., 2004). Again videotaping procedures were discussed and the readers were provided with written information summarizing discussed strategies, to include as a reference in their binders (see Appendix F for Phase 2 training materials). While dyads could read any of the study books previously received as often as they desired, the research team requested that the dyad videotape each of the two new books once a week. Additionally, each week they were asked to videotape the reading of one other book of their choice. As a result, dyads again collected video of three readings per week. Researchers continued frequent collection of videotapes for analysis.
Also, during the inter-phase training session the faculty member and, in most cases, the research assistant, interacted with the student to (a) assess his or her needs related to AAC, (b) complete additional reading-based assessment procedures, and (c) read the new study books using the Phase 2 strategies. As in previous trainings, this session was videotaped.

Phase 3

Dyads utilized a variety of AAC-related materials in the final, approximately four-week long intervention phase. To facilitate interaction during reading, participants received a collection of AAC materials, tailored to their specific needs (see Table 7 and Appendix G). These materials included picture symbols, adapted books, voice output communication devices, and a small keychain flashlight. Researchers borrowed several of the voice output devices from a state-wide lending library for use in the study and used others from their personal collections. In two cases students used devices that they already owned rather than borrowed equipment. It was hoped that in so doing the student would benefit from use of a familiar device and the adult reader would be better able to continue applying learned strategies after the study concluded. The other two students either did not have home access to devices used at school or infrequently used voice output. Adam, Patrick, and Timothy were provided both single message and multiple message communication devices. During training sessions it became apparent that Rebecca enjoyed using the communication devices as a toy or for repetitive self-stimulatory behavior. As a result of this assessment, Rebecca received only a multiple message device.
Table 7
Voice Output Augmentative and Alternative Communication Devices Used by Students in Phase 3

<table>
<thead>
<tr>
<th>Student</th>
<th>Single Message Device (Manufacturer)</th>
<th>Multiple Message Device (Manufacturer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam</td>
<td>One Step Communicator (Ablenet)</td>
<td>Go Talk (Attainment Company)</td>
</tr>
<tr>
<td>Patrick</td>
<td>Cheap Talk 8 (Enabling Devices)</td>
<td>Step-by-Step Communicator (Ablenet)</td>
</tr>
<tr>
<td>Timothy</td>
<td>BigMack (Ablenet)</td>
<td>Cheap Talk 8 (Enabling Devices)</td>
</tr>
<tr>
<td>Rebecca</td>
<td>None</td>
<td>Tech Speak 6 by 32 (Advanced Multimedia)</td>
</tr>
</tbody>
</table>

The inter-phase training session split the dyads for part of the time, allowing researchers to provide the adult with (a) AAC materials, (b) information about using AAC during reading, and (c) strategies for encouraging communication. Strategies introduced were modeled after those outlined by Skotko, Koppenhaver, and Erickson (2004) and Light, Binger, and Kelford Smith (1994). Based upon research involving students with and without disabilities, these strategies included the following:

1. Assume meaningfulness in the student’s attempts to communicate and react accordingly (Skotko, et al., 2004). Through adopting an optimistic outlook on communication readers begin to reconsider the intent of behaviors that may previously have been overlooked.
2. “Prompt the use of communication devices or symbols through natural questions and comments rather than commands” (Skotko, et al., 2004, p.149).

3. Pause during reading to allow the student opportunities to process and communicate. Carefully provide support, as needed, after asking a question. (Skotko, et al., 2004; Light, et al., 1994).

4. Talk about the story and how it relates the student, thereby providing “scaffolding” to help improve comprehension (Light, et al., 1994, p.266).

5. Encourage repeated readings of favorite texts, allowing students to gradually take a more active role in the reading process (Light, et al., 1994).

6. Ask highly evocative questions that encourage students to infer, predict, or interpret (Light, et al., 1994; Skotko, et al., 2004).

7. Provide useful, effective vocabulary (Light, et al., 1994) that allows the adult to “ask questions and make comments that maximize the use of available symbols and voice-output messages” (Skotko, et al., 2004, p.149).

During this time the principal researcher also (a) reviewed the sensory and calming strategies discussed in the previous phase, (b) provided AAC-based materials to help in the application of these strategies, and (c) distributed printed information on the AAC-based strategies for inclusion in the adult’s binder (see Appendix H).

Concurrent with the adult training session, the student worked with the other members of the research team to evaluate and, as needed, fine-tune his or her specially designed AAC materials. This was done through reading the new study books and applying the proposed methods. To conclude the training, dyads briefly reunited allowing the adult to observe the student’s use of the AAC-related materials, ask questions, and receive advice. As part of this activity researchers demonstrated the use of the (a) keychain flashlight and (b) cloze procedure for prompting student responses.
The dyads were encouraged to continue to use strategies from the first treatment phase in combination with the AAC materials. Again researchers asked the readers to videotape each new book once a week, and requested that they record one reading of a dyad selected third book each week as well. Videotape collection and analysis continued as previously described.

Post-Study

Following completion of the final study phase the research team again visited each dyad. At this time the faculty member and assistant videotaped one reading of the last two study books and the principal researcher asked follow-up questions (see Appendix I), provided information adult readers could use to continue working with their students, and collected all loaned study materials. Post-study sessions typically lasted less than one half hour.

Procedures

Coding Videotapes

Following a basic protocol and coding system (see Appendix J) modified from those established and utilized by Skotko, Koppenhaver, and Erickson (2003a; 2003b) and Light, et al. (1994), the principal investigator analyzed and coded the interactions documented in the videotapes. The researcher specifically identified the student’s communication modes and communication purposes, as well as the adult reader’s responses to student communication and use of questions and commands. In the case of the adult reader’s communication, stating questions or commands from the actual text was not counted as a communication behavior unless the speaker embedded this text in a novel utterance or repeated the line with the specific intent of producing a student response. The basic unit examined was a single utterance, with repetitions counted
separately. Occasionally during the data analysis portion of the study the researcher discussed coding strategies with the university faculty member, an experienced observer, fine tuning definitions and creating new categories as needed.

The principal researcher reviewed and coded all of the video. To assure accuracy and interobserver agreement, another researcher, a graduate research assistant from the University of Wisconsin Oshkosh, reviewed at least 20% of the readings from every dyad. This sample included readings from multiple study phases. After studying a written copy of the coding definitions and discussing protocol with the principal researcher the graduate research assistant coded each tape. Subsequently a comparison and discussion occurred amongst the researchers focusing on disagreements and omissions until a 100% level of agreement, or consensus, was reached. Consensus included three options. A behavior could be included or excluded after discussion, or a new category could be created. Statistical analysis examined frequencies and types of interactions between members of the dyad.

**Data Analysis**

The researcher timed reading interactions, beginning when the adult reader began reciting the book title or text to the student and ending either when the adult reader declared the session over or the student terminally disengaged from the process. As the amount of time spent reading varied greatly amongst the sample, frequencies were calculated, dividing the total number of occurrences of a behavior by the length of the session. This protocol was modified from one previously applied by Koppenhaver, Erickson, and Skotko (2001) and allowed for comparison between the dyads.

**Quantity of Communication**

To determine whether intervention influenced the quantity of student communication during reading interactions the researcher first looked at all identified
behaviors combined then assessed students’ use of individual types. As a result the researcher was able to examine general trends while isolating each student’s primary modes of communication across study phases. All comparisons were facilitated by converting raw data into frequencies. To address the saliency of AAC, the researcher compared the students’ overall rate of use of (a) all communication modes except moves away and AAC (i.e. manipulation of the book, vocalizations, eyepointing, pointing or gesture, manual sign, and other book or object) to (b) AAC.

As recommended by Light, et al. (1994) and Koppenhaver, et al. (2001) analysis of the results proceeded on both the molecular (individual cases) and molar (group) levels. This allowed the researcher to identify (a) student specific and (b) group trends. As such, the researcher looked for patterns of behavior and communication evident in the performance of two or more students or adults, and noted these in the results as appropriate.

Finally, quantity of adult communication was considered. To do so researchers (a) calculated the rates at which adults performed two identified communication behaviors, (b) compared each adult’s rate across phases, and (c) examined the relationship between rates of adult and student communication within each dyad. To conclude the researcher looked for trends between dyads.

Quality of Communication

Quality was examined in three ways. First, it was hoped that students, throughout the course of the study, would begin communicating for purposes more clearly related to the reading. To examine this, the principal researcher tallied the purposes for which each student communicated (i.e. responds to adult’s questions or directives, comments related to the book, direct the reader, unrelated comments, and nonspecific) in each study phase and converted the totals into frequencies. Using these frequencies the researcher then
identified predominant communication purposes for each student. The researcher recognized, however, flaws in solely relying upon this analysis, as student’s inherent motor and language abilities could directly hamper their ability to clearly communicate for a variety of purposes.

Second, the researcher looked at the students’ use of nonspecific comments. Behaviors identified as nonspecific frequently were difficult for a reading partner to understand or served a self-stimulatory purpose. The researcher hoped that, through time spent reading and the implementation of intervention strategies readers overall clarity of communication would improve leading to a decrease in the number of nonspecific comments by the end of the study period.

Finally, the researcher compared the number of adult reader responses to the students’ communication (coded in the category adult response to student’s communication) to the total number of student communication attempts. Similarly, the relationship between the total number of adult questions (coded as adult asks a question) and student responses (coded as responds to adult’s questions or directives) was examined. In both cases the results were examined between phases and students.

Supplementary Discussions

To complete the review of data the researcher examined students’ responses to familiar and unfamiliar books. However, only one student demonstrated notable differences in this area. Additionally, the adult readers’ reactions of to the study were reviewed.
Chapter IV

Results

Researchers analyzed a total of 99 readings (baseline: 24, Phase 2: 39, Phase 3: 36) spanning 5.04 hours of videotape. Samples of the data gathered through this process appear in Appendix R. Table 8 summarizes the number and length of readings for all of the students, by intervention phase. For each reading dyad the length of shared storybook readings varied greatly from day to day throughout all phases of the study (see Figures 1 and 2). While many of the variables leading to the range of reading lengths could not be determined, the videotapes document several contributing factors including student fatigue, attention difficulties, external distractions, and seizure activity. Notably, for one student, Patrick, lengths of readings increased steadily over the course of the study. Prior to beginning intervention Patrick’s mother had expressed a desire for him to remain on task during the reading of a short book. This goal was consistently met by study’s end.

Additionally, the researchers asked the dyads to read twelve books in each of the intervention phases. No dyad completed the number of readings requested during both Phase 2 and Phase 3. In most cases readers reported that winter related health problems like colds and flu, family scheduling, work, or travel limited the amount of time available for reading. Rebecca and her caregiver completed the fewest readings overall and finished the study early, after four readings in Phase 3. During Phase 2 Rebecca’s seizure activity noticeably increased. Evidence in the videotapes demonstrates that Rebecca’s communication and participation during reading fell when seizures were the most prevalent. As a result of the increase, Rebecca began a new course of treatment at the time of Phase 3. Unfortunately, a side effect of the medication was increased sleepiness.
This led to her early withdrawal from the study, however, since Rebecca had already completed four readings in Phase 3 the results continue to include her data.

### Table 8
Summary of the Ranges of the Number and Length of Readings for All Dyads

<table>
<thead>
<tr>
<th>Phase</th>
<th>Number of Readings</th>
<th>Length of readings (min)</th>
<th>Total reading Times (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>6</td>
<td>1.25 to 6.72</td>
<td>13.47 to 20.90</td>
</tr>
<tr>
<td>Phase 2</td>
<td>7 to 12</td>
<td>0.75 to 7.33</td>
<td>26.13 to 33.68</td>
</tr>
<tr>
<td>Phase 3</td>
<td>4 to 12</td>
<td>1.00 to 7.17</td>
<td>11.28 to 38.58</td>
</tr>
<tr>
<td>Total</td>
<td>22 to 28</td>
<td>0.75 to 7.33</td>
<td>53.75 to 87.75</td>
</tr>
</tbody>
</table>

Figure 1. Total length of readings by dyad.
Figure 2. Length of readings across the phases per student.

Adam

Patrick

- Time spent reading
- Linear (Time spent reading)
Similarly, while readers were asked to videotape three readings per week, one of each study book and a third of their own choosing, this formula was not consistently followed by participants. As a result, the dyads read more books of one type at the expense of another leading to an imbalance in the overall number of readings of texts across categories. This trend and the relatively low numbers of books read overall by each participant made it unproductive for researchers to analyze readings by book type.

Quantity of Behavior and Communication

When examining students' quantity of behavior and communication researchers categorized behaviors as one of eight modes. Categories were as follows: (a) manipulates the book, (b) vocalizations, (c) eyepoints, (d) points or gestures, (e) moves away, (f) manual signing, (g) augmentative and alternative communication, or (h) other book or object. Complete definitions of these classifications are listed in Appendix J. While no instructions were given to avoid AAC use prior to Phase 3, no dyad chose to use AAC during the initial two study phases. At the same time, because of his limited ability to perform other types of communication, only one student, Timothy, was considered to use eyepointing. The points or gestures category broadly included pointing, waving, clapping, and body movements like lifting one's head.

Baseline and Phase 2

During baseline and Phase 2 students used only preexisting forms of communication. For Adam this meant that most communication attempts in the initial study phases involved pointing and gesturing, manipulating the book, vocalizations, or other books or objects. Rates at which Adam preformed these behaviors totaled 4.03 occurrences per minute for baseline and 7.12 per minute for Phase 2. Patrick and Rebecca relied heavily on vocalizing and manipulating the book. In reviewing Patrick’s videotapes
these behaviors were observed at a rate of 7.72 and 6.35 occurrences per minute, in baseline and Phase 2 respectively. At the same time, Rebecca’s rates were 2.80 and 3.54 per minute. For all three students these were the only communication behaviors that occurred more than once every minute in at least one of the first two study phases. Overall, Adam and Patrick displayed the broadest array of communication types, demonstrating use of all coded varieties multiple times over the course of the study.

Reviewing videotaped documentation of the readings revealed that Timothy’s behavior and communication during the first two study phases consisted solely of eyepointing to elements in the book, gesturing, and manipulating the book. Of these, only eyepointing, during Phase 2, occurred more often than once every two minutes (1.34 occurrences per minute). The communication acts coded as points or gestures did not actually include pointing. Rather, they were two instances when Timothy responded to his mother’s request to raise his head and three others when he lowered his arms on command. The researchers considered these behaviors intentional because, despite his difficulty controlling body movements, the relationship between the requests and actions are clearly evident when viewing the video. Similarly, Timothy manipulated the book when he bumped it with his hand after being asked to close it (see Figure 3).
Figure 3. Student’s rates of behavior and communication by type.

Adam

Patrick

Type of Communication
The overall rate of behavior and communication for three students (Adam, Timothy, and Rebecca) increased over the course of the study (See Table 9). At the same time Patrick’s rate decreased. However, his rate during baseline was the highest of all four students, nearly doubling that of the second highest student (Adam). Further, Patrick had the highest rate of communication over the course of the entire study and, when comparing phase by phase rates, the most consistent numbers overall. Data analysis also showed that individual student’s rates of communication varied greatly from one reading to the next (see Figure 4). Error! Not a valid link.
Figure 4. Student’s overall rate of behavior and communication across phases.
Timothy

Rebecca

Readings

Rate (occurrences per min)

- Student behavior and communication
- Linear (Student behavior and communication)

Readings

Rate (occurrences per min)

- Student behavior and communication
- Linear (Student behavior and communication)
Phase 3

Devices to aide in communication, including voice output AAC and picture symbols, were provided to the dyads in the final study phase. To examine the effectiveness of their use the researcher compared each student’s rate of AAC usage to the rate of all other types of behavior and communication except those coded as “moves away.” Moves away data was excluded from this category because it primarily served the purpose of attempting to terminate reading sessions and could not be performed by Timothy. Immediately upon entering Phase 3 all readers quickly began using AAC. Two readers, Adam and Patrick, demonstrated slight to moderate decreases in their level of other forms of communication coinciding with their initiation of AAC use. During the reading of two non-study books Adam’s father did not directly provide him access to AAC, yet, even in these readings he independently sought a device and used it minimally. Patrick’s use of AAC never outpaced his communication by other means. The other readers (Timothy and Rebecca) relied almost completely on the use of AAC during the final phase of intervention (see Figure 5).
Figure 5. Student’s rate of behavior and communication by type across phases.

Adam

Patrick
Timothy

Rebecca

Readings

Rate (occurrences per min)

Augmentative and alternative communication (AAC)
Others except moves away (MA)
Linear (Augmentative and alternative communication (AAC))
Linear (Others except moves away (MA))
Quantity of Adult Communication

Further, the principal researcher calculated the rates of two adult communication behaviors, adult responds to student's communication and adult asks a question or makes a command. During the initial two study phases three readers, Adam's father, Patrick's mother, and Rebecca's caregiver demonstrated rates of response to student communication greater than two times per minute. Over the same period adults in these dyads also asked questions or made commands frequently, ranging from 3.87 to 7.77 times per minute.

Despite study directions to the contrary, Timothy's reader varied in the baseline period. In different readings Timothy worked with his mother, father, and brother. During the second training session researchers reemphasized the importance of a consistent reader and in all subsequent readings Timothy read with his mother. Overall, Timothy's reading partners during baseline questioned or commanded him at a rate of 1.58 occurrences per minute and responded to his communication less than once per minute (0.05). In Phase 2 Timothy's mother questioned or commanded 7.54 times per minute and responded to his communication at a rate of 0.64 times per minute. The minimal number of adult responses for Timothy reflects his low rate of communication during these intervals. Examining the rates of identified communication of adult dyad members reveals increases in all participants' responses to their student and use of questions and commands. A comparison of the rates of adult and student communication by dyad appears in Figure 6.
Figure 6. Comparison of Adult and Student Rates of Communication.
Readings

Timothy

Rebecca

Student's behavior and communication
--- Adult's communication
Linear (Adult's communication)
Linear (Student's behavior and communication)
Quality of Communication

The principal researcher also attempted to identify the purposes of students' communication behaviors. All occurrences of communication were assigned one of five descriptors: responds to adult, comments on book, unrelated comments, directs reader, or nonspecific. In baseline and Phase 2 of the intervention Adam, Patrick, and Rebecca performed communication acts that served one of these functions at a rate of at least one every two minutes. However, their specific communication profiles revealed very different aims. While Adam most frequently communicated to respond to the adult’s questions or commands, Patrick directed the reader and Rebecca commented about the book. In Phase 2 Patrick’s dominant purpose for communicating changed to “responds to questions” while Adam’s and Rebecca’s remained the same as in baseline. Because of the difficulty interpreting the meaning of Timothy’s uncontrollable body movements discussed previously all of his communications during baseline and Phase 2 were considered a response to a question or command. With the addition of AAC in Phase 3 Timothy’s communicative purposes increased to include all possible modes.

Students’ Use of Nonspecific Comments

Communication behaviors of unclear meaning and those that did not readily fit another category were considered nonspecific. Examining the rate of occurrences of nonspecific communication revealed notable differences between all four students (see Figure 6). Patrick’s rate of nonspecific comments decreased steadily over the course of the study. In contrast, Adam, Timothy, and Rebecca increased their rates of the same behavior. Adam’s communication of this type rose gradually from baseline through Phase 3 and roughly parallels his increased usage of AAC. As mentioned previously, all of Timothy’s baseline or Phase 2 communication was considered a response to the adult.
Resultantly, Timothy’s rate of nonspecific comments peaked in Phase 3 at an average rate of 0.75 occurrences per minute.

Rebecca’s rates of AAC use and nonspecific comments were roughly parallel, as almost all of her Phase 3 communication was found to be nonspecific uses of AAC. Documentation of Phase 3 readings reveals Rebecca’s problematic fascination with her AAC device. Rebecca perseverated on approximately three messages when using the communication devices, and failed to develop meaningful AAC use despite attempts by the researchers and caregiver to overcome her fixation. As a result, her caregiver resorted to hand-over-hand prompting of device use. According to information gathered during a phone conversation with her caregiver, nearly all of the hand-over-hand AAC activations noted on the videotape were completed with little, if any purposeful assistance from Rebecca. At the same time, Rebecca’s stopped using vocalizations during reading when an AAC device was present. This finding, however, may also relate to her increased seizure activity during the final phase of the study.
Figure 7. Comparison of student’s rate of usage of nonspecific communication and augmentative and alternative communication.

Adam

Patrick
Timothy

Rebecca

Readings

Rate (occurrences per min)

- Augmenative and alternative communication (AAC)
- Nonspecific communication (NS)
- Linear (Augmenative and alternative communication (AAC))
- Linear (Nonspecific communication (NS))
Adults’ Questions and Commands

One component of Phase 3 training was a discussion of adult’s communication strategies. Readers were instructed to ask questions more frequently than they made commands. Further, they were encouraged to use wait time to allow their student a chance to process and respond. While each of the four readers used increasing rates of questions or commands as the study progressed, the rate of increase was less than their overall increase in measured communication variables (see Figure 7).

Figure 8. Comparison of adult’s rates of questions and commands to their rates of overall communication.
Adults’ Responses to Students’ Communication

To gain insight into the adults’ understanding of their students’ messages, researchers compared the adults’ rates of response (ARC) to the students’ overall rates of behavior and communication (see Figure 8). In every dyad adult readers increased their responses to student’s behavior and communication over the course of the study, even when student communication decreased (Patrick). In the other three dyads (Adam, Timothy, and Rebecca) students’ communication gains outpaced the rate of improvement in adult responses to this communication.

While the data gives little insight into the specific reasons for the increases in adult responses, adult training during Phase 3 may be a factor. In the Phase 3 training sessions adult readers learned about interacting with their students as part of the reading process. These discussions included the concept that readers should assume meaningfulness in the student’s behavior and communication and react accordingly.
Readers also learned the importance of talking to their student about the story and finding ways to relate it to his or her personal experiences, interests, and sense of humor.

Figure 9. Adult’s rate of response to student’s behavior and communication.
Students’ Responses to Adults’ Questions or Commands

Similarly, researchers compared the adults’ rates of asking questions or making commands (AAQ) and students’ rates of responding (RQ). Three students, Adam, Patrick, and Timothy responded to questions and commands more frequently as the study progressed. The fourth student, Rebecca, responded less frequently, however, this decrease coincided with her increased seizure activity. In Adam’s dyad, both readers’ rates grew to a roughly uniform degree. Patrick’s mother held her rate fairly constant throughout the study. The last two dyads (Timothy’s and Rebecca’s) saw adult questions and commands increase at a rate noticeably outpacing student responses.
Figure 10. Comparison of rate of adult questions and commands to students' responding.

Adam

![Graph showing adult questions and commands vs. student responses]

Patrick

![Graph showing adult rate of questioning or commanding vs. student responses]

Legend:
- Adult's questions or commands (AAQ)
- Student's responses (RQ)
- Linear (Adult's questions or commands (AAQ))
- Linear (Student's responses (RQ))
Rebecca’s Response to Familiar Books

No clear differences were observed between students’ rates of communication when reading familiar versus unfamiliar books for Adam, Patrick, and Timothy. Rebecca’s communication during the reading of familiar books in Phase 2, however, deserves attention. Early in Phase 2, prior to her increase in seizure activity, Rebecca communicated frequently when reading familiar books considered by her caregiver to be her favorites. However, Rebecca rarely vocalized when reading other books (see Figure 10). In the middle of the fourth reading in Phase 2 Rebecca suffered a seizure. Reports from her caregiver indicate that Rebecca’s seizure activity persisted through the remainder of Phase 2 and throughout Phase 3. Rebecca rarely vocalized, regardless of the type of book read, after the seizures became more pervasive.

Figure 11. Rebecca’s communication in Phase 2 during the reading of familiar books.
Following the final phase of the study adult readers were asked to complete a simple questionnaire about their experiences. All dyads complied. Adam’s father, Patrick’s mother, and Timothy’s mother all reported seeing uniformly beneficial changes in their sons’ behavior and communication over the course of the study. Further, they all considered their reading opportunities to be a mutually enjoyable experience. Adam’s father commented that the training he received was useful, and that learning to use the AAC devices was the most challenging aspect of the study. At the same time he believed that his son benefited from the adaptations made to books (page fluffers and incorporated picture symbols) and the time spent reading, listening, and communicating.

Patrick’s mother echoed many of the previous comments, but recommended involving adult readers in practice during training sessions. She found the durability of the laminated books and focusing assistance of the small flashlight provided in the study supplies especially helpful. She also commented that Patrick made frequent use of the page fluffers when turning pages. Finally, she stated that it was sometimes difficult to judge whether Patrick was ready to read and that finding a regular reading time proved challenging amidst seasonal illnesses, family demands, and the hectic pace of life.

Timothy’s mother also found training useful, especially the portions dealing with the use of repeated lines and AAC. She found the researchers interactions with her son to be most beneficial and agreed that it was sometimes difficult to incorporate learned strategies and new materials into the reading process. She also commented that it was hard to wait for his responses and physically balance all of the materials needed during the AAC phase.

Rebecca’s caregiver also believed the study benefited herself and Rebecca. However, she stated that Rebecca’s obsession with AAC use led to decreases in her
overall participation during Phase 3. While all trainings were clearly explained, Rebecca’s caregiver felt that Phase 3 training was the most helpful. She and Rebecca already practiced many of the strategies taught in Phase 2 and read together very frequently prior to beginning the study. She also commented that Rebecca enjoyed most of the study books and liked to be able to pick what they were going to read together. Finally, the failure of AAC and her related discussions with the principal researcher led Rebecca’s caregiver to a deeper understanding of Rebecca’s love of what she called “repetition and memorization.”
Chapter V
Discussion

Analysis of the data collected revealed encouraging trends in the rates of communication of students in the study, suggesting that even students with significant disabilities can benefit from shared storybook reading. While the present study focused on somewhat different variables, the results appear similar to the findings of other researchers (Koppenhaver, Erickson, Harris, et al., 2001; Koppenhaver, Erickson, and Skotko, 2001; Skotko, Koppenhaver, and Erickson, 2004) who documented increases in the symbolic communication and labeling behavior of girls with Rett syndrome as the result of the introduction of augmentative and alternative communication (AAC) into the process of shared storybook reading. Koppenhaver, Erickson, Harris, et al. (2001) define symbolic communication as the appropriate use of AAC devices or symbols with concomitant recognition and response by the adult reader. While readers in the present study were given no specific instructions to avoid AAC use in baseline or Phase 2, no readers used AAC devices or symbols until it was presented by the researchers in Phase 3. In the previous research only one girl with Rett syndrome used AAC prior to its official introduction. As a result, in both studies rates of symbolic communication peaked after the inception of AAC use. Further, these outcomes were achieved through a short-term intervention requiring little specialized training.

Phase 2 and 3 Results

Considering the results of the present study, the principal researcher cannot ascertain how much of the improvements in students' rates of behavior and communication during Phase 2 related directly to the sensory and control-based calming intervention. Other factors, potentially including increases in reading opportunities as
well as changes in adults’ (a) perceptions of students’ communication, (c) level of
confidence, and (d) familiarity with the process may also have played a role in student
success. In their work Koppenhaver, et al. (2001) provide similar suggestions of
causality. At the same time, however, the potential value of the interventions utilized
should not be discounted. Environments free from distraction support the learning of
students who feel settled and in control. Within the parameters of this study it is difficult
to specifically measure the degree to which these factors influenced the observed changes
in student performance.

Further, the adults’ prior experiences and related education may have impacted
students’ performance, although more research would be necessary to accurately
determine the impact of this variable. On the other hand, adults’ experience may have
more critically impacted student performance during the period prior to the study. For
students working with highly experienced adults, intervention may have actually leveled
the playing field, providing everyone with similar knowledge and equipment. This may
be reflected in Rebecca’s early success with vocalizations.

Phase 3 data appears to more conclusive. Immediately following the provision of
(a) augmentative and alternative communication (AAC) materials and (b) adult reader
training, all students achieved relatively high rates of AAC use. In general, students who
used multiple modes of communication prior to the study and during videotaped readings
(Adam and Patrick) appeared to communicate more frequently than those who used fewer
modes of communication (Timothy and Rebecca). Additionally, Adam and Patrick were
better at maintaining the use of other forms of communication after the introduction of
AAC.
Quantity of Communication

Researchers were encouraged by the generally upward trends in all students’ communication. For example, Timothy demonstrated promising improvements in communication as the study progressed. However, the current study lacks measures to determine if his gains, and those of the other students, related to the (a) interventions, (b) increased opportunity, or (c) other factors. Timothy began the study as primarily a non-communicator in reading situations. His development of skills seemed to hinge primarily on three factors, (a) his mother’s increased use of questions and commands, (b) his mother’s improved recognition of his communication, and (c) his use of AAC.

Implications of the research on home and school routines

While shared storybook reading has the potential to improve students’ communication it remains the first step. For all of the students, including Timothy, improvement in communication during reading remains insufficient for meeting daily needs and improving quality of life. As such, dyad members must learn to apply these skills in other situations. Those individuals interested in truly improving the lives of students like Timothy must find ways to move students beyond early communication and literacy skills, toward advanced communication, conventional literacy, and more effective and diverse applications of these tools.

Patrick also saw great gains in his attention to the book and communication. Patrick’s early readings depict a resistant student who often began readings by performing the avoidance or self-injurious behaviors he often employs elsewhere. Fortunately occurrences of these behaviors rapidly decreased. By study’s end Patrick (a) remained focused for extended periods of time, (b) pointed at elements in the text, and (c) seemed to enjoy reading with his mother. Repeated practice, patience, and persistence seem to have given him the opportunity to succeed. The same traits were apparent in the
readings of the other dyads as well. Other educators wishing to replicate Patrick’s success should remember these dynamics.

The results suggest that all of the subjects, regardless of their perceived level of ability, could benefit from some form of literacy instruction. This becomes especially important when considering the goals and objectives commonly found on students’ individualized instructional plans (IEP) and their daily home and school routines. The principal researcher remembers an instance, when observing Patrick’s classroom several years ago, in which an educational assistant related that she did not see the point in reading to the students. She considered them “too disabled” and thought reading to the students was a waste of her time. When he was about 11 years old Adam’s family was told at an IEP that it would be “unfair” to include literacy in his goals and objectives. His teacher saw literacy in the traditional sense, as a hierarchy of required steps. In other words, she missed the point. Unfortunately, this attitude persists in many classrooms. The fact that no student in the study receives literacy instruction in the school setting confirms this, and suggests that parents often (a) buy into the argument of incapability, (b) believe they have little power to affect change, or (c) lack the knowledge of how to promote their child’s literacy.

One area of concern that emerged when analyzing the data, however, was the decrease in other communication behaviors that occurred as students began using AAC. This was especially pronounced in Timothy and Rebecca’s dyads. While some decrease in other forms of communication should be expected as students develop more effective modes, the AAC materials supplied were insufficient for meeting many of the student’s reading related communication needs. Perhaps a parental focus on AAC use was partially to blame, as adult questions or commands during Phase 3 placed a new emphasis on voice output devices (e.g. can you push the button?) reflecting their desire for the
students to achieve success. In any event, educators and families pursuing AAC use should carefully monitor their students’ communication. By promoting any forms of communication which effectively and appropriately support the learner’s needs, and reinforcing continued use of previously learned skills, educators and families can help students develop a broad repertoire of applicable skills. This, in turn, fosters generalization of learned skills to new situations.

**Quality of Communication**

Through the development of alternate, supplemental forms of communication many students with severe speech and motor impairments (SSMI) move beyond basic forms of interaction toward those that promote increased socialization, inclusion, and autonomy. At the same time, as students become more skillful, the listeners’ understanding of the student’s communication improves. Changes in the adults’ perception of the students’ communication are reflected in the fact that adults more frequently responded to the students’ attempts as the study progressed. Students, with the exception of Rebecca, were also observed to increase their rates of response to adult questions and commands. One could suggest that altering adult perceptions of students’ capacity to communicate related directly to the improved level of interaction documented in the videotapes.

For students with SSMI an improved ability to express themselves can also lead others to question their beliefs about the students’ capability as a learner. Unfortunately many people mistakenly assume that individuals who cannot talk are also incapable of literacy. Rather, they lack the skills to demonstrate their aptitude for literacy learning. Shared storybook reading can serve as a venue in which these individuals can display their competence.
At the same time, one should consider the level of nonspecific communication by students. For all students except Patrick, nonspecific communication increased over the course of the study, becoming especially prevalent in Phase 3. Factoring out Rebecca’s problematic use of AAC, the communication of Adam and Timothy may imply that learners need a breaking in period, during which they become accustomed to AAC use. The AAC materials employed provided all students instant access to applicable, story-specific vocabulary, yet, most students demonstrated multiple instances of inappropriate utilization of the devices. Frequently these appeared to be the result of (a) playing, (b) self-stimulatory behaviors, (c) perseveration, or (d) inaccuracy. Ultimately, additional practice over an extended period of time using AAC both in storybook reading and other settings could potentially decrease students’ level of nonspecific comments and improve communication overall.

Students with Limited Speech

Rebecca’s difficulties during Phase 3 highlight an important point. For people who already possess limited speech, individuals planning for the student’s use of AAC must carefully consider the function of that speech. In many ways from the beginning of the study Rebecca and her caregiver already used her voice in much the same way other pairs used AAC in Phase 3. The pattern they followed, in which the adult reader leads the student to comment by reading up to the repeated line and inserting a pregnant pause, was repeated by the other adult readers in Phase 3. As a result, Rebecca was already successfully involved in the types of interactions the study promoted.

Additionally, Rebecca’s level of involvement in familiar texts on days when she was not experiencing the effects of a recent or impending seizure, demonstrated the potential merit of repeated storybook readings. Rebecca learned the text of the book through repeated reading, anticipated what was going to happen next, and used her voice,
albeit in a repetitive fashion, to talk about the story. This was apparent during Phase 2 as Rebecca and her caregiver read one of her favorite stories, “Stanley and Rhoda,” by Rosemary Wells. As the reading progressed Rebecca became more and more involved in the story. She excitedly repeated “Daddy, Daddy, Daddy,” early in the story, to which her caregiver responded “What will Daddy do? Yeah, does it talk about Daddy?” Over the next few minutes they read on together, with an occasional burst of excited chatter. Rebecca happily chimed in giving the name of Rhoda’s doctor... “Zuckerman,” then promptly finished her caregiver’s sentences with words like “butter,” “Henry,” and “ball.” Finally, they came to what appeared to be Rebecca’s favorite part of the story. After visiting the doctor Rhoda is given a treat. Rebecca knew what would happen next, and she jumped in with “muffin to cheer you up!” Her caregiver, talking to the camera commented, “She knows this book by heart.”

Rebecca’s communication during familiar stories was encouraging, yet, when given AAC, Rebecca’s vocalizations disappeared. Perhaps to Rebecca, the imposition of an artificial system of communication into a process in which she already was successful seemed pointless. While her vocalizations primarily occurred during the reading of familiar books it would have been interesting to continue monitoring Rebecca after the study period to see if repeated readings of these books eventually led to the same level of student participation. Similarly, a longer period of examination in which the other study participants reread study books and used AAC may have revealed increases in their participation and independence. Rebecca’s failure to communicate effectively with AAC in the context of storybook reading does not imply that it would not be useful in other situations. It is possible that Rebecca would more appropriately use AAC if she were in a situation where the level of communication required to successfully complete the task was greater than what she could accomplish with her voice.
Overall Conformity with Study Directives and Length of Readings

The demands placed upon families in general and especially those with a student with a severe disability may be reflected in the dyads' frequent failure to complete all readings for a given phase and the decreasing length of readings in Adam's and Timothy's groups. All four students had at least one other sibling in the home. As a result the adult readers, including Rebecca's caregiver, juggled the competing demands common in families today. Despite directions to the contrary adults often clustered readings, going through two or three books on a single day, instead of spreading them out, one per day over the course of a week. In several cases adult readers verbally stated that they experienced difficulty completing their readings because of the hectic family schedule or the health of the student.

Similarly, these types of interferences may hamper a student's progress in the classroom, especially when placed in segregated programs, as were the students in this study, where educators use much of the day to care for student's basic needs. Educators and families of students with severe speech and motor impairments, who wish to engage in a literacy-based communication program such as this one, must recognize these issues and find ways to overcome them. Timothy's mother acknowledged this when she listed as a priority, home and school working together as a team to develop and implement strategies.

Limitations

Inherently, much of the research involving individuals with severe disabilities has limitations related to the diversity of the population. The range of ages and student characteristics present in the current study also restricts generalization of the results. As such, the patterns of communication observed when Adam, Patrick, Timothy, and
Rebecca followed study procedures and read with an adult may not be representative of all students with SSMI. However, three students, despite their diversity, appeared to benefit from instruction. This in itself suggests the potential power of shared storybook interventions combined with the use of calming strategies and AAC. At the same time, one must note that the current investigation remains insufficient to clearly demonstrate which factors contributed the most strongly to the changes observed.

Admittedly, the researcher also recognizes flaws in the coding procedures used to analyze videotapes. Employing an individual with more experience evaluating observational data, either as the primary or secondary rater would allow for more accurate description and analysis of communication behaviors. Further, to combat rater drift, the second rater should review videotapes early in the data analysis process, roughly in parallel with the primary rater. Prompt review would strengthen the discussion between the two raters, as observations would be fresh in their memories, allowing adjustments in procedures to immediately effect coding and preventing some of the need to reexamine readings in light of new codes.

Implications for Practice

Shared storybook reading can serve as a powerful means of promoting communication for students with severe disabilities. Storybooks focus their readers’ attention on a specific subject depicted on an open page. Illustrations clarify the meaning of the words, helping both partners understand each other’s communication and further narrowing the frame of reference. Those interested in using shared storybook reading as an intervention tool should begin with certain general expectations. Practitioners must:

- Anticipate inconsistency- Our research showed that factors often beyond our control, like seizures, sensory needs, health, and attention to task often hampered
students' performance. These findings are consistent with research related to the learning characteristics of students in this population. However, the persistence of the adults in the present study demonstrated that, given time and patience, students can make progress.

- Minimize distractions- While students can benefit from reading with groups of peers or siblings, reading to improve communication appears to work best, at least initially, in one-on-one settings. Together, in a quiet home, a student and adult are able to focus jointly on a text and each other. Through this intimate relationship the dyad builds a bond of communication and understanding. The presence of distractions, like noisy siblings, television, or a family pet may steal the readers’ attention and ultimately weaken this bond.

- Read and reread- Repeated readings of favorite texts finds strong support in research conducted with students without disabilities. In the present study increased reading opportunities may have led to improved attention to task and ultimately higher rates of student communication.

- Thoughtfully select texts- Find interesting, age-appropriate books that include repeated lines. Appealing reading materials support students’ attention to task and learning. Books with repeated lines provide students more frequent opportunities to communicate through AAC or other means using predictable vocabulary.

- Carefully consider communication- Evaluate the student’s current communication repertoire before adding supplemental forms. If the student already has an appropriate and effective means of communicating during shared reading, do not replace it. Rather, use AAC to expand the student’s communication to meet new challenges.
Implications for Research

For students with SSMI, becoming increasingly competent communicators appears closely linked to becoming literate. Toward this end, students must move beyond emergent levels of literacy toward conventional literacy. While research documents successful literacy instructional programs for students with SSMI, many educators continue to overlook its potential benefits. To narrow the gap between research and practice researchers should ensure the accessibility of the interventions utilized. Programs should be easy to follow and understand. Readily replicable protocols and reliance upon readily available materials also would encourage educators to put strategies to use in their own classrooms. Perhaps most importantly, educators must understand that literacy is more than reading and writing and recognize its significance to students with SSMI. To accomplish this, researchers need to find ways to encourage teachers in the field to reconsider their views of students' abilities and needs. Unfortunately, even the best instructional efforts will likely meet with failure unless teachers hold the basic belief that students with SSMI can attain literacy.

Effective instruction also requires careful assessment of students' learning. As such, researchers need to find new ways to assess the progress of students who use nonverbal forms of communication. While assessment provides essential information directing instruction, proof of progress, even minor, encourages those supporting student learning as was apparent in the comments of adult readers in the present study. Similarly, in future storybook reading studies researchers should seek to find more specific and objective ways to measure and analyze the quality of communication. Many student specific factors influence individual performance and cloud the interpretation of the results. Seeking a more homogeneous sample or narrowing the study focus to a specific characteristic of communication could help in this area. Additionally, further research
should more carefully examine the relationship between adult behavior and communication and student communication.

Adults’ use of the cloze procedure and nonverbal behaviors, such as pointing, for prompting a student response was not included as a study variable. For example, when reading a page from a *Dark Dark Tale*, Adam’s father prompted device usage without asking a question or making a command by saying “and in the corner there was...” emphasizing the last word and leaving a pregnant pause. Adam responded using his switch to say “a dark, dark” after which his father added “cupboard.” Adam’s portion of this conversation was coded as AAC use for the purpose of commenting about the book (CB). Following this, his father demonstrated an adult response to student’s communication (ARC). For most students the use of the cloze procedure for prompting only occurred after the introduction of AAC. Rebecca’s caregiver, however, used this strategy to prompt her speech from the beginning. Similarly, in all study phases adults were occasionally observed pointing to elements in the book to prompt communication.

The author recommends that others interested in performing similar research rethink the adult coding categories to include adult prompting of communication through the cloze procedure and nonverbal means. In the example above his father’s initiation of communication would be coded in a new category, and Adam’s reaction would become a use of AAC in response to an adult (RQ). In the present study, failure to address means of prompting besides the use of questions and commands may have skewed students’ (a) rates of response to adult questions and commands and (b) use of comments related to the book. For a student like Adam, adding in the proposed adult coding categories would have shown that he had a greater number of opportunities to respond than have been identified in this study. At the same time, Adam’s rate of comments related to the book
would have dropped concomitant with an increase in responses to questions or commands.

Finally, little research has been conducted looking at the needs of older learners with SSMI whose skills fall in the emergent level of literacy. Like those students who participated in the present research many individuals, for one reason or another, have not been able to develop conventional literacy skills. Research in this area should focus on both on reasons for prior failure and instructional materials and strategies. Through a better understanding of what has been tried, researchers can devise new approaches to instruction. Further, research must carefully investigate reading materials. Older students present challenges when looking for interesting, age-appropriate storybooks. Many books developed for typical emergent readers do not relate to the lives of older elementary aged students, let alone adolescents and adults who struggle to learn to read. As a result, appropriate texts often must be adapted or specially written. Unfortunately, most educators have little extra time to specially create the volume of books needed by older students engaged in literacy learning. Researchers can promote this process by developing a clearer understanding of the needs of older learners and describing, in a practical way, the characteristics of a good book. As much as possible, these books should be readily available or easily adapted from an existing source.

Over the course of the study Adam, Patrick, Timothy, and Rebecca, despite their apparent differences, demonstrated the value of reading to students with disabilities. Adam and Patrick demonstrated that, even with limited means of communication, a student still can have much to say about an interesting book. Timothy emerged from relative silence to become an active participant in reading while his mother became more adept at fostering his participation. Rebecca, in her own way, joyously retold aspects of her favorite books, hinting at the power of repeated readings for students with SSMI.
Even Patrick, the most resistant student initially, appeared to enjoy reading by study’s end. The students’ achievements were accomplished primarily through the dedication and persistence of their adult readers, with little specialized training, few materials beyond appealing books, and no school-based literacy instruction. Reading together required little time, and all readers reportedly found their interactions enjoyable. Admittedly, while taking students beyond emergent literacy and basic communication becomes more difficult, the progress of these students, offers a glimpse of possibility. To truly impact the quality of life of students with SSMI educators must accept the vision of these individuals as literate members of society and take up the challenge of finding new ways to understand and teach them.
Appendix A

Institutional Review Board Approved Materials
IRB PROJECT SUMMARY

A. Project Overview

1. **Project title:** Assessing the Communication of Students with Severe Speech and Motor Impairments During Home-Based Literacy Activities

2. **Principal Investigator's name:** Amy Cox (to conduct research as part of Special Education 790 under the guidance of Dr. Wayne Swanger and Dr. Billie Jo Rylance)

3. **Date:** October 5, 2004

4. **Abstract:** Individuals with severe disabilities have difficulty (a) developing social relationships, (b) producing meaningful and independent forms of communication, (c) building literacy skills, and (d) accessing academic and work opportunities. However, when provided individualized intervention, research suggests that students with severe disabilities, including severe speech and motor impairments, can develop the skills needed to participate in discussions during reading activities, a first step toward diminishing some of the fore-mentioned difficulties (Koppenhaver, 2000; Koppenhaver, Erickson, and Skotko, 2001). Research confirms the benefits of balanced literacy approaches that include reading, writing, speaking, and listening when working with students with severe disabilities. Balanced literacy helps these individuals develop the tools needed to foster relationships, improve communication, and increase access to education and vocations. Over the course of the 2004-2005 academic year, the investigator will design and conduct a research-based home literacy intervention with four students with multiple disabilities that include severe speech and motor impairments. All of the individuals have
been labeled cognitively disabled by their respective schools and three are further classified severe. Following a four phase research design, dyads, consisting of a parent or family designated caregiver and a student, will videotape themselves reading picture books twice a week for four months. The intervention phases will include a baseline period, followed by the introduction of simple augmentative and alternative communication devices (AAC) and training for members of the dyads in strategies to improve the quality and quantity of interactions during reading. Videotaped reading sessions will be viewed and coded by the researchers, looking specifically for changes in the frequency of interactions, as well as at the types of communication behaviors engaged in by participants. Based upon the results of the study suggestions will be offered for future analysis and practical application.

B. Participants:

1. Describe the pool(s) of human participants you will be using:

   a. **Sex, race, or ethnic group, age range, etc.:** Four children will participate in the study. These school-aged students are between 6 and 18 years of age. Additionally, family members or family designated caregivers will read to the children. These adults are at least 21 years of age.

   b. **Affiliation of participants:** The participants are not affiliated with any institutions.

   c. **Participants’ general state of health:** The students have severe disabilities affecting their ability to function successfully and independently. Additionally, some of the children have disability
related health problems which will not be affected by the study. None of the participants, adults or children, will be labeled as mentally ill.

d. *Number of participants*: Ideally, eight individuals will participate in the study. These subjects will form four dyads, each consisting of one student and his or her parent or family designated caregiver.

e. *If human participants are minors, mentally incompetent, prisoners, or legally restricted groups, give an explanation as to the necessity for using these particular groups*: The development of literacy and communication skills can significantly improve the quality of life of individuals with severe disabilities. To reap this benefit, educators must have research-based teaching strategies to choose from when planning individualized classroom instruction. In order to develop this pool of knowledge, research needs to be conducted with the individuals it is designed to benefit, children and youth with real disabilities. Since the learning characteristics of students with severe speech and motor impairments are unique, it is not possible to generalize research results from a different group. Through the simple, noninvasive process of analyzing the reading related communication of students with disabilities and those who read to them the researchers hope to gain insight into the students’ and adults’ needs, and which strategies appear the most effective.

C. Procedures:

1. *Contacting Participants*: Families will be recruited through local parent groups and recommendations from professionals in the field. To enroll a
student in the research, families will be contacted via telephone, by the principal investigator or another member of the research team. The project will be described to the family, and subsequently, they will be provided a written description of the research and the obligations of participants. Families will have an opportunity to ask questions about the project and, if desired, meet with the investigators. Individuals who agree to become part of the study will be asked to sign an IRB approved consent form and return it to the research team.

2. **Data collection:** The principal researcher and three other members of the research team will participate in data collection and analysis. The other researchers include Dr. Denise Clark, assistant professor of special education, and two graduate students. Three types of data will be collected. First, the adult dyad member will videotape the dyad’s interactions during the reading of one familiar and one unfamiliar text two times per week for the duration of the study. Videotapes will be collected by the research team. Videotaped interactions will be coded by the members of the research team, following a format utilized in previous studies by Koppenhaver, Erickson, and Skotko (2001) and Light, Binger, and Kelford Smith, (1994). Second, researchers will video tape the child’s portion of inter-phase training sessions. These tapes will not be coded, but will be used by the research team to make decisions regarding intervention and the child’s unique needs. Third, as deemed relevant to the study anecdotal, conversation-based notes gathered during conversations with the adult participants at inter-phase training sessions or at other times throughout the study will be documented.
3. **Personnel:** The research team will include the principal investigator, who will be responsible for study design, implementation, and analysis of data. Dr. Billie Jo Rylance and Dr. Wayne Swanger, associate professors of special education, will oversee the project as part of the principal investigator’s completion of coursework for Special Education 790. Dr. Denise Clark, assistant professor of special education, will (a) advise the principal investigator, (b) assist with assessment of students (to be conducted during the inter-phase training sessions), (c) help develop individualized strategies for using AAC and conversation-based strategies, and (d) assist with parent training. Additionally, two graduate research assistants will help with videotaping and coding, act as resource people for families, and participate in inter-phase training sessions.

4. **Research location:** Inter-phase family training sessions will occur at the University of Wisconsin Oshkosh in Nursing Education 210 and other rooms as needed. If this location presents a significant inconvenience to families the research team will make every effort to provide an alternative location. Dyads will read in the privacy of the child’s home.

5. **Project duration:** The subjects will participate for a four month period. Participants will set their own weekly schedules, spending at least 10 minutes, two times per week, reading at home. Additionally, four training sessions will be held for each family. These will last approximately 2 hours each. Additionally, members of the research team will spend up to approximately 2 hours with each of the dyads collecting videotapes and providing assistance. The exact amount of time necessary for this function
will be determined during the course of the study. Data analysis should be completed by May 2005.

6. Data storage: Videotaped documentation of dyad interactions and the results of the coding process will be maintained in the locked file cabinet in NE 411, Dr. Clark’s office. Individuals with access to the data will be limited to the principal researcher, Dr. Clark, Dr. Rylance, Dr. Swanger, and the graduate assistants.

D. Risk/deception:

1. Describe in detail any physical, psychological, social, legal, economic or other risks you can foresee, both immediate and long range:
   a. Immediate risks: The researcher foresees no immediate risks.
   b. Long-range risks: The researcher foresees no long-range risks.
   c. Rationale for the necessity of such risks: The principal activities to be conducted by adults or students participating in the study (a) reading together, (b) using assistive technology and conversation building strategies, (c) video taping reading activities, and (d) attending inter-phase training and assessment sessions, are not inherently risky behaviors and are unlikely to cause physical harm. Families will assume no economic risk while participating in the study. Unless families prefer to use personal video equipment, researchers will provide all materials required for completion of the study.
   d. Alternatives that were or will be considered: If requested by the family member or caregiver a family representative other than the adult may attend the child’s portion of the training session. If this
is not possible, the training sessions can be modified to allow the adult to observe the student during training.

e. *Why alternatives may not be feasible:* Modified inter-phase training would increase the length of training sessions; however this should not be an insurmountable challenge.

2. "Non-Beneficial Research": This research project will benefit the members of the dyads by providing opportunities for a family member or caregiver to interact with the student through the reading of a book. Further, through the intervention both members of the dyad should develop skills needed to improve the quality of interactions during reading and in other activities. Finally, sharing time together has many benefits beyond the scope of this project.

3. *If deception will be utilized in gathering data:* Deception will not be used as part of this project.

E. Safeguarding participants’ identities:

1. *How will information obtained from the participants be used?* Information obtained from the participants, in the form of videotaped documentation of reading interactions and training sessions, and notes from discussions with the adults will be analyzed and, in the case of videotaped reading, coded by the researchers. Notes from conversations with the adults will be used, as appropriate, to clarify findings, provide background on the members of the dyad, and aid in assessment and project planning.

2. *What elements of your project might be openly accessible to other agencies or appear in publications?* The project will be written up as a thesis or field report by the principal investigator, including a (a)
description of the methodology, (b) statistical overview of project findings, and (c) discussion of the results. Additionally, the same types of information may be available to others in the form of a presentation at a conference or in a future academic journal article. However, in any of these circumstances care will be taken to preserve the privacy of all participants.

3. What precautions will be taken to safeguard identifiable records or individuals?

   a. Immediate data: As previously noted, videotaped documentation will be viewed only by those directly involved in the research, specifically the (a) primary investigator and her instructors for Special Education 790, (b) supporting investigator, and (c) graduate assistants. Such viewing follows the specific written permission of the participants, or in the case participants are minors, their immediate family members or guardians. Additionally, the adult member of the dyad may view the video of their own reading sessions, if they so request.

   b. Long-range data: Coded data will be analyzed using qualitative methodology (Kazdin, 1982) and simple numeric statistics commonly used in single subject research (i.e. average number of minutes spent reading, frequency of interactions, frequency of specific types of communication) (Skotko, Koppenhaver, & Erickson, 2004). All subsequent reporting, unless otherwise requested by the participants, will utilize pseudonyms for all subjects to protect anonymity.
c. Describe specific procedures to be used to provide confidentiality of data: All subjects will be given a pseudonym. No information will be provided that specifies the school districts attended by the students or their places of residence.
POSSIBLE INTERVENTION STRATEGIES

During the course of the research project, researchers will examine the effectiveness of specially-designed interaction strategies and augmentative and alternative communication devices (AAC), in enhancing the communication of both the adult and child participants in reading activities. Through special training sessions the researchers will teach reading partners (the child with severe speech and motor impairments and the adult) to use these intervention tools. This document briefly describes these strategies and materials. The reader should understand, however, that decisions regarding specific strategies and materials to employ during the course of the research will reflect characteristics of the learner and his or her communication and reading abilities that researchers will identify through ongoing observations and analysis. As such, any list prepared prior to initiating the research has limitations as the specific strategies employed with each individual student will be determined at a later time. However, the strategies used in the study will not go beyond those listed. For that reason, the researchers have attempted to provide an exhaustive list of instructional tools, knowing that not all tools will actually be used.

This research mirrors studies completed by leading researchers in the field. Strategies to introduce would be modeled after those outlined by Skotko, Koppenhaver, and Erickson (2004), Light, Binger, and Kelford Smith (1994), Arnold, Lonigan, Whitehurst, and Epstein (1994), and Sturm and Clendon (2004). Based upon research involving students with and without disabilities, these strategies potentially include teaching adult reading partners to:

(a) Assume meaningfulness in the student’s attempts to communicate and react accordingly (Skotko, et al., 2004).
(b) "Prompt the use of communication devices or symbols through natural questions and comments rather than commands" (Skotko, et al., 2004, p.149).

(c) Model the use of communication systems when talking about a text to demonstrate (a) AAC based discussion (Sturm & Clendon, 2004) and (b) correct answering procedures (Arnold, et al., 1994).

(d) Pause during reading to allow children opportunities to process and communicate. Carefully provide support, as needed, after asking a question. (Skotko, et al., 2004; Light, et al., 1994).

(e) Talk about the story and how it relates the student, thereby providing "scaffolding" to help improve comprehension (Light, et al., 1994, p.266).

(f) Recognize the student’s interests and consider these to help guide discussions (Arnold, et al., 1994).

(g) Encourage repeated readings of favorite texts, allowing students to gradually take a more active role in the reading process (Light, et al., 1994).

(h) Ask highly evocative questions that encourage children to infer, predict, or interpret (Light, et al., 1994; Skotko, et al., 2004), including “what” questions (Arnold, et al., 1994).

(i) After the child learns the name of an object in an illustration continue asking related questions examining attributes of that object, who might use the object, or what it does (Arnold, et al., 1994).

(j) Provide useful, effective vocabulary (Light, et al., 1994) that allows the adult to “ask questions and make comments that maximize the use of
available symbols and voice-output messages” (Skotko, et al., 2004, p.149).

(k) Repeat correct responses to encourage the student (Arnold, et al., 1994).

(l) Offer frequent praise and follow up for encouragement (Arnold, et al., 1994).

(m) Make reading fun by balancing discussion with listening, turn-taking, and text based games (Arnold, et al., 1994).

As appropriate, reading partners may learn other strategies to accompany the reading process. The researchers might (a) demonstrate ways to include the child in drawing or writing activities to follow a reading of the book, (b) teach participants simple games to play to encourage further exploration of the text and pictures, or (c) train reading partners to make predictions about text, conduct picture walks, retell stories in their own words (using AAC), or in other ways connect to the reading. These activities would be modeled after strategies described by Cunningham, Hall, and Sigman (1999) and others.

Augmentative and alternative communication materials used in the study will include: (a) simple voice output communication devices capable of producing from one to 48 messages, (b) picture communication symbol cards, and (c) communication boards. As needed by the child, the researchers may also build basic stands for positioning AAC materials to maximize the student’s access. Adult readers and the children with severe speech and motor impairments will receive training in the use of materials.
References


SUMMARY OF RESEARCH PROJECT

Project Title: Assessing the Communication of Students with Severe Speech and Motor Impairments during Home-Based Literacy Activities

The purpose of this summary is to describe the research study entitled, "Assessing the Communication of Students with Severe Speech and Motor Impairments during Home-Based Literacy Activities," and to explain the scope, aims, and purpose of the study. For the purpose of this research, children with severe speech and motor impairments will participate in at-home reading activities with an adult reader, namely a parent or a family designated caregiver. The child and the adult reader will also participate in three to four, two hour long inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

Reasonably the study may benefit the researchers and participants in several ways. The principal researcher will complete the requirements for a master's degree in special education through the successful completion of this study. Through the study the adult reader will (a) learn about materials and strategies useful for improving the communication and enriching literacy learning of children with severe speech and motor impairments, (b) practice applying these tools, and (c) spend time reading with a child. Each child will practice using augmentative and alternative means of communication while reading and have the opportunity to utilize communication skills and experience fun individualized literacy activities. Further, while the benefits of participation may vary, spending time reading has many advantages beyond the scope of this project.

The research is intended to help educators in the field and other researchers. Although many studies have examined the literacy and communication of students without disabilities, we believe that studies must look at the needs and abilities of real students with severe speech and motor impairments in order to improve educators' knowledge and skills. The type of information provided by this and similar studies can prove vital for improving the educational opportunities for and long-term quality of life of these individuals.

Researchers estimate that the adult and child readers' participation in the study would last four to five months. The first month or phase of the study would be a base-line period in which reading pairs are observed reading without applying any intervention. Subsequent phases introduce useful, non-invasive, non-aversive interventions designed to improve the quality and quantity of communication interactions occurring in the context of reading activities. An outline of the interventions has been approved by the University of Wisconsin Oshkosh IRB for Protection of Human Participants. The procedures that will be used involve: (a) suggesting ways to minimize distractions and adapt activities to students' unique learning needs; (b) providing appropriate, individualized communication devices and picture symbols; (c) teaching the adult reader to understand the child's cognitive needs as they relate to read and communication; and (d) instructing the adult
reader on strategies to increase communication during reading. At the same time, children will be introduced to communication devices and picture symbols and given opportunities to practice with researchers. On some occasions children may also practice strategies with their adult readers.

During the course of the study we would ask the adult and child readers to contribute to the research in two ways. First, we would like the reading pairs to read books two books together at least two times per week. Second, we would request that the reading pairs participate in inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

For the first activity adult reading partners would select two storybooks from a grouping of children's reading materials, one that the child has read previously and one new book. We would request that the reading pairs read each storybook together at least two times per week for the duration of the study, videotaping these reading interactions and returning the tape to the researchers for analysis. This portion of the study will be divided into four or five, one month phases. As part of these phases the adult and child participants will be provided with assistance from the researchers aimed at improving the quality and quantity of communication during reading sessions.

For the second part of the project reading partners will participate in inter-phase training sessions. During these sessions adult reading partners will (a) pick new books, (b) receive materials needed for study completion including video equipment and communication aides, (c) learn strategies to employ during reading, (d) practice using the materials and strategies with your student, (e) ask questions of the research team, and (f) provide basic background information on the child, his or her needs relating to communication and literacy, and current caregiver/child reading practices. At the same time Dr. Clark, previously a teacher of students with severe disabilities, will work with the child. Together they will (a) assess the child's present level of functioning, (b) determine the student's likes and dislikes in reading material, (c) identify physical and environmental challenges to be addressed subsequent phases, and (d) read books, practicing the strategies employed during the course of the study.

The researchers do not anticipate that the study will present any medical, social, or economic risk to either the adult or child participants.

The researchers have not identified any alternative procedures that could have been used in conducting this study. Researchers will, however, gladly address any concerns raised by participants about these procedures and will make appropriate accommodations as needed.

Any personal information used in this study will be treated confidentially. Information which identifies any individual will not be released, without his or her consent, to anyone for purposes which are not directly related to this research study.
Until then if you have any questions about this study or your rights, or wish to stop participation please contact either of the researchers:

Amy Cox  
Department of Special Education  
University of Wisconsin Oshkosh  
Oshkosh, Wisconsin, 54901  
(920)749-9213  
acox@new.rr.com

Dr. Denise Clark  
Department of Special Education  
University of Wisconsin Oshkosh  
Oshkosh, Wisconsin, 54901  
(920)424-7032  
clarkd@uwosh.edu

Dr. Wayne Swanger  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-3163  
wanger@uwosh.edu

Dr. Billie Jo Rylance  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-7243  
rylance@uwosh.edu
ADULT CONSENT DOCUMENT-PARENTS PERMISSION FOR CAREGIVER TO PARTICIPATE WITH CHILD

Assessing the Communication of Students with Severe Speech and Motor Impairments during Home-Based Literacy Activities

Graduate student Amy Cox, as part of the requirements for completing a master of science in education degree at the University of Wisconsin Oshkosh, and her faculty mentor, Dr. Denise Clark of the Department of Special Education, are conducting a study examining the communication of students with severe speech and motor impairments during storybook reading activities. Dr. Wayne Swanger and Dr. Billie Jo Rylance, also of the Department of Special Education, will supervise the project as part of the course requirements for Special Education 790. We would appreciate your permission to allow ____________, a caregiver requested and designated by you, to participate in this research together with your child. The research will (a) assist us in understanding the communication and literacy needs of students with these types of disabilities and (b) help us understand how to meet these needs.

The expected duration of participation in the study would last four to five months. During that time we would ask your designated caregiver to contribute to the research in two ways. First, we would like the caregiver to read books to your son or daughter with severe speech and motor impairments. Second, we would request that the caregiver and the child participate in three to four inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

For the first role, as a reading partner, we would ask the caregiver to select two storybooks from a grouping of children’s reading materials, one that the child has previous exposure to and one new book. We would request that the caregiver read each storybook to the child at least two times per week for the duration of the study, videotape these reading interactions, and return the tape to the researchers for analysis. This portion of the study will be divided into four or five, one month phases. As part of these phases the adult and child participants will be provided with assistance from the researchers aimed at improving the quality and quantity of communication during reading sessions.

During inter-phase training sessions the caregiver will (a) pick new books, (b) receive materials needed for study completion including video equipment and communication aides, (c) learn strategies to employ during reading, (d) practice using the materials and strategies with your son or daughter, (e) ask questions of the research team, and (f) provide basic background information on the child, his or her needs relating to communication and literacy, and your current caregiver/child reading practices. At the same time Dr. Clark, previously a teacher of students with severe disabilities, will work with the child.
Inter-phase training sessions will occur at the University of Wisconsin Oshkosh at a time convenient to the child and caregiver. Researchers will videotape these sessions. Each session will last approximately two hours.

We do not anticipate that the study will present any medical, social, or economic risk to you. Through the study the caregiver and child will (a) learn about materials and strategies useful with the child and (b) spend time reading together. While the benefits of participation may vary, sharing time together has many advantages beyond the scope of this project.

The information we gather through observation, video analysis, informal assessment, and anecdotal note collection will be recorded and reported in confidential form. We will not release information to anyone in a form that would allow others to identify you, the child, or the caregiver. If you want to withdraw from the study at any time you may do so without penalty. The information collected from you up to that point would be destroyed if you so desire.

If you have any questions please speak to any of us or contact:

Amy Cox  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)749-9213  
acox@new.rr.com

Dr. Wayne Swanger  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-3163  
swanger@uwosh.edu

Dr. Denise Clark  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-7032  
clarkd@uwosh.edu

Dr. Billie Jo Rylance  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-7243  
rylance@uwosh.edu

If you have any complaints about your treatment as a participant in this study, please call or write:

Chair, Institutional Review Board  
For Protection of Human Participants  
c/o Grants Office  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-1415
Although the chairperson may ask for your name, all complaints are kept in confidence.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.

PRINTED NAME  SIGNATURE  DATE

I have received an explanation of the videotaping involved in the study and agree to allow myself to be videotaped during the course of my participation in this research.

PRINTED NAME  SIGNATURE  DATE

The research project has been approved by the University of Wisconsin Oshkosh IRB for Protection of Human Participants for a 1-year period, valid until__________.
CHILD CONSENT DOCUMENT- PARENTS PERMISSION FOR CHILD TO PARTICIPATE

Assessing the Communication of Students with Severe Speech and Motor Impairments during Home-Based Literacy Activities

Graduate student Amy Cox, as part of the requirements for completing a master of science in education degree at the University of Wisconsin Oshkosh, and her faculty mentor, Dr. Denise Clark of the Department of Special Education, are conducting a study examining the communication of students with severe speech and motor impairments during storybook reading activities. Dr. Wayne Swanger and Dr. Billie Jo Rylance, also of the Department of Special Education, will supervise the project as part of the course requirements for Special Education 790. We would appreciate your child's participation in this research as it will (a) assist us in understanding the communication and literacy needs of students with these types of disabilities and (b) help us understand how to meet these needs.

The expected duration of participation in the study would last four to five months. During that time we would ask your child to contribute to the research in two ways. First, as part of the study we would like your child to participate in at-home reading activities with an adult reader, namely you or a family designated caregiver. Second, we would request that your child and the adult reader participate in three to four inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

For the first role, as a reading partner, we would request that your child participate in the reading of two storybooks with the adult reading partner at least two times per week for the duration of the study. These reading sessions will be videotaped by the adult reading partner who will return the tape to the researchers for analysis. This portion of the study will be divided into four or five, one month phases. During these phases the adult and child participants will be provided with assistance from the researchers aimed at improving the quality and quantity of communication during reading sessions.

During inter-phase training Dr. Clark, previously a teacher of students with severe disabilities, will work with your child. Dr. Clark will (a) assess the child’s present level of interest and participation in literacy and communication activities, (b) examine the student’s likes and dislikes in reading material, (c) identify physical and environmental challenges to be addressed subsequent phases, and (d) read books, practicing the strategies employed during the course of the study. Graduate research assistants, from the department of special education may assist Dr. Clark during these sessions. Researchers will videotape these sessions. If requested, parents may attend these sessions.

Inter-phase training sessions will occur at the University of Wisconsin Oshkosh at a time convenient to you, your child, and, if you are not the reading partner, the adult caregiver. Researchers will videotape these sessions. Each session will last approximately
two hours. Researchers will gladly address any concerns you have about these procedures and make appropriate accommodations as needed.

We do not anticipate that the study will present any medical, social, or economic risk to you or your child, other than the inconvenience of extra time required for reading and attend training sessions. Through the study the adult reading partner will (a) learn about materials and strategies useful with your child and (b) spend time reading to your child. Your child will practice using augmentative and alternative means of communication while reading and have the opportunity to practice communication skills and experience fun individualized literacy activities. While the benefits of participation may vary, spending time reading has many advantages beyond the scope of this project.

The information we gather through observation, video analysis, informal assessment, and anecdotal note collection will be recorded and reported in confidential form. We will not release information to anyone in a form that would allow others to identify the adult reading partner or your child. If you want to withdraw your child from the study at any time you may do so without penalty. The information collected from you up to that point would be destroyed if you so desire.

If you have any questions please speak to any of us or contact:

Amy Cox  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)749-9213  
acox@new.rcom

Dr. Denise Clark  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-7032  
clarkd@uwosh.edu

Dr. Wayne Swanger  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-3163  
swanger@uwosh.edu

Dr. Billie Jo Rylance  
Department of Special Education  
UW Oshkosh  
Oshkosh, WI 54901  
(920)424-7243  
rylance@uwosh.edu

If you have any complaints about your treatment as a participant in this study, please call or write:
Chair, Institutional Review Board
For Protection of Human Participants
c/o Grants Office
UW Oshkosh
Oshkosh, WI 54901
(920)424-1415

Although the chairperson may ask for your name, all complaints are kept in confidence.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.

PARENT'S PRINTED NAME SIGNATURE DATE

CHILD'S NAME

I have received an explanation of the videotaping involved in the study and agree to allow my child to be videotaped during the course of my participation in this research.

PARENT’S PRINTED NAME SIGNATURE DATE

CHILD’S NAME

The research project has been approved by the University of Wisconsin Oshkosh IRB for Protection of Human Participants for a 1-year period, valid until ___________.

ADULT CONSENT DOCUMENT- PARENTS AS READING PARTNERS

Assessing the Communication of Students with Severe Speech and Motor Impairments during Home-Based Literacy Activities

Graduate student Amy Cox, as part of the requirements for completing a master of science in education degree at the University of Wisconsin Oshkosh, and her faculty mentor, Dr. Denise Clark of the Department of Special Education, are conducting a study examining the communication of students with severe speech and motor impairments during storybook reading activities. Dr. Wayne Swanger and Dr. Billie Jo Rylance, also of the Department of Special Education, will supervise the project as part of the course requirements for Special Education 790. We would appreciate your participation in this research as it will (a) assist us in understanding the communication and literacy needs of students with these types of disabilities and (b) help us understand how to meet these needs.

The expected duration of participation in the study would last four to five months. During that time we would ask you to contribute to the research in two ways. First, as part of the study we would like you to read books to your son or daughter with severe speech and motor impairments. Second, we would request that you and your child participate in three to four inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

For the first role, as a reading partner, we would ask you to select two storybooks from a grouping of children’s reading materials, one that your child has previous exposure to and one new book. We would request that you read each storybook to your child at least two times per week for the duration of the study, videotape these reading interactions, and return the tape to the researchers for analysis.

During inter-phase training sessions you will (a) pick new books, (b) receive materials needed for study completion including video equipment and communication aides, (c) learn strategies to employ during reading, (d) practice using the materials and strategies with your student, and (e) provide basic background information on the child, his or her needs relating to communication and literacy, and your current parent/child reading practices. At the same time Dr. Clark, previously a teacher of students with severe disabilities, will work with your child.

Inter-phase training sessions will occur at the University of Wisconsin Oshkosh at a time convenient to you and your child. Researchers will videotape these sessions. Each session will last approximately two hours.

We do not anticipate that the study will present any medical, social, or economic risk to you. Through the study you will (a) learn about materials and strategies useful with your child and (b) spend time reading to your child. While the benefits of
participation may vary, sharing time together has many advantages beyond the scope of this project.

The information we gather through observation, video analysis, informal assessment, and anecdotal note collection will be recorded and reported in confidential form. We will not release information to anyone in a form that would allow others to identify you or your child. If you want to withdraw from the study at any time you may do so without penalty. The information collected from you up to that point would be destroyed if you so desire.

In the meantime, if you have any questions please speak to any of us or contact:

Amy Cox
Department of Special Education
UW Oshkosh
Oshkosh, WI 54901
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c/o Grants Office
UW Oshkosh
Oshkosh, WI 54901
(920)424-1415

Although the chairperson may ask for your name, all complaints are kept in confidence.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.
I have received an explanation of the videotaping involved in the study and agree to allow myself to be videotaped during the course of my participation in this research.

The research project has been approved by the University of Wisconsin Oshkosh IRB for Protection of Human Participants for a 1-year period, valid until ____________.
ADULT CONSENT DOCUMENT- CAREGIVERS

Assessing the Communication of Students with Severe Speech and Motor Impairments During Home-Based Literacy Activities

Graduate student Amy Cox, as part of the requirements for completing a master of science in education degree at the University of Wisconsin Oshkosh, and her faculty mentor, Dr. Denise Clark of the Department of Special Education, are conducting a study examining the communication of students with severe speech and motor impairments during storybook reading activities. Dr. Wayne Swanger and Dr. Billie Jo Rylance, also of the Department of Special Education, will supervise the project as part of the course requirements for Special Education 790. We would appreciate your participation in this research as it will (a) assist us in understanding the communication and literacy needs of students with these types of disabilities and (b) help us understand how to meet these needs.

The expected duration of participation in the study would last four to five months. During that time we would ask you to contribute to the research in two ways. First, we would like you to read books to a child with severe speech and motor impairments. Second, we would request that you and the child participate in three to four inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

For the first role, as a reading partner, we would ask you to select two storybooks from a grouping of children’s reading materials, one that the child has previous exposure to and one new book. We would request that you read each storybook to the child at least two times per week for the duration of the study, videotape these reading interactions and return the tape to the researchers for analysis.

During inter-phase training sessions you will (a) pick new books, (b) receive materials needed for study completion including video equipment and communication aides, (c) learn strategies to employ during reading, (d) practice using the materials and strategies with your student, and (e) provide basic background information on the child, his or her needs relating to communication and literacy, and your current caregiver/child reading practices. At the same time Dr. Clark, previously a teacher of students with severe disabilities, will work with the child.

Inter-phase training sessions will occur at the University of Wisconsin Oshkosh at a time convenient to you and the child participant. Researchers will videotape these sessions. Each session will last approximately two hours.

We do not anticipate that the study will present any medical, social, or economic risk to you. Through the study you will (a) learn about materials and strategies useful
with the child and (b) spend time reading together. While the benefits of participation may vary, sharing time together has many advantages beyond the scope of this project.

The information we gather through observation, video analysis, informal assessment, and anecdotal note collection will be recorded and reported in confidential form. We will not release information to anyone in a form that would allow others to identify you or the child. If you want to withdraw from the study at any time you may do so without penalty. The information collected from you up to that point would be destroyed if you so desire.

If you have any questions please speak to any of us or contact:

Amy Cox  
Department of Special Education  
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If you have any complaints about your treatment as a participant in this study, please call or write:

Chair, Institutional Review Board  
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Although the chairperson may ask for your name, all complaints are kept in confidence.

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.
I have received an explanation of the videotaping involved in the study and agree to allow myself to be videotaped during the course of my participation in this research.

The research project has been approved by the University of Wisconsin Oshkosh IRB for Protection of Human Participants for a 1-year period, valid until __________.
Appendix B

Parent Contact Materials
SAMPLE PARENT LETTER

Dear Parent:

I am a graduate student at the University of Wisconsin Oshkosh and the mother of a 12 year-old son with severe disabilities who is nonverbal. Watching my son for many years, I have become interested in finding ways to improve his ability to communicate and perhaps eventually, learn to read. This interest in his learning encouraged me to go back to school several years ago.

Since receiving my teaching certification last spring, I received a grant to conduct research that will be used to complete a thesis or field report for my master’s degree in special education. For this grant project I am working with Dr. Denise Clark, a university faculty member who specializes in the teaching of students with severe disabilities. Together we are exploring ways to promote the communication and interaction of children and adolescents who do not speak during storybook reading sessions.

Currently we are looking for families to participate in this study and hope that you will consider taking part. There is no cost for participation and all study materials will be provided by the researchers. Further, all information gathered during the research project will be kept confidential, and, should you so chose, you may freely leave the study at any time.

The attached overview provides additional details about the project. Please look over this information and consider whether you might be willing to participate. I will call you in a few days to see if you are interested in helping with this project. In the meantime, feel free to contact me with any questions you might have about the study.

Thank you for considering this request. I look forward to speaking with you soon.

Sincerely,
SAMPLE SCRIPT FOR INITIAL PHONE CONVERSATION

Greeting

You should have received information in the mail about a study I am conducting. In the research I am doing I am looking at emergent or early literacy and students with severe disabilities. The project is part of my masters' degree coursework and is being supervised by three University of Wisconsin Oshkosh faculty members and the University’s research review board.

Explanation of the project

During the emergent phase of literacy children explore words in books and the world around them, observe people using words for a variety of purposes, and experiment with language and communication.

I am trying to see if repeated book reading positively impacts literacy learning and communication. Research similar to this has been conducted by people around the world. Generally these studies show that children do benefit from these types of activities. However, most studies have looked at preschool aged children. For the good of older children who cannot read, it is important that research begins explore their needs.

As you saw in the materials I sent, the study involves three periods of reading. During each period readers will read three books together once each, per week. Readers will videotape these interactions. These book readings will be done in the child’s home, at the family’s convenience.

The first period of the study is a baseline period. During these two weeks readers will read as they naturally do. Observing these interactions through reviewing the videotapes will give us a measure of your child’s current communication and participation in reading. Prior to the baseline period we will meet with the adult and child
readers to get acquainted, gather general information, provide a better explanation of the study, select books, and carry out any other needed tasks.

During the second period readers will work together to increase the child’s involvement in the process. At a training session adult readers will learn simple strategies to employ before and during reading. These strategies are based upon recommendations found in the research.

In the third period readers will use simple assistive technology to increase the child’s ability to communicate during reading. Again a training session will be held to explain the materials and new strategies to the readers.

We will provide readers with six books, two during each study period. We will also provide video equipment unless you choose to use your own. Participants may leave the study at any time as they desire.

We hope that, through participation, you and your child will learn about materials and strategies that can help you improve the communication and literacy skills of your child. We also hope that reading together will be fun for you both. Do you have any questions about the study? Does this sound like something you would be interested in helping with?

Introductory Questions

I have a few questions to ask you. These will help me get a better understanding of your child and whether or not (he/she) would be a good match for this study.

Subject Selection Criteria 1

Where does the child attend school?

Who is his or her teacher?

Subject Selection Criteria 2

What grade is the student in?
Subject Selection Criteria 3
Do you consider your child a reader?
Does he or she read independently?
Does he or she like looking at books?
Does the child recognize/identify words in isolation, in text, in the environment?
If so, how about many?
If so is he or she aware of the relationship between the meaning of the word and the story itself?

Subject Selection Criteria 4
Do you consider your child primarily nonverbal?
If your child speaks, describe his or her verbal language.

Subject Selection Criteria 5
Does your child have physical or motor impairments including difficulties with motor planning, apraxia, and sensory processing?

Subject Selection Criteria 6
Do you consider your child’s visual and auditory skills to be sufficient for listening to storybooks and attending to illustrations and communication symbols?

Subject Selection Criteria 7
Does your child actively participate in communication during shared reading?
If so, describe.

Subject Selection Criteria 8
Does your child have routine access to books and other text in the home?
Do you or other family members or caregivers read to the child?

Selection Criteria 9
Do you consider improving your child’s communication an important goal?
Conclusion

Do you have any questions? Would like to participate in this research? If yes state the following: To proceed we need to meet for a few minutes to sign consent documents for the university and select two books for the baseline period. I can come to your home to do this. What date and time would work for you? We should also try to set a date for the first training session...

Thank you for agreeing to participate in this research. I look forward to meeting with you. If you have any questions please call or email me.
Appendix C

Books Available During the Study
TRADE BOOKS


ADAPTED BOOKS

To create adapted books the research team selected age-appropriate stories from published collections designed for use by learners who communicate with AAC. In most cases the researchers hand colored the illustrations, laminated, and bound the texts to make durable student books. In a few cases the team substituted photographic illustrations or clip art in place of the provided pictures to make the texts more suitable for older readers. Adapted books used during the study were originally published in the following texts:


Appendix D

Pre-Study Questionnaires
STUDENT BACKGROUND INFORMATION

Prior to beginning the first phase of intervention the research staff collected basic background information on the students by asking questions of their parents or caregivers. Researchers used the information gathered to make decisions during the intervention phases, select appropriate books and communication materials, and understand the specific individual’s needs.

Background Information

1. How old is the student?
2. What is the student’s diagnosis/predominant disability?
3. Does the school district consider the child to have a mild, moderate, or severe cognitive disability?
4. Describe how the student communicates to familiar and unfamiliar people.
5. Does the student use augmentative or alternative communication systems like pictures, voice output devices, or signing? If so, how often and in what types of situations?
6. What seems to be the student’s preferred mode of communication?
7. Do you think the student’s current modes of communication are working well for him or her? Is so why, if not, why not?
8. What do you think would improve the student’s ability to communicate and his or her ability to be understood?
9. Describe the student’s current educational placement.
10. How does the student relate to peers and staff in the classroom?
11. Do you consider this a successful or appropriate placement? Why?
12. In the past were the student’s educational placements similar to or different from this one? How? How successful was your student in these situations?

13. Does the student enjoy reading, looking at books, or being read to?

14. Do peers or adults in the school setting read to the child on a regular basis?

15. Does the student receive reading and writing instruction at school? If so describe.

16. Are books available for the student to read, look at, or play with during the school day? What types of books?

17. Are books available for the student to read, look at, or play with outside of school? What types of books?

18. How often does someone read to the student outside of school?

19. Who reads to the student most often outside of school? Do others read to the student at home, if so, who?

20. Does the student read words or printed materials on his or her own? If so, describe.

21. Does the student self-select printed materials for you to read or to examine on his or her own? Roughly how often? What types of materials does he or she seem to prefer?

22. What types of materials does someone, outside of school, typically read with the student?

23. What do you think are some of the student’s favorite reading materials, titles, or subjects?

24. What do you look for when selecting a new text for the student?

25. How can you tell when the student is enjoying what is being read?

26. What are your goals for the student relating to literacy?
Appendix E

Baseline Adult Training Materials
Baseline Instructions

General information:
Baseline lasts two weeks. During this phase, try to read together normally. We want to see how you and your child naturally interact before implementing new strategies. This will allow us to document changes over time. Read together as often as you like, but make sure to video tape the following each week:

- One reading of each current study book. Please try to tape the reading of only one book in a given sitting.
- One reading of a book chosen by you and/or the child from your own collection, the library, or your previous study books.

Please state the date and name of the book, on tape, at the beginning of the recording. For books of your own choosing briefly hold the book toward the camera at the beginning of the tape and state the name of the author to help us identify the text.

Also, record the date of the reading by placing a sticker on the calendar provided in your binder. You may also write any notes you wish to include on the study calendar.
How long should we read?
The amount of time spent reading together will vary depending on the child, the book, and the day. Do not force your child to read, but rather read together as long as the interaction seems positive and pleasant. You know your student better than we do. Stop when he or she seems done.

Using the camera:
Set the video camera at approximately a 45° angle in front of the readers. Make sure you can see both participant’s eyes and the student’s whole body. This will help us look for nonverbal communication including gestures and glances. If your child seems preoccupied with the camera set it up at other times during the day until its presence seems more normal.

Use one tape per week for your recordings. Select the tape with the current week’s dates. Additional tapes will be provided by the researchers as needed.

Returning the tapes:
We would like you to return tapes to us once a week. This will help us plan future phases and monitor your progress. To return your weekly tape please place it in the preaddressed, postage paid envelopes provided by the researchers and drop it in the mail.

What to do if you have questions:
If you have any questions during this phase please contact us using the contact information provided in the binder.
Study Contact Information

If you have any questions or problems during the study period please contact us:

Amy Cox
920-749-9213
acox@new.rr.com

Denise Clark
920-424-7032
clarkd@uwosh.edu

For the protection of the participants Dr. Billie Jo Rylance and Dr. Wayne Swanger of the special education department and members of the University of Wisconsin Oshkosh Institutional Review Board are providing oversight for this study. Contact information for these individuals is listed on the consent documents found in the final section of this binder.

Thank you for participating!
Preparing to Videotape

*When to videotape:*

Please videotape three adult/child reading interactions each week. Consider trying to read at times when your child typically seems eager to participate or when you feel relaxed and comfortable together.

*Goal of videotaping:*

Through reviewing videos of you and your child reading together we will gain an understanding of your joint communication, your needs during reading, and your child’s interest and participation in reading.

*Camera set-up:*

Place the camera at approximately a 45° angle in front of the readers. This way we’ll see your child’s eyes and hand movements when reviewing the tapes. Sometimes children use large body movements or other unconventional means to attempt communication, so please make sure we can see your child’s entire body.

*What to do if you have questions or problems:*

Do not hesitate to contact us if you have any problems with the video equipment or if you do not understand these instructions. Thanks for all of your help!
Project Overview

What's it all about?

For the purpose of this research, children with various speech and motor impairments will participate in at-home reading activities with an adult reader, namely a parent or a family designated caregiver. The child and the adult reader will also participate in three, one to two hour long inter-phase training sessions, scheduled at approximately one month intervals throughout the study period.

What will we do when we read together?

The adult and child will read three books together, at least one time per week, for about 2 1/2 months. The adults will select books to read from a collection gathered by the researchers and from their own libraries. Selected books will be provided to the readers at no charge. Children will also keep these books after the study. The reading interactions will take place in the family's home. We will loan participants a video camera, tripod, and tapes, and provide postage paid envelopes so that the adult can videotape reading interactions and return the tapes to us. It is estimated that each reading session will last under 30 minutes; however, no minimum or maximum time requirements will be set. Rather, readers should read together as long as the child maintains interest and cooperation.

The first two weeks of the study will be a base-line period during which reading pairs read together as they normally would, without any special intervention. During the two subsequent months reading pairs will learn strategies to use while reading to help increase the child's attention to the story and maximize his or her ability to participate in the reading activity. All interventions will be user-friendly, non-aversive, and designed to improve the quality and quantity of reading related communication interactions. We hope that both readers will find the process enjoyable.
What happens during the training sessions?

Both the adult and child will attend three training sessions. During these sessions adult reading partners will (a) pick new books from the researcher's collection, (b) borrow materials needed for study completion including video equipment and communication materials, (c) learn strategies to employ during reading, (d) practice using the materials and strategies with your child, (e) ask questions of the research team, and (f) provide basic background information on the child, his or her needs relating to communication and literacy, and current caregiver/child reading practices.

While the adults complete their portion of the training, Dr. Clark, previously a teacher of students with severe disabilities, will work with the child. Together Dr. Clark and the child will play, read books, and try out study materials to (a) assess the child's present level of functioning, (b) investigate your child's likes and dislikes in reading material, (c) identify physical and environmental challenges to be addressed subsequent phases, and (d) read books, practicing the strategies employed during the course of the study.

How will participation in the study help me and my child?

Through the study you or your child's caregiver will learn about materials and strategies useful for improving the communication and enriching literacy learning of your child. The adult reader will also practice applying these tools and spend time reading with your child.

Your child will practice using augmentative and alternative means of communication while reading and experience fun individualized literacy activities. We hope that participation in the research will help you and your child for years to come.
Appendix F

Phase 2 Adult Training Materials
Adult Background Information

In order to better understand your background, please answer the following questions:

Have you or another significant caregiver received training relating to the following (if not yourself indicate who has received the training):

<table>
<thead>
<tr>
<th>Mark type of training:</th>
<th>Workshop</th>
<th>Class</th>
<th>Readings</th>
<th>Special Training</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching students with cognitive disabilities?</td>
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<tr>
<td>Specifically helping your child with his or her needs?</td>
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<tr>
<td>Reading instruction-regular education?</td>
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<td>Reading instruction-special education?</td>
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<td>Fostering communication-special education?</td>
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<tr>
<td>Assistive technology?</td>
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<tr>
<td>Sensory integration?</td>
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</table>

If so, please briefly describe your experiences:

Has your child had in home occupational or speech therapy or have you observed therapy sessions at school or in another location?

(Circle one) YES NO
Phase 2 Instructions

General information:
Phase 2 lasts four weeks. During this phase read together implementing the strategies we discussed in our second training session. We will look at the tapes of these sessions to see if using these strategies helps increase your child’s involvement in, communication during, and enjoyment of your reading time.

Again, read together as often as you like, incorporating the sensory and interaction strategies we discussed at the most recent training session. Try to start the tape as soon as you get to the reading location. This way we can see some of the ways you and your child prepared for reading.

Make sure to videotape the following each week:

- One reading of both current study books. Please try to tape the reading of only one book in a given sitting.
- One reading of a book chosen by you and/or the child from your own collection, the library, or your previous study books.

Please state the date, time of day, and name of the book, on tape, at the beginning of the recording. Also, on tape briefly describe the child’s day and what he or she did prior to reading. For books of your own choosing briefly hold the book toward the camera at the beginning of the tape and state the name of the author to help us identify the text.
Also, record the date of the reading by placing a sticker on the calendar provided in your binder. Place an additional sticker on the date if you have used sensory and/or interaction strategies before or during reading. You may also write any notes you wish to include on the study calendar.

**How long should we read?**
The amount of time spent reading together will vary depending on the child, the book, and the day. Do not force your child to read, but rather read together as long as the interaction seems positive and pleasant. You know your student better than we do. Stop when he or she seems done.

**Using the camera:**
Set the video camera at approximately a 45° angle in front of the readers. Make sure you can see both participant's eyes and the student's whole body. This will help us look for nonverbal communication including gestures and glances. If your child seems preoccupied with the camera set it up at other times during the day until its presence seems more normal.

Use one tape per week for your recordings. Select the tape with the current week's dates. Additional tapes will be provided by the researchers as needed.

**Returning the tapes:**
We would like you to return tapes to us once a week. This will help us plan future phases and monitor your progress. To return your weekly tape please place it in the pre-addressed, postage paid envelopes provided by the researchers and drop it in the mail.

**What to do if you have questions:**
If you have any questions during this phase please contact us using the contact information provided in the binder.
Phase 2 Pre-Reading Strategies

Your child may be more relaxed when beginning reading if he or she understands the plan and feels some level of control. Allowing your child to help prepare for reading and make simple choices can provide a cue indicating what is happening next. Read through the following and think about the questions to help you develop a supportive pre-reading routine.

- Make sure to talk to your child when preparing to read. Tell him or her that it is reading time and explain, as appropriate, what you are doing to get ready. At the same time, think about how your child could request reading. Is there something he or she already does that indicates a desire to hear a story or look at a book?

- Let the child pick a reading spot. Narrow the choices to two locations you think will foster success. When choosing these locations think about the child’s positioning in general, and in relation to the adult reader and materials.
  - What locations might support my child’s participation?
  - What do I need to do to improve the location/environment to promote interaction?
• Make the child responsible in some way for the reading materials. Keep them in a standard location or have the child transport them after you have retrieved them. Let him or her open the bag and find the books. For my child this might look like...

• When picking a book to read from your own collection, or, as appropriate, when choosing between the two study books, allow your child a choice. My child could do this by...
Phase 2 Sensory Strategies

Sometimes children have difficulty focusing on reading activities. Think about your own child and the reading you have been doing the past two weeks.

- In general, did your child seem focused on the reading?
- If not, was he or she (a) too active, (b) not active enough, or (c) a combination of these things?

Occupational therapists have suggested simple activities that parents and educators can use to help children prepare themselves for an activity. Read through the simple activities listed in the next section. Most do not
require any special materials. Please note, sometimes children respond differently to these activities, for example, they may find a calming strategy alerting of visa versa.

• From your experience which activities seem to stimulating or alerting (a) to your child?

• Which seem calming (c)?

• Which do your child enjoy (+) or dislike (-)?

• Of the preferred activities, do any increase or decrease your child's focus on other tasks?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

From this list jot down two to five activities you could incorporate into the reading process to help your child focus. You may be using some already. How could you use these during reading?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
**Calming Techniques**

**Modifications to the Environment:**
- Snuggling in blankets, a comfortable chair, pillows, etc.
- Quiet music with a consistent beat (about 1 beat per second is often recommended)
- Minimized distractions (noise from other parts of the house, dimmed lights - but not too dim to obscure the video)

**Activities to do with the Child:**
- Deep-pressure massage or comfortable back rub
- Gentle rocking or swinging
- Bear hugs (child faces away from you)
- Fidget toys, e.g.
- Holding a comfort object, like a pillow or stuffed animal
- Weighted blanket, lap snake, or vest

Information gathered from:
Appendix G

AAC Book Modifications
AAC Book Modifications

All custom made books included:

- Picture symbols representing key elements of the text - Picture symbols were accompanied by related text.

- Highlighted repeated lines - If the story had multiple repeated lines the color of each was consistent throughout the text. The text of the repeated line was also circled in blue everywhere it occurred.

- A black and white symbol, below the highlighted text, representing the repeated line - A consistent symbol was chosen and used in the book and related AAC materials. Like the repeated line, the symbol was circled in blue.

- Page fluffers - All books were modified to include page fluffers.

Trade books used by study participants were modified to include the above elements with minor differences. These were as follows:

- In many books the preprinted text was superimposed over a picture, making it difficult to consistently highlight and circle repeated text. As such, repeated lines were highlighted as they appeared above the added picture symbols.

- The original versions of the modified books included only black and white symbols for ease of copying. When preparing trade books, researchers used color picture symbols.
AAC Development Checklist

1. Single message device? N / Y...type
2. Multiple message device? N / Y...type
3. PECS type symbols? N / Y...size and image type

4. PECS type symbols in the book?

5. Communication board? N / Y...size and image type

6. Eyegaze materials? N / Y...describe

7. Book names:

8. Other:

9. Positioning:

Notes:
Appendix H

Phase 3 Adult Training Materials
Phase 3 Instructions

General information:
Phase 3 lasts four weeks. During this phase read together implementing the strategies we discussed in our training session. We will be looking at the tapes of these sessions trying to see if using these strategies helps increase your child's involvement in, communication during, and enjoyment of your reading time.

Again, read together as often as you like, but make sure to video tape the following each week:

- One reading of each current study book. Please try to tape the reading of only one book in a given sitting.
- One reading of a book chosen by you and/or the child from your own collection, the library, or your previous study books.

Please state the date and name of the book, on tape, at the beginning of the recording. Also, on tape briefly describe the child's day and what he or she did prior to reading. For books of your own choosing briefly hold the book toward the camera at the beginning of the tape and state the name of the author to help us identify the text.
Also, record the date of the reading by placing a sticker on the calendar provided in your binder. You may also write any notes you wish to include on the study calendar.

**How long should we read?**
The amount of time spent reading together will vary depending on the child, the book, and the day. Do not force your child to read, but rather read together as long as the interaction seems positive and pleasant. You know your student better than we do. Stop when he or she seems done.

**Using the camera:**
Set the video camera at approximately a 45° angle in front of the readers. Make sure you can see both participant's eyes and the student's whole body. This will help us look for nonverbal communication including gestures and glances. If your child seems preoccupied with the camera set it up at other times during the day until its presence seems more normal.

Use one tape per week for your recordings. Select the tape with the current week's dates. Additional tapes will be provided by the researchers as needed.

**Returning the tapes:**
We would like you to return tapes to us once a week. This will help us plan future phases and monitor your progress. To return your weekly tape please place it in the preaddressed, postage paid envelopes provided by the researchers and drop it in the mail.

**What to do if you have questions:**
If you have any questions during this phase please contact us using the contact information provided in the binder.
Phase 3- Fine Tuning Strategies

Review:
As we talked about last time, research suggests that children become more active participants when given the chance to make choices and have some control of the process. When reading together you can provide these types of opportunities by:

- Encouraging the child to initiate reading
- Allowing the child to select a reading location and making sure the child is positioned effectively for involvement
- Involving the child in the process of preparing for reading
- Allowing the child to select books to read
- Encouraging interaction during reading

The reading routine you created last time can help you provide these opportunities for the child. The following will help us fine-tune your routine by giving the child a few "tools":

- How successful is the child at requesting reading? (Circle one)

REQUESTS READING... OFTEN SOMETIMES RARELY

- OFTEN... If he or she is successful continue to encourage this communication. Watch the signal and offer praise, a pat on the back, or some other form of reinforcement. Try to respond to the signal as much as possible. Even if you cannot read when the child requests to do so, verbally acknowledge the request, "I see you'd like to read right now but...why don't we read in a little bit."
- SOMETIMES... Try a bit of both the recommendations for "OFTEN" and "RARELY."
RARELY... If the child does not regularly request reading you can model ways he or she could do this, for example, sign book and say "its time to read" to indicate the beginning of reading time. Modeling gives the child an example that he or she can try to imitate.

- How does/should the child initiate reading? Will he or she do this independently all of the time/some of the time/ or will I primarily cue him or her? PICTURE, SIGN, ETC.?

- How does the child to pick a reading spot? PICTURE CARDS, BOARD, ETC.?

- How does the child to pick a book? ACTUAL BOOKS, PICTURE CARDS or BOARD?
Phase 3- Communication Strategies

Strategies to discuss together:

1. Be careful to promote the joy of reading together. When the child stops enjoying the activity, stop reading. Read for different purposes during different sittings. Reading does not always have to be used as a means to promote communication. Sometimes it is good just to read for fun and relaxation, in a comfortable place, together (Light, Binger, & Kelford Smith, 1994).

2. Repeatedly read the same books. This encourages the child to take a progressively more active role in the process and helps them develop basic literacy skills. As possible and using available resources, allow your son or daughter to take on more of the responsibility for “reading” and interpreting the text (Light, Binger, & Kelford Smith, 1994). HOW MIGHT WE DO THIS...

3. Assume meaningfulness in the student’s attempts to communicate and react accordingly. Even if you do not understand the meaning of the child’s vocalizations or gestures verbally respond. Example: Your son/daughter sits quietly until you turn the page and see_________________. Suddenly he/she waves his/her arms in the air and/or squeals. Barring contradictory information (like the doorbell ringing, etc.) assume this was a response to the picture. What might you say and do? (Skotko, Koppenhaver, & Erickson, 2003).

4. If the book relates to something within the child’s experience, talk about it. If it appeals to his or her sense of humor or yours, comment and laugh. Doing this helps provide a “scaffolding” that will promote
understanding of the text. Light, Binger, and Kelford Smith (1994) say this scaffolding helps "bridge the gap" between the child's own experiences and the theme of the text, and argue this is especially important for children with disabilities because their experience may differ from that of their peers without disabilities. PRACTICE

5. Pause during reading to allow the child opportunities to process and communicate. This allows the child time to process what they see and hear and gives them a chance to respond (Light, Binger, & Kelford Smith, 1994; Skotko, Koppenhaver, & Erickson, 2003). The child does not always have to respond during this pause. Watch to see if the child maintains focus on the page. Respond to your child's level of attention and involvement by commenting or continuing to read. ROLE PLAY

6. Ask questions about the story or illustrations instead of making commands ("touch the dog" or "look at the boy") say "what did she eat?" Try to use "wh" questions as well as those that require a "yes/no" answer. If your child has difficulty responding, carefully provide support, as needed, after asking a question. Using evocative questions, or those that require the child to make inferences or interpret a text, appears to promote the child's use of expressive language (Light, Binger, & Kelford Smith, 1994; Skotko, Koppenhaver, & Erickson, 2003). THINK OF SOME QUESTIONS YOU MIGHT ASK AND HOW THE CHILD COULD RESPOND

7. Think about your child's typical responding. Does he or she usually require wait time after asked to do something before he or she responds? ________________ What might a reasonable wait be for your child? ____________________________ After waiting, if your child still does not respond, provide feedback that will help her/him learn to respond by modeling and talking about the desired response. If this does not work use hand-over-hand assistance to help the child complete the request. Make sure to give your child praise and encouragement during the process (Light, Binger,
& Kelford Smith, 1994; Skotko, Koppenhaver, & Erickson, 2003).

**PRACTICE WAITING/ MODELING/ PROMPTING**

8. Encourage your child to look at the words and the pictures. Point or use a small key chain flashlight to illuminate an element in the text. **PRACTICE WITH THE FLASHLIGHT**

9. Allow your child to handle the book, turn pages, etc. **EXPLAIN PAGE FLUFFERS**
Phase 3 Quick Strategy Guide

Strategies to try during reading:

- Assume meaningfulness in the student’s attempts to communicate and react accordingly.
- Pause during reading to allow the child opportunities to process and communicate.
- If the book relates to something within the child’s experience, talk about it.
- If it appeals to his or her sense of humor or yours, comment and laugh.
- Ask questions about the story or illustrations instead of making commands, for example, say “what did she eat?” instead of “point at the fly.” If your child has difficulty responding, carefully provide support, as needed, after asking a question.
- Encourage your child to look at the words and the pictures. Point or use a flashlight to illuminate an element in the text.
- Allow your child to handle the book, turn pages, etc.
- Use repeated readings of familiar texts.

Sources: Light, Binger, & Kelford Smith, 1994; Skotko, Koppenhaver, & Erickson, 2003.
Appendix I

Follow-Up Questions
FOLLOW-UP QUESTIONS

Reader:
Date:

1. Did the trainer clearly explain:
   a. General study procedures?
   b. Camera use?
   c. Sensory and involvement strategies?
   d. Communication devices and materials?
   e. Communication strategies?

2. What could have been done to improve the clarity of the explanations listed above?

3. What parts of the study seemed:
   a. Most beneficial to you? Why?
   b. Most beneficial to your child? Why?
   c. Least beneficial to you? Why?
   d. Least beneficial to your child? Why?
   e. Easiest to implement?
   f. Most difficult to implement?

4. Were the materials provided (e.g. book bag, books, adapted books, communication materials) useful and appropriate for your child?

5. Did you and your student enjoy reading together as part of this study?

6. Will you continue to apply strategies learned as part of the study during reading activities?
Appendix J

Coding Procedures
CODING PROCEDURES

The researchers devised a coding system to specifically address the following study questions:

1. Does the use of sensory and control-based calming procedures prior to reading improve the quantity or quality of students’ communication during shared story-book reading interactions?

2. Does the use of AAC and supportive communication strategies during story-book reading interactions improve the quantity or quality of students’ communication during shared story-book reading interactions?

Many of the coding procedures were adapted from those described by other researchers (Light, Binger, & Kelford Smith, 1994; Skotko, Koppenhaver, & Erickson, 2003a; Skotko, Koppenhaver, & Erickson, 2003b).

Definitions

Quantity: A measure of quantity was found by identifying and counting the student’s communication attempts (see Student’s Communication Modes). To facilitate comparison across study phases, the researcher calculated the rate of student communication attempts (number of behaviors per minute) for each reading session.

Quality: Quality was examined in two ways. First, researchers tallied the purposes for which each student communicated and converted the totals into rates. These rates were then compared through the course of the study. Researchers recognized, however, that student’s inherent motor and language abilities could cloud this measure, as the more complex needs of some students would directly hamper their ability communicate for a
variety of purposes. Second, researchers examined the number times the adult reader responded to the student’s communication as compared to the total number of student communication attempts.

Characteristics of the Interaction

Researchers did not attempt to describe the adult reader’s compliance with study guidelines as part of the video review process. However, the following aspect of the interaction was noted during coding:

1. *Length of the reading session (LRS)*. Researchers timed each reading session, beginning when the adult read the book’s title to the student. Sessions were considered concluded when the adult finished reading from the text and/or recognized the student’s termination of the activity.

Student’s Behavior and Communication

Data collection also examined the student’s use of behavior, pointing, and other means to communicate interest, exert control, or make choices during the taped portion of the reading process. For this purpose the following items were calculated:

1. *Manipulation of the Book (MB)*. Use of the book or an element of the book being read for communication, for example, closing the book or throwing the book to indicate the completion of the activity. Researchers also counted the number of times a student initiated page turning and completed the task with or without assistance during each reading. An event, or singular occurrence of this behavior, consisted of an uninterrupted manipulation for a seemingly consistent purpose.

2. *Vocalizations (V)*. This category included any use of the student’s voice whether or not the action produced intelligible words (Koppenhaver). In cases where the
student consistently vocalized for an extended period of time a new vocalization could be counted after the student remained silent for at least a two to three second period.

3. Eyepointing (EP). Student’s eyepointing to a picture symbol for communication was counted whether or not it was recognized by the adult reader. Researchers also counted this behavior when the student responded to a question or attempted to comment by distinctively glancing at an area of the book. Researchers only counted this behavior for students who could not effectively use their hands for pointing. Gazing at the book during reading was not counted unless the student clearly glanced for an intended purpose.

4. Pointing or Gesture (PG). The student physically points to communication symbols or tries to hand them to a reading partner. The student physically points to something in the book. The student communicated through a noticeable movement but not a standardized sign. This could include manipulating reading related objects for purposes apparently related to communication. For students who relied upon eyepointing this behavior was not counted.

5. Moves Away (MA). If a child disengaged from the reading process by moving away from the adult reader and book the act was tallied in this category. A new occurrence of the behavior occurred only after the child became involved in the reading again.

6. Manual Sign (MS). The student uses a sign, whether standardized or idiosyncratic (a student specific sign variation with a consistent recognizable form whether or not the meaning is clear).

Student’s Communication Purposes

Researchers attempted to ascertain the purposes of all of the student’s coded communication acts. In cases where several communication acts occurred nearly simultaneously or clearly centered around one purpose, they were routinely given the same delineation.

1. *Responds to adult’s questions or directives (RQ).* This included any form of a response to a question or directive, whether or not it was the desired reaction, as long as the respondent began the response or chain of responses directly after the question or directive was posed. Also, researchers counted responses to adult statements (e.g. after the adult says “yes” the child nods in agreement). In cases where the student required wait time to process and complete a response the researchers attempted to factor this into the coding process. Responses were assigned to a different category only if they were clearly unrelated to the question. For example, when the student closed the book or turned the page directly after the adult asked a question or requested something other than one of these behaviors, these actions were coded in the “direct the reader” category.

2. *Comments related to the book (CB).* The student uses available means of communication to comment about the book, expand upon its theme, or label elements in the text. In response to an element or concept in the book the student performs a related action or communicates about a related idea. This could include using a feature of the book to comment.

3. *Direct the Reader (DR).* In this category the researchers looked for instances in which the student made a specific request of the reading partner related to the story or reading process (not to the environment or unrelated materials). This
included turning pages or closing the book when the student initiated these behaviors independently.

4. *Unrelated comments (UC)*. If a student used available means of communication to comment for purposes clearly unrelated to the book or for unclear purposes the researchers counted it as an unrelated comment.

5. *Nonspecific (NS)*. If researchers were unsure of the student’s intent or the communication did not meet the requirements of any other category, the act was considered nonspecific.

**Adult Behavior**

Two adult behaviors were coded for this study and used in data related to quality of communication:

1. *Adult response to student’s communication (ARC)*. Any verbal, signed, or AAC-based response from the adult to a student’s tallied communication was counted in this category. Nods yes or no were also included. Coded responses included acknowledgements, questions, or statements and communication used by the parent to extend the interchange or foster turn taking.

2. *Adult asks a question (AAQ)*. Any time the adult asked an unscripted question the researchers counted it in this category. Similarly, researchers also counted commands made by the readers. Items coded as a question could also be a response to a student’s question, and, when this occurred, were included in both tallies.
Appendix K

Sample Study Data
# DATA RECORDING SHEET

## Coding Sheet- Communication in Literacy

<table>
<thead>
<tr>
<th>Name:</th>
<th>Phase:</th>
<th>Date of Recording:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Factors:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TOTALS:
- **Responds to adult questions (RQ)**
- **Comments on book (CB)**
- **Unrelated comments (UC)**
- **Directs reader (DR)**
- **Nonspecific (NS)**

### STUDENT'S BEHAVIOR AND COMMUNICATION

<table>
<thead>
<tr>
<th>Manipulates book (MB)</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Vocalizations (V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eyepoints (EP)</td>
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<tr>
<td>Points/Gestures (PG)</td>
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<tr>
<td>Moves Away (MA)</td>
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<td></td>
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</tr>
<tr>
<td>Manual signing (MS)</td>
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</tr>
<tr>
<td>AAC (AAC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other book/object (OBO)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### TOTALS:

### STUDENT'S COMMUNICATION PURPOSES

| Responds to adult questions (RQ) |        |        |        |
| Comments on book (CB)            |        |        |        |
| Unrelated comments (UC)          |        |        |        |
| Directs reader (DR)              |        |        |        |
| Nonspecific (NS)                 |        |        |        |

### TOTALS:

### ADULT BEHAVIOR

| Adult responds to student (ARC) |        |
| Adult asks question (AAQ)       |        |

### TOTALS:
SAMPLE CODING DATA

REBECCA PHASE 2
1st Reading

DATE: Feb. 15, 2005
BOOK: Stanley and Rhoda
SETTING: Porch chair- same as before. Wearing a purple shirt and overalls.
TIME: 7:14:54 to 7:17:45; TOTAL: 2:51


2. M reads. “What’s that…” K5 vocalizes (RQ). “It is a wagon. See the wagon. Yeah.” M reads. “Look (CB) at it.” M responds and confirms the response. K5 vocalizes (NS) (pretend sneeze). K5 closes (DR) the book, stands (DR) up, vocalizes (NS), claps (NS), and pretends (NS) to sneeze. (7:17:45) MB=1 PG=1 MA=1 V=5 RQ=1 CB=1 DR=2 NS=4 ARC=2 AAQ=2

V=11 PG=1 MA=1 MB=1
RQ=1 CB=6 UC=1 DR=2 NS=4
ARC=7 AAQ=4
REFERENCES


Rohena, E.I., Jitendra, A.K., & Browder, D.M. (2002). Comparison of the effects of Spanish and English constant time delay instruction on sight word reading by


