Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Submitted by the Center for Literacy & Disability Studies
University of North Carolina at Chapel Hill

Karen Erickson, Ph.D., Gretchen Hanser, Ph.D., Penelope Hatch, Ph.D.,
Eric Sanders, M.S./CCC-SLP

June 17, 2009

This publication was developed by the Center for Literacy and Disability Studies in the Department of Allied Health Sciences, School of Medicine at the University of North Carolina at Chapel Hill under a contract funded by the Council for Chief State School Officers (CCSSO) Assessing Special Education Students (ASES) State Collaborative on Assessment and Student Standards (SCASS). Members of the ASES workgroup reviewed this document. The views expressed herein do not necessarily represent the policies of the CCSSO.

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Center for Literacy and Disability Studies
321 S. Columbia St.
Ste 1100 Bondurant Hall
CB # 7335, University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-7335

Phone: (919) 966-966-8566
Fax: (919) 843-3250

http://www.med.unc.edu/ahs/clds

Disclosure: Faculty at the Center for Literacy and Disability Studies participated in the development of *MEville to WEville: An Early Literacy and Communication Program* (AbleNet, 2004). No individual at the Center or author of this monograph receives any royalties related to the sales of that or any other product included in this report.

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Chapter 1: Introduction

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Literacy is defined as "the ability to use language to read, write, listen, and speak . . . at a level that lets one understand and communicate ideas in a literate society, so as to take part in that society" (www.wikipedia.org). For students with significant intellectual disabilities, instruction that facilitates literacy is a complex and poorly understood issue. Only recently has the importance of literacy for this population been recognized with several reviews of the literature providing important syntheses of the extant research base (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Joseph & Konrad, 2008; Joseph & Seery, 2004; Saunders, 2007). These reviews, however, have been limited in their discussion of comprehensive literacy instruction and the application of literacy-related skills to the "use [of] language to read, write, listen, and speak . . . at a level that lets one understand and communicate ideas in a literate society, so as to take part in that society." These reviews are further limited by their inclusion of research conducted with participants with a broad range of intellectual functioning—from mild to severe. To date, there has been no systematic review of the research that addresses all of the components of comprehensive literacy instruction specifically targeting students with significant intellectual disabilities.

The purpose of this monograph is to conduct a systematic review of the literature as it relates to literacy instruction for students with significant intellectual disabilities. The review describes the multiple components of comprehensive instruction (i.e., phonemic awareness, phonics, fluency, vocabulary, comprehension, as well as writing and emergent literacy) and identifies research-based practices that address and support learning in each of these areas for students with significant intellectual disabilities, including students with physical and/or sensory impairments.

Specific attention is given to the use of assistive and instructional technologies to support literacy learning for students with significant intellectual disabilities.

Students with Significant Intellectual Disabilities

The monograph focuses on students with significant intellectual disabilities. In the United States, approximately 1% of school-aged children have an intellectual disability (U.S. Department of Education, 2002) that is "characterized by significant limitations both in intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills" and that originates before the age of 18 (American Association of Intellectual and Developmental Disabilities, 2009). Historically, this disability has been known as *mental retardation*, and although this term continues to be used in some situations (e.g., as a term for a qualifying condition for Individual Education Plans and as a term in *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition), the current preferred term is *intellectual disabilities* (American Association of Intellectual and Developmental Disabilities, 2009). The term *intellectual disabilities* has several synonyms that appear throughout the literature, including *cognitive disability* (Centers for Disease Control, 2005), *intellectual impairment* (State of Queensland Department of Education, 2006), *cognitive impairment* (Beukelman & Mirenda, 2005), and *developmental disability* (U.S. Department of Health and Human Services, 2008). We propose to subsume each of these terms under the term *intellectual disabilities* in the current monograph.

Causes of intellectual disabilities may be known, as in the case of children born with Down syndrome, fragile X syndrome, or fetal alcohol syndrome, or children who experience anoxia, certain infections, head injury, or stroke (Beukelman & Mirenda, 2005; Centers for Disease Control, 2005), but it also possible that intellectual disabilities can occur without a known cause. Children with intellectual disabilities represent at least 9.9% of all students served in Special Education in the United States; however, given that intellectual disabilities may co-occur with other disabilities such as a communication impairment, autism, orthopedic impairment, sensory deficits, and traumatic brain injury, the 9.9% estimate is likely conservative (U.S. Department of Education, 2002).

There are different degrees of intellectual disabilities that affect the rate of learning and acquisition of adaptive skills. As with the label of this disability, the terms used to describe the various degrees of intellectual disabilities and the manner in which those degrees are defined have changed over time. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR®) (American Psychiatric Association, 2000) relies on IQ scores to determine the severity of an individual's intellectual disabilities. Specifically, these levels are (a) mild or educable, as indicated by an IQ level of 50–55 to approximately 70; (b) moderate or trainable, as indicated by an IQ level of 35–40 to 50–55; (c) severe, as indicated by an IQ level of 20–25 to 35–40; and (d) profound, as indicated by an IQ level below 20 or 25 (American Psychiatric Association, 2000). A more recent classification of the degree of intellectual disabilities focuses on the level of support that an individual requires rather than the person's IQ level (Luckasson, Borthwick-Duffy, & Buntix, 2002). The range of support includes intermittent, limited, extensive, and pervasive.

For the purposes of this monograph, students with significant intellectual disabilities are defined as those who have a diagnosis and/or label of intellectual disabilities with evidence of cognitive functioning in the range of severe to profound or those who have the need for extensive or pervasive supports. In the absence of this specific information, the level of cognitive functioning will be approximated using narrative descriptions of participants that suggest significant intellectual disabilities. These students may also have accompanying communication, motor, sensory, or other impairments.

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Chapter 2: Issues in Literacy and Students with Significant Intellectual Disabilities

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Literacy is an integral part of the general curriculum. Beyond the obvious literacy demands in the areas of English and language arts, there are literacy demands inherent in other core curriculum areas such as science, social studies, and math. Without the ability to read and write, students can learn skills and information across the curriculum, but they cannot learn important lifelong skills that allow them to independently revisit and build on that information.

Students with significant intellectual disabilities first gained mandated access to the general curriculum through the Individuals with Disabilities Education Act Amendments (IDEA) of 1997 (PL 105-17), with further access guaranteed following the passage of the No Child Left Behind Act (NCLB) of 2001 (PL 107-110), a reauthorization of the Elementary and Secondary Education Act of 1965 (PL 89-10). NCLB required states to establish challenging standards aligned with the general education curriculum, to develop an assessment program that measures student progress against those standards in the areas of reading/language arts and math, and to hold schools accountable for ensuring that students achieve the standards. An important part of NCLB is the regulation that all children, including those with the most significant intellectual disabilities, make adequate yearly progress (AYP) toward achieving grade-level standards (U.S. Department of Education, 2004. For students with significant intellectual disabilities, achieving grade-level standards is not the same as meeting grade-level expectations because their instructional program addresses extensions or access points related to the grade-level standards. Furthermore, their progress is monitored using alternate assessments reflecting alternate achievement standards.

This mandated emphasis on access to the general curriculum for all students has resulted in a call to define *literacy* more broadly so that idiosyncratic, nonconventional, and often symbol-based behaviors of students with significant intellectual disabilities can be described as literate behaviors (Downing, 2005). There is no doubt that these behaviors have value as students develop their abilities to communicate meaningfully with others and participate in print-based activities, but these are emergent literacy behaviors at best, and there is a danger in describing them as literate behaviors. The danger is that students with significant intellectual disabilities will be denied meaningful, intensive, ongoing opportunities to further develop emergent and then conventional literacy skills and understandings because the skills and behaviors they are already demonstrating are viewed as sufficient. As Koppenhaver (2000) states, "Unfortunately, our field has often treated emergent literacy as an end goal rather than a starting place. That is, practitioners have been quicker to accept emergent literacy and nonconventional performance than to consider how to move the children on to conventional reading and writing" (p. 273).

We define *Literacy* narrowly throughout this monograph quite simply as *reading* and *writing* (i.e., the cognitive processes of comprehending and composing meaning in written texts). We do so not to exclude students, as suggested by Downing (2006) but to insure that the focus remains on research-based practices that build knowledge, skills, and abilities that have the potential to result in reading and writing skills. It is no longer acceptable to offer educational programs to students with significant intellectual disabilities that focus solely on skills that are unrelated to the general curriculum in the name of developing other life or functional skills. Nor should it be acceptable to provide access to content without developing knowledge, skills, and understandings that will promote lifelong learning. Reading and writing are functional components of the general curriculum. We must collectively increase our understanding of research-based practices that will help students with significant intellectual disabilities develop the reading and writing skills required for them to reap maximum benefits from the access that recent legislation has afforded them.

What Is Functional Literacy?

Beginning in the late 1970s, educational programs for students with significant intellectual disabilities underwent what has been called a transformation from a developmental to a functional approach (Browder & Spooner, 2006). The result was a dramatic change in the way individuals with significant intellectual disabilities were taught. Instruction started to address the skills that individuals required to function effectively across current and future environments instead of focusing on mental age and content that matched that age (regardless of the chronological age of the individual) (Brown, Nietupski, & Hamre-Nietupski, 1976). Functional approaches and curricula addressed vocational, home, community, and leisure skills (U.S. Office of Special Education Programs, 2006), with an emphasis on the acquisition and use of those skills in the natural environment to insure generalization (Brown, Branston, Pumpian, Certo, & Greunewald, 1979). In the realm of reading and literacy, this functional approach resulted in an emphasis on an area widely referenced as "functional literacy."

Sight word instruction is frequently the core of instruction that addresses functional literacy, and this emphasis on functional literacy is often separated explicitly from other more integrated and applied forms of reading and literacy. For example, in describing options for addressing both functional sight word instruction and literacy instruction broadly, Browder, Courtade-Little, Wakeman, and Rickelman (2006) write: "The first [option] is to provide two concurrent forms of reading instruction—one that focuses on promoting literacy and the other on the systematic instruction of sight words in the context of daily living as a 'safe-guard' for having some functional reading if the student doesn't learn to read. A second option is to provide extensive literacy instruction in the elementary grades and transition to a functional reading approach if progress is not made by late middle school or high school. A third option is to make sight-word instruction part of the literacy program" (p. 66). This description of options clearly reflects the belief that functional reading can be separated from literacy. In fact, the ability to recognize sight words is a critical component of literacy (Meyer & Felton, 1999). While we can extract sight word instruction from literacy, one cannot become literate without word identification skills. Furthermore, there are significant differences between approaches designed to address sight word learning in isolation and those designed to help students become readers and writers who can use print meaningfully to communicate with others.

Approaches to functional literacy instruction are often "reductionist interventions" (Katims, 2000, p. 4) that employ sequenced, hierarchical drill and practice instruction focused on training skills such as letter names and sounds, word decoding, sight words, and filling out written forms (Joseph & Seery, 2004; Katims, 2000; Zascavage & Keefe, 2004). Such "interventions" are a stark contrast to the comprehensive instructional approaches that reflect the general curriculum. Comprehensive literacy approaches that reflect the general curriculum include instruction in a variety of word identification strategies, vocabulary, comprehension, fluency, writing, and opportunities to independently read a wide array of texts. Rather than learning specific words, memorizing information through drill and practice, or addressing each of the areas individually until some predetermined level of mastery is achieved, comprehensive instruction addresses all of these approaches in the course of a single day or week so that students can learn new skills and apply them right away. It is the combination of the knowledge, skills, and abilities reflected in the standard course of study that leads to successful literacy learning, and comprehensive instruction that combines approaches intended to build literacy-related knowledge, skills, and abilities is required to achieve this success.

According to the *American Heritage College Dictionary* (1997), *functional* is defined as "capable of performing" (p. 551), and *literacy* is defined as "the ability to read and write" (p. 792). Combining these definitions, *functional literacy* can be defined as the capability of reading and writing at a level proficient enough to conduct one's daily affairs. Unfortunately, the reductionist interventions that characterize functional literacy in the field of significant disabilities do reflect this definition. Throughout this monograph, we will refer to the concept of comprehensive instruction and to the approaches that build knowledge, skills, and understandings in reading and literacy that allow individuals to read and write at a level proficient enough to conduct their daily lives. A traditional functional reading approach may have its place, but its place is not in lieu of instruction intended to build true functional literacy skills.

What Is the Difference Between Accessing the General Curriculum and Learning to Read and Write?

As noted, the emphasis placed on literacy for individuals with significant intellectual disabilities is driven by IDEA 1997 and NCLB. First, IDEA mandated that all students have access to the general curriculum. Then, NCLB required that states have challenging standards with assessments that measure student performance against those standards while holding schools accountable for student achievement in reading, math, and science. Individual states are working to guide educational teams in meeting the demands of IDEA 2004 and NCLB by identifying alternate access or entry points that are aligned with the general curriculum (e.g., North Carolina, Florida, California). These access or entry points provide specific examples of the ways in which students with varying degrees of severe disabilities might gain access to the general curriculum and demonstrate achievement or progress over time. Educational teams should take great care to create instructional programs based on either the general curriculum or these alternate access or entry points to ensure that students are developing new skills from year to year.

Progress that students make in accessing the general curriculum through these alternate access or entry points is measured through alternate assessments. Unfortunately, the alignment between the alternate assessments and the general curriculum is generally weak, particularly in the area of literacy (Browder et al., 2003). As a result, educational teams often struggle to identify targets for literacy instruction that meet the student's needs while also aligning with the general curriculum or alternate access points. For example, two teams might identify specific tasks or skills from the general curriculum that a student will be expected to demonstrate through the alternative assessment process. One team might choose to create an intervention program through which it teaches the skills directly by using a system of least-to-most prompts. This team would spend a portion of the student's school day engaged in massed trials of the skills to ensure successful performance on the end-of-year assessment. In contrast, another team might teach the same skills across environments and with a variety of materials and activities. Instead of devoting instructional time to massed trials on the target skills, the team chooses to teach the skills as part of a comprehensive instructional program that systematically addresses not just a few skills selected from the general curriculum but all of the knowledge, skills, and understandings required to read and write.

The Importance of Evaluating the Alignment Between Skills Addressed in Research and the General Education Curriculum. Conducting the review for this monograph demonstrated that there has been an increase in the number of published studies addressing areas of literacy for students with intellectual disabilities that extend beyond the sight word instruction that dominated the literature through the late 1990s (Browder & Xin, 1998). There remains a dearth of research focused specifically on students with significant intellectual disabilities, but those investigations are emerging. The problem remains, however, that the studies that are appearing address more of the areas involved in literacy (e.g., phonemic awareness and phonics) but they do not address the research-based instructional approaches that are employed in addressing the general curriculum with students without disabilities.

For example, Browder, Ahlgrim-Dezell, Courtade, Gibbs, & Flowers (2008) used a system of least prompts to teach letter-sound correspondence and phonemic awareness, yet nowhere in the literature addressing instruction in these areas for students without intellectual disabilities could we find a recommendation to use these prompting procedures. Stimulus-and-response prompting procedures (e.g., constant time delay, system of least prompts, simultaneous prompting, stimulus fading, stimulus shaping) are used broadly with students with significant intellectual disabilities (Collins, 2007), but they do not reflect our current understandings of research-based approaches to reading and literacy. In the end, we agree with Saunders (2007): “To date, important developments in the mainstream reading literature have had little impact on the field of mental retardation, despite recognition of this gap in the literature” (p. 79).

Throughout the manuscript, the research will be reviewed with reference to the “mainstream reading literature” both in terms of instructional focus and methods. Again, quoting Saunders (2007), “There is a need for intensive teaching studies that incorporate the best of what is known about reading instruction in typically developing children” (p. 82). Until we have studies that address both the literacy content of the general curriculum and the “best of what is known about” the methods for teaching that content, we will not truly understand what levels of literacy achievement are possible for students with significant intellectual disabilities.

What Is the Role of Assistive Technology in Literacy Learning?

Assistive technology (AT), as defined by the Individuals with Disabilities Education Act (1990), includes "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a individuals with disabilities." The law also defined AT services as "as any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device." Both AT services and devices are important to consider when addressing the literacy learning challenges faced by students with significant intellectual disabilities. The unique combination of intellectual, linguistic, and often physical and/or sensory impairments that students with significant intellectual disabilities experience typically result in difficulties holding books, seeing standard print, holding a pencil, using a standard keyboard, and numerous other skills required for reading and writing. Appropriate and ongoing provision of AT services with carefully selected AT devices can minimize these difficulties.

Unfortunately, the use of AT to support students with disabilities is not well understood (Matvy, 2000), and there is minimal empirical evidence to support the use of assistive technology in educational settings (Edyburn, 2003). The little research that does exist has produced mixed results. As such, there is an "urgent need" to produce relevant and useful research about AT (Edyburn, 2005, p. 60). However, waiting for the research to be conducted is not an option if the goal is to engage students with significant intellectual disabilities in meaningful literacy learning and use. Students with significant intellectual disabilities require AT both to access information and to access learning. We must find ways to study both AT and literacy instructional approaches if we are to understand how to provide access to the general curriculum in reading and literacy for students with significant intellectual disabilities.

This distinction between technology to support access to information and technology to support access to learning comes from Rose and Meyer (2002) and their work on Universal Design for Learning. Their use of this distinction is focused primarily on helping educators understand that sometimes maximizing access undermines learning. For example, if the educational goal for a student is to help that student learn to decode words, then providing the student with access to all text in a digital format through the use of screen-reading software will make it more difficult for

the student to reach the goal, not easier. In the context of students with significant intellectual disabilities, this distinction between access to information and access to learning takes on additional meaning, since physical and/or sensory-based access to content is as much of an issue as cognitive and linguistic access to learning. Indeed, according to Boone and Higgins (2007), "mere access to the content is inadequate as an AT unless that access is mediated by instructional design supports appropriate for the specific disability of the user" (p. 138).

One AT-related issue in significant disabilities that has the potential to provide access to content while impeding access to learning reading skills is the use of picture-supported text. This practice involves pairing or replacing text with picture symbols (Downing, 2005). Software programs such as Boardmaker v.6 (Mayer-Johnson, 2006), PixWriter v.3 (Slater Software, 2008), and Writing with Symbols 2000 v.2.6 (Widgit Software, 2002) allow the user to type in running text and to produce a picture symbol paired with each word. Although this practice is intended to provide access to text that a student could not otherwise read, it simultaneously diminishes opportunities for developing literacy skills since several studies have concluded that pictures slow the rate of word learning (Pufpaff, Blischak, & Lloyd, 2000; Rose & Furr, 1984; Saunder & Solman, 1984).

According to Hatch (2009), pairing picture symbols with words may limit access to learning because pictures may actually be confusing—especially when they represent abstract concepts, have multiple meanings, or serve more than one grammatical function. For example, consider verbs such as *do* and *is*. These words do not have obvious picture referents, so they are represented by abstract, arbitrary symbols (see Figure 1). If the student has to learn this abstract symbol, why not teach the printed word instead? While the alphabet is an abstract symbol set of its own, printed words are much more widely understood than abstract symbols and can build into a reading and writing system.

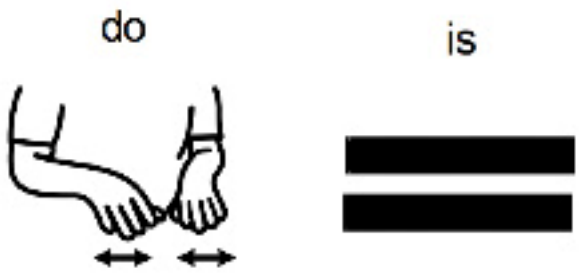

Figure 1. Boardmaker picture communication symbols for the verbs *do* and *is* (Mayer-Johnson, 2006).

Pairing pictures with text may, in fact, make the text more accessible for students with significant intellectual disabilities, but that research has not been conducted to date. At the same time, there is research suggesting that the practice of pairing pictures with words slows down the rate at which students learn to read the word. Because of this combination, educators must be very clear regarding their goal when they choose to pair pictures with text. If the goal is merely to provide access to content, then it is reasonable to expect that pictures will increase comprehension of content that otherwise would not be accessible. However, if the goal is to improve literacy skills, pairing pictures with text is likely to slow down the rate at which students develop those skills. In either case, AT decisions require that we consider both access to content and access to learning if we want to insure that students achieve their goals.

Summary

There are many issues to consider regarding literacy for students with significant intellectual disabilities before the literature can be fairly reviewed. Beyond issues of the specific methods followed in the review itself and the quality of the research reported in the literature, the review presented in this monograph is based upon the assumption that students with significant intellectual disabilities can successfully access the general curriculum while learning to read, write, and communicate if they are afforded access to high-quality instruction that reflects what we understand not only about topics but also about instructional approaches in the mainstream. In the next two chapters, the reports of the National Reading Panel and the National Early Literacy Panel will be introduced as important sources of information regarding our

understanding of topics and instructional approaches to reading and literacy in the mainstream. In subsequent chapters, the literature regarding each topic as it relates to students with significant intellectual disabilities will be reviewed.

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Chapter 3: National Reading Panel Report

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

The National Reading Panel (NRP) was convened as a result of a request from the U.S. Congress to the Director of the National Institute of Child Health and Human Development and the U.S. Secretary of Education. The request was made on the basis of a desire to have an updated assessment of the status of our research-based knowledge regarding approaches to teaching children to read (National Reading Panel, 2000). Once convened, the members of the NRP worked together to develop a strategy to address the demands of their charge. As they reported in the introduction of the published report, "it quickly became apparent that the Panel could not respond properly to its charge within the time constraint" (p. 1-1). They addressed their concerns first by securing an extension and second by selecting prioritized topics using a screening task and their own informed judgment.

What Is the Importance of the National Reading Panel Report?

All of this background is important because it provides a context for understanding why the NRP focused on the areas of instruction that have come to be known as *The Big Five*: phonemic awareness, phonics, fluency, vocabulary, and comprehension. These topic areas resulted from an initial decision by the NRP to form subgroups based on the topic areas that had been designated by the National Research Council (1998) as "central to learning to read" (National Reading Panel, 2000, p. 1-2) and on subsequent public hearings and discussions among the NRP members. In its report, the NRP states: "It should be made clear that the Panel did not consider . . . the instructional issues they considered to be the *only* topics of importance in learning to read. The Panel's silence on other topics should not be interpreted as indicating that other topics have

no importance or that improvement in those areas would not lead to great reading achievement" (p. 1-3).

How Does the Report of the National Reading Panel Relate to This Monograph?

In the current monograph, all five of the areas in the NRP report are included, as well as some areas that did not appear in the NRP report because they are critical components of literacy learning for all students, including students with significant intellectual disabilities. First, emergent literacy has been included as a topic because a large segment of the population of students with significant intellectual disabilities is just beginning to develop understandings of literacy. The very recent publication of *Developing Early Literacy: Report of the National Early Literacy Panel* (National Institute for Literacy, 2009) provides an important review of the literature related to emergent literacy development for children without disabilities and will be used in this monograph as an indicator of what we understand about issues related to emergent literacy in the mainstream.

A second topic that was added to the review reported in this monograph is writing. Because the charge of the NRP was to review the research in reading, writing was not a topic it addressed; yet writing helps students learn to read (Cunningham & Allington, 2006; Spivey, 1997), and writing has proven to be an exemplary indicator of developing literacy skills in children with significant intellectual disabilities (Erickson, Koppenhaver, Yoder, & Nance, 1997; Koppenhaver & Erickson, 2003; Wolf & Hogan, 2002). Particularly when students with significant intellectual disabilities have concomitant complex communication needs, writing is essential to support independent communication (Beukelman & Mirenda, 2005).

A third topic that was added to the review reported in this monograph is word identification, or sight word, instruction. While it is not necessarily an area that the members of the NRP would have deemed important to include in a more comprehensive review had they had more time, word identification instruction and research is deeply entrenched in the field of significant disabilities. A review of all of the research published from 1975 through 2003 (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006) regarding reading and students with

significant intellectual disabilities revealed 128 studies. Of those, 80 (62.5%) addressed sight word instruction. Whether or not sight word instruction is an area that the NRP would deem important, it is clearly important in the field and therefore worthy of inclusion. Furthermore, it is included as a topic in this monograph because there are misunderstandings regarding the relationship between sight word learning and vocabulary as it is defined by the NRP in the literature related to literacy for students with significant intellectual disabilities (Browder et al., 2006).

The fourth, and final, topic that was added to the review reported in the current monograph is comprehensive instruction. This area was added as a direct response to the fact that sight word instruction dominates the research literature in the field of significant disabilities. While learning to read words is important, learning to read words has limited utility without instruction targeting the use of those words in reading connected text along with comprehension and writing to communicate with others. This is a common theme in the mainstream. In each area reviewed by the NRP (National Reading Panel, 2000), the conclusion was the same: the most effective approaches must be integrated with other types of instruction to create a complete reading program. This was the case regarding phonemic awareness, phonics, fluency, comprehension, and vocabulary.

What Was the Process the National Reading Panel Used to Review the Research?

The National Reading Panel used a very rigorous and clearly defined process in their review of the research. While there has been, and continues to be, controversy regarding the approach it followed (Cunningham, 2001; Garan, 2001), the application of the findings in the report continues to drive both policy and standards in general education. A major focus of the controversy related to the NRP was the specific methods it used first to identify studies that met its criteria for inclusion and then to combine the results of those studies.

Right or wrong, the NRP selected only those published studies employing a design allowing the claim to be made that a change in the target reading behavior was the direct result of the

intervention and not other factors. After identifying studies with the required types of designs, it then employed a statistical process that allowed it to collapse findings across multiple studies. This process involved calculating effect sizes.

Effect Sizes. When two groups are compared using an effect size, a 0 indicates that the average scores for the groups were the same at posttest. An effect size of 0 suggests that the intervention was not better than the control. Effect sizes generally range from 0 to 1.0, but there are examples of interventions so effective that their effect sizes reach 3.0 and higher, indicating that they are far superior to the control intervention. Since most of the effect sizes reported by the NRP fall in the range of 0 to 1.0, it is most important to remember that an effect size of .2 is considered small, .5 moderate, and .8 large (Cohen, 1988). These effect sizes allow us to consider the relative effectiveness of interventions for different groups of students; however, not all of the Big Five areas included sufficient research to calculate an effect size. When it was not possible to calculate effect sizes, the panel members engaged in a rigorous review-and-summary process in their efforts to analyze the existing research.

How Does the Report of the National Reading Panel Relate to Students with Significant Intellectual Disabilities?

While there are a few exceptions, most of the research reviewed by the NRP involved students from three different populations. One group included beginning readers in preK, kindergarten, and first grade. Many of the children in this group were selected for participation in research because they were deemed at risk for having later reading difficulties. These risk factors were generally based on socioeconomics or a family history of dyslexia. A second group of students was labeled by the NRP as Disabled Readers; however, the term *disabled* was not used in the way many special educators would assume. In the report of the NRP, this group of students included *only* those students who had average intelligence but who struggled to read. This group of students has historically been identified as having learning disabilities by using a discrepancy formula.

The final group was called Low-Achieving Readers. The students in this group are most like the students with significant intellectual disabilities who are the focus of this monograph, but students described as Low-Achieving Readers by the NRP tended to be higher functioning intellectually than most students with significant intellectual disabilities. Like Disabled Readers, Low-Achieving Readers struggled to read, but they had other cognitive difficulties, typically including an IQ that fell below average. Again, there are a few exceptions to these general categories of students in the entire NRP report, but it is important to note that none of the research analyzed by the NRP included students with significant intellectual disabilities. It is also important to note that common references to the NRP report refer to the summaries of the entire set of research, including all three of these groups. Rarely are the findings for the individual groups described in isolation.

Why Should We Use the Complete Report of the National Reading Panel Subgroups?

Throughout this monograph, all references to the Report of the National Reading Panel and the NRP are related to the actual *Report of the National Reading Panel: Teaching Children to Read* (Reports of the Subgroups) (National Reading Panel, 2000). This is an important distinction because the summary of this report (National Institute of Child Health and Human Development, 2000) does not accurately reflect the findings of the subgroups (Garan, 2002, 2005) and often neglects the nuances that appeared relative to individual groups of children. While it is daunting to consider tackling a document that is more than 450 pages in length, one should consult the actual report of the subgroups to find more information regarding the issues raised throughout this monograph.

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Chapter 4: National Early Literacy Panel Report

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

What Is the Importance of the National Early Literacy Panel Report?

The National Early Literacy Panel (NELP) was convened two years after the release of the Report of the National Reading Panel (NRP), with the National Institute for Literacy acting as the lead agency. The purpose of convening the NELP was to conduct a systematic review of the research on early literacy development (including home and family influences on that development) (National Institute for Literacy, 2009). In addition to seeking to identify research-based practices to support early literacy learning, the NELP sought to understand what skills and abilities in young children (birth – five) predict success with reading in later years.

The NELP report is important because it is the first to focus explicitly on early and emergent literacy rather than conventional literacy. Emergent and early literacy is best defined as the reading and writing behaviors that precede and develop into conventional reading and writing (Teale & Sulzby, 1986). According to the NELP report (2009), "Conventional literacy skills refer to such skills as decoding, oral reading fluency, reading, comprehension, spelling, and writing" (p. vii). The NRP report focused exclusively on conventional literacy skills, which made it difficult to apply it to students with significant intellectual disabilities, who often remain at emergent levels of literacy understanding for years. The NELP provides specific information regarding what is known in the mainstream about strategies that support early and emergent literacy learning as well as early skills that are the best predictors of later literacy success.

How Does the National Early Literacy Panel Report Relate to Students with Significant Intellectual Disabilities?

The most significant contribution the NELP report makes to students with significant intellectual disabilities is the information it provides about early and emergent literacy. It provides a critical reference point from which we can plan interventions most likely to succeed with students with intellectual disabilities of all ages. Unfortunately, the NELP report includes no specific information regarding children with disabilities. In fact, the Panel adopted procedures for selecting research to include in the review that systematically excluded many studies with participants who had disabilities. The description of the inclusion/exclusion criteria states: "To be included, these studies had to provide quantitative data describing children within a normal range of abilities and disabilities" (p. 4). It would not be unusual for children with significant intellectual disabilities to be represented among the "normal range of abilities and disabilities": however, the description continues: "[S]tudies were excluded if they . . . included children with neurological or degenerative disorders, such as acquired immune deficiency syndrome (AIDS) or autism, or children who were blind or deaf" (p. 4). While no specific information is provided one way or the other, it seems highly unlikely that any students who would be described as having significant intellectual disabilities would have been included in the research reviewed by the NELP.

Nonetheless, the NELP report does provide valuable information for those interested in addressing the literacy learning needs of students with significant intellectual disabilities. Like this monograph, the NELP report defines *literacy* narrowly and remains focused on early literacy skills and interventions that are most likely to promote later conventional literacy success. The goals expressed throughout the report are consistent with those expressed by Koppenhaver (2000), who states that emergent literacy is a starting place. The NELP gives a road map to work from as we start with students with significant intellectual disabilities.

How Does the National Early Literacy Panel Report Inform This Monograph?

One purpose of this monograph is to review the research in literacy for students with significant intellectual disabilities with reference to what is known about literacy in the mainstream. Since the overall aim of this monograph is to review research-based approaches to providing access to the general curriculum in literacy and reading, it is important to have a basic understanding of the skills in the general curriculum *and* the underlying skills needed for students to be successful with the general curriculum. The NELP report helps us understand what early and emergent literacy skills are most important to address if the goal is to help students with intellectual disabilities access the general curriculum while learning to read and write.

In the sections of the monograph that highlight emergent literacy, phonemic awareness, and writing, specific references will be made to the NELP and its findings. While phonemic awareness is clearly addressed in the NRP report (2000), it is a skill that begins to develop for many children before they enter school. As such, it is also addressed in the NELP report. Emergent literacy and writing, on the other hand, are not addressed in the NRP report. Therefore, the guidance provided by the NELP will be critical in understanding the literature regarding students with significant intellectual disabilities in those two areas.

References:

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Chapter 5: Review Methods

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

The review procedures for this monograph were developed in order to insure a rigorous review of the literature. Specific parameters were set to determine both inclusion and exclusion criteria. While we do not intend to evaluate effect sizes, as would be required in a meta-analysis, we did employ a process that will yield a final monograph that will offer more rigor and be more systematic than a narrative review.

Research Study Inclusion Criteria

Criteria for the literature review were established to insure a rigorous review. The following criteria were used to identify the most current research regarding literacy for students with significant intellectual disabilities. Specifically, the research had to 1) be published in peer-reviewed journals, dissertations, books, or book chapters between 2003 and 2009; 2) be based on a quantitative or qualitative design; 3) report on student outcomes related to one or more components of literacy (i.e., emergent literacy, reading, word identification, phonemic awareness, phonics, fluency, vocabulary, comprehension, and writing), and 4) include at least one student between the ages of 3 and 21 with a significant intellectual disability. If research results were reported in more than one article, the most recent publication was selected for inclusion in the review.

Search Methods

Systematic procedures were developed for the literature searches as described below.

1) Extensive computer literature searches were conducted using the databases of ERIC, PsychINFO, Academic Premier, CINAHL, and Dissertation Abstracts International. To insure breadth of information, these databases were selected to allow searches in multiple fields, such as education, psychology, and allied health.

2) Searches were completed using selected disability terms and literacy terms. Twelve disability terms were chosen on the basis of the definition of "intellectual disabilities": *intellectual disabilities, intellectual impairments, cognitive disability, cognitive impairments, mental retardation, autism, Rett syndrome, Down syndrome, fragile X syndrome, multiple disabilities, cerebral palsy, and augmentative and alternative communication*.

In addition to the disability terms, a total of 27 literacy terms were searched in combination with the disability terms. Twenty-three of the 27 search terms had been used as search terms in the National Reading Panel Report. These include *reading, nonword reading, alphabetics, word identification, word recognition, phonological awareness, phonemic awareness, direct instruction, phonics, decoding, blending, word attack, synthetic phonics, fluency, comprehension, reading comprehension, text comprehension, vocabulary, vocabulary instruction, spelling*, and *invented spelling*. Four additional terms were chosen to insure that the review included early and emergent literacy—terms that may best address the needs of many students with significant intellectual disabilities. These four terms were *emergent literacy, shared reading, writing*, and *literacy*.

Database searches were conducted by pairing one disability term with each of the literacy terms, (e.g., *mental retardation* and *phonics, mental retardation* and c*omprehension*).

3) Manual searches were conducted of the reference lists of meta-analyses, literature reviews, and the studies that met the inclusion criteria as described above to identify other research that may have been overlooked in the search of the databases.

Results of the Search

Preliminary searches with each unique combination of the terms above yielded a total of 4,061 potential documents. After these were reviewed to insure that they addressed school-aged (3–21) children with intellectual disabilities and after all duplicates were eliminated, 283 documents remained. These 283 documents were then individually reviewed; a total of 101 met the criteria for inclusion described below.

Consistent with the differences in the incidence of different levels of intellectual functioning, there were more studies targeting students with mild-to-moderate intellectual disabilities than studies targeting students with more significant disabilities. Across the studies, researchers used a broad range of methods to identify students as having a significant intellectual disability. In a number of studies, researchers provided only the diagnosis of each participant without further details about the level of intellectual functioning. (For example, van Bysterveldt, Gillon, & Moran [2006] report that their participants had Down syndrome, but they provide no further descriptions of their participants' level of intellectual functioning.) In order to account for these variations and to insure the selection of studies that exclusively address the specific population of interest, it was necessary to establish additional parameters to identify those studies that included participants with significant intellectual disability.

The parameters we used in completing the selection of articles addressing students with significant intellectual disability include at least one of the following in the article:

(1) Explicit reporting of intelligence quotients of 40 or lower.
(2) Explicit reporting of the need of the participant(s) for extensive or pervasive support.
(3) An intelligence quotient of 40 or lower calculated from explicitly reported chronological and mental ages [IQ = (chronological age/mental age) x 100].
(4) Explicit reporting of standard scores below 40 on the *Peabody Picture Vocabulary Test* (PPVT; 40 is the lowest standard score in the PPVT manual).

The 101 articles were then carefully read and reviewed to judge their application to the current review. A total of 49 of the 101 were not included in the final manuscript because they did not

address literacy despite having a literacy-related term as a keyword in the database, because they did not include school-aged students (3–21) in the sample, or because they failed to provide information regarding an intervention or characteristics of individuals with significant intellectual disabilities that would inform decisions regarding the provision of research-based approaches to access the general curriculum in literacy and reading.

There are a number of other important articles that we included in the final monograph because they address interventions with participants who have a developmental disability that is a common cause of intellectual disability (e.g., fragile X syndrome, Down syndrome, Rett syndrome). In many cases, no additional information is provided regarding the level of intellectual functioning. In other cases, insufficient information is available, but some information is provided regarding performance on a standardized test of intelligence (e.g., Raven Matrices) or language (e.g., Clinical Evaluation of Language Fundamentals). These articles appear in the monograph under clearly named sections that address studies that included participants with unspecified or less severe levels of intellectual functioning.

After 283 studies were reviewed using these criteria, a total 103 studies were identified as those that included students with intellectual disabilities. Of these, only 12 specifically included participants with significant intellectual disabilities. An additional 91 included participants with unspecified intellectual disabilities or with less severe levels of intellectual functioning.

These 103 studies are listed below in the following sections: emergent literacy, phonemic awareness, phonics, word identification, fluency, vocabulary, comprehension, and writing. Within each of these sections, the articles have been further divided into two sections: (1) participants with significant intellectual disabilities and (2) participants with unspecified or less severe levels of intellectual functioning.

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Chapter 6: Emergent Literacy

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Emergent literacy is the term used to describe the reading and writing experiences of young children *before* they learn to write and read conventionally (Teale & Sulzby, 1986). Emergent literacy learning starts at an early age, as infants and toddlers actively engage in many types of experiences with print, including writing. Young children learn about literacy through exposure to print within their natural environment and seeing models of others interacting with print (Teale & Sulzby, 1992). They also learn about the functions of reading and writing through active engagement and interaction with the adults in their world (Clay, 2005).

In the past, it was believed that literacy development did not occur until students entered school. Additionally, in order to qualify for reading instruction, educators had maintained that children needed to demonstrate certain prerequisite skills that would develop naturally as the child matured (Teale & Sulzby, 1992; Yaden, Rowe & MacGillivray, 1999). According to this maturational or readiness view, reading and writing could not begin before a child was specifically taught the requisite skills.

The emergent literacy viewpoint represented a stark contrast with previously embraced notions of reading readiness (Teale & Sulzby, 1992; Yaden, Rowe & MacGillivray, 2000). Beginning with Marie Clay's observations of young children in the 1960s and continuing today, the unconventional, early literacy behaviors that young children engage in before they receive any formal instruction (e.g., scribbling, flipping through the pages of a book, retelling a story to a stuffed animal) are recognized as comprising an early stage of reading development (Senechal, LeFevre, Smith-Chant, & Colton, 2001). During this phase, rather than being the passive recipients of instruction, children at emergent literacy levels are seen as active and involved

learners who apply their own "primitive hypotheses" (Clay, 2005, p. 9) when given opportunities to explore and interact with print (Senechal, LeFerve, Smith-Chant, & Colton, 2001). As such, emergent literacy is acknowledged as a necessary and important component of overall literacy development (Clay, 2005, Teale & Sulzby, 1992) that is "intimately tied to later literacy achievements" (Justice and Kaderavek, 2004, p. 231).

What Are the Tenets of Emergent Literacy?

Several conclusions drawn from the existing research comprise the tenets of emergent literacy (Teale & Sulzby, 2005). First, literacy development begins at or before birth and occurs in the child's home and community settings, long before the introduction of formal instruction (Clay, 2005). Secondly, children learn a great deal about reading and writing, such as the functions of these skills, through active engagement and interaction with the adults in their world (Clay, 2005). When children see adults using literacy to "get things done," it is meaningful. Thus, the functions of literacy are as important for a child to observe and learn as the forms (Teale & Sulzby, xvii). Contrary to the readiness view, another tenet of emergent literacy is that the oral and written language skills of listening, speaking, reading, and writing develop concurrently and interrelatedly rather than sequentially (Teale & Sulzby, 2005). For example, when children write, they attempt to read what they write. If an adult asks the child what he or she wrote, speaking and listening occur as part of the communicative exchange. Finally, although there are generalized stages of early literacy learning, because reading and writing are emerging, there is also a great deal of developmental variation (Clay, 2005; Teale & Sulzby, 1992). Although children may be demonstrating a variety of unconventional literacy behaviors, they are engaged in critical cognitive development during this period as they explore and experiment with print. Variation in literacy development may also occur due to differences in the quantitative and qualitative language experiences that children have in their home and school environments (Dickinson, McCabe, & Clark-Chiarelli, 2004).

What Does Emergent Literacy Look Like?

During the emergent literacy phase, children are busy developing their oral language, their understandings of how and why to use print, and their early phonemic and syntactic awareness (Senechal, LeFerve, Smith-Chant, & Colton, 2001). By the time children reach kindergarten many have had over 1000 hours of meaningful experiences with print (Heath, 1983). These experiences are characterized by multiple things that adults do naturally with young children. Through activities such as shared storybook reading, children develop a sense of story structures and increase both their vocabulary and knowledge of the world (Roskos, Christie & Richgels, 2003). As they watch adults interact with books and explore books on their own, children begin to learn concepts about print that include the orientation of a book, turning pages, directionality of print, the concept of a word, and the idea that print carries meaning (Clay, 1993; Roskos, Christie & Richgels, 2003). As young children explore books and see print within their environment, they may begin to recognize some words (Clay, 1993; Goodman, 1992). Engaging in songs, rhymes and poems provides children with the opportunity to play with sound (Roskos, Christie & Richgels, 2003). Exploration with writing takes many forms during this period including scribbling, drawing lines, writing pseudo and/or learned letters (Clay, 1993). Additionally, children may explore many different genres of writing such as notes or letters to another person or pretending to take an order at a restaurant or shop (Roskos, Christie & Richgels, 2003). These attempts at writing come from models children observe within their environment and can occur as part of play.

What is the Importance of Emergent Literacy for Students With Significant Intellectual Disabilities?

When it comes to students with significant disabilities, these early language and literacy experiences do not come easily. For a variety of reasons, students with significant intellectual disabilities face numerous barriers to literacy learning opportunities. At this important literacy learning time in their life, parents may be consumed with care demands for their children, which are often intense and make it difficult to find the time and energy for literacy activities. When compared to self-help, communication, and medical needs, literacy has a lower priority for the

parents and teachers of children with severe disabilities including intellectual disabilities (Light & McNaughton, 1993).

In addition to limited time and energy, the information parents receive from medical, psychological, and educational professionals regarding literacy development for their children is often less than encouraging (Kliewer, Biklen, & Kasa-Hendrickson, 2006). Consider the information found in the DSM-IV (American Psychiatric Association, 2000). The academic expectations for individuals with significant intellectual disabilities include familiarity with the alphabet, simple counting, and learning how to sight read some survival words, which is a far cry from acquiring conventional literacy. However, as pointed out by Kliewer and his colleagues (2006), the limited expectations presented in the DSM-IV (2000) are arguably socially imposed rather than based on biological limitations. Unfortunately the few opportunities most parents have to meet or interact with literate adults with significant intellectual disabilities reinforces the low expectations of the DSM-IV.

Based on these factors, parents may view literacy as an unrealistic goal for their children and a poor use of their time and energy. This then impacts the frequency and quality of literacy learning activities (Light & McNaughton, 1993). As a result, we end up with many students with intellectual disabilities who enter elementary school with limited exposure and few experiences with literacy materials. This creates shaky and incomplete understandings of print which ultimately make it difficult, if not impossible to learn how to conventionally read and write (Sturm, 2005). The difficulties continue to grow when these students are faced with the conventional literacy activities that dominate the general curriculum before they have had a chance to build an emergent literacy foundation.

What is the Difference Between Emergent Literacy and Conventional Literacy?

As previously explained in this chapter, *emergent literacy* is the term used to describe the reading and writing experiences of young children *before* they learn to write and read conventionally (Teale & Sulzby, 1986). Some examples of these behaviors may include

interpreting a story through pictures rather than through text, manipulating books in nonconventional ways (e.g., looking at the book from back to front or holding it upside down), scribbling, and the use of invented spelling (Clay, 1993; Koppenhaver, 2000). While exploring literacy materials, observing print within the natural environment, interacting with conventional readers and writers, and seeing models of how and why print is used, emergent readers and writers are making discoveries and learning about literacy (Teale & Sulzby, 1992). To summarize, emergent literacy "comprises all of the actions, understandings and misunderstandings of learners engaged in experiences that involve print creation or use" (Koppenhaver & Erickson, 2003, p. 283), and these experiences are not only necessary but closely related to later literacy outcomes (Justice and Kaderavek, 2004).

Conventional literacy refers to reading and writing that follow the form, content, and use of standard conventions (Koppenhaver, 2000). It is built on discoveries and understandings made during the emergent literacy phase of development. According to the National Reading Panel report (NRP; NICHD, 2000), in order to produce and understand conventional literacy an individual must develop phonemic awareness, phonics, vocabulary, fluency, and comprehension of connected text. Conventional literacy requires the simultaneous and integrated use of these skills to independently construct a message that can be accurately interpreted by other conventional readers (Koppenhaver, 2000).

Special educators may not fully appreciate the distinctions between emergent and conventional literacy, as their formal training may center on conventional literacy instruction for students with high incidence disabilities. In the realm of special education, there has been a tendency to teach students with significant intellectual disabilities who remain at emergent literacy levels mastery of one isolated skill (e.g., memorization of the alphabet or a list of sight words) in the hope that students might appear more age-appropriate (Kaderavek & Rabidoux, 2004). One of many problems with these types of "reductionist interventions" (Katims, 2000, p. 4) is the use of decontextualized, sequenced, hierarchical drill and practice. Without the understandings that emergent readers and writers discover through their own exploration in a print rich environment, mastery of one isolated is meaningless because the skill is not used outside of the instructional context. An additional consideration is that reading involves the use of multiple rather than a

single skill. Not only is more than one skill employed at a time, conventional readers must be able to simultaneously integrate those skills (Erickson, Koppenhaver & Cunningham, 2006).

How Does the Report of the National Early Literacy Panel Inform Our Emergent Literacy Intervention for Students with Significant Intellectual Disabilities?

In the spring of 2009, the National Institute for Literacy published the Report of the National Early Literacy Panel (NIFL, 2009). The National Early Literacy Panel (NELP) was convened in order to conduct a synthesis of the research regarding early literacy skills in children from birth through age 5. The resulting report provides important guidance regarding the skills, abilities and understanding early and emergent readers and writers must hold to successfully transition into conventional reading and writing.

In conducting the synthesis of the research, the NELP created five categories of interventions or influences on the development of literacy skills in young children. These five areas of intervention are: Code-focused, shared reading, parent and home programs, preschool and kindergarten programs, and language enhancement. Across each of these areas, the NELP concluded that interventions had a moderate to large effect on early literacy learning. Furthermore, these effects during the early childhood years influenced later conventional literacy development.

The report of the NELP contributes to our understanding of research-based interventions that support access to the general curriculum in reading and literacy for students with significant intellectual disabilities because a substantial portion of these students are emergent readers and writers. Even when they have developed some isolated conventional reading skills, these students often lack the range of experiences and understandings required to successfully apply those skills in conventional reading and writing contexts.

The findings of the NELP will also help to insure that the interventions emergent readers and writers with significant intellectual disabilities encounter are likely to build the skills they require

to one day read and write conventionally. For example, it is commonly recommended today that functional sight word reading be integrated into the day-to-day instructional program of school-aged students with significant intellectual disabilities (see e.g., Browder & Spooner, 2006), yet these sight word reading skills have no relationship with later conventional word reading skills (Ehri, 2005). In other words, the time and energy spent teaching sight words does not contribute to future reading abilities.

In contrast, the NELP found that code-related interventions that focus on building phonological awareness and alphabetic knowledge (letter names and sounds) have a direct, positive impact upon children's conventional literacy skills. Similarly, shared book experiences that promote interactions and engagement have a direct, positive impact on later conventional literacy skills. Understanding each of the these findings will support efforts to build successful emergent literacy interventions that will help students with significant intellectual disabilities build the foundation they require to emerge as readers and writers.

Code Related Interventions. These interventions largely address phonological awareness, alphabet knowledge, and early decoding. Across the board these interventions led to improved scores at the completion of the intervention, and they led to improved conventional reading and writing skills at a later time. A key finding relative to students with significant intellectual disabilities is that the children with the lowest skills levels at the outset of the interventions benefited the most. The Panel was unable to identify any prerequisite skills that seemed to be required for students to benefit from the code-related interventions studied. Other important findings lead to the conclusions that effective alphabet knowledge interventions combine phonological awareness interventions with letter-sound awareness instruction.

Shared Reading. These interventions involve increasing the volume of book reading or changing the style of the interaction between and an adult and a child or group of children. Shared reading interventions vary greatly from one study to the next, but the NELP concluded that shared reading interventions as a group have a direct, positive effect on oral language, print knowledge and writing development. Furthermore, shared reading was equally effective whether children were 2 or 5. This has strong implications for students with significant intellectual disabilities,

particularly those who have complex communication needs. If the shared reading interventions had positive effects on 2-year-old children, the requirements shared reading places on the student must be fairly minimal.

Parent and Home Programs. The programs included in the studies reviewed by the NELP varied greatly in terms of their focus, but all of them actively involved parents as "agents of intervention for children" (p. 180, NIFL, 2009). These parent and home interventions consistently had a positive impact on child language and general cognitive development. These findings support previous findings that suggest that children have the greatest literacy and language outcomes in homes where parents engage them in multi-turn conversations, read and write for real purposes that their children can witness and interact with their children during print and literacy-related activities. Once again, the NELP findings suggest that there are not significant differences in the impact of parent programs based upon child age.

Preschool/Kindergarten Programs. The NELP found surprisingly few studies of the impact of preschool and kindergarten programs that met the selection criteria they set. As a result, the effects of these programs are presented with qualifications. Given the few number of studies they did identify, these school programs had a large positive effect on the development of print knowledge and reading. Programs also had a positive effect on the general category of skills called readiness skills.

Language Interventions. In this category of interventions, the NELP looked specifically at interventions that were designed with the intent to explicitly and directly improve language outcomes for young children. These interventions had the largest positive effect on general cognitive ability, print knowledge and oral language. Once again they found that younger children benefited more from the interventions than older children, but there were no differences in the level of benefit for children with differing levels of language ability. Language interventions have a positive effect on children of all abilities.

Each of these findings relative to the NELP can help guide efforts to develop successful emergent literacy interventions for students with significant intellectual disabilities. Although the

NELP excluded research that addressed the needs of children with a range of disabilities, the findings have meaning for students with significant intellectual disabilities of all ages.

What Does the Literature (2003-Present) Tell Us About Emergent Literacy Instruction for Students with Significant Intellectual Disabilities?

Three studies addressing emergent literacy development for students with significant intellectual disabilities were identified as part of this review. Two of the studies describe classroom interventions and the third describes a parent intervention. In all cases the interventions reflect at least some of the findings of the NELP (NIFL, 2009). For example, one study (Erickson, Clendon, Abraham, Roy, Van de Karr 2005) investigated the impact of the *MEville to WEville: Early Literacy and Communication Curriculum* (AbleNet, Inc., 2004) on the early literacy development of 23 children with significant intellectual disabilities. The intervention included a range of book sharing, writing, and print-based interactions. The *MEville to WEville* program supported the teachers in using technology to support the children as they engaged in interactions and literacy activities such as book reading (books were on the computer) and writing (using alternate keyboards, switches access, and partner assisted scanning). The children demonstrated moderate gains in print knowledge (Cohen's $d = .51$), which is consistent with the moderate effect sizes the NELP (NIFL, 2009) calculated when analyzing preschool and kindergarten interventions. While the children in the Erickson et al (2005) study were all 8 – 14 years old, their level of emergent literacy and language understandings at the time the investigation began were consistent with the typically developing children included in the research reviewed by the NELP.

In another classroom intervention, Koppenhaver and Erickson (2003) evaluated the impact of naturalistic literacy interventions for preschool-aged children with a diagnosis of autism and intellectual disabilities. The interventions involved dramatically increasing access to reading, writing, and print related activities while increasing the level of interactions with adults in the classroom during the activities. There were no formal measures of language or literacy reported, but the authors provide a number of examples of child knowledge and skill demonstrations that

suggest that the children developed their understandings of print, the alphabet, and reading as a result of the intervention.

In the final study involving students with significant intellectual disabilities (Skotko, Koppenhaver & Erickson, 2004), mothers of girls with Rett syndrome were taught to use simple assistive technologies and augmentative communication strategies to improve the quality of book sharing interactions with their daughters. The results of the study suggest that the mother-child book sharing led to improved communication for the children. Furthermore, results reveal an important relationship between parent behaviors and child outcomes. As mothers asked more prediction and inferencing questions, pointed more to the communication symbols to model responses, labeled and described pictures in the book, and related storybook events to their child's life experience, the children communicated more often and more successfully. The parent book sharing intervention in this study led to some of the same types of gains that resulted in the very large effect size for parent-directed book sharing interventions analyzed by the NELP (NIFL, 2009).

Across these three studies, there is a convergence of evidence suggesting that students with significant intellectual disabilities who are emergent readers and writers benefit from many of the same types of interventions that yield strong effects on language and literacy outcomes for children without disabilities. These findings are important because they highlight areas of the general curriculum in reading and literacy that when accessed, albeit often at different chronological ages, lead to positive outcomes for students with significant intellectual disabilities.

What Does the Literature (2003-Present) Tell Us About Emergent Literacy Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

Trudeau, Cleave and Woelk (2003) examined the impact of a mother-child book sharing interaction involving students with moderate levels of intellectual disabilities. The two children with disabilities in the study had complex communication needs. They participated in weekly

sessions (60-90 minutes) with their mothers and a speech-language pathologist. The sessions focused on increasing the use of augmentative communication strategies to improve interactions during book reading. Reading books together, completing craft projects, singing, and having snack using the augmentative communication strategies to support interactions accomplished this. The investigation compared levels and types of child communication attempts when engaged with their mothers in book sharing with books that had been adapted with symbols to support communication and those that were not. Both children showed improved communication during the group and at home when the augmentative communication strategies were available.

In yet another study that taught parents book sharing techniques, preschool aged children with Down syndrome demonstrated significant improvements in code-related phonological awareness and letter knowledge skills (van Bydterveldt, Gillon, Moran, 2006). The parents of seven children with Down syndrome and 7 control children without disabilities were taught a specific book sharing approach that involved print referencing administered 4 times per week for 6 weeks. Each session lasted approximately 10 minutes and involved a book that parents selected from among their child's favorites. The parents were trained to draw their child's attention to four targeted letters and their corresponding sounds while maintaining their child's interest in the story. The children with Down syndrome made significant gains on three measures of phonological awareness, while the control group only made gains on the test of letter knowledge. Overall, the results suggest that parents can be taught to use book sharing and print referencing techniques to build their child's code-related skills. An interesting an important finding involved the relationship between alphabet knowledge and performance on an initial consonant task for the children with Down syndrome. The results support previous findings that suggest that children with Down syndrome need to know letter names and sounds to be successful in developing phonemic awareness. In the van Bydterveldt, Gillon, and Moran (2006) study, the children who were successful in scoring a better than chance levels on the initial phoneme identification task knew the letter name or sounds for at least three of the letters used in the task. Those who did not know the letter names were not successful. Teaching phonemic awareness to children with Down syndrome, and perhaps others with significant intellectual disabilities, using letters was recommended by the National Reading Panel (NRP; NICHD, 2000) and seems like an important area for further research.

Another study addressing students with unspecified or higher levels of intellectual disabilities was actually a survey of home literacy environments of young children with Down syndrome (Al Otaiba, Lewis, Whalon, Dyrlund, & McKenzie, 2009). The 107 parents who responded to the survey placed a higher priority on literacy than previous work had suggested. They also found that the vast majority of the children had high levels of access to books and other print materials in the home. Certainly these homes are ripe for focused interventions that would maximize the quality of parent-child interactions during literacy events and positively influence later conventional literacy learning.

In contrast to the supportiveness of homes as potential sources of literacy learning opportunities for students with intellectual disabilities, Pufpaff (2008) highlighted the multiple forms of barriers that made access to the general curriculum in kindergarten challenging for one 7-year-old boy with multiple disabilities, complex communication needs, and intellectual disabilities. Results indicated that his ability to make gains or access the general curriculum was severely limited by access and opportunity barriers. The access barriers were the result of his multiple disabilities, which made it difficult for him to physically access the curriculum and communicate with others about it. The opportunity barriers resulted from the limited knowledge and skills the adults in the classroom had relative to including a child with multiple disabilities and complex communication needs in the classroom.

Summary

Students with significant intellectual disabilities have demonstrated their ability to develop a wide range of emergent literacy skills in understandings through a variety of intervention approaches. The last 6 years have witnessed an increase in approaches that involve parents in these literacy interventions. Given the findings of the NELP (NIFL, 2009) regarding the direct positive effects parent interventions can have on child literacy and language outcomes, it is encouraging to see a trend toward these types of interventions that is already emerging. Al Otaiba, Lewis, Whalon, Drylund, and McKenzie (2009) have provided us with the first empirical evidence suggesting that parents' attitudes toward literacy for their children with intellectual

disabilities is shifting, and it is now a much higher priority than it has been in the past. Additionally, we have reports appearing in the literature of children who find they can demonstrate skills in understanding in written language that they are less able (Koppenhaver & Erickson, 2003) or unable (Atkin & Lorch, 2006) to demonstrate in oral language. Finally, we have a convergence of research from the mainstream (NIFL, 2009) and the field of significant disabilities (Koppenhaver, Hendrix, & Williams, 2007) to guide our efforts in diminishing the opportunity barriers that have prevented too many students with significant intellectual disabilities from successfully accessing the general curriculum in reading and literacy so that they too can become literate.

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Chapter 7: Phonemic Awareness

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Phonemic awareness is the awareness of spoken sounds, or phonemes, within a word and the ability to manipulate those sounds (Yopp, 1992). Phonemic awareness is an auditory awareness that can be demonstrated in the absence of print, yet it is an important predictor of later reading and spelling success (Ehri, 1999; Lonigan, Burgess, Anthony, & Barker, 1998; Torgesen, Wagner, & Rashotte, 1994; Wood & Terrell, 1998). That phonemic awareness is auditory distinguishes it from phonics, which involves the relationship between the sounds in words and print. The development of phonemic awareness typically begins long before students receive formal instruction in reading and writing in school (Lonigan, Burgess, Anthony, & Barker, 1998). Demonstrations of phonemic awareness are preceded by an awareness of spoken words, syllables, and rhymes, or phonological awareness (Ehri, 1999). Phonemic awareness is a specific form of phonological awareness that addresses the individual sounds in words.

Phonological Awareness

Phonological awareness refers to the whole spectrum of awareness of sounds in spoken language—from primitive awareness of speech sounds and rhythms to rhyme and syllable awareness to, at the highest level, awareness of phonemes, which are the smallest units of sound in speech (Ziegler & Goswami, 2005). Students need to develop some level of basic phonological awareness, such as awareness of rhymes and syllables, before they can develop knowledge of the individual phonemes in spoken words.

Phonological awareness usually begins to develop when typically developing students are around three years old and continues to develop until students are successfully applying their phonemic awareness skills through phonics in the primary grades. Several researchers have offered hierarchies that break down the sequence of phonological skill development. Most agree that students develop an awareness of words, then syllables, then alliteration before moving into more complex phonemic awareness skills such as segmenting onsets from rimes (for example, removing the *b* from *ball* to get *all*), blending and segmenting individual phonemes, and deleting and manipulating phonemes. For example, students typically understand that *ball* has one part or syllable and *baseball* two before they are able to recognize that *ball* and *call* rhyme or that *ball* can be segmented into its individual sounds /b/ /a/ /l/ or that those sounds can be blended together to make *ball*.

Understanding this sequence is helpful in providing a road map for the typical development of phonological awareness skills, but these hierarchies should not be viewed as a scope and sequence for instruction. Certainly, we want to insure that students have developed some basic phonological understandings at the word level before moving onto skills at the level of the individual phoneme, but the findings of the National Reading Panel suggest that we should not teach each skill in the sequence to mastery before moving on to the next. Furthermore, the findings of the National Early Literacy Panel (National Institute for Literacy, 2009) suggest that phonological awareness intervention should be combined with instruction in letters and letter-sound associations since the effects of these combined interventions were better across multiple outcomes (e.g., reading, oral language, phonemic awareness) than phonological awareness activities alone.

The Alphabetic Principle

Alphabet knowledge is quite simply the knowledge of individual letter names, sounds, and shapes. The alphabetic principle is the idea that letters and groups of letters represent the sounds of spoken language. Readers apply the alphabetic principle through phonics when they use their knowledge of the relationships between sounds and letters to read both familiar and unfamiliar words. The goal of instruction in the alphabetic principle is to teach students to apply their

knowledge of letters and letter sounds rather than targeting identification, matching, and mastery through direct instruction and repeated trials. In fact, the National Early Literacy Panel (National Institute for Literacy, 2009) does not recommend isolated instruction of alphabet knowledge because there is no evidence to support its impact on important reading-related outcomes.

Nonetheless, knowing the names of individual letters is an important early skill. There are specific programs that teach only letter sounds, not names, but research suggests that knowing names and sounds is important. Research has demonstrated that letter name knowledge is often a better predictor of later achievement in reading than phonemic awareness (Gallagher, Frith, & Snowling, 2000; Muter & Diethelm, 2001). Furthermore, knowledge of at least some letter names appears to be a precursor to the development of phonemic awareness in students without disabilities. In other words, it seems that students need to have some understanding of the relationship between individual letters and their names to understand that words are comprised of sounds that can be isolated and manipulated.

Which letters students learn first and which letters are most important are questions still open to debate; however, we do know that extrinsic factors like the type of instruction students receive and the amount of letter practice they get from their parents influence how many letters and which letter names students without disabilities know. For example, students' names and the order of the alphabet influence which letter names students without disabilities are most likely to know. Students are 17 times more likely to identify the first letter of their first name than any other letter, and they are 7 times more like to identify any letter in their first name than they are to identify letters not in their first name. They are also more likely to identify letters that appear early in the alphabet than later in the alphabet (Justice, Pence, Bowles, & Wiggins, 2006).

Learning the names of letters contributes directly to the success students have in learning the sounds associated with individual letters, which is likely to contribute to their overall understanding of the alphabetic principle and their ability to apply that principle in using phonics to read words. While phonological awareness, the awareness of words in spoken language, can develop in the absence of alphabet knowledge, it appears that at least some letter-name knowledge is a precursor to being able to develop the awareness of individual phonemes in

spoken words. In fact, most recent research suggests that phonemic awareness instruction is more effective when students use letters because the letters appear to provide visible, permanent, and discrete correspondents to phonemes. As such, phonological awareness, phonemic awareness, alphabetic knowledge, and later reading achievement are all highly interrelated.

How Does the Report of the National Early Literacy Panel Inform Our Phonemic Awareness Intervention for Students with Significant Intellectual Disabilities?

The report of the National Early Literacy Panel (National Institute for Literacy, 2009) reviewed research on phonological and phonemic awareness as well as alphabet knowledge as part of its emphasis on code-related interventions. The panel defined code-focused interventions as "interventions designed to teach students skills related to cracking the alphabetic code. Most code-focused interventions include phonological awareness interventions" (p. viii). The skills addressed in these code-related interventions were all found to relate positively to later reading-related outcomes. Specifically, alphabet knowledge related strongly to later decoding and spelling outcomes and moderately to later comprehension outcomes. Phonological awareness (including some measures of phonemic awareness) related moderately to all three outcomes. The panel also concluded that code-related interventions in general yield moderate-to-large effects on later reading-related outcomes. These findings were consistent whether students were in preschool or kindergarten. Furthermore, the panel found support for small group or individual formats for code-related interventions. This differs from the findings of the National Reading Panel, which concluded that small group instruction was more effective than individual or one-on-one instruction. The authors of the report of the National Early Literacy Panel acknowledge that they did not find research showing the large group instruction addressing code-related skills to be ineffective, but all of the evidence they found supporting the positive impact of code-related instruction did employ individual formats.

While all of these findings can certainly inform our understanding of code-related interventions for students with significant intellectual disabilities, that the National Early Literacy Panel systematically excluded research that included children with disabilities cannot be overlooked.

We cannot assume that the findings of the panel will apply directly to students with significant intellectual disabilities, but in the absence of research that does include children with significant intellectual disabilities, our best option is to follow the guidance of the National Early Literacy Panel.

How Does the Report of the National Reading Panel Inform Our Phonemic Awareness Intervention for Students with Significant Intellectual Disabilities?

The report of the National Reading Panel situates phonemic awareness instruction in the context of a comprehensive instructional approach. Phonemic awareness is just one area of instruction that should not be an exclusive focus of reading instruction—even for a short period of time. The NRP also reported that phonemic awareness is most effective when it is taught in small groups, which are even more effective than one-on-one instruction.

The total amount of time spent teaching phonemic awareness was also an important finding of the National Reading Panel. Programs that offered a total of 5–18 hours of phonemic awareness training had more positive effects than programs that offered more or fewer hours. The 5–18 hours of instruction were spread out over several weeks with short (15–20 minute) sessions delivered to small groups of students. Also important was the finding that effective phonemic awareness instruction focused on just one or two skills, not all of the skills in the hierarchy of phonemic awareness development.

Each of these findings has particular relevance to students with significant intellectual disabilities because we have a tendency to teach them skills in isolation, one on one, with hours of repetition and practice. We also tend to break everything down into its constituent parts, à la task analysis, and teach each of those skills to mastery. The findings of the National Reading Panel report should make us reconsider these common practices when addressing phonemic awareness. If we know from the National Early Literacy Panel that the most effective code-related interventions address both phonological awareness and alphabet knowledge and if we know that the National Reading Panel found that we should not teach all of the skills in the phonological-phonemic awareness hierarchy, we should think twice about our special education practice of task

analyzing and teaching skills to mastery. If that practice overwhelmed the students without disabilities who participated in the research reviewed by the National Early Literacy Panel and the students with higher levels of cognitive functioning included in the National Reading Panel, why would we think it appropriate for students with significant intellectual disabilities?

Two additional findings of the National Reading Panel add strength to the findings of the National Early Literacy Panel regarding phonological and phonemic awareness. First, phonemic awareness instruction is more effective when students are actually manipulating letters and not just listening to and manipulating the sounds. This means that students who cannot physically move the letters should be given opportunities to eye-gaze or otherwise direct others to manipulate letters during the instruction. This also means that we are diminishing the impact of our instruction when we use pictures, tokens, or other nonprint materials during our phonemic awareness instruction. We should use letter tiles, magnetic letters, or index cards with letters written on them when teaching students about phonemes in our phonemic awareness instruction. Second, phonemic awareness instruction has the most impact on reading and spelling ability when it is taught early. Per the findings of the NRP, waiting until students are in 3rd grade, 4th grade, or higher does not promote improvements in spelling in the ways it does for younger students. In fact, the National Early Literacy Panel suggests that children as young as 3 or 4 benefit from phonological awareness intervention. Given the important role that spelling can play as a means of communication for students with significant intellectual disabilities who cannot use speech to communicate, it is important to start addressing phonological and phonemic awareness as soon as students have even an emerging means of communication and interaction.

The findings of the NRP clearly suggest that students benefit from explicit instruction in phonemic awareness, yet the findings also indicate that some students develop phonemic awareness as a result of learning to read and spell. Phonemic awareness is not a necessary prerequisite to learning to read. This has particular relevance for students with significant intellectual disabilities who may find it particularly difficult to understand the abstract notion of phonemic awareness until they have developed some early reading and writing skills.

Interestingly, two recent studies (Erickson, Clendon, Abraham, Roy, & Van de Karr, 2005; Erickson & Hatch, 2008) involving students with significant disabilities found that students made gains in phonological and phonemic awareness when they were immersed in comprehensive literacy instruction that did not include *explicit* phonemic awareness instruction. In both studies, the comprehensive intervention consisted of reading, phonics, and writing instruction. Phonological and phonemic awareness, specifically the ability to recognize rhyming words and words that begin with the same sound as well as the ability to blend phonemes to identify the target word, developed as a result of comprehensive reading instruction in the absence of explicit instruction in phonological or phonemic awareness.

What Does the Literature (2003–Present) Tell Us About Phonemic Awareness Intervention for Students with Significant Intellectual Disabilities?

Only one article published since 2003 specifically addresses phonological and phonemic awareness in students with significant intellectual disabilities (Erickson et al., 2005) and it does not include specific interventions targeting these skills. Instead, the intervention described by the authors is a commercially available early literacy and communication and instructional program called *MEville to WEville* (AbleNet, 2004). The study involved a single-group pretest/posttest design with 12 weeks of intervention using *MEville to WEville* for at least 30 minutes each day. The study measured student growth in writing, concepts about print, letter identification, and phonological/phonemic awareness. The authors point out that the *MEville to WEville* intervention does not include direct instruction in phonological or phonemic awareness; however, they report small gains for some of the students in rhyme recognition and phoneme blending. While the investigation does little to direct us regarding specific strategies we can use to promote phonological and phonemic awareness for students with significant intellectual disabilities, it does provide preliminary evidence that emergent readers with significant intellectual disabilities experience at least some of the same bidirectional benefits of gains in other literacy-related areas that are reported by the National Early Literacy Panel for emergent readers without disabilities.

That students with significant intellectual disabilities can develop phonological and phonemic awareness skills is further supported by Browder and her colleagues (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008). They report on a seven-month investigation of a curriculum called *Early Literacy Skill Builder* (ELSB) (Browder, Gibbs, Ahlgrim-Delzell, Coutade, & Lee, 2007). The ELSB curriculum is a comprehensive program that will be described in more detail later in this monograph; however, important here is that a key component of the ELSB is the development of phonemic awareness skills that can serve as a "bridge to reading by late elementary school" (p. 35). The 11 students with significant intellectual disabilities who used the ELSB program made substantially more progress than their peers who did not receive instruction with ELSB on measures of phonemic awareness and phonics (Cohen's d = 1.35 for intervention and .51 for control on the phonics and phonemic awareness section of a researcher-made assessment).

The ELSB curriculum targets the development of phonemic awareness directly through activities that emphasize (1) clapping syllables and then phonemes in spoken words; (2) identifying the first and last sound of words; (3) finding pictures that begin/end with a specified sound; (4) pointing to letters in segmented words; and (5) pointing to pictures to represent segmented words. The specific method of instruction across these skills is described as a "[d]irect instruction approach with a model/lead/test strategy" (Browder et al., 2007, p. 36), which requires the teacher to physically guide students when they make an incorrect response and which accommodates the needs of students with physical impairments. After seven months of daily instruction that included lessons such as those described here, the 11 students in the intervention group demonstrated that they learned the skills they were taught on a curriculum-based measure and could apply those skills to untaught items on a researcher-developed assessment.

Browder et al. (2008) provide us with the only explicit evidence of the impact of direct instruction in phonemic awareness on students with significant intellectual disabilities. The small group of students in the investigation clearly learned new phonemic awareness skills and could apply them to novel items. Now, the test that was put forth by the National Early Literacy Panel must be met: we must see how those skills influence later progress in conventional reading and

writing. Browder et al. (2008) indicate that they are continuing to follow the students in subsequent years of instruction. They will be first to demonstrate whether the link between early phonemic awareness skill development and later reading success is as strong for students with significant intellectual disabilities as it is for children without disabilities.

Regardless of the outcome of the ongoing investigation of the ELSB curriculum, we should continue to investigate the specific methods of instruction used to teach the skills in the first place. The report of the National Early Literacy Panel (National Institute for Literacy, 2009) suggests that we do not have enough information at this time to know which intervention methods are most successful but that we do know that successful code-focused interventions involve "actively engaging in analysis or synthesis of words at the syllable, onset-rime, or phoneme level with feedback on correct and incorrect responses" (p. 119). The direct instruction approach in ELSB guides students in providing a correct response and provides corrective feedback (through physical guidance) rather than allowing incorrect responses and providing instructional feedback to the student. Furthermore, it is unclear how the National Early Literacy Panel defines "actively engaging in analysis and synthesis of words," but it is possible that the response format in ELSB (a format that was developed to meet the unique needs of students with significant intellectual disabilities who have complex communication needs and/or significant physical impairments) does not encourage enough active engagement in these two critical processes. These are questions that will have to be addressed through further research. For now, it important that we have clear evidence that students with significant intellectual disabilities can learn phonological and phonemic awareness skills, yet it seems prudent to heed the advice of the National Early Literacy Panel and "distill the specific components of interventions to determine what types of intervention activities produce the most positive effects on children's early literacy skills" (p. 119).

What Does the Literature (2003–Present) Tell Us About Phonemic Awareness Intervention for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

The primary emphasis of the research investigating phonemic/phonological awareness in students with intellectual disabilities has been to describe the nature of their phonemic/phonological awareness skills and the relationship between those skills and reading. A number of studies have found that the relationship for children with Down syndrome (Kennedy & Flynn, 2003a; Kennedy & Flynn, 2003b; Roch & Jarrold, 2008; Verucci, Menghini, & Vicari, 2006), Williams syndrome (Menghini, Verucci, & Vicari, 2004), and complex communication needs (Card & Dodd, 2006; Larsson & Sandberg, 2008; Larsson, Sandberg, & Smith, 2009) is similar to the relationship in children without disabilities. Furthermore, rhyming tasks are consistently proving unexpectedly difficult relative to other phonemic awareness abilities that are typically later developing. For example, Kennedy and Flynn (2003a) found that the young children with Down syndrome in their study (ages 5;6 to 8;10 years) found more advanced tasks such as phoneme isolation and blending easier than rhyme awareness tasks. Similarly, the children with cerebral palsy and complex communication needs in Larsson and Sandberg's (2008) investigation found that deleting and blending phonemes was easier than identifying rhyming words.

The research regarding phonemic/phonological awareness for children with complex communication needs specifically points out that these children do develop and use these skills in reading; however, they experience difficulty with tasks based on the load each task places on phonological memory rather than the size of the unit being analyzed (Larsson & Sandberg, 2008). These findings are very important when considering interventions for students with significant intellectual disabilities who often experience complex communication impairments. Interventions developed for children without disabilities are largely based on the hierarchy of phonological awareness development put forth by Adams (1990). This hierarchy holds that children first learn to process sounds at the word level and then progress to processing sounds at the syllable and phoneme level. The research since 2003 clearly supports the fact that students with intellectual disabilities do not necessarily follow this pattern. Findings suggest that many of

the students who participated in the research performed better on phoneme level tasks because they had already begun to read (e.g., Kennedy & Flynn, 2003a; Larsson, Sandberg, & Smith, 2009). In other words, their phonemic awareness developed as a result of learning to read. While we need more research before we can understand which sequences and strategies are most important, current evidence suggests that we should not view phonological and phonemic awareness as necessary precursors to reading development for students with intellectual disabilities and that we should begin teaching reading as a means of building those skills.

Two studies published since 2003 were conducted to investigate specific interventions designed to develop phonological awareness skills in children with Down syndrome (Kennedy & Flynn, 2003b) and cerebral palsy with complex communication needs (Truxler & O'Keefe, 2007). Neither study resulted in universal success for the participants, but both provide evidence that the students with intellectual disabilities can learn at least some phonological awareness skills. Furthermore, both studies employed intervention approaches that do not reflect the research regarding effective approaches for children without disabilities; therefore, it is difficult to determine if the issue was that the instructional approach was ineffective or if the children with intellectual disabilities who participated in the research lacked the ability to make more progress.

The intervention reported by Kennedy and Flynn (2003b) targeted children with Down syndrome (ages 7;2, 8;4, and 8;10). The three children each participated in 8 one-hour sessions that targeted alliteration, phoneme isolation, spelling, and rhyme detection. All of the children improved their spelling abilities, an improvement which reflects increased understandings of grapheme-phoneme connections, but they failed to generalize the skills they learned to other related skills. The authors acknowledge that this may be due to the limited duration of the intervention; however, the overall length of the intervention may have been less of an issue than the length of each session, the grouping, and the specific skills that were targeted. Each of these areas is addressed by the report of the National Reading Panel. For example, the findings of the National Reading Panel suggest that phonemic awareness intervention is most successful when it is delivered to small groups rather than individuals and when it is delivered in short (15–20 minute) sessions that are part of a comprehensive instructional program. The panel also found that specifically addressing blending and segmenting is more effective than addressing a broad range

of skills. None of these findings are reflected in the intervention designed by Kennedy and Flynn. Until we investigate interventions that reflect the evidence-based strategies found in the much larger body of research regarding phonemic/phonological awareness for children without intellectual disabilities, we cannot make claims about what children with intellectual disabilities can and cannot learn and generalize.

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Chapter 8: Phonics

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Phonics is the understanding of the relationship between the sounds (phonemes) and letters (graphemes) in written words. Phonics instruction teaches students the specific grapheme-phoneme associations as well as how to use that knowledge to "decode" or spell unfamiliar words. For example, when beginning readers attempt to decode a new word such as *big*, they may try to segment it and sound it out by mapping an individual sound (phoneme) onto each letter (grapheme) /b/ /i/ /g/ before blending those sounds together. The same thing happens during writing when students attempt to spell an unfamiliar word. When they attempt to spell the word *big*, they may try to stretch out the sounds in the word before segmenting the sounds and representing each with a letter or combination of letters. Because phonics emphasizes the relationship between letters and sounds, it is easy to see why early phonemic awareness and alphabet knowledge are two of the best predictors of reading achievement (Share, Jorm, Maclean, & Matthews, 1984).

Phonics instruction is typically introduced during the primary grades after students have developed fundamental emergent literacy understandings such as concepts about print, the alphabetic principle, and basic phonological awareness skills. The goal of phonics instruction is to make word reading as efficient as possible so that the focus during reading can be on comprehension. If readers have to work too hard to decode words while reading, their comprehension of the text suffers (Ehri, 2005). Phonics instruction that effectively meets the goal of making word recognition effortless is explicit and emphasizes the systematic and

predictable patterns in written words (National Institute for Child Health and Development [NICHD], 2000).

Phonics is the route through which readers learn to identify words with automaticity. Words that are read with automaticity, or "sight words," are learned first by decoding and then through a process of making connections between the letters in the word and the pronunciation of the word (Ehri, 1992, 1998). Sight words also include words such as *was* and *the*, which cannot be decoded using letter-sound knowledge and are learned by mapping the entire spelling onto the correct pronunciation without the benefit of using grapheme-phoneme relationships. In both cases, words must first be read with some level of attention and effort. But if beginning readers are given enough opportunities to read and spell words in meaningful contexts, words can eventually be recognized effortlessly by sight (Ehri, 1992).

A Model to Inform Phonics Instruction: Adams' Model of Word Reading

For beginning readers, the task of decoding unfamiliar words is a multilayered process that involves more than learning letter-sound associations. Adams (1990) describes these layers in her model of word reading. Understanding the general aspects of this model gives insight to the processes that readers need to use to successfully read a word with understanding. Adams's model is important because it helps provide a context for understanding all the aspects of phonics instruction—an area that has only recently become an area of emphasis in research and practice for students with significant intellectual disabilities.

Adams's (1990) model is a cognitive model describing four cognitive "processors" that interact during reading. They are the *orthographic* processor (which processes the visual print image or the Braille representation), the *phonological* processor (which processes the speech or cued speech information), the *meaning* processor (which processes the potential multiple meanings for the word), and the *context* processor (which processes the precise meaning of the word given the context of its use). During reading, each processor works independently and in concert with the others. Very simply, the job of the processors is to figure out new words on the basis of the way

they look, the sound their letters make, and the meaning of the words in the context where they are encountered.

When a beginning reader encounters an unfamiliar word, the orthographic processor is responsible for visually analyzing the word. The processor searches the reader's memory for words the reader has seen before and tries to find a visual match to that particular word. For example, when the reader encounters the word *can*, the orthographic processor searches the reader's memory for the entire spelling array of words that have *c* or *an* to match the spelling pattern. At the same time, this information is shared with the phonological processor that attempts to assign sounds to the individual letters in the word (/c/ /a/ /n/) or groups of letters (/c/ /an/) to generate potential pronunciations. The orthographic and phonological processors interact with one another and the meaning processor, which generates potential meanings of the word. For example, as a student reads the word *can*, the meaning processor considers at least two possible meanings, either the verb (I *can* do things after school) or the noun (There is a *can* of tuna). With at least two meanings to choose from, the context processor determines which meaning is most likely given the context of the word's use. For example, if the word is used in the sentence, "I'd like a can of soda," the context processor will help determine which meaning is correct.

As described above, eventually words are encountered so frequently that readers can read them without the support of the phonological processor (Ehri, 1992). Instead, they immediately and effortlessly recognize the spelling pattern of a word and associate it with its pronunciation without having to apply any knowledge of letter-sound relationships (Ehri, 2005). For the most part, until words become words that are read as sight words, all of the processors must be working in unison for successful word identification to occur while reading text.

In beginning readers, these processors and the interaction between each of them are underdeveloped and imbalanced, resulting in slow, laborious reading. The imbalance often results from the fact that young children typically have knowledge of words in oral language (meaning and context processors) that exceeds their knowledge of print (orthographic processor) and letter-sound associations (phonological processor). For these students, an emphasis on early

phonics that addresses the orthographic and phonological processors is defensible because they already have skills in the other two processors. For students with significant intellectual disabilities, such an approach would be more difficult to defend. Successful word reading requires the integration of all four processors, and students with significant intellectual disabilities are likely to have oral language skills that are at least as impaired as their orthographic and phonological knowledge. Given this disadvantage, the importance of instruction that continuously supports meaning cannot be overemphasized. Adams's model provides a specific framework that can help researchers and educators as they work to develop interventions that address the needs of students with significant intellectual disabilities.

How Does the National Reading Panel Report Inform Our Phonics Instruction for Students with Significant Intellectual Disabilities?

The report of the National Reading Panel (NRP) (National Institute for Child Health and Development [NICHD], 2000) provides critical guidance regarding the importance of phonics and research-based approaches that should be employed to teach phonics. While the NRP did not review research that specifically addressed students with significant intellectual disabilities, its findings will certainly inform the decisions we make regarding future research and instruction for students with them.

Perhaps the most important finding of the NRP with respect to phonics is that it is a required component of instruction. Historically, reading instruction for students with significant intellectual disabilities has been dominated by sight word instruction (Browder & Xin, 1998; Browder, Courtade-Little, Wakeman, & Rickelman, 2006; Katims, 2000). However, in the past two years, two new phonics instructional programs designed to meet the unique learning needs of students with significant intellectual disabilities have been published (*Accessible Literacy Learning Curriculum* by Mayer Johnson and *Early Literacy Skill Builders* by Attainment). Each program was developed to reflect the findings of the NRP, and each program has a research base that includes students with intellectual disabilities (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Light, McNaughton, Weyer, & Karg, 2008). However, these programs are just one component of a comprehensive reading programs because "systematic phonics instruction

should be integrated with other reading instruction to create a balanced reading program. Phonics instruction is never a total reading program" (NICHD, 2000, 2-97).

Approaches to Phonics Instruction

In its review of the phonics research, the NRP looked at numerous phonics programs and organized them into three categories on the basis of the program's instructional approach: synthetic (which emphasizes grapheme-phoneme relationships), large unit (which emphasizes onsets, rimes, and spelling patterns), and miscellaneous phonics instruction. While the NRP concluded that no one approach was superior to another (NICHD, 2000), it did conclude that phonics instruction had to be explicit and systematic. Understanding these different approaches to phonics provides a framework for understanding the existing research and its application to providing access to the general curriculum and phonics instruction for students with significant intellectual disabilities.

Synthetic Phonics Approach. Synthetic phonics is the most widely known form of instruction and is the type of phonics most people are referencing when they tell a child to "sound it out." A synthetic phonics approach emphasizes individual graphemes (individual letters or letter combinations) and phonemes (the sounds those letters and letter combinations make). In synthetic approaches, the grapheme-phoneme relationships are taught individually, and then students are taught to synthesize or blend the sounds together to pronounce the word. Typically, lessons focus on reading words that share common graphemes and phonemes followed by opportunities to read words, sentences. and simple passages that contain words requiring the use of the learned grapheme-phoneme relationships. Most synthetic phonics programs require students to achieve mastery with one set of letters and sounds before new letters and sounds are introduced. Synthetic phonics approaches primarily target the development of Adams's (1990) phonological processor and often employ nonsense words to insure that the students are not using their orthographic processors to read words with familiar spelling patterns. Often the meaning and the context processor are also interrupted since the sentences and texts that students read have controlled vocabulary and focus more on insuring that the words provide practice with the newly acquired phonics skills ("pigs in wigs eating figs") than emphasizing meaningful text.

Two difficulties with synthetic approaches to phonics instruction were highlighted by the NRP (NICHD, 2000). First, blending letter-sounds to create a pronunciation for a word requires that the student delete the extra sounds that are made when we say the name of some consonants separately. For example, when saying the sound for the letter *p* in isolation, an additional vowel is added, and the result is pronounced /puh/. To segment a word that begins with *p*, such as *pat*, the letters pronounced in isolation typically sound like /puh/ /a/ /tuh/. In order to blend these sounds smoothly together to say the complete word, students need to leave out the extra vowel sounds. The second challenge with synthetic phonics is the demand it places on working memory as words get longer. Remembering and blending three sounds is not particularly challenging, but remembering and blending five or six sounds places significant demands on memory since students have to remember and manage the order of the sounds. These two concerns have been raised regarding synthetic phonics instruction for students with mild-to-moderate intellectual disabilities in particular (Flores, Shippen, Alberto, & Crowe, 2004).

Students with significant intellectual disabilities face many challenges that require us to be thoughtful in selecting an approach that best addresses their needs (Flores, Shippen, Alberto, & Crowe, 2004). Because they require support to build receptive vocabulary in order to develop their meaning and context processors, it does not seem prudent to select an approach that does not emphasize those processors. Given the difficulties many students with significant intellectual disabilities face in using speech to communicate, the challenges inherent in producing and blending the individual sounds in synthetic approaches may pose insurmountable difficulties.

Large Unit Phonics Approach. The second category of approaches to teaching phonics described by the NRP is called large unit approaches. These approaches emphasize the analysis and blending of larger parts or chunks of words such as onsets, rimes, and spelling patterns. Usually, large unit approaches include instruction in decoding by analogy, through which students learn to use known word parts to decode unfamiliar words. One benefit of large unit approaches to phonics is that those larger units can have more meaning (because they are morphemes) and can be linked to key words that serve as a point of reference for the student and the teacher (Gaskins, Downer, Anderson, Cunningham, Gaskins, & Schommer, 1988; Gaskins, Downer, & the

Teachers of Benchmark School, 1986). Recent research involving larger unit phonics approaches with struggling readers suggests that beginning readers learning a large-unit-only approach make slower progress in both reading and spelling than students who receive a combination of synthetic and large unit phonics instruction but that the differences disappear after the third year of instruction (Ehri, Satlow, & Gaskins, 2009).

Miscellaneous Phonics Approaches. The third category of phonics instruction created by the NRP (NIHCD, 2000) included all of the approaches it encountered that did not qualify as synthetic or large unit approaches. These included spelling-based approaches to phonics, phonics basal programs, and programs created by the researcher. This category also included studies that addressed phonics-related skills but that did not constitute complete phonics programs. Only a handful of studies were included in the NRP report that fell into this category.

Combined Phonics Approaches. One last category emerged from the analysis, and that included approaches that combined synthetic and large unit approaches. At the time the NRP report was written in 2000, only one study fit into this category that found that this was an effective approach (Lovett, Lacerenza, Borden, Frijters, Steinbach, & De Palma, 2000). In 2009, Ehri, Satlow, and Gaskins published a report of their large-scale, longitudinal investigation comparing a large-unit-only approach with an approach that combined large unit with synthetic phonics. The 102 struggling readers who participated in their study all had intelligence at or above average, and each was followed through four years of instruction. During the first two years of instruction, the students who had the combined large unit and synthetic phonics instruction read and spelled words earlier and with more success than the students who had the large-unit-only instruction. By the third year, the advantage of the combined approach disappeared, and the participants in both interventions performed similarly on measures of word reading, spelling, and reading comprehension. In addition to studying an approach that combined synthetic and large unit approaches to phonics instruction, specifically comparing two effective programs to learn if one was superior rather than comparing phonics to no-phonics makes this investigation unique (NICHD, 2000). It also provides important guidance regarding differences that may exist in the short term but that disappear over time. Because the NRP analysis concluded that none of the approaches was superior to the others, this type of information is particularly valuable.

Who Benefits From Phonics?

The NRP (NICHD, 2000) considered age as a mediator influencing the effectiveness of phonics instruction. The findings clearly show that phonics instruction is most effective when children are in kindergarten or first grade. Older, reading-disabled students (those who have average intelligence) benefit from systematic phonics instruction to a lesser degree, and older, low-achieving students (those with below average intelligence) do not benefit significantly from systematic phonics instruction. As the NRP subgroup reported, there are a number of potential explanations for the finding that phonics instruction did not lead to significant reading growth for older, low-achieving students, but no explanations are conclusive. More research is needed to understand both why this group of students was the only one to fail to benefit from systematic phonics instruction and which approaches to phonics, at what level of intensity, in which instructional format (one-on-one, small group) garner success.

Of all of the findings of the NRP regarding phonics, those pertaining to the older, low-achieving students have the greatest implications for students with intellectual disabilities because the students in this NRP category are the only ones who potentially have below-average intellectual abilities. Overall results from the NRP indicate that this group of students failed to make statistically significant improvements in reading as a result of the phonics instruction they received. This does not mean that they can not learn phonics; it means that they did not learn to read better as a result of the phonics instruction they did receive. Perhaps they would have made more progress with instruction that was more intensive and/or they required an instructional program that also addressed difficulties with comprehension in order to make use of the phonics skills they did acquire. Whatever the case, we do not yet know what type of phonics instruction is most effective for older, low achieving students, but we do know that they did not benefit from synthetic phonics instruction delivered through a variety of programs (Open Court, Direct Instruction, Orton-Gillingham). The one approach that did lead to significant improvements, although only in a single study (Greaney, Tunmer, & Chapman, 1997), was a large-unit approach that taught students spelling patterns (rimes) and strategies for using their knowledge of those

patterns to read unfamiliar words. This intervention led to moderate gains with maintenance when measured a year later.

Another finding of note relative to students with significant intellectual disabilities is related to the success children in kindergarten had when they received systematic phonics instruction. Historically, it has been thought that kindergartners need to be working on more fundamental concepts about how print works and alphabetic knowledge rather than phonics. Interestingly, many of the kindergarten-aged children in the research analyzed by the NRP did not know letter names or sounds when they were enrolled in the investigations (NICHD, 2000), yet the effect of the phonics instruction on their reading outcomes was strong. This has implications for students with significant intellectual disabilities. It is likely that many students with significant intellectual disabilities could learn about letters, sounds, and early phonics well before we traditionally view them as "ready"; furthermore, they may be able to acquire important alphabetic knowledge and phonemic awareness as a result of phonics instruction. Further research is required to test these possibilities.

What Does the Literature (2003–Present) Tell Us About Phonics Instruction for Students with Significant Intellectual Disabilities?

The one study identified that specifically addressed phonics instruction for students with significant intellectual disabilities employed a synthetic approach to instruction. Browder, Ahlgrim-Delzell, Courtade, Gibbs, and Flowers (2008) evaluated a curriculum called the *Early Literacy Skill Builder* (ELSB) (Attainment, Inc.). They report the results of an investigation involving 23 children (11 intervention, 12 control) who received seven months of daily instruction. The 11 children assigned to the ELSB intervention group participated in just under 20 minutes per day of one-on-one intervention with the program. The 12 children in the control group participated in the existing sight word program and what are described as additional literacy activities for the same period of time. In addition, both groups participated in story-based lessons and other activities that resulted in a total of 50-55 minutes of literacy instruction each day.

According to the authors (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008), the specific components of the ELSB program that addressed phonics-related skills included syllable and phoneme segmentation, letter-sound correspondence, first and last phoneme awareness, and word segmenting and blending. Each of these skill areas was taught through direct instruction employing a model/lead/test strategy and/or a system of least prompts. Pre- and posttest performance on a battery of researcher-constructed and standardized measures of language and literacy revealed significantly larger effect sizes for the intervention than the control group; however, the greatest differences were found on the researcher-constructed tests, including the assessment that was designed as a pretest and posttest for the ELSB curriculum and the researcher-constructed Nonverbal Literacy Assessment that employs many of the same response modes and tasks that are found in the ELSB program. Interestingly, the effects on reading performance on the one standardized measure of reading skill, the Letter-Word Identification subtest of the Woodcock Language Proficiency Battery, were very close across the two groups (Cohen's *d* of .48 for intervention and .41 for control). This is consistent with the findings of the meta-analysis of phonics research conducted by the NRP (NICHD, 2000). Effect sizes for standardized measures tend to be smaller than effect sizes for researcher-constructed measures because the standardized measures tend to tap a broader skill set. Given the descriptions of the researcher-constructed measures in the current study, this appears to be a reasonable explanation for these findings.

What Does the Literature (2003–Present) Tell Us About Phonics Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

Historically, research on word instruction for students with mild-to-moderate disabilities has focused on sight word instruction (Browder & Xin, 1998; Browder, Courtade-Little, Wakeman, & Rickelman, 2006; Katims, 2000). Recently two reviews of the research confirmed that the trend persists. For example, Joseph and Seery (2004) conducted a review of the literature regarding reading instruction for students with intellectual disabilities published between 1990 and 2002. They found only seven studies that addressed phonics instruction. Browder et al. (2006) reviewed the literature on reading instruction for students with intellectual disabilities

published between 1975 and 2003 and found that only 13 of the 128 studies focused on phonics instruction. This lack of attention may simply reflect the low expectations and beliefs that educators hold regarding the potential of students with intellectual disabilities to learn phonics (Joseph & Seery, 2004). It may also reflect the emphasis on functional reading during the time periods addressed in the reviews (Browder & Spooner, 2006).

Despite limited research, there is growing evidence that students with mild-to-moderate disabilities can learn phonics (Bradford, Shippen, Alberto, Houchins, & Flores, 2006; Cohen, Heller, Alberto, & Fredrick, 2008; Goetz, Hulme, Brigstocke, Carroll, Nasir, & Snowling, 2008**;** Hanser, 2008; Joseph & McCachran, 2003; Joseph & Seery, 2004), and a number of studies addressing phonics instruction for students with intellectual disabilities have been published since 2003. In the following sections, these recent studies are reviewed with respect to the different approaches to phonics instruction as defined by the NRP.

Approaches to Phonics Instruction

The most common approaches to phonics discussed in the NRP are synthetic phonics and large unit approaches. Consistent with this, the current review of the research for students with mild-to-moderate intellectual disabilities revealed that the largest number of studies employed a synthetic phonics approach. Out of the 10 studies that were identified, 8 investigated synthetic-based phonics programs. This ratio defies the NRP finding suggesting that older, low-achieving students did not benefit from synthetic approaches to phonics, but it points to an increased interest in understanding phonics instruction for students with significant intellectual disabilities.

Most studies using a synthetic approach had success in teaching students to “sound out” words, but they had less success in getting students to blend the sounds to read the words (Cohen, Heller, Alberto, & Fredrick, 2008; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006); Flores, Shippen, Alberto, & Crowe, 2004). This instruction typically begins with a focus on learning a select set of letter sounds and then learning to blend those letter sounds in simple words and nonwords. A critical component of this instruction is the need for students to produce the sounds in order for teachers to evaluate and correct their efforts. However, many students with

intellectual disabilities have complex communication needs that make it difficult, if not impossible, for them to articulate individual letter sounds. With these students, alternatives must be considered. In fact, in one study (Flores et al., 2004), the difficulty one participant's speech presented as he attempted to sound out letters and words led the researchers to suggest that speech and language abilities be carefully considered before selecting a synthetic phonics program.

Two studies have investigated the effectiveness of synthetic phonics approaches that have been developed specifically to accommodate the needs of students with intellectual disabilities and complex communication needs (Fallon, Light, McNaughton, Drager, & Hammer, 2004; Light, McNaughton, Weyer, & Karg, 2008). Fallon et al. (2004) investigated the effects of a direct instruction approach on the single word reading skills of students with intellectual disabilities and complex communication needs. They designed a word reading intervention using 5 short vowel sounds and 9 consonants, which were combined to create a corpus of 75 consonant-vowel and consonant-vowel-consonant words. A picture was then selected to represent each of the 75 words so that students could point to an array of pictures or match words to pictures to demonstrate their word reading skills. Five students (ages 9–14) were recruited for participation. All but one had moderate levels of intellectual disabilities, and all had complex communication needs. Students worked individually with a researcher who taught them to match single sounds to the initial sounds of words, to blend (telescope) sounds into words, and to read simple consonant-vowel and consonant-vowel-consonant words.

Each intervention session targeted 15 words, with 5 words used for each of the three components of instruction. When a student made an error, a model-prompt-check procedure was used to correct it. Sessions were terminated for individual students as they reached the criterion for reading the targeted consonant-vowel and consonant-vowel-consonant words. The total number of 30-minute sessions required by participants ranged from 10 to 34, but all of the participants reached criterion on the trained words. Unfortunately, only one of the participants reached criterion on untaught words. The lack of generalization to novel words may have been the result of the instructional approach, which included multiple presentations of the words during the sessions. This allowed students to map the spelling of the printed word to its internal pronunciation or picture-based meaning without applying alphabetic or phonological knowledge.

Light, McNaughton, Weyer, and Karg (2008) used a variety of instructional methods, including a most-to-least prompting hierarchy beginning with errorless learning, to teach letter-sound correspondences, decoding, and sight word recognition to several students with intellectual disabilities and complex communication needs. They report on the experience of one 8-year-old girl. The instruction employed the same methods as those described by Fallon et al. (2004), with the addition of instruction in phonological awareness and letter-sound correspondences before moving on to the word reading instruction, as well as sight word instruction, reading connected text, reading comprehension, and early writing. Here, the most important component of the intervention is the emphasis on letter-sound correspondence and word reading. Over the course of 16 months (55 hours) of instruction, the girl learned 20 letter-sound relationships and 60 words. While the instruction did focus on phonics using the same process as Fallon et al. (2004), the same challenges with interpretation exist. In learning to read the words using the sounding-out strategy being taught, the girl had repeated exposure to the printed word with its pronunciation and a picture referent. More emphasis on independent spelling during writing and more evidence of generalization of phonics to support reading untaught words would resolve these challenges.

The lack of generalization of the skills taught was a common theme across the studies reviewed for this monograph (Cohen, Heller, Alberto, & Fredrick, 2008; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006; Flores et al., 2004; Fallon, Light, McNaughton, Drager, & Hammer, 2004; Goetz, Hulme, Brigstocke, Carroll, Nasir, & Snowling, 2008). The limited generalization may have been the result of a number of factors, including lack of attention to the meaning and context processors during the instruction (Fallon, Light, McNaughton, Drager, & Hammer, 2004). The instruction in these studies targeted mastering the associations between letters and their sounds and blending those sounds together to read words, focusing primarily on the phonological processor. The lack of generalization may also have resulted from the fact that the students were taught to read a target set of words that were presented repeatedly while students received guided practice in segmenting and blending the sounds in the words. It is possible that these multiple exposures to the printed words allowed the students to learn the words by mapping the spelling patterns onto appropriate pronunciations using prealphabetic approaches

that do not generalize to reading other words (Ehri, 2005). This would explain how the students learned to read the target skills without acquiring the phonics skills that would allow them to read untaught words.

One study looked more broadly at the generalization of taught skills and considered both the participants' ability to produce the correct sounds and their ability to pronounce taught and untaught words. Conners, Rosenquist, Sligh, Atwell, and Kiser (2006) matched pairs of students with mild-to-moderate levels of intellectual disabilities according to age, IQ, nonword reading skill, phonemic awareness, and language comprehension. One member of each pair was then randomly assigned to the treatment or control group. The treatment group received 10–20 minutes of one-on-one intervention 2–3 days per week for 22 days. The group worked on oral practice with sound blending, letter-sound associations, and sounding out simple, consonant-vowel or consonant-vowel-consonant word patterns. After 8–11 weeks of instruction, students who participated in the intervention outperformed the control group on measures of reading taught and untaught words. These students demonstrated greater transfer to untaught words at the level of identifying the correct sounds in the words than at pronouncing the entire word by blending the sounds. This may have been the result of many factors, but the low receptive language skills and subsequent lack of attention to the meaning and context processors in an intervention that emphasized the phonological processor only are a highly plausible explanation.

Several studies used pictures to support the learning of letter-sound correspondences, decoding, and sight word reading. Picture cues with embedded letters and fading techniques were used to teach students with mild-to-moderate intellectual disabilities letter-sound associations (Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006). This use of embedded picture cues is supported by research (Ehri, Deffner, & Wilce, 1984), where it has been demonstrated that children without disabilities learn letter names and sounds more efficiently when the letters are drawn in the shape of associated words (e.g., *s* is drawn to resemble a snake) than when the pictures have no relation to the shape of the letter (e.g., *s* is shown with a picture of snake in a coil rather than in the shape of an *s*) or when there are no pictures. As the field continues to move forward in developing programs that systematically teach letter-sound relationships, it is important to note that the NRP also found that programs that go beyond these picture mnemonics to support letter name and

letter sound awareness can become "difficult and time-consuming, particularly for children who come to school knowing [no letters]. The relations are arbitrary and meaningless" (NICHD, 2000, p. 2-125). These picture mnemonics appear to provide an important support for memory of the abstract system of letters and sounds for beginning readers, but the evidence for the use of these techniques at the level of the word is less supportive.

Large Unit Phonics. A few studies have investigated large unit approaches to phonics instruction (Joseph & McCachran, 2003). A common large unit phonics approach described earlier, decoding by analogy, is generally as effective as synthetic phonics (NICHD, 2000). In this approach, students are taught words with common spelling patterns as well as strategies to use those words to help them decode and spell novel words. Two studies offered emerging evidence of the effectiveness of this approach.

Joseph and McCachran (2003) investigated the use of word sorts, an activity typically used to support decoding by analogy. Eight first and third grade students with mild-to-moderate intellectual disabilities and eight at-risk first and second grade students who scored below the 20th percentile on classroom reading measures were enrolled in the study. The 16 students were divided in two groups, with a mix of children with intellectual disabilities and children at risk in each group. Groups met each day for 20 minutes for 8 weeks. All words used in the word sort lessons had CVC or CVCC spelling patterns. During each lesson, students had 3 category words and a deck of 12 words to sort according to sound and spelling patterns in the category words. After attempting the sort, the children read the words and were encouraged to self-correct; however, no specific information was provided in the manuscript regarding instruction or feedback/correction techniques employed by the teacher. Results suggest that students in both groups benefited from the instruction in terms of gains in letter and word identification, but the results were inconsistent across participants. The authors suggest that word sorts may not be effective for all students with intellectual disabilities or those at risk for reading failure; however, without additional details regarding the specific instructional approach, its reflection of the research regarding effective word sort instruction, and its place within a more comprehensive reading instructional program, it is difficult to make judgments regarding the appropriateness of the approach.

The NRP described a study that combined synthetic phonics and large unit phonics instruction with promising results (Lovett et al., 2000). In a more recent study, Hanser (2008) also investigated the effectiveness of a combined approach to phonics instruction. Three participants with complex communication needs, including one with moderate intellectual impairments, engaged in 25 days of phonics instruction that employed a spelling-based approach to phonics with word sorts and other large unit instructional strategies. The three participants all made gains in word identification and spelling words with clear evidence of generalization beyond the items that were taught. Another interesting and important aspect of this investigation is that it systematically addressed vocabulary development. In other words, there was instruction that specifically addressed all four processors within Adams's (1990) word reading model. More research is required to understand the impact of this type of comprehensive approach to phonics instruction and the potential impact it may have upon students with significant intellectual disabilities.

Goetz, Hulme, Brigstocke, Carroll, Nasir, and Snowling (2008) investigated a different type of early phonics approach. They evaluated the impact of a short-term, multicomponent intervention that built on the commercial programs *Jolly Phonics* (Lloyd, 1998) and *Reading Intervention* (Hatcher, Hulme, & Ellis, 1994). Fifteen children with Down syndrome and unspecified levels of intellectual functioning participated in either 8 or 16 weeks of 40-minute intervention sessions, depending on group assignment. The intervention included a range of instructional activities, including, but not limited to, letter sound work, book reading, segmenting and blending, sight word reading, and sound production exercises. The results suggest that the multifaceted intervention was successful in helping children acquire and apply skills to novel items as well as maintain learned skills over time. This type of multifaceted approach to early word reading reflects the type of comprehensive instruction that would be consistent with the general curriculum and is required for students to learn skills that they can effortlessly apply across contexts and purposes.

Summary

Despite the problems with generalization observed in many recent studies, there is a growing understanding that students with intellectual disabilities *can* learn phonics. In fact, many researchers are beginning to look beyond simply teaching children to "sound out" words in isolation and are recognizing the need to address comprehension (Cohen et al., 2008; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006), vocabulary (Cohen et al., 2008; Fallon et al., 2004; Goetz, Hulme, Brigstocke, Carroll, Nasir, & Snowling, 2008), the role of language (Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006), and how to balance phonics and sight word instruction (Goetz, Hulme, Brigstocke, Carroll, Nasir, & Snowling, 2008) for this population of students. Despite the shift that appears to have taken place and the dramatic increase in studies addressing phonics for this population, there continues to be a gap between general education literacy practices and practices that are being investigated with students with significant intellectual disabilities (Joseph & McCachran, 2003; Joseph & Seery, 2004; Saunders, 2007). This gap is obvious when we look at the approaches and practices used in the studies reviewed here. While the interventions utilized phonics *approaches* supported by the NRP, few of them used the *teaching practices* described in the NRP, which may have contributed to students' difficulties with generalization. In light of the emphasis of giving students with intellectual disabilities access to the general education curriculum, it seems essential to also give them access to the teaching practices that are most likely to teach them skills they can apply across their lives.

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Chapter 9: Vocabulary & Word Identification

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

The combination of vocabulary and word identification in this chapter is intended to help readers distinguish between these two very important, yet different, areas of instruction. In the literature regarding literacy and students with significant disabilities (see, e.g., Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006), sight word identification is often characterized as vocabulary instruction. However, the reading literature offers clear distinctions between the two (see, e.g., Ehri, 2005; Adams, 1990). They are discussed here in the same chapter to provide a means of explicitly contrasting the two.

What Is Vocabulary?

As defined by Neuman and Dwyer (2009), "Vocabulary refers to the words we must know to communicate effectively: words in speaking (expressive vocabulary) and words in listening (receptive vocabulary). Children use the words they hear to make sense of the words they will eventually see in print. Vocabulary instruction, therefore, must be more than merely identifying or labeling words. Rather, it should be about helping children to build word meanings and the ideas that these words represent. By understanding words and their connections to concepts and facts, children develop skills that will help in comprehending text" (p. 385).

Vocabulary appears to relate most to reading through its connection to language comprehension. At the beginning stages of reading, print is translated to speech so that beginners can take advantage of oral language vocabularies that are expected to be larger than reading vocabularies (Kamil, 2004). At this early stage, words must already be in a reader's oral vocabulary for the

printed form to be translated meaningfully into a known word. As readers become more skilled, vocabulary is required for successful comprehension of connected text instead of single words, and the size of one's vocabulary is directly related to reading ability (Stanovich, Cunningham, & Freeman, 1984).

While the specific causal relationship between vocabulary and reading ability is unclear (Stanovich, 2000), it does appear that vocabulary knowledge correlates so highly with reading ability because vocabulary is not just about word meanings; it is also about knowledge (Neuman & Dwyer, 2009). Understanding the meaning of a word includes knowing what the word represents and understanding the concepts that are connected with that word (Stahl & Murray, 1994; Stahl & Nagy, 2006). This strong knowledge regarding words provides an important base upon which knowledge of new words is built (Hirsch, 2003).

To be successful in learning to read with comprehension, children need a large oral vocabulary even before they begin school (Neuman, 2006; National Institute for Literacy [NIFL], 2009). Children can learn new word meanings in isolation, but they are more successful when they are actively engaged in learning new words (see Dole, Sloan, & Trathen, 1995), encounter those words repeatedly across multiple contexts (National Institute for Child Health and Development [NICHD], 2000), and participate in instruction that employs multiple methods and task restructuring as necessary (NICHD, 2000).

What Is Word Identification?

Word identification is used here to define the component of reading that involves the translation of printed words into pronunciations (Cunningham, 1993; Cunningham, Koppenhaver, Erickson, & Spadorcia, 2004). Word identification can occur in two main ways: through *decoding*, or using letter-sound knowledge to construct a pronunciation, or through *word recognition*, which requires readers to use their familiarity with the spelling of a word to match the printed word with a pronunciation stored in memory (Cunningham et al., 2004). When identifying words, readers often access the meaning of words, but good readers are able to identify words that have

unknown meaning or no meaning at all (pseudowords). The ability to identify words and the ability understand their meanings are two separate processes.

Beginning word readers, those in a prealphabetic phase who lack knowledge of letter-sound relationships, read words by remembering selected visual features of the word (Gough, Juel, & Griffith, 1992). This prealphabetic word reading based on visual features is the earliest form of word reading and occurs in the absence of letter-sound connections (Ehri, 2005). This connection between visual features of words and prealphabetic word recognition is supported by research that has demonstrated that prealphabetic readers do not notice slight changes in familiar labels (Masonheimer, Drum, & Ehri, 1984) and that preschool-aged children learn the letters in their own name first but that the letters are not connected with the sounds in their name (Bloodgood, 1999; Share & Gur, 1999; Treiman & Broderick, 1998). One critical research finding is that "word reading at the pre-alphabetic phase does not contribute to word reading during later phases" (Ehri, 2005, p. 176).

Beyond these very early, prealphabetic efforts to read words, the process of learning to recognize words as sight words first involves forming connections between graphemes (letters and letter combinations) and phonemes to construct the pronunciation for words through decoding and then storing them in memory (Ehri, 1992, 1998). Readers must have phonemic awareness and knowledge of the alphabetic system to engage in this route to sight word recognition. Once students have achieved this alphabetic stage of word decoding, seeing words in print facilitates learning the meaning of new words (Ehri, 2005). It is only at this point that word identification and vocabulary learning overlap. Prior to this alphabetic stage of word decoding, there is no evidence that printed words support vocabulary learning.

What Is the Significance of the Distinction Between Vocabulary and Word Identification for Students with Significant Intellectual Disabilities?

Recent efforts to insure that reading instruction for students with significant intellectual disabilities is aligned with the findings of the National Reading Panel (NRP) (NICHD, 2000) have resulted in the misclassification of sight word instruction as vocabulary instruction. The

danger here is that students who are in great need of quality vocabulary instruction to support their receptive and expressive language systems are actually receiving instruction that does little to contribute to their language understandings or their future word reading abilities.

What Does the Literature (2003–Present) Tell Us About Word Identification Instruction for Students with Significant Intellectual Disabilities?

The volume of research being published regarding word identification for students with significant intellectual disabilities appears to have decreased since the completion of a rigorous meta-analysis (Browder & Xin, 1998) and two reviews of the literature (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Joseph & Seery, 2004) concluded that the literature regarding literacy for students with significant intellectual disabilities was inundated with research on the topic. As a result, only one study was identified that specifically addressed word identification for students with significant intellectual disabilities.

Van der Bijl, Alant, and Lloyd (2005) recruited 33 children aged 9–13 with moderate-to-severe intellectual disabilities who spoke Afrikaans as their home language. All participants had to demonstrate the ability to identify pictures that would be used in the intervention in the absence of the ability to read the target words. The 33 children were matched in groups of three on the basis of gender, receptive language, and alphabet knowledge. Each member of the group was then assigned to the traditional orthography condition (printed words), the modified orthography condition (words embedded in pictures), and the traditional-modified orthography condition (words embedded in pictures and printed words). Participants were taught 10 sight words over the course of two weeks during two daily sessions. In all cases, instruction employed a constant time delay procedure.

On the 10th day of intervention, the order of effectiveness for the three interventions from most to least successful was traditional-modified orthography, traditional orthography, and modified orthography. While none of the differences were statistically significant, there is practical significance to the order of effectiveness. Providing students with access to the modified and traditional orthography from the beginning of instruction appears to allow students with

significant intellectual disabilities to access the meaning of the printed word from the picture while also providing exposure to the printed word so that visual features that distinguish the word from others can be identified from the beginning.

The success of the modified-traditional orthography condition highlights the need to address both the meaning of words and the printed word in instruction. The pictures appear to provide rapid access to a single representation of the meaning of a word, while the printed word (traditional orthography) allows the student to focus on the visual spelling pattern so that it can be mapped to the pronunciation and stored in memory. Importantly, this approach falls short of the vocabulary instructional approaches recommended by the NRP (NICHD, 2000) because students are not actively engaged in constructing the meaning of the word using different approaches across multiple contexts.

What Does the Literature (2003–Present) Tell Us About Word Identification Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

Research that taught single word meanings while helping students learn to recognize the printed word was also dominant in the research regarding students with unspecified or less severe levels of intellectual disabilities. Five studies were identified that investigated the influence of different uses of pictures in word identification instruction. Four of those focused on paired associate learning with fading. The use of words integrated in pictures was compared to words with integrated pictures that were faded and traditional orthography with 13 children with mild-to-moderate intellectual disabilities (Didden, de Graaff, Nelemans, Vooren, & Lancioni, 2006). While some children reached criterion fastest in the picture fading condition, overall words were learned the fastest in the traditional orthography condition, and no child found the embedded pictures conditions fastest.

A 6-year-old boy with autism and moderate intellectual disabilities successfully learned 15 words that were taught by fading a picture upon which a word was superimposed across 30 sessions (Birkan, McClannahan, & Krantz, 2007). The generalization probe in this investigation

lends further evidence to the understanding that learning words through prealphabetic techniques such as the one employed herein are recognized on the basis of individually defined visual features. In this case, the generalization probe presented the target words in a different font/background color and a different-sized font. The black/white foreground was changed for the generalization probe, but the color of the font and background offered no distinct visual information that the boy could use in learning to read the words. Furthermore, changing the size of the font does not change the relative shape or proportions of letters in the printed word so that visual features useful during the instruction phase carry over in the generalization probe.

In a final study investigating the relationship between word identification instruction and pictures, Fossett and Mirenda (2006) compared paired associate learning with a print-to-text matching condition. The authors acknowledged the number of studies that have already resulted in the conclusion that teaching students to read words paired with familiar pictures is unsuccessful because of what is believed to be a blocking effect which leads the reader to attend more to the familiar picture than the printed word paired with it (e.g., Didden, Prinsen, & Sigafoos, 2000; Singh & Solmon, 1990; Solmon & Singh, 1992). In their investigation, two boys (aged 10 and 11 with moderate intellectual disabilities) learned to read carefully matched words in the paired associate condition or by matching a printed word with a picture representing it. In the end, the two boys were successful in learning to read the words and transferring their knowledge of the printed words learned in the picture-matching condition while they experienced limited success in learning the words in the paired associate condition.

Hetzroni and Shalem (2005) found that the six children with moderate intellectual disabilities in their study learned a set of eight words representing known food items when provided with computer-based instruction that systematically faded the picture in which the word was embedded. In another study (Mechling, Gast, & Krupa, 2007), students worked in small groups with a SMART board (an interactive, computer-based whiteboard). Each student learned to read and match pictures to a set of nine grocery words, and each student learned at least some of the words his or her peers were learning. In other words, the students with moderate intellectual disabilities in this study were successful in learning their own target words through direct instruction while learning at least some of their peers' words through observation.

Burns (2007) investigated the impact of two different levels of opportunities to respond during sight word learning. There was a single nine-year-old child with moderate intellectual impairments in this study. The child learned 25 new words each week for four weeks across two conditions. The first condition provided moderate opportunities to respond to the new words (6–18 repetitions, 3 rehearsals). The second condition provided high opportunities to respond to the new words (18–54 repetitions, 9 rehearsals). Both conditions provided a high ratio of known words (90%) to new words (10%). Except for differences in the number of opportunities to respond, the instruction across the two conditions was the same, and the words were carefully selected to insure their equality. The two conditions were alternated each week, with word reading probes conducted at the beginning of each session. Across two cycles of alternating treatments in four weeks, the high-opportunities-to-respond condition led to increased retention for the words learned.

In an effort to understand the impact of a ratio of known to new words during word identification instruction, Knight, Ross, Taylor, and Ramasamy (2003) compared constant time delay procedures to teach a set of unknown words versus a procedure of interspersed known items (70% known–30% unknown) with a five-step error correction procedure. The investigation included two children with moderate intellectual disabilities and two children with learning disabilities. The groups of children responded differentially to the two treatments. While the students with learning disabilities had similar outcomes in the two conditions, the students with intellectual disabilities had superior outcomes in the time delay procedure. It is likely that the improved performance in the constant time delay condition resulted from the increased opportunities to respond specifically to the new words. If prealphabetic word reading requires students to remember visual features of the word in order to store the printed word in memory, it makes sense that increased opportunities to focus on the printed word would increase performance.

Summary

Vocabulary and word identification are both important yet distinct areas related to reading. While it is true that sophisticated word readers benefit from printed words when storing new vocabulary in memory (Ehri, 2005), the words that beginning readers are learning to read must already exist in their oral vocabulary. As readers begin applying their letter-sound knowledge in decoding unfamiliar words, their superior knowledge of words in oral language supports them in translating the print into the correct pronunciation. Before this, students learn to read words using prealphabetic approaches that require them to focus on visual features of the word to support them in storing the word and its pronunciation in memory. These distinctions between word identification and vocabulary are not always clear in the literature regarding students with significant intellectual disabilities. If we are going to be successful in developing research-based approaches that provide these students with access to the general curriculum in reading and literacy, we must keep these distinctions clear.

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Chapter 10: Comprehension

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

The purpose of reading is to comprehend meaning that is conveyed in print (Adams, 1990). Historically, reading comprehension has not garnered the attention of researchers because it has been viewed as a byproduct of successful word recognition (Lipson & Wixson, 2009). Recently, more attention has been focused on understanding the nature of reading comprehension and developing ways to facilitate the understanding of written text. It is now understood that successful reading comprehension involves concurrently extracting and constructing meaning from text and that the process involves the *interaction* of the reader, the text, and the activity (RAND Reading Study Group, 2002). Additionally, it is now thought that instruction in reading comprehension deserves the same focused, explicit attention that instruction in word recognition receives (Lipson & Wixson, 2009).

A variety of component skills are necessary for a reader to successfully read for comprehension. A commonly held view used to conceptualize how these skills work together is the *Simple View of Reading* (Gough & Tumner, 1986). The Simple View holds that reading is a combination of decoding and linguistic comprehension. Here, decoding refers to the ability to link printed words with their pronunciations. Linguistic comprehension refers to the interpretation of word level semantic information within sentence or discourse contexts. Clearly, the ability to decode or read words with automaticity is the first step in successfully comprehending a text. However, adequate decoding skills do not insure successful reading with comprehension (Nation & Norbury, 2005). Typically decoding and linguistic ability develop together, but sometimes they develop in an uneven pattern resulting in reading comprehension impairment (Hoover & Gough, 1990; Nation & Norbury, 2005).

Research has indicated that reading comprehension deficits have been associated with a variety of clinical disorders (Nation, 2005). There is evidence that points to a relationship between poor

reading comprehension and a weakness in oral language skills (Nation, 2005; Snowling & Hulme, 2005). For example, research with individuals with Down and Williams syndrome reveals that their reading comprehension difficulties are in line with their language deficits (Snowling & Hulme, 2005). As individuals with significant intellectual disabilities of varying known and unknown etiologies often have concomitant language impairment, it is necessary to understand the connection between language skills and reading comprehension. Understanding the nature of reading impairment in individuals with significant intellectual disabilities can lead to the development of appropriate instructional techniques designed to facilitate comprehension.

Reading Comprehension Instruction

Research investigating reading comprehension instruction shows that it should consist of explicit teaching of strategies that require students to read actively (RAND Reading Study Group, 2002). Historically, however, even specific instruction of comprehension has resulted in the targeting of a discrete set of skills such as identifying the main idea of a passage or answering basic comprehension questions. These types of activities do not provide children with the foundation they need to read with comprehension independently because many other skills and strategies are required to successfully comprehend written text (Lipson & Wixson, 2009; NICHD, 2000; RAND Reading Study Group, 2002).

Children who are low achieving readers read better when reading comprehension strategies are taught with greater explicitness (RAND Reading Study Group, 2002). In addition, teachers must model how to interact with texts across the school day. Teachers can do this by “thinking aloud” while making their own connections and considering meaning. By doing this, teachers are able to show their students how to activate their own self and world prior knowledge as well as the prior knowledge within the text (Lipson & Wixson, 2009).

Teachers must also be explicit in explaining to their students what the purpose of a strategy is and when each strategy would be most appropriately used. To employ strategies effectively, readers also need to understand their purpose for reading, determine if their purpose is being met, and adjust their strategy to help achieve the purpose as required (Lipson & Wixson, 2009).

Successful readers are strategic about making connections with prior knowledge, questioning, monitoring their own comprehension, inferring and predicting, summarizing, and evaluating. These types of skills are necessary because successfully reading with comprehension involves more than just reading words. It is the active construction of meaning that is central to understanding what is written.

For students with significant intellectual disabilities, it is important that these types of strategies are taught even before students can independently read text. This can be done by teaching comprehension through listening or its equivalent. Part of this intervention is the selection of a wide range of text types that provide students with the opportunity to learn new words and new text structures while increasing their understanding of written language. To increase the reading comprehension skills of students with significant intellectual disabilities it is necessary to provide support in using a variety of strategies across a variety of texts and contexts and in cooperation with other readers, including the teacher.

How Does the Report of the National Reading Panel Inform Our Comprehension Instruction for Students with Significant Intellectual Disability?

The National Reading Panel reviewed several different approaches to comprehension instruction. They found research that supports individual strategies that appear to be effective and most promising for classroom instruction. These include *comprehension monitoring* through which readers learn to monitor how well they comprehend while they are reading. *Cooperative learning* interventions during which readers learn to focus and discuss reading materials. *Graphic and semantic organizers* including story maps which all help students visually reflect the relationship among ideas, events, and characters in a text. The final three are *question answering and generating*, *summarization*, and *story structure.*

Comprehension Monitoring. While the overall summary of the findings of the National Reading Panel suggests that comprehension monitoring is an effective approach to comprehension strategy instruction, a closer look at the findings suggests that these findings must be qualified. It

is clear that the approaches to teaching monitoring that have been studied lead students to learn the strategies, but there is limited evidence that learning the strategy leads to more successful reading with comprehension. The suggestion that teaching students to comprehend is successful must also be qualified because the vast majority of the research was conducted with students without disabilities in grades 2-6. Within the age range studied, there were differences in the effectiveness of comprehension monitoring instruction with no evidence that learning comprehension monitoring strategies improved comprehension while reading for the youngest students. In the end, the panel concluded that comprehension monitoring is likely most successful when it is included as one part of a multiple strategy approach to comprehension instruction.

If the students who benefit most from comprehension monitoring instruction are older students without disabilities, it is unlikely that this approach would be particularly successful with students with significant intellectual disabilities. It is, however, likely that students with significant intellectual disabilities could learn the strategies in much the same way that the younger students did in the research reviewed by the National Reading Panel. Unfortunately, students with significant intellectual disabilities would also be likely to experience the same difficulties in applying those strategies when reading independently. Not necessarily due to their significant intellectual disabilities, but due to the fact that they have reading skills that are commensurate with the younger students.

Cooperative Learning. Cooperative learning involves having peers instruct or interact about the use of reading strategies. The National Reading Panel reviewed a total of 10 studies related to cooperative learning. All involved students in grades 3-6. There was clear evidence of improved comprehension on researcher-created tasks, but limited evidence of transfer to comprehension on standardized tasks. The panel concluded that this approach leads to improved comprehension while giving students more control over their learning and social interaction with peers. While it is difficult to imagine using cooperative learning as a strategy among two or more students with significant intellectual disabilities, it may be possible to pair students with more skills with students with significant intellectual disabilities in an effort to support them in reaping the benefits of cooperative learning while reading. At least study involved the successful use of

cooperative learning to improve the reading comprehension skills of students with physical impairments who were delayed academically (Klinger, Vaughn, & Schumm, 1998).

One primary challenge with implementing cooperative learning to improve reading comprehension is the demand it places on face-to-face communication. Students with significant intellectual disabilities often have complex communication needs that make it difficult for them to communicate in real time about novel ideas. If students with significant intellectual disabilities are to be successful improving their comprehension by engaging in cooperative learning with their peers, they must have access to well designed communication systems that support in communicating in the flexible ways required when interacting in real-time with peers.

Graphic Organizers. The studies of graphic organizers reviewed by the National Reading were conducted in the context of Social Studies and Science instruction primarily with students in grades 4 to 6 who had well-established reading and writing skills. In fact, reading and writing are REQUIRED to be able to learn and use graphic organizers independently to support reading comprehension. Graphic organizers appear to be most effective at improving a reader's memory for the content that has been read. However, using graphic organizers was found to have an overall positive effect on achievement in Social Studies and Science content areas and may lead to generalized improvements in comprehension. In special education, we have access to instructional and assistive technology that must clearly be investigated relative to their impact on the use of graphic organizers in reading. For example, software that supports students in creating graphic organizers without requiring reading such as Kidspiration may, in fact, allow students to benefit from graphic organizers before they have well-developed reading and writing skills. Given that the students who were included in the research reviewed by the National Reading Panel were predominantly in grades 4 to 6 with well-developed reading and writing skills, the applicability of these findings to student with significant intellectual disabilities is unknown.

Answering and Generating Questions. Many teachers recognize the difficulty students have answering questions, particularly about the things they have read. As a result, they tend to ask a lot of questions hoping that the practice will help students get better at answering them. Unfortunately, this is not the case. While we certainly can assess how well students understood

what they have read by asking questions, theses questions don't improve comprehension. In fact, the National Reading Panel reviewed 17 studies that used answering questions as a form of intervention. Answering questions had a positive impact on how well research subjects did answering questions during the research, but those positive effects did not generalize to performance on standardized tests or other measures of comprehension. The National Reading Panel concludes that teachers might ask students to respond to questions as part of a comprehensive instructional program to guide student comprehension, but asking questions does not directly improve student comprehension.

In contrast, teaching students to generate their own questions after reading is very effective at improving comprehension both on the research tasks and on standardized tests of reading comprehension. The process of generating questions about a text requires a reader to consider what happened in the text and make decisions about which questions might be most effective. The impact of these two findings for students with significant intellectual disabilities is dramatic. It is easy for us to consider how we could display responses from which students might select an answer to a question we generate. However, it is far more difficult to consider how we could support them in generating their own questions, particularly when they have complex communication needs. Yet, if the findings from the National Reading Panel are going to be applied to students with significant intellectual disabilities, we must address this challenge.

Story Structure (Grammar). Since providing students with the communication supports required to generate questions is a serious barrier to question generation as an intervention technique for students with significant intellectual disabilities, it is important to consider other approaches to comprehension that yielded positive effects in the National Reading Panel analysis. One such approach involves teaching students about story structure. This approach teaches students about the content and organization of stories by teaching them to ask and answer who, what, where, when, and why questions about the plot and, in some cases, teaches them to record the time line, characters, and events in stories. An example of teaching story structure might begin with before reading activities that focus on getting students to generate a particular type of who, what, where, when OR why question related to a shared event at school. Then students would read for the purpose of reading so that they could generate two specific types of questions relative to the text.

After reading, students would then generate two questions. Narrowing the focus to story structure and a particular question type makes it more possible to provide appropriate communication supports for students with significant intellectual disabilities who also have complex communication needs.

Summarization. Another strategy that the National Reading Panel determined was successful in improving comprehension was summarization; however, once again, most of the studies reviewed involved students in grades 5 and 6 who already had well developed reading and writing skills. Strategies intended to teach these students to summarize what they had read were very effective in teaching them to write summaries of the text. Writing summaries improves recall of the information included in the summary. Learning summarization strategies improves student ability to respond accurately to questions after reading. It leads students to be more successful in identifying the main idea. It does so by helping them learn to leave out unimportant details, include ideas that are related to the main idea, generalize, and remove redundancy. Learning to summarize when reading appears to be effective with older students who have successfully gained essential reading and writing skills. The National Reading Panel was unable to identify any research regarding the use of summarization with beginning readers or older, low achieving readers. Given that the majority of students with significant intellectual disabilities are beginning readers and writers, summarization would be a difficult at best.

What Does the Literature (2003-Present) Tell Us About Our Comprehension Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

A majority of literature investigating reading comprehension instruction in individuals with intellectual disabilities has focused on the link between language and reading comprehension. In children with intellectual disabilities, just as in typical development there is a parasitic connection between language and reading comprehension. The ways reading comprehension deficits manifest themselves, however, may be different depending on the etiology of the intellectual disability. Much of the research since 2003 has been conducted with individuals with

Down syndrome. There has also been research conducted with individuals whose intellectual disability is due to autism and cerebral palsy.

Only a handful of studies investigating the link between language and reading comprehension have used measures of reading comprehension. The majority of studies view reading through the lens of language skills that are known to underpin successful reading comprehension. Roch and Levorato (2009) investigated the role that decoding and linguistic comprehension play in the reading comprehension of individuals with Down syndrome. The simple view of reading (as described earlier in this section) holds that reading comprehension is a combination of decoding ability and linguistic comprehension. The authors revealed two different, distinct profiles of reading comprehension by comparing individuals with Down syndrome to individuals who are typically developing that have the same reading comprehension level. The "simple view" held true for the individuals who were typically developing. For individuals with Down syndrome, however, their linguistic comprehension skill was found to predict reading comprehension as opposed to a combination of both decoding and linguistic comprehension. Similarly, Cardoso-Martin and colleagues (2009) found a strong relationship between oral language skills and reading skill. In a sample of 19 individuals with Down syndrome, they found that as a group all measures of word reading, decoding, and spelling were higher than their receptive vocabulary, while their reading comprehension was low like their receptive vocabulary. These findings underscore the need to be aware of the role linguistic comprehension plays in reading comprehension for individuals with Down syndrome.

Others have also looked at the comprehension of oral narratives and texts in individuals with Down syndrome. As linguistic comprehension has been shown to play a critical role in the reading comprehension of this population, investigation of this link is of primary importance. Seung and Chapman (2003) found that a positive relationship between syntax comprehension and the ability to recall oral narratives. Interestingly, Levorato and colleagues (2009) found that higher-level linguistic abilities such as the integration of context and world knowledge may play a bigger role than syntax comprehension and vocabulary in the oral text comprehension of individuals with Down syndrome. Others (Kim et al., 2008) have not found a link between skills such as receptive vocabulary, letter naming, and word attack skills and the comprehension of

narratives. This may point to the importance of higher-level linguistic comprehension skills in this population. In this particular study, individuals with Down syndrome were also found to be sensitive to the causal structure of narratives, which is important in understanding written texts. These findings may point to the strong role linguistic comprehension ability (beyond vocabulary and syntax) plays in reading comprehension in this population.

The impact of specific instructional strategies and presentation of oral narratives has also been examined in students with unspecified or less severe levels of intellectual disability. In terms of the presentation of narratives, Kim et al. (2008) found that individuals with Down syndrome could recall events from narratives and answer questions when they were presented in both an audio and visual format. These results point to the potential use of other media that may be used to bolster reading comprehension skills of narratives before and during reading instruction. Related to this, Evmenova (2008) explored the impact of making adaptations to academic videos on the comprehension skills of 11 individuals with intellectual disabilities (7 with Down syndrome). One of the key components of these adaptations was adding captions and comparing if highlighting the text or using picture/word-based captions increased comprehension. There appeared to be no difference between most of the individuals when asked inferential or factual comprehension questions based on the videos. Some students, however, showed preference for one type of captioning over another. These studies point to the possible strength of using multimedia to support comprehension in some individuals with intellectual disabilities (e.g. Down syndrome).

There have only been a handful of studies that have explored the effects of strategies that the NRP (2000) advocates for in their systematic review of reading comprehension instruction. In a single-subject study with a student who had autism and moderate intellectual disability, Reyhout and Carter (2007) found that the effects of a Social Story (Gray, 2000) to reduce repetitive behavior were increased as the participants' ability to answer questions about the social story increased. As suggested by Koppenhaver and Erickson (2009), the effects of Social Stories interventions may be enhanced even further if they were taught research-based instructional approaches known to support comprehension for students without significant disabilities (e.g., comprehension monitoring). Ip and Lian (2009) used metacognitive strategies to try to increase

the reading comprehension of students with cerebral palsy who also had mild mental retardation. Students were taught about different topics and then taught to ask themselves a set of prewritten questions about those topics (e.g. asking questions about deleting redundant information). This strategy was modeled by the teacher. The teacher faded the cueing and modeling until children used the questions to guide their own reading of the passage. The majority of students made gains in reading comprehension, which suggests that self-questioning is as effective with students with intellectual disabilities as it was for the students included in the research reviewed by the NRP (NICHD, 2000).

In a closely related investigation, Morgan, Moni, and Jobling (2004) used a program that provided explicit instruction in strategies designed to increase the reading comprehension of young adults with Down syndrome. These strategies included teaching students how to use question words with texts, use prediction, integrate prior knowledge, and then retell the story by using an adapted text. As the NRP (NICHD, 2000) suggests the use of written summaries of texts and this could be difficult for students with intellectual disabilities, the structured retelling used in this program could be a way to modify the suggestions of the NRP for students with intellectual impairment.

Summary

In their meta-analysis of research about reading comprehension instruction, the NRP (NICHD, 2000) presented several strategies that had been successful in helping children improve their reading comprehension. Furthermore, low achieving readers who have difficulty with comprehension must be taught comprehension strategies using modeling and explicit approaches (RAND Reading Study Group, 2002). Currently, we have no research regarding effective strategies to address reading comprehension for students with significant intellectual disabilities, yet the literature that is available for students with unspecified or less severe levels of intellectual disabilities has highlighted a connection between oral language skills and reading that mirrors the research in other struggling reader populations and successes with the application of explicit strategies to bolster reading comprehension in this population. The scarcity of literature in this area underscores the need for future research and investigation into the nature of reading

difficulties and ways to improve the reading comprehension of students with significant intellectual disabilities.

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Chapter 11: Fluency

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Fluency, a component of successful oral and silent reading, is the ability to read text with speed, accuracy, and expression (Allington, 1983). Fluency differs from automatic word recognition because reading fluency requires a text rather than words in isolation or strings of unrelated words. The goal of instruction addressing fluency is to minimize the resources spent reading words in order to maximize resources available for comprehension (Ehri, 2005).

Fluent readers are typically more successful comprehending text because they are able to automatically recognize the majority of words they read. They are also able to use punctuation to know when and where to pause, change intonation, and place emphasis (Schreiber, 1987). This opens up cognitive resources to concentrate on the message conveyed in the text rather than deciphering the pronunciation or meaning of the words. The automatic word recognition that fluent readers apply allows them to read function words (*of*, *was*, *the*) with no conscious attention while focusing on content words (National Institute for Child Health and Development [NICHD], 2000). Fluent readers also have sophisticated eye movements that allow them to process more words in a single fixation (Rayner, 1986). These types of skills are necessary to successfully comprehend text.

How Does the Report of the National Reading Panel Inform our Phonemic Awareness Intervention for Students with Significant Intellectual Disabilities?

The overall effect of fluency interventions analyzed by the National Reading Panel (NRP) (NICHD, 2000) is strongest with respect to word recognition outcomes. Addressing fluency directly helps students develop their ability to recognize words in isolation. Additionally, fluency

instruction improves fluency and comprehension, although not to the same extent that it improves word recognition. Overall, the NRP concluded that fluency interventions are successful across multiple indicators of improved reading.

While fluency interventions lead to positive results, the NRP did find that reading comprehension is actually hindered when too much attention is focused on fluency instruction. The NRP also concluded that effective fluency instruction occurs when it is one component of a comprehensive instructional program. Furthermore, the most effective approach to fluency intervention is guided oral reading in which readers are provided with feedback when they encounter difficulty reading individual words while reading connected text orally.

Unfortunately, there was not enough existing research regarding subgroups of children for the NRP to conduct secondary analyses that differentiated among students who were classified as reading-disabled or low-achieving. It is possible that the effects of fluency instruction are different for groups of students with diverse learning characteristics. For example, that many students with significant intellectual disabilities struggle to speak with fluency would likely influence their ability to benefit from fluency instruction or, at the very least, their ability to demonstrate improved oral reading fluency. Nonetheless, our current understandings suggest that we must provide students with sufficient opportunities to develop fluency in reading connected text if they are going to be able to read with comprehension regardless of their ability to read orally.

What Does the Literature (2003–Present) Tell Us About Fluency for Students with Unspecified or Less Severe levels of Intellectual Disabilities?

Only a handful of studies since 2003 have investigated reading fluency in students with intellectual disabilities, and none of those included students with significant intellectual disabilities. The research that has been conducted has focused on the effects of repeated readings and modeling techniques on the overall fluency levels of students with physical impairments, with only a few also presenting students with mild levels of intellectual disabilities. All of the participants in these studies were able to use speech to communicate. The paucity of studies

highlights the need for further research in this area regarding students with intellectual disabilities.

Heller, Rupert, Coleman-Martin, Mezei, and Calhoun (2007) investigated the effects of repeated readings with correction and of unison reading with correction on the reading fluency of two students with physical impairments. One of the students had a mild intellectual disability. This student made improvements in reading fluency under both conditions. In the repeated reading-with-correction program, the student was corrected during reading if a word was mispronounced, omitted, or in response to a request for help. In the unison reading context, the student was also able to have the same guided support as in the repeated reading context but was also provided modeling. Not surprisingly, the student had greater success on measures of oral reading fluency in the unison condition where modeling was provided as an additional component. With this unison-with-correction instruction, the student was able to increase reading fluency and read novel passages with greater fluency. This student with physical and mild intellectual disabilities benefited from reading fluency interventions that were consistent with the guided oral reading interventions recommended by the NRP (NICHD, 2000).

In addition, Coleman (2009) investigated the use of an intervention program to increase the fluency skills of four students with physical impairments. Two of the participants had mild intellectual disabilities, but their response to the intervention did not differ from the participants with average intelligence. The treatment program investigated included repeated readings, error correction, computer modeling, and performance feedback. All students in the study were able to improve their reading fluency, accuracy, and comprehension within each session. However, the results were not as consistent when the students were required to read unfamiliar passages. These results are also in line with the findings of the NRP (NICHD, 2000), since components of this program provided repeated and guided practice.

Summary

There is clear a need for research regarding the impact of fluency in students with significant intellectual disabilities. Areas of further research should include in-depth investigations of the

transfer of fluency skills to novel texts and fluency instructions' impact on word recognition and comprehension in this population. Furthermore, there is a need to consider differences between oral and silent reading fluency given the complex communication needs experienced by many students with significant intellectual disabilities. If fluency is always defined in the realm of oral reading, these students will be excluded. However, fluency is a construct that carries over from oral to silent reading, and the challenge is to develop measures of silent reading fluency that can be employed to reliably measure progress in intervention research.

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Chapter 12: Writing

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Writing is a complex process of translating ideas into text that requires attention to the mechanics of transcription as well as the composition, organization, and presentation of ideas (Harris, Graham, Mason, & Saddler, 2002). Writers must attend to spelling, grammar, and punctuation while simultaneously considering the content, form, purpose, and audience for which they are writing (Harris, Graham, & Mason, 2003). Writers with significant disabilities, particularly those with physical disabilities, must also attend to the physical act of selecting, printing, or otherwise producing letters and words (Erickson & Koppenhaver, 2007). Skilled writers accomplish the task of translating ideas into text by taking time to plan, compose, and revise their work, and using strategies to manage these steps as they write (Baker, Gersten, & Graham, 2003). They also engage in self-regulation to monitor and direct their individual composition process (Mason, Harris, & Graham, 2002).

A Model to Inform Writing Instruction: Flower and Hayes' Model of Writing

In 1981, Flower and Hayes introduced a model of the cognitive processes underlying successful writing. More than 25 years later, their model continues to provide an important organizing framework that helps define the multiple demands placed on students as they attempt to translate their thoughts into text. It is important here because it provides a comprehensive view of the components of effective writing and a backdrop upon which to understand the state of

knowledge regarding instruction addressing these components for students with significant intellectual disabilities.

As described by Flower and Hayes (1981), writing involves planning, translating, reviewing, and monitoring. *Planning* is composed of the processes of setting goals, generating ideas, and organizing thoughts relative to a written text. *Translating* requires the writer to convey ideas such as images, sensory impressions, and spoken language into written language that follows print conventions. *Reviewing* is composed of both revision (i.e., reorganizing existing text) and evaluation (i.e., appraising the degree to which a text fulfills the writer's plan). *Monitoring* refers to the writer's ability to attend to and adjust the application of these component processes while composing a given text. Recently, Singer and Bashir (2004) added an additional component to the model, text production. *Text production* refers to the speed and mode of recording printed words on or in various media and is influenced by the writer's graphomotor skills. Text production is particularly relevant to understanding the writing process for students with significant intellectual disabilities who often must use computers and other technologies as their writing instruments. Such tools typically require conscious attention to the tool itself, which limits cognitive resources available to other composition processes (Perfetti, 1985). This presents a substantial burden to students who are already challenged by the cognitive demands of writing.

How Does Research Regarding Writing Instruction for Students without Significant Disabilities Inform Writing Instruction for Students with Significant Intellectual Disabilities?

Existing research provides a clear picture of the characteristics of students without significant disabilities who struggle to write. They often lack knowledge about the characteristics and processes required for good writing (Harris et al., 2003; MacArthur, 2000), and typically approach writing tasks as knowledge telling exercises (Harris et al., 2003; Troia & Graham, 2002) rather than knowledge transformation experiences (Graham & Perin, 2007). Struggling writers fail to take the time to plan. Instead, they write down everything they know about a topic, using few or no strategies (Baker et al., 2003; Harris et al., 2002). Finally, and perhaps most importantly for students with significant disabilities, struggling writers often have difficulties with the mechanics of writing. This taxes the writer's working memory capacity and compromises the ability to attend to higher order skills used for composition (MacArthur, 2000).

The only comprehensive review of the research in writing across grade levels that parallels the report of the National Reading Panel (NICHD, 2000) focuses on effective writing interventions for students in grades 4 through 12 (Graham & Perin, 2007). In all, the authors identified 11 instructional elements that had a positive effect on overall writing quality for older children and adolescents with and without identified disabilities. The most effective of all of the approaches was a writing strategy approach, which explicitly teaches students strategies that support planning, revising and editing. Another effective approach was collaborative writing, which teaches students to work in pairs to plan, draft, review, and edit their written work. While writing strategy instruction and collaborative writing both had significant, positive impacts on writing

outcomes, Graham and Perin point out that none of the approaches constitute an entire writing program – even when all 11 are used together.

Unfortunately, research suggests that students generally do very little writing in schools (Applebee, 2000; National Commission on Writing, 2003), yet simply increasing the amount of time students spend writing does not appear to lead to improvements in writing quality (Graham & Perin, 2007). Much like the wide reading of text is required to provide students with the opportunity to develop automaticity in the application of reading skills they are acquiring (Ehri, 2005), it appears that increased opportunities to write must be paired with increased time devoted to high-quality writing instruction (Graham & Perin, 2007).

What Does Literature (2003-present) Tell Us About Writing Instruction for Students with Significant Intellectual Disabilities?

No studies were identified that investigated writing instruction for students with significant intellectual disabilities. This is consistent with a review of the literature completed by Joseph and Konrad (2008). In their search for research on writing with students with intellectual or developmental disabilities between 1986 and 2007, they were able to locate only 9 studies. None of those nine studies addressed students with significant intellectual disabilities.

What Does Literature (2003-Present) Tell Us About Our Writing Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

The research regarding students with unspecified or less severe levels of intellectual disabilities suggests that the approaches that are effective in promoting positive writing outcomes for students without disabilities or with high incidence disabilities (Graham & Perin, 2007) are also effective with students with intellectual disabilities. For example, three studies investigated the effectiveness of writing strategy instruction for a group of students including students with intellectual disabilities. The first (Guzel-Ozmen, 2006) included 4 boys with mild intellectual disabilities. The strategy instruction they received lead to increases in the: inclusion of the specific text elements they were taught, time spent planning, time spent writing, length of the text, coherence and quality. Konrad and Test (2007) found similar results with a specific self-regulated strategy approach that allowed one adolescent with mild intellectual disabilities to improve the overall quality of his writing for both the specific structures he was taught and generalized structures. Finally, three adolescents with mild intellectual disabilities participated in writing strategy instruction that lead to improved quality and content that was maintained over time (Konrad, Trela, & Test, 2006).

There is also evidence to support the application of collaborative writing approaches with pairs of students that include students with intellectual disabilities. For example, Bedrosian, Lasker, Speidel and Politsch (2003) investigated a collaborative story writing intervention with two high school students with mild intellectual disabilities. One of the students one had the label of autism and used an augmentative and alternative communication device. The 50-minute intervention sessions took place once a week for nine months. During the intervention, the two students

worked collaboratively to plan, draft, revise and publish three stories. Numerous supports were used to facilitate the story writing process. An augmentative communication device was woven throughout the intervention, programmed with messages to allow the student with autism to interact with the peer for collaborative story planning, joint writing and revision. Both students demonstrated improved writing across planning, drafting, revising, and publishing as a result of the intervention.

One study was identified that included a student with moderate intellectual disabilities (Millar, Light, & McNaughton, 2004). The intervention focused on teaching students 5 letter-sound correspondences and identification of those letters at the beginning of words. The authors described the intervention as a combination of direct instruction in letter-sound associations combined with a writer's workshop approach. In the direction instruction portion of the intervention, the adult said a letter sound or a word and the students used an adapted keyboard to select the letter that matched the sound. The goal of the writers' workshop activity was to practice these letter-sound correspondence skills. During the writer's workshop, students were presented with 3 picture choices. The picture names began with the target letter-sound correspondences. Once students selected the picture, they were asked to write the name of the item in the picture. Two of the students learned to use the 5 target letters to represent the first letter of the words represented by the pictures. Unfortunately, their writing was limited to this letter-sound task and did not involve the other cognitive processes involved in writing.

Summary

Six years ago, the literature regarding phonics instruction for students with significant intellectual disabilities was as sparse as the literature for writing is today. At that time, we had just a hint of evidence that students with significant intellectual disabilities could learn phonics and successfully decode words. Today, the literature regarding writing for this population is in the same place. We have hints that students with intellectual disabilities can learn to write when provided with instruction that reflects what is known regarding effective practices for students without disabilities or with high incidence disabilities. Specifically, we have three separate studies that suggest that students with mild intellectual disabilities benefit from writing strategy instruction and one that suggests they can benefit from collaborative writing approaches. While this is just a beginning, it provides a starting place as we work toward building a research-base that includes students with significant intellectual disabilities. Furthermore, it provides important guidance as we work to provide these students with access to the general curriculum. If the same instructional strategies can be applied successfully to address the important cognitive processes underlying writing addressed by Flower and Hayes (1981), then we will be able to turn our attention more completely to the text production demands faced by students with significant intellectual disabilities and the assistive technologies that might alleviate those demands.

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Chapter 13: Comprehensive Instruction

Research-Based Practices for Creating Access to the General Curriculum in Reading and Literacy for Students with Significant Intellectual Disabilities

Conventional literacy programs must be comprehensive and address all of the constructs involved in literacy if all children are to learn to read and write (Snow, Burns, & Griffin, 1998). Even when a student's understandings of literacy are just emerging, interventions must be comprehensive (National Institute for Literacy, 2009). As described in Chapter 6, comprehensive emergent literacy interventions include a wide range of literacy learning opportunities including shared book reading, writing, phonological awareness development, oral language and vocabulary development and independent book explorations. It is the combination of these things and others that comprise comprehensive emergent literacy interventions.

Comprehensive conventional literacy instruction insures that students are provided with daily instruction and opportunities to build their skills across all the areas addressed by the National Reading Panel (NRP; NICHD, 2000) as well as writing and wide reading. This includes *comprehensive word identification instruction* that focuses on phonemic awareness and phonics as well as automatic word recognition skills. It includes *reading comprehension instruction* that focus on expanding and enriching vocabulary, teaching background knowledge and schemata, developing knowledge of text structure, and teaching metacognitive strategies (Staskowski & Creaghead, 2001). It also includes frequent opportunities for students to engage in *self-directed reading* of a wide variety of text that are at an easy and comfortable reading level to build fluency and sight word recognition, and numerous opportunities to engage in *writing* for meaningful purposes.

The *Report of the National Reading Panel* (NICHD, 2000) does not include a specific area focused on comprehensive instruction; however, calls for comprehensive instruction can be found throughout the reports of the subgroups. For example, the reviews of the research on phonemic awareness and phonics both concluded that these areas are only single components of

a complete reading program that "should be integrated with other reading instruction to create a balanced reading program" (p. 2-97, NICHD, 2000). The NRP also stated that by "emphasizing all of the processes that contribute to growth in reading, teachers will have the best chance of making every child a reader (p. 2-97, NICHD, 2000)." Other support for the importance of a comprehensive approach to literacy instruction can be found in the report of the National Research Council, *Preventing Reading Failure in Young Children* (Snow, Burns, & Griffin, 1998) and in the standards that can be found in the general curricula in states across the country.

How Does Comprehensive Instruction Relate to Accessing the General Curriculum in Literacy and Reading for Students with Significant Intellectual Disabilities?

Comprehensive conventional literacy programs include systematically integrated instruction that emphasizes all of the areas addressed in the Report of the National Reading Panel (NICHD, 2000) as well as writing and wide reading of text (Snow, Burns, & Griffin, 1998). Unfortunately, students with intellectual disabilities rarely have access to comprehensive literacy instruction. Reviews of the research consistently reveal that research in reading for individuals with significant intellectual disabilities focuses largely on word identification (see Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006) to the exclusion of other areas. Yet, numerous case study reports clearly demonstrate that students with significant intellectual disabilities who are provided with comprehensive instruction do make significant improvements in their abilities to read, write, and communicate (e.g., Erickson, Koppenhaver, Yoder, & Nance, 1997; Ryndak, Morrison, & Sommerstein, 1999; Wolf & Hogan, 2002).

A number of factors likely contribute to the trend to focus exclusively on word identification. First, functional word reading is widely viewed as a critical component of education for students with significant intellectual disabilities (Browder & Spooner, 2006). Second, there is a prevailing belief that individuals with developmental disabilities, particularly those with intellectual disabilities, cannot learn to decode words using phonics-based strategies (Kaderavek & Rabidoux, 2004). Third, descriptions of methods used to provide students with intellectual disabilities with access to the general curriculum in reading and literacy recommend explicitly

teaching sight word skills while "exposing" students to other components of the literacy curriculum (Browder, Courtade-Little, Wakeman, & Rickelman, 2006) or selecting only those areas of the curriculum that are most meaningful to the child (Downing, 2005). Whatever the reason, research and practice regarding other areas of comprehensive reading instruction for students with significant intellectual disabilities is sparse. Without an increase, we are unlikely to see dramatic changes in the literacy learning success achieved by the population of students with significant intellectual disabilities.

The primary difficulty arising from this sole focus on sight word instruction is that most students who are experiencing literacy-learning difficulties do not have isolated word identification problems. Many students who are experiencing literacy-learning difficulties, including those with significant intellectual disabilities, also have problems with language comprehension, vocabulary, fluency, and so on. In one study (Catts, Fey, Zhang, & Tomblin, 1999) only 14% of 2nd graders classified as poor readers had isolated word-reading deficits, and in the population of children with autism, the percentage was even lower (Nation, Clark, Wright, & Williams, 2006). The 23 students with significant intellectual disabilities in Erickson, Clendon, Abraham, Roy, and Van de Karr (2005), as well as the 23 children in Browder, Ahlgrim-Delzell, Courtade, Flowers (2008), all experienced receptive language deficits that suggest they would struggle with written language comprehension. Furthermore, numerous investigations of reading involving students with intellectual disabilities have concluded that their participants would likely have benefited from an increased focus on vocabulary and comprehension (e.g., Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006; Fallon, Light, McNaughton, Drager, & Hammer, 2004).

Across the country, the general curriculum in reading and literacy includes standards that address all of the components of what has been described here as comprehensive literacy instruction. Unfortunately, students with significant intellectual disabilities often access only a handful of extensions to those standards while merely being exposed to others. If the ability to read, write, and communicate is the ultimate goal, then we must better understand how to maximize access to the entire general curriculum in literacy and reading while providing comprehensive instruction that addresses the individual needs of each student with significant intellectual disabilities.

What Does the Literature (2003-present) Tell Us About Comprehensive Instruction for Students with Significant Intellectual Disabilities?

Two articles were identified that addressed what the authors called comprehensive instruction that included students with significant intellectual disabilities (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Erickson, Clendon, Abraham, Roy, Van de Karr, 2005). The study by Browder et al. (2008) evaluated the effectiveness of a conventional literacy curriculum called *Early Literacy Skills Builders* (Attainment, Inc.). The Erickson et al. (2005) study evaluated the effectiveness of an emergent literacy curriculum called *MEville to WEville: An Early Literacy and Communication Program* (AbleNet, Inc.). The studies have been included in the monograph in several sections because they are the two of only a few studies that investigated reading interventions for students with significant intellectual disabilities that go beyond sight words. Both are included in this section because the authors and publishers refer to each of their interventions as a curriculum, which implies that they are comprehensive instructional programs.

In their description of the *Early Literacy Skills Builders* (ELSB), Browder et al. (2008) describe 13 objectives that address sight words, one-to-one correspondence between spoken and written words, vocabulary, listening comprehension, phonemic awareness, and letter-sound awareness. The combination of activities used to address each of the objectives resembles comprehensive word study instruction more than comprehensive literacy instruction. Consider Adam's (1990) model of word reading that was described in the chapter on phonics as a framework to explain this distinction. The four processors in the model are the orthographic, phonological, meaning and context process. The sight word instruction in ELSB helps to build the orthographic processor by helping students develop their visual recognition of printed words. The phonemic awareness and phonics activities in ELSB address the phonological processor by helping students learn to process the sound system and match those sounds to printed letters. The vocabulary activities in ELSB help develop the meaning processor by developing student's receptive vocabulary, and some of the comprehension activities help students consider the meaning of individual words within the context of a complete sentence.

There are two parts of the ELSB program, as described by the authors (Browder et al., 2008) that do not directly fit Adam's (1990) model of word reading. Those are the activities focused on print concepts and the literal question comprehension activities. The print concepts activities address important emergent literacy understandings that would not traditionally be a component of comprehensive conventional literacy instruction. The literal comprehension question activities teach students specific responses to questions rather then focusing on strategies that would help them comprehend novel next. Questions are one way to assess student's comprehension of text, but responding to questions does not teach students to understand text.

The design of the investigation reported by Browder et al. (2008) suggests that the authors recognize that other instructional activities are required to create a comprehensive literacy instructional program that includes ELSB. For example, all of the participants in the study participated in 40 minutes of literacy instruction that was not drawn from the ELSB program including a shared book reading intervention called story-based lessons. These lessons used grade-appropriate texts and a researcher-designed 10-step process for engaging students in the shared reading experience. This story-based lesson component of the intervention was so effective that both the intervention and control group made significant improvements from pre-to-posttest on a measure that assessed their knowledge of reading conventions.

The results of the investigation conducted by Browder et al. (2008) clearly indicate that students who engage in ELSB as part of their daily literacy intervention make significant progress across multiple measures. However, ELSB is not a comprehensive literacy intervention on its own. It must be supplemented with reading and listening comprehension instruction like that provided through the story-based lessons and would likely lead to even greater gains if the intervention also included daily opportunities to write and engage in self-directed, wide reading of texts. Even if the judgment of the comprehensive nature of the ELSB is restricted to the areas Big Five areas identified by the National Reading Panel, the program fails to provide experience that would build fluency and text comprehension without the supplemental instructional activities identified here.

In contrast to ELSB, the *MEville to WEville* program focuses exclusively on the development of emergent literacy skills. In their description of the program, Erickson et al. (2005) describe 5 different categories of lesson types that focus on building vocabulary, listening comprehension, concepts about print, writing, sight words, and general print and literacy experiences. Teachers who participated in a 2005 study using the *MEville to WEville* program did not receive a specific implementation protocol for the intervention. Instead, they received the *MEville to WEville* curriculum materials and were asked to use them for at least 30-minutes every day as they felt appropriate for their students. Rather than using repeated trials to achieve mastery of a limited set of skills, *MEville to WEville* used repetition of skills across a variety of activities. Skills reappeared in different contexts with increased expectations for independent use over time. The goal was for students to be able to apply what they had learned as new opportunities arose. The students with significant intellectual disabilities who participated in the study made measureable but not significant gains across multiple measures of literacy (e.g., letter identification, writing, concepts about print).

According to the National Early Literacy Panel (National Institute for Literacy, 2009), successful emergent literacy interventions include code-focused, book-sharing, and language enhancement interventions. Together, these interventions have a moderate to large impact upon later conventional literacy skills. The *MEville to WEville* program includes book-sharing and language enhancement interventions as core components of the curriculum, but there are not specific code-focused interventions. This may explain why the participants in the study did not make more progress. Creating a comprehensive literacy program with *MEville to WEville* would require the addition of instructional activities that directly address code-focused, phonological awareness skills.

What Does the Literature (2003-present) Tell Us About Comprehensive Instruction for Students with Unspecified or Less Severe Levels of Intellectual Disabilities?

Only one study was identified that investigated the impact of comprehensive literacy instruction on students with unspecified or less severe levels of intellectual disability. Al Otaiba and Hosp

(2004) reported on the effects of an after school tutoring program involving 4 students with Down syndrome (ages 7-12 years). No specific information was provided regarding the intellectual functioning of the 4 students, but their standard scores on the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981) ranged from 40 – 64 (mean = 47.5). Each of the students worked one-on-one with a tutor who was a graduate student for a period of ten weeks. The intervention, designed to address the Big Five areas as identified by the NRP (NICHD, 2000) included phonological awareness, phonics, sight word fluency, vocabulary, and comprehension. Progress over the course of the ten weeks was monitored using curriculum-based assessment tools that focused on letter sounds and word reading fluency for two students, word reading and passage reading fluency for a third, and passage reading fluency only for the fourth.

All four students made progress in reading as a result of their participation in the intervention; however, they demonstrated that progress differentially. The two lowest performing students demonstrated progress through the curriculum-based measures while the student who entered the intervention with the highest reading scores demonstrated the most gains on the standardized reading assessments. Interestingly, the authors did not report any findings relative to improvements in comprehension despite the fact that at least 1/3 of each tutoring session was devoted to vocabulary and comprehension. Furthermore, the passage reading curriculum-based assessment used with two of the students measured reading fluency, yet the intervention failed to provide explicit practice that would lead to improved reading fluency. The authors describe the sight word instruction they provided as "word reading fluency," but fluent reading of connected text requires practice with connected text rather than words in isolation. Adding guided oral reading and other strategies that would build reading fluency may have allowed these higher-level readers to demonstrate more progress on the curriculum-based measures.

Summary

Literacy and reading instruction for students with significant intellectual disabilities is in its infancy. For decades, research and teaching focused almost exclusively on functional sight word instruction. As a result, there is a dearth of information regarding complete instructional

programs that might help these students learn to read and write. Recently, there has been an increased focus on trying to create instructional programs that address the Big Five areas of reading identified by the NRP (NICHD, 2000), and this is certainly a step in the right direct. As the field continues to investigate these approaches and others, we must insure that the instruction reflects what is known about effective approaches in the mainstream in practice not just in name (e.g., fluency must involve meaningful, connected text) and that we go beyond the Big Five to include writing and wide reading.

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APPENDIX 1

Annotated Bibliography

Abbeduto, L., Warren, S. F., & Conners, F. A. (2007). Language development in Down syndrome: From the prelinguistic period to the acquisition of literacy. Mental Retardation & Developmental Disabilities Research Reviews, 13(3), 247-261.

This article reviews literature pertaining to the language development in individuals with Down syndrome, which is one of the most impaired areas of function. Several syndrome-specific features that are common were identified throughout as well as variability within the population. The language phenotype of individuals with Down syndrome often changes throughout an individual's lifetime. Differences also exist between individuals with Down syndrome and other neurodevelopmental disorders in the cognitive domain, as well as expression of lower levels of maladaptive behaviors and psychopathologies and strengths in social skills. Individuals with Down syndrome often present with oral-motor and hearing difficulties that can result in impaired language learning and use. In terms of prelinguistic communication, canonical babbling is usually not delayed and imitation and gesture use are considered relative strengths. Typically, children with Down syndrome produce their first words later and make slower progress in producing words than typically developing children. Receptive vocabulary is a relative strength while syntax development is regarded as a weakness. With regard to pragmatic language, an uneven profile often emerges. The authors also devote a section of the review to literacy development in this population. What is known about literacy in this population primarily involves emergent literacy and the decoding of single words. Word recognition is a strength in individuals with Down syndrome (in early development) when compared to phonological decoding.

Al Otaiba, S. (2004). Providing effective literacy instruction to students with Down syndrome. *Teaching Exceptional Children, 36*(4), 28-35.

The effects of an after school tutoring program involving 4 students with Down syndrome (ages 7-12 years) were investigated in this study. Four students with intellectual disabilities worked one-on-one with a tutor for a period of ten weeks. The intervention, designed to address the Big Five areas as identified by the NRP (NICHD, 2000) included phonological awareness, phonics, sight word fluency, vocabulary, and comprehension. Progress over the course of the ten weeks was monitored using curriculum-based assessment tools that focused on letter sounds and word

reading fluency for two students, word reading and passage reading fluency for a third, and passage reading fluency only for the fourth. All four students made progress in reading as a result of their participation in the intervention; however, they demonstrated that progress differentially. The two lowest performing students demonstrated progress through the curriculum-based measures while the student who entered the intervention with the highest reading scores demonstrated the most gains on the standardized reading assessments. Interestingly, the authors did not report any findings relative to improvements in comprehension despite the fact that at least 1/3 of each tutoring session was devoted to vocabulary and comprehension.

Al Otaiba, S., Lewis, S., Whalon, K., Dyrlund, A., & Mckenzie, A. R. (2009). Home literacy environments of young children with Down syndrome: Findings from a web-based survey. Remedial and Special Education, 30(2), 96-107.

The purpose of this study was to learn more about the home-based literacy experiences of young children with Down syndrome through a Web-based survey and targeting caregivers of children with Down syndrome under the age of 7. The researchers were interested in the amount of books were made available and read to children. Additionally, they were interested in how old the children were when they reached certain emergent literacy milestones and in the lifelong literacy goals parents had for their children. The results were based on 107 responses. 80% of the respondents reported that they had at least 50 children's books and 17% reported that they had over 200. A vast majority of respondents also reported that the books were made available to children for at least 10 to 30 minutes per day. Over 50% said that children looked at books by themselves for at least 10 minutes per day. The results also indicated that the respondents generally provided a broad array of literacy experiences in the home (e.g., magnetic letters, flash cards) and considered literacy to be a high priority. ifelong literacy goals included "recognizing the alphabet", "reading chapter books", and "reading signs for safety".

Antonucci, M., Lancioni, G. E., Singh, N. N., O'Reilly, M. F., Sigafoos, J., Oliva, D., et al. (2006). A writing program with word prediction for a young man with multiple disabilities: A preliminary assessment. *Perceptual & Motor Skills, 103*(1), 223-228.

The researchers investigated the efficiency of 2 computer software programs with a 20-year old student with multiple disabilities. Using an ABAB approach, they compared the student's writing using a word processing program with a word prediction program. Results found that the use of the word prediction program increased the student's speed of writing on the computer.

Atkin, K., & Lorch, M. P. (2006). Hyperlexia in a 4-year-old boy with autistic spectrum disorder. Journal of Neurolinguistics, 19(4), 1-17.

This study aims to present a case study of a four year-old boy with autism spectrum disorder with a mental-age of approximately 1;5 who displays precocious reading ability and a lack of spontaneous speech. The participant's early developmental history showed that he developed reading skills more advanced than his chronological age with poor comprehension. His oral language was typically limited to reading printed text, occasional echolalia, and repetitive phrases. For this study, the participant was assessed 12 times over a four month period (from the time he was 4;3 to 4;7) on a battery of measures and tasks designed to measure his ability to read irregular words, pseudo words, homographic heterophones (e.g. "tear" is pronounced two different ways based on semantic context), single sentences, and texts. The results suggest that he read by using grapheme-phoneme correspondences as well as sight words. Interestingly, his performance on homographic heterophones and in the miscue analysis when reading text (e.g. paraphrasing the text) indicated a level of semantic, syntactic, and pragmatic language beyond what his chronological and mental age suggested.

Basil, C., & eyes, S. (2003). Acquisition of literacy skills by children with severe disability. *Child Language Teaching & Therapy, 19*(1), 27-48.

Basil & Reyes (2003) investigated a computer-based intervention with 6 students the ages of 8-16, reported to have mental ages of 2-6. A word based writing program was used that consisted of 70 pre-determined whole words which students could use to construct complete sentences on

the computer. After the sentence was constructed, a cartoon of their sentence would appear on the computer. The intervention consisted of three sets of lessons organized in a sequenced format, beginning with constructing noun-verb-noun sentences, using prepositions and then using conjunctions and adjectives. The intervention was done over a 3-month period, twice a week for 30-minute sessions. Students' literacy skills were assessed 4 times over the course of the study using test lessons and a literacy battery that included phoneme blending, syllable segmentation and word dictation. The authors reported gains in the literacy scores, some which were significant. Students also made significant gains in sentence construction, with sentences increasing from three grammatical elements to seven. Skills were maintained 3 months and 6 months after the intervention ended. However, it should be noted that the students receive their regular literacy instruction throughout the duration of the intervention.

Bedrosian, J., Lasker, J., Speidel, K., & Politsch, A. (2003). Enhancing the written narrative skills of an AAC student with autism: Evidence-based research issues. *Topics in Language Disorders, 23*(4), 305-24.

The study investigated a story writing intervention with two students ages 13 and 14. Both students had mild intellectual disabilities, one of which had the label of autism and who used an augmentative and alternative communication device. The intervention took place once a week for 50-minute sessions over a 9-month period. The study was based on an A-B-A design and an A-B design for lessons. During the intervention, the students worked collaboratively to plan, draft, revise and publish three stories. Numerous supports were used to support the writing process: an augmentative communication device with messages for joint story planning, writing and revision, a story grammar map, storyboards and a computer using special software. At baseline, the student with autism was only able to write two brief sentences. During the first part of each lesson, the students worked together using the writing supports. Instruction was provided during the second half of the lesson. Post intervention, the student with autism made marked increases in communicating ideas, recording story plans and story contents. Generalization of knowledge of the writing process was observed in the student's writing. The student was able to independently complete a story map and write a 7-sentence story. In the end, the use of story

maps, a communication device, peer scaffolding, and computer supports were effective in facilitating the story writing process.

Birkan, B., McClannahan, L. E., & Krantz, P. J. (2007). Effects of superimposition and background fading on the sight-word reading of a boy with autism. *Research in Autism Spectrum Disorders, 1*(2), 117-125.

Using a multiple baselines design across materials, the effect of superimposing printed words on related pictures and fading the background pictures over time was assessed. A 6-year-old with the label of autism and very limited word reading skills participated in 30, 15-minute sessions during which he identified the words first superimposed over the pictures and eventually only the words after the picture was faded. After 30 sessions he could identify all 15 words. During a maintenance probe on day 44, he correctly identified 14 of the 15 printed words.

Bradford, S., Shippen, M. E., Alberto, P., Houchins, D. E., & Flores, M. (2006). Using systematic instruction to teach decoding skills to middle school students with moderate intellectual disabilities. *Education and Training in Developmental Disabilities*, 41(4), 333-343.

This study investigated the effectiveness of the Corrective Reading Program to teach decoding skills to three middle school students (ages 12-15) with moderate intellectual disabilities. Program content focused on identifying letter-sound correspondences, sounding out words, blending sounds, decoding irregularly spelled words, reading sentences, and reading short passages. Lessons were organized into four components: 1) word attack activities, 2) group reading, 3) reading checkout, and 4) workbook exercises. A common sight word list (Edmark Word List or Dolch List) served as the pretest-posttest measure to determine change in students' abilities to decode untaught words. Highly scripted and mastery based in nature, the instructional lessons were given by a trained teacher in a one-on-one setting. Each student received a total of 65 lessons across a 6-month period. During intervention lessons and program mastery tests, data was collected about students' oral reading and writing skills. Results indicated that all students made gains in reading untaught words from the sight word list. Authors reported student gains in

all other areas, with the exception of reading fluency. Results suggest that this program was effective in teaching students early decoding skills.

Browder, D. M., Ahlgrim-Delzell, L., Courtade, G., Flowers, C. (2008). Evaluation of the effectiveness of an early literacy program for students with significant developmental disabilities. *Exceptional Children*, *75*(1), 33-52.

This study evaluated the effectiveness of *Early Literacy Skill Builders* (Attainment, Inc.) with a group of 23 children with moderate to severe intellectual disabilities enrolled in grades k to 4. All of the children were educated in self-contained special education classrooms and received slightly less than 1 hour of literacy instruction per day. Twelve children received the business-as-usual literacy instruction that included sight word instruction while 11 received the *Early Literacy Skill Builders* program. The *Early Literacy Skill Builders* focuses on sight words, phonemic awareness, phonics, and listening comprehension. All children also participated in the same shared storybook intervention in addition to the treatment and control interventions. The intervention lasted 8 months with approximately 18 minutes per day devoted to the *Early Literacy Skill Builders* while the control group participated in other literacy activities. The results suggest that the *Early Literacy Skill Builders* program led to large effect sizes (d = 1.15 to 1.57) on researcher designed measures of literacy and standardized measures of receptive vocabulary, memory for sentences, and letter-word identification.

Browder, D. M., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozzine, B. (2006). Research on reading instruction for individuals with significant cognitive disabilities. *Exceptional Children, 72*(4), 392-408.

The article reports on an extensive review of the research regarding literacy for students with significant intellectual disabilities. The authors identified 128 studies and organized them with reference to the five areas of the National Reading Panel Report (2000). All 128 studies meet stringent criteria including having an experimental quasi-experimental or single subject design. Most of the studies (88) used a single subject design while 40 used a group design. About 1/3 of

the studies investigated picture identification. Only 24% included comprehension as a measure and only 10% of the studies addressed phonics. Results support the use of systematic prompting techniques in a repeated trial format to teach sights words. Results also provide preliminary evidence support phonics instruction for students with significant intellectual disabilities.

Burns, M. K. (2007). Comparison of opportunities to respond within a drill model when rehearsing sight words with a child with mental retardation. *School Psychology Quarterly, 22*(2), 250-263.

This study investigated the impact of two different levels of opportunities to respond during sight word learning. One 9-year-old child with moderate intellectual impairments was taught 25 new words each week for 4 weeks across two conditions: (1) moderate opportunities to respond to the new words (6-18 repetitions, 3 rehearsal); and (2) high opportunities to respond to the new words (18-54 repetitions, 9 rehearsal). Both conditions provided a high ratio of known words (90%) to new words (10%) and all other aspects of the instruction was constant except for the number of opportunities to respond. The two conditions were alternated each week with word reading probes conducted at the beginning of each session. Across two cycles of alternating treatments in 4 weeks, the high opportunities to respond condition led to increased retention for the words learned in comparison to the moderate opportunities condition.

Card, R., & Dodd, B. (2006). The phonological awareness abilities of children with cerebral palsy who do not speak. *AAC: Augmentative & Alternative Communication, 22*(3), 149-159.

The primary focus of this study was to assess the impact of type of task on the phonological awareness abilities of children with cerebral palsy who do not speak. Specifically, the investigation compared performance on tasks that required use of an articulatory code (e.g., rhyme judgment, syllable segmentation, phoneme manipulation) with tasks that did not (e.g, identification of syllables and rhyme spoken by the examiner). The key difference in the two conditions was that the examiner provided a spoken model of the word in the tasks that did not require use an articulatory code and the children were required to produce their own representations of the words (from pictures and printed words) in the tasks that did. Eleven

children with cerebral palsy (5 speaking; 6 nonspeaking) were compared with 10 younger children without disabilities matched on nonverbal intelligence. All children completed many of the phonological awareness tasks, which suggests that speech is not required for the emergence of phonological awareness skills; however, the absence of speech does influence performance on some phonological processing tasks that require articulatory rehearsal.

Cardoso-Martins, C., Peterson, R., Olson, R., & Pennington, B. (2009). Component reading skills in Down syndrome. *Reading and Writing: An Interdisciplinary Journal, 22*(3), 277-292.
This study aims to determine if word reading ability is atypically strong for individuals who have Down syndrome given general impairments in intellectual functioning and speech and language functioning and the nature of relationships between oral/language and visual/spatial abilities and reading in individuals with Down syndrome. Nineteen individuals with Down syndrome between the ages of 10 and 19 were compared with two groups of children (1) 19 mental age matched typically developing children; (2) reading ability matched children with dyslexia. All participants completed a battery of cognitive, language, and visual-spatial assessments. Results of the study suggest that word reading ability does not constitute an "island of ability" for individuals with Down syndrome and that their ability to read and spell words was related to their ability to read words through phonological recoding. Additionally, correlations did exist between several oral language measures and reading skill. Performance on these measures differentiated good from poor readers (as determined by word identification ability) a majority of the time. Interestingly, a gap between mental age and language age was found for students who were considered poor readers and not those considered good readers. These results suggest that oral language and reading difficulties are linked in Down syndrome just as they are in other populations of readers.

Chiara Levorato, M., Roch, M., & Beltrame, R. (2009). Text comprehension in Down syndrome: The role of lower and higher level abilities. *Clinical Linguistics & Phonetics, 23*(4), 285-300.
The purpose of this study was to examine the impact of lower and higher-level linguistic abilities on oral text comprehension in individuals with Down syndrome. Lower-level linguistic abilities

that are thought to contribute to text comprehension include understanding of receptive vocabulary and sentence comprehension. Higher-level linguistic abilities include being able to integrate context through world knowledge to comprehend a text. To determine the role each of these abilities, the performance of 16 individuals with Down syndrome between ages 8 and 16 was compared to 16 typically developing individuals that comprehended oral texts at the same level on a battery of linguistic assessment measures. When the lower level abilities were compared, the individuals with Down syndrome performed worse than the typically developing individuals on sentence comprehension tasks but performed the same on the receptive vocabulary tasks. As these two groups performed at the same level on their overall text comprehension, higher level linguistic abilities were assessed to see if the individuals with Down syndrome used these skills to compensate for their relative weaknesses in sentence comprehension. To do this, the groups were compared on measures that required the integration of context to understand the meaning of a target sentence. This use of context increased the group of individuals with Down syndrome's ability to comprehend target sentences and it did not in the group of individuals who were typically developing. These results suggest that individuals with Down syndrome may use higher level skills like the use of context and world knowledge to comprehend oral texts. The authors believe that this knowledge is important in terms of intervention in that individuals with Down syndrome may be taught to exploit these skills to increase their comprehension of texts.

Cohen, E. T., Heller, K. W., Alberto, P., & Fredrick, L. D. (2008). Using a three-step decoding strategy with constant time delay to teach word reading to students with mild and moderate mental retardation. *Focus on Autism and Other Developmental Disabilities*, 23(2), 67-78.

Using a multiple baseline across subjects design, the effects of a three-step decoding strategy using a constant time delay approach was investigated with 5 students between the ages of 9-14 who had mild and moderate intellectual disabilities. For each student, two word lists were constructed based on error analysis of their performance on letter-sound measures. The first word list contained six words with different word patterns, such as "un", "ob", "ag", "ib", "im". The second word list contained six different words with the same word patterns. Students received

instruction on word list 1, followed by a probe and then instruction on word list 2. A constant time delay (CTD) procedure was used to teach the three steps of the decoding strategy made up of: 1) the attention getter, students were prompted to touch the word card, 2) decode the word, students were prompted to say each letter slowly and 3) read the word, students were prompted to say the sounds without stopping. Results indicated that the students were able to decode and read the target words in both sets of lists. Overall, students tended to have higher accuracy with sounding out the words and less ability to blend the sounds together to read the words. The researchers found that some students reached criterion reading the second word list faster than the first list. As list 1 contained same word patterns in list 2, the authors suggested that students may have been using what they learned from the first set of words to read the new words in the second set. However, on the generalization probe, although increases in decoding new words were observed, none of the students were able to reach criterion on reading the new words. Results suggest that the intervention was successful in teaching students to decode and read the target words, however students had difficulty generalizing these skills to reading new words.

Coleman, M. E. (2009). The use of a repeated readings with computer modeling treatment package to promote reading fluency with students who have physical disabilities. ProQuest Information & Learning). ***Dissertation Abstracts International Section A: Humanities and Social Sciences, 69*** **(7), 2669-2669.**

This study aims to examine the effects of a reading fluency treatment package on the reading fluency, accuracy, and comprehension of 4 students (age 9;8 – 12;0) with physical disabilities. All of the participants were diagnosed with cerebral palsy and two had IQs in the mild intellectual disabilities range. All had reading achievement scores considerably below their grade level. The treatment package consisted of 3 repeated readings of a passage as well as 2 computer generated models within each session. Additionally, there were elements of error correction and performance feedback for the participants. Within a session all participants were able to increase their reading fluency, accuracy, and comprehension on the same passage. Reading comprehension was assessed by asking the participant 2 fact based and 1 inference question after the first and third readings of the passage. The results revealed that 3 of 4 participants slightly increased their ability to read the novel passages fluently. This suggests that this program was

able to help students with physical disabilities increase their fluency, reading accuracy, and reading comprehension on passages that were repeatedly read.

Conners, F. A., Rosenquist, C. J., Sligh, A. C., Atwell, J. A., & Kiser, T. (2006). Phonological reading skills acquisition by children with mental retardation. *Research in Developmental Disabilities, 27*(2), 121-137.

This study examined the use of an 8-10 week phonological reading intervention with 40 students with mental retardation, ages 7-12 with mild to moderate intellectual disabilities. A matched control group design was used with students matched by developmental level. Over 22 training sessions, students engaged in lessons targeting three areas: 1) phonological practice for sounding out syllables, onsets and rimes, 2) letter-sound associations and 3) sounding out phonemes to read real words and nonwords. Overall results indicated that the experimental group did better than control group. (However, the control group did better than expected. Authors did not control for classroom instruction for this group and suggested possible effects.) Students in the experimental group demonstrated greater skill in sounding out words and nonwords that were taught in the intervention and those that were not. However, students had difficulty with blending the sounds to read the words. Additional tests revealed that IQ and verbal working memory were not correlated with the students' progress. The results suggest that the intervention was successful in teaching students letter-sound associations, but not the ability to blend sounds to read words.

Dahlgren Sandberg, A. (2006). Reading and spelling abilities in children with severe speech impairments and cerebral palsy at 6, 9, and 12 years of age in relation to cognitive development: a longitudinal study. *Developmental Medicine & Child Neurology*, 48, 629-634.

A longitudinal study was conducted with 6 students with severe speech and physical impairments. The development of reading and spelling skills in relation to phonological skills, IQ and working memory were examined at ages 6, 9 and 12. A battery of tests was given which examined each of these areas. Chronologically same aged peers without disabilities were also

given the same tests. Tests revealed that overall, the majority of growth in reading and spelling occurred between the ages 6-9, with growth slowing down considerably by age 12. The author points out that at 6 years of age, students with disabilities showed normal IQ and age expected phonological skills. However, despite the presence of phonological skills, students still had difficulty with developing higher reading and spelling skills. The author suggests that in comparison to typically developing children, phonological skills may not have the same predictive power for students with significant disabilities.

Didden, R., de Graaff, S., Nelemans, M., Vooren, M., & Lancioni, G. (2006). Teaching sight words to children with moderate to mild mental retardation: Comparison between instructional procedures. *American Journal on Mental Retardation, 111*(5), 357-365.
In this study, the use of three different instructional approaches o teach sight words were compared with 13 children ages 10-15 with mild to moderate intellectual disabilities. The children each learned three matched sets of words: (1) printed words, (2) printed words integrated into a picture, and (3) printed words integrated into a picture that was faded over time. Training was discontinued when students read all words correctly in a single condition and demonstrated generalization of the word reading skill by matching the word with the correct object. While some children reached criterion fastest in the picture fading condition, overall words were learned the fastest in the traditional orthography condition and no child found the embedded pictures conditions fastest.

Erickson, K.A., Clendon, S. A., Abraham, L., Roy, V., Van de Karr, H. (2005). Toward positive literacy outcomes for students with significant developmental disabilities. *Assistive Technology Outcomes and Benefits, 2*(1), 45-55.
This study evaluated the effectiveness of *MEville to WEville: An Early Literacy and Communication Program* (AbleNet, Inc.) with a group of 23 children with moderate to profound intellectual disabilities enrolled in grades k -5. All of the children were educated in self-contained special education classrooms and received a minimum of 45 minutes of literacy instruction per day. All 23 children received the targeted intervention in a single-group

pretest/posttest study. The intervention focused primarily on building emergent literacy skills rather than phonemic awareness per se, but the researchers assessed phonological and phonemic awareness as part of the pretest/posttest battery. Students demonstrated measurable, but not statistically significant gains in writing, letter identification, print concepts, and phonological/phonemic awareness.

Evmenova, A. S. (2008). Lights! camera! captions!: The effects of picture and/or word captioning adaptations, alternative narration, and interactive features on video comprehension by students with intellectual disabilities. ProQuest Information & Learning). ***Dissertation Abstracts International Section A: Humanities and Social Sciences, 69*** **(6), 2218-2218.**

The primary focus of this study was to investigate the effect of making adaptations to non-fiction academic videos on comprehension in individuals with intellectual disabilities. These adaptations included changing the narration, highlighting text, using picture/word-based captions, and adding interactive video searching tools. To determine the effects of these adaptations, the authors employed a single-subject research design with 11 individuals with intellectual impairments. 7 individuals with Down syndrome, 1 individual with mental retardation, 1 individual with autism, 1 individual with specific learning disability, and 1 individual with multiple handicaps participated in the study. Their ages ranged from 19 to 24 and IQs ranged from 40 to 72. When the alternative narration and captioning adaptations were made, participants increased their ability to answer factual questions. Modest gains were made on 8 of 11 participants in the comprehension of inferential questions. Participants also provided more oral responses to questions when using adapted videos as opposed to non-adapted videos. The type of captioning (picture/word based vs. highlighted text) was not found to make a difference on the amount of questions answered correctly. There was also no substantial difference in comprehension measures when motion videos and static images on the video were compared.

Fallon, K. A., Light, J., McNaughton, D., Drager, K., & Hammer, C. (2004). The effects of direct instruction on the single-word reading skills of children who require augmentative

and alternative communication. *Journal of Speech, Language & Hearing Research, 47*(6), 1424-1439.

A multiple baseline across subjects design was used to study the effects of direct word instruction with 5 students with severe speech impairments. Subjects were between the ages of 9 and 14 years, 3 of whom used an augmentative and alternative communication device. A synthetic phonics approach was used to examine students' abilities to decode target words, to generalize learned letter sounds in target words to novel words, and to generalize reading target words within a book. Maintenance probes were done 2 weeks, 1 month and 2 months after treatment. Instructional sessions consisted of three activities: matching single sounds to initial sounds in words, blending sounds into words, and reading VC and CVC words. Various adaptations were used to accommodate for students difficulties with speech, such as letter cards and pictures. Students were learned to read word lists with 80% accuracy after which generalization probes were used to assess students' abilities to read novel words and to read target words in the context of a book. Results indicated that all students were able to reach criterion in reading 35-45 target words over 10-34 sessions. The students maintained these skills throughout the maintenance periods. On the two generalization tasks of reading novel words, 1 student was able to reach criterion. On the generalization task of reading target words in books, none of the students were able to reach criterion in reading novel words. The results suggest that the intervention was successful in teaching the target words; however the students had difficulty with generalization.

Flores, M. M., Shippen, M. E., Alberto, P., & Crowe, L. (2004). Teaching letter-sound correspondence to students with moderate intellectual disabilities. *Journal of Direct Instruction, 4*(2), 173-188.

The authors used a multiple baseline across behaviors design to investigate the effects of Direct Instruction with 6 students with aged 8-13 with moderate intellectual disabilities. The instructional framework from the Corrective Reading Program (Engelmann, Carnine & Johnson, 1988) was used with slight modifications. Instruction targeted four letter sounds (m, a, s, t) and practice with sounding them out in two words (sam, mat). At the conclusion of the intervention

program, 5 of the students were able to sound out and read the target words. A majority of these students, however, were unable to sound out and the blend the sounds to read novel words.

Fossett, B., & Mirenda, P. (2006). Sight word reading in children with developmental disabilities: A comparison of paired associate and picture-to-text matching instruction. *Research in Developmental Disabilities, 27*(4), 411-429.

This investigation compared paired associate learning with a print-to-text matching as methods of teaching sight words. Two boys (ages 10 and 11 with moderate intellectual disabilities) learned to read words through a variety of activities with words presented in the paired associate condition or by matching a printed word with a picture representing it. The two boys were successful in learning to read the words and transferring their knowledge of the printed words learned in the picture-matching condition while they experienced limited success in learning the words in the paired associate condition.

Goetz, K., Hulme, C., Brigstocke, S., Carroll, J. M., Nasir, L., & Snowling, M. (2008). Training reading and phoneme awareness skills in children with Down syndrome. *Reading and Writing: An Interdisciplinary Journal, 21*(4), 395-412.

Researchers investigated the effectiveness of a reading intervention with 15 students between the ages of 8-14 with Down syndrome of unclear degree. The intervention consisted of a combination of the Jolly Phonics Program and the Reading Intervention Program, supplemented with researcher-developed activities. The intervention targeted phoneme segmentation and blending in context of learning letter sounds and working with words in books, sight words activities and speech production exercises. Book activities included shared readings and time to read easy books. Assessments targeted letter sound knowledge, word reading, nonword reading, and initial and final phoneme matching. The intervention was administered by teaching assistants. Students were divided into two treatment groups. For the first 8 weeks, group 1 received the intervention and group 2 did not. Results indicated that in comparison to group 2, group 1 made significant gains in letter-sound knowledge and early word recognition, however not in word and nonword reading. For group 2, although some gains were also noted in letter-

sound knowledge and early word recognition, they were not significant. Both groups maintained skills 5 months after the intervention was completed.

Hanser, G. (2008). Investigating the effects of integrated systematic decoding, spelling, and communication instruction for students with complex communication needs. Unpublished dissertation, University of New Hampshire. Durham, NH.

This study investigated the impact of an integrated decoding, spelling and communication intervention on literacy and communication outcomes for students with complex communication needs (CCN). 3 students with CCN participated in the study, all of whom used a particular augmentative communication device. Using a non-concurrent multiple baseline across subject design and a descriptive case study design, the study tested the hypothesis that integrated instruction would lead to improvements in decoding, spelling and, communication using an AAC device. The intervention provided integrated, systematic and explicit instruction through scripted lessons that taught students to decode, spell and communicate the same corpus of high frequency words. The intervention was grounded in general education constructivist based practices and was provided daily by a consistent educator. Throughout the study outside of directed instructional times, the frequency of spontaneous device use was measured across a baseline phase, intervention phase, 1-week post phase and a 5-week post phase. Students' progress was also measured across five pretest-posttest measures including word identification, developmental spelling, word generation, icon sequencing, and expressive communication. Results found high day-to-day fluctuations in students' spontaneous use of their communication devices. However, the most important finding was students' progress on the literacy and communication pretest-posttests, yielding not only improvement in abilities, but generalization across reading, spelling, and communication measures. The findings suggest that integrated communication, decoding and spelling instruction based on constructivist-based practices was successful in improving communication and literacy outcomes.

Heller, K. W., Rupert, J. H., Coleman-Martin, M., Mezei, P. J., & Calhoon, M. B. (2007). Reading fluency instruction with students who have physical disabilities. *Physical Disabilities: Education and Related Services, 25*(2), 13-32.

Two children (ages 11 and 9) participated in this study which examined the effects of repeated reading with error correction and unison reading with error correction on oral reading fluency. One participant was diagnosed with cerebral palsy and the other had a diagnosis of both arthrogyposis and spina bifida. The student in the repeated reading with error correction condition did not have an intellectual disability, while the student in the unison reading with error correction condition had a mild intellectual disability. In addition to comparing each child under each condition, the effects of the two instructional techniques with the participant who had a mild intellectual disability was also compared. Results suggest that both strategies were effective in increasing the fluency skills of these two students with physical impairment. Overall, fluency instruction with unison reading with error correction was more effective than repeated readings with error correction. With the unison reading with error correction condition there were a total of 5 readings of the passage as compared to the repeated readings condition where there were only 3 repetitions. This may have been a reason why the unison reading task was more successful. Based on this assumption, the authors compared fluency gains after three readings in the unison reading condition. When compared and graphed there was no clear distinction between the two conditions. In addition to these findings, the authors also note that the student who read the passages in unison could read novel passages more fluently than the student who was exposed to the repeated readings condition. These findings suggest that unison reading with error correction was a more effective strategy than repeated readings with error correction to increase reading fluency in a student with physical impairment.

Hetzroni, O. E., & Shalem, U. (2005). From logos to orthographic symbols: A multilevel fading computer program for teaching nonverbal children with autism. *Focus on Autism & Other Developmental Disabilities, 20*(4), 201-212.

This study investigated the use of a seven-step fading procedure to teach sight word reading via the computer. Six students (ages 10-13 years) learned to read 8 individually selected words that named food items that were meaningful to the child. The children read words on the computer

first with the word superimposed on a picture of the food package until, after 7 levels of fading, they were able to read the printed words without the picture present. The children learned the words and also demonstrated generalized ability to read the words when asked to match the printed words with the actual food items displayed on a table.

Hye-Kyeund Seung& Chapman, R. S. (2003). The effect of story presentation rates on story retelling by individuals with Down syndrome. *Applied Psycholinguistics, 24*(4), 603-620.
This study aimed to investigate the effect story presentation rates had on the ability to retell the story in individuals with Down syndrome. 35 individuals with Down syndrome were presented with audiotaped stories at a "normal", "storyteller" and "slow" rate. Their ability to recall key words in the story was used as a measure of how well they could recall the story. Performance of the individuals with Down syndrome was compared against 3 matched control groups. One group was scored the same on measures of mental age, the other had a comparable syntax comprehension age, and the final group was of a similar syntax production age. Statistical differences based on the rate the stories were told at were not found. However, there were differences found amongst the groups regardless of the rates the stories were told at. Statistical analysis showed differences between the Down syndrome group and the matched syntax production group, with the Down syndrome group recalling more words. Additionally, when the results of the Down syndrome group were further examined it was found that better syntax comprehension contributed to the prediction of more words recalled of the story.

Ip, C. K., & Lian, M. J. (2005). Effects of metacognitive strategies on reading comprehension of children with physical and multiple disabilities in Hong Kong. *Journal of the International Association of Special Education, 6*(1), 3-14.
The purpose of this study is to examine the effectiveness of a meta-cognitive reading strategy on the reading comprehension abilities of 5 children who have physical and mental disabilities and labeled as having mild mental retardation. The children ranged in age from 11 to 13 and were all diagnosed with cerebral palsy. A single-subject research design was used to determine the effectiveness of using these strategies for an 8 week period. Each session was devoted to one of

the following topics: deleting redundant information, deleting trivial information, locating the topic sentence in a passage, rating sentences in order of importance, identifying the main idea in a paragraph, identifying the main idea in a passage, and review. Students were taught to ask themselves questions about each of these topics through teacher modeling, guided practice, and self-guidance. Performance based on reading comprehension questions increased for 4 of the 5 participants.

Joseph, L. M., & Konrad, M. (2009). Teaching students with intellectual or developmental disabilities to write: A review of the literature. *Research in Developmental Disabilities: A Multidisciplinary Journal, 30*(1), 1-19.

A review of the research was conducted regarding writing between 1986 and 2007. Studies examining writing instruction for students with intellectual disabilities with IQs below 75 were reviewed. Nine studies were identified. The majority of the studies targeted the use of strategy instruction resulting in positive effects. The authors provide multiple suggestions for future research.

Joseph, L. M., & McCachran, M. (2003). Comparison of a word study phonics technique between students with moderate to mild mental retardation and struggling readers without disabilities. *Education and Training in Developmental Disabilities, 38*(2), 192-199.

This study investigated the effects of a word sort activity with 8 students with mental retardation (mean IQ of 69), ages of 7-10, and 8 students who are “at risk” readers, ages 6-8. The intervention took place in an elementary school classroom daily for 20 minute sessions over 2 months. A total of 70 words were selected for the intervention. During each session, students were given word cards with different word families represented and asked to sort them by word family. The authors reported that students were able to do these tasks during the intervention. Pretest-Posttest measures included the Woodcock Johnson Psycho-Educational Battery Letter-Word Identification and Word Attack subtests, a spelling test using intervention words, a spelling test with words that have word families taught in intervention, and the Comprehensive

Test of Phonological Processing. Although some students were able to complete word sorts and make substantial gains from pretest to posttest, results were not statistically significant.

Joseph, L. M., & Seery, M. E. (2004). Where Is the Phonics*? Remedial & Special Education, 25*(2), 88-94.

A review of the research conducted addressing phonics research between 1990 and 2002 is described. Studies examining phonetic analysis strategies and/or phonics instruction for students with intellectual disabilities were reviewed. Seven studies were identified. None of the studies focused on the use of explicit synthetic phonics. Even without the systematic, explicit features that are characteristic of effective phonics instruction, results from the participants in the seven studies suggest that individuals with intellectual disabilities can learn phonics. The authors provides multiple suggestions for future research.

Kennedy, E. J., & Flynn, M. C. (2003a). Early phonological awareness and reading skills in children with Down syndrome. *Down Syndrome Research and Practice, 8*(3), 100-09.

This study examined the phonological awareness, reading, speech production, expressive language, speech perception, auditory-visual memory, and hearing of 9 young children (ages 5;6 – 8;10 years) with Down syndrome. Results suggest that reading skills related best to the number of months the children had spent in school better than chronological age. Phonemic awareness skills were highly related to reading skills, but phoneme awareness skills did not appear in the same order as they do for children without disabilities. For example, only 2 children in this study could successfully complete the rhyme awareness task while 3 were able to complete far more advanced phoneme isolation and blending tasks. Level of speech and hearing impairment was not related to performance on any measures for this group of children. Results suggest that phonemic awareness developed as a result of learning to read in this group of children and early reading success can be achieved in the absence of rhyme recognition skills.

Kennedy, E. J., & Flynn, M. C. (2003b). Training phonological awareness skills in children with Down syndrome. *Research in Developmental Disabilities, 24*(1), 44.

Three children with Down syndrome (ages 7;2, 8;4 and 8;10) participated in 8 hours of phonological and phonemic awareness training across 8 sessions. The intervention activities targeted alliteration, phoneme isolation, spelling, and rhyme detection. All children demonstrated improved spelling which reflects increased understanding of grapheme-phoneme connections. One child made this progress despite being unable to recognize rhymes. The intervention did not result in generalization to other related skills, but the authors acknowledge that this may have been due to the limited duration of the intervention.

Kim, O., Kendeou, P., Broek, P., White, M., & Kremer, K. (2008). Cat, rat, and Rugrats: Narrative comprehension in young children with Down syndrome. *Journal of Developmental & Physical Disabilities, 20*(4), 337-351.

The purpose of this study was to investigate if children with Down syndrome were sensitive to the causal structure of narrative stories presented in television and audio format, and if their skills in narrative comprehension related to measures of receptive vocabulary, phonological awareness, and letter identification. Twelve 6 and 7 year old children with Down syndrome were presented with a narrative story in a television and audio format and asked to recall events from the story and answer questions pertaining to central and peripheral causal events, the goals of the characters, and the theme of the story. In the television format, the children with Down syndrome were found to recall events from the story that that had more causal connections to other events in the story than those events that were less connected. This trend was also found when a narrative was presented in the audio format. Additionally, narrative comprehension skills were not related to basic language skills and early reading development. These results suggest that children with Down syndrome are sensitive to the causal structure of narratives, which is an important component of comprehending written texts. Furthermore, they suggest these skills may develop separately from basic language skills. The authors suggest that narrative comprehension skills may be taught to children with Down syndrome in variety of media formats and that these skills could then be used to bolster comprehension of written narratives

Knight, M. G., Ross, D. E., Taylor, R. L., & Ramasamy, R. (2003). Constant time delay and interspersal of known items to teach sight words to students with mental retardation and learning disabilities. *Education and Training in Developmental Disabilities, 38*(2), 179-191.
This study investigated the impact of a ratio of known to new words during sight word instruction. The investigation compared a constant time delay procedure used to teach a set of unknown words to a procedure of interspersed known items (70% known - 30% unknown) with a 5-step error correction procedure. Two children with moderate intellectual disabilities and two children with learning disabilities learned words under both treatments. The participants with learning disabilities responded similarly to the two conditions, the students with intellectual disabilities had superior outcomes in the time delay procedure.

Koppenhaver, D. A., Hendrix, M. P., & Williams, A. R. (2007). Toward evidence-based literacy interventions for children with severe and multiple disabilities. *Seminars in Speech and Language, 28*, 79-90.
An overview of literacy for the target population is followed by specific recommendations for optimizing emergent literacy in toddlers and preschoolers and conventional literacy interventions for school-aged children. The findings of a variety of intervention studies are described in detail. The authors argue for a definition of evidence-based practice that takes into account the emerging body of research in the field of literacy for students with multiple and significant disabilities.

Koppenhaver, D. A., and Erickson, K. A. (2003). Natural Emergent Literacy Supports for Preschoolers with Autism and Severe Communication Impairments. *Topics in Language Disorders, 23(*4), 283-292.
The results of a naturalistic literacy intervention for preschool-aged children with a label of autism are described. The intervention involved dramatically increasing access to reading, writing, and print related activities while increasing the level of interactions with adults in the classroom during the activities. The three 3-year olds in the study demonstrated increased understandings of print through improved attempts to write, identification of printed names and

letters of the alphabet, and interactions during book sharing and other literacy events. There were no formal measures of language or literacy reported, but the authors provide a number of examples of child knowledge and skill demonstrations that suggest that the children developed their understandings of print, the alphabet, and reading as a result of the intervention

Larsson, M., & Sandberg, A. D. (2008). Phonological awareness in Swedish-speaking children with complex communication needs. *Journal of Intellectual & Developmental Disability, 33*(1), 22-35.

The purpose of this investigation was to better understand the ways that different types of phonological awareness tasks and the load they place on phonological working memory influences performance on a battery of assessments tapping different phonological awareness skills. Fifteen children with complex communication needs (average age 8;7) and cerebral palsy were compared to 15 children (average age 5;6) matched for gender, linguistic age, and mental age. The children in the comparison group performed as expected given our understandings of the relative difficulties of different types of phonological awareness tasks. In contrast, the performance of the children with complex communication needs suggests that the difficulty of the phonological awareness tasks is influenced by the requirements for phonological memory. Specifically, the children with complex communication needs found blending and deleting phonemes easier than rhyming tasks that required them to identify rhyming words from pictures and printed words not spoken by the examiner. The authors conclude that the difficulty of a phonological awareness task for children with complex communication needs is influenced not only by the size of the unit (word, syllable, versus phoneme) but also on the load the task places on phonological memory.

Larsson, M., Sandberg, A. D., & Smith, M. (2009). Early reading and spelling abilities in children with severe speech and physical impairment: A cross-linguistic comparison. *Research in Developmental Disabilities, 30*(1), 77-95.

The reading and spelling abilities of children with severe speech and physical impairments from Sweden and Ireland were compared. Specifically, the authors sought to identify differences in

phonological, reading, and spelling skills across the two groups. Further, they sought to understand the relationship between phonological, reading and spelling skills for children in each group. The 15 Swedish children had an average age of 8;7 years while the 15 Irish children had a mean age of 9;6. The authors acknowledge that the difference in age combined with differences in the number of years in school (children in Sweden start school at 6 or 7 years of age while children in Ireland start at 4 or 5 years of age) contributed to the significant differences between the two groups on measures of reading and spelling with the Irish children outperforming the group of children from Sweden. Both groups completed many of the phonological awareness tasks, but the Swedish children did not perform as well as the Irish children. The Irish children had the most difficulty with spelling pseudowords which require alphabetic coding while the Swedish children had the most difficulty with tasks that were presented without oral support provided by the examiner. Differences across groups can be explained by differences in the structure of the two languages, but may also be due to differences in exposure to literacy instruction and progress in learning to read and spell.

Liboiron, N., & Soto, G. (2006). Shared storybook reading with a student who uses alternative and augmentative communication: A description of scaffolding practices. Child Language Teaching & Therapy, 22(1), 69-95.

The purpose of this study was to describe the interaction in a shared storybook reading context between an 11 year-old student who has cerebral palsy and uses augmentative and alternative communication (AAC) and a speech-language pathologist. They had no instruction about how to interact with the storybook prior to the reading of the book. The authors described the interaction in terms of the number of conversation turn, the types of scaffolding strategies used, and the level of semantic complexity within each conversational turn. Types of scaffolding strategies included print reference, cloze procedure, expansion, binary choice, pointing/cueing, questions constituent (lower level comprehension), and questions comprehension (higher level comprehension). Semantic complexity categories included indicating something in the book, labeling, describing, interpretation (of those things that were not explicit), inferencing, and metalanguage (knowledge about language). There were a total of 360 conversational turns (168 by the student and 192 by the speech-language pathologist). A variety of scaffolding strategies

were used by the speech-language pathologist, with the majority of them targeting higher-level, more abstract semantic complexity levels such as metalangauge, interpretation, and inference. Comprehension questions were the most widely used scaffolding strategy. The authors suggest that these results may help in the development of shared storybook reading interventions for AAC users.

Light, J., McNaughton, D., Weyer, M., & Karg, L. (2008). Evidence-based literacy instruction for individuals who require augmentative and alternative communication: A case study of a student with multiple disabilities. *Seminars in Speech & Language, 29*(2), 120-132.

Through a case study, the researchers describe the progress of an 8-year old girl using a literacy intervention across a 16-month period. The student used an augmentative and alternative communication device and had multiple disabilities that included cortical vision impairment, moderate to severe hearing loss and other severe physical disabilities. The intervention targeted letter-sound correspondences, decoding skills, sight word instruction, along with opportunities to apply skills during shared reading and writing. A most-to-least prompting hierarchy was used with an errorless learning format. Adaptations were made to accommodate for the student's inability to speak as follows: for letter sound correspondence, a keyboard was used for identifying letter sounds; for sight words, a picture was paired to a word; for decoding, a picture was matched to the spoken word; for reading words during shared reading, the student signed the word or chose its picture; and for writing, the student signed a sentence and the adult sounded out the words for the student to write down. Prior to the intervention, the student was unable to demonstrate phonological skills, letter-sound correspondences, decoding, and sight word skills beyond the chance level. By the end of the intervention, the student had learned 20 letter-sound correspondences, 60 or more words, began to read those words during simple supported book reading activities, and began to write short structured sentences with adult support. The results suggest that the intervention was effective in teaching the student early letter-sound correspondences and word reading and writing skills.

Mechling, L. C., Gast, D. L., & Krupa, K. (2007). Impact of SMART board technology: An investigation of sight word reading and observational learning. *Journal of Autism and Developmental Disorders, 37*(10), 1869-1882.

The use of a SMART board (an interactive, computer-based white board) as a means of promoting observational or incidental sight word learning among young adults with moderate intellectual disabilities was investigated in this study. A constant time delay procedure was used to teach 3 participants (ages 19-20) to read a set of 9 grocery words. Each participant took turns using the SMART board to match words and pictures and identify words (by touching them) while the other two observed. Participants learned their own words and most of the words their peers learned.

Menghini, D., Verucci, L, & Vicari, S. (2004). Reading and phonological awareness in Williams syndrome. *Neuropsychology, 18*(1), 29-37.

The aim of this study was to describe the reading and phonological awareness skills of individuals with Williams syndrome by comparing them to a group of controls matched on mental age. The 16 adolescents and young adults with Williams syndrome had a mean chronological age of 17;7 and a mental age of 7;0. The 16 controls had chronological ages ranging from 6;3 – 8;6 and an average mental age of 7;7. There were no significant differences between the two groups on measures of word reading rate and accuracy; however, the participants with Williams syndrome had more difficulty with reading nonwords. This difficulty reading nonwords suggests that individuals with Williams syndrome have more difficulty with grapheme-phoneme correspondence than mental-age matched controls. Furthermore, the participants with Williams syndrome had more difficulty with comprehension and some phonological awareness tasks than the controls. Specifically, they struggled with phonological awareness tasks involving syllable deletion and rhyme detection.

Millar, D. C., Light, J.C., & McNaughton, D. (2004). The effect of direct instruction and writers' workshop on the early writing skills of children who use augmentative and

alternative communication, *AAC: Augmentative and Alternative Communication*, 20(3), 164-178.

This study investigated an intervention that combined direct instruction on letter-sound correspondences and a modified writer's workshop with 3 students between the ages of7-10 who had moderate to significant intellectual disabilities. A multiple baseline across subjects design was used. During the intervention, five letters were taught: s, d, c, f, and b. Lessons consisted of letter-sound correspondence activities, word dictation, and a modified writers' workshop. During activities, students were asked to use an adapted keyboard to select the first letter of an orally presented word or the letter of a corresponding sound. Results indicated that the first two students reached criterion on letter-sound correspondence and identifying the initial letter on the word dictation task, but only one was able to reach criterion on the initial letter generalization probes. On writer workshop letter activities, both students were able to identify sounds with 80% accuracy. The third student did not reach criterion on any of the tasks and required a modified program. The authors stated that while 2 students did acquire 5 letters, it was not sufficient to help them with writing.

Morgan, M., Moni, K. B., & Jobling, A. (2004). What's it all about? Investigating reading comprehension strategies in young adults with Down syndrome. *Down Syndrome: Research & Practice, 9*(2), 37-44.

This study aimed to investigate the effectiveness of Latch-On (Literacy and Technology Hands On), a 15 week literacy and technology based program, on the literacy skills of individuals with Down syndrome. This program includes explicit and meaningful instruction in comprehension strategies that move in a hierarchy that progresses from the introduction of question words, to strategies to increase access of prior knowledge and experiences, to predicting, and finally to retelling the story. All reading series were selected based upon the interests and needs of the target individual. The program was initiated with 6 individuals, but data had not been collected on all individuals at the time of publication. Therefore, the authors present the results of a single participant. The results show that the individual made gains in word reading accuracy, comprehension, and fluency. Conversely, increases were noted in the amount of mispronunciations and substitutions when reading a passage. The authors posit that this was

because the participant was able to read more difficult passages in the assessment session due to increased reading ability then when the program first began, and this lead to an increase in these errors. The authors suggest that the use of this explicit reading comprehension program increased the reading comprehension ability of this individual.

Peeters, M., Verhoeven, L., de Moor, J., & van Balkom, H. (2009). Importance of speech production for phonological awareness and word decoding: The case of children with cerebral palsy. *Research in Developmental Disabilities, 30*(4), 712-726.

The authors conducted a longitudinal study that looked at the predictors of early reading development for 52 children with cerebral palsy in comparison to 65 children without disabilities beginning in kindergarten. Children were 5 years old at the start of the study, with normal hearing and vision, the ability to communicate intentionally either through speech, gestures or an AAC device, and a mild intellectual disability or average intelligence. Children demonstrated a range of speech and motor abilities and 12 children used an augmentative and alternative communication device. A battery of tests was given which measured IQ, speech production, phonological memory, speech perception, rhyme perception and word decoding. All children were tested three times across the study when students were in kindergarten and then first grade. Results indicated that speech production was the most important predictor of reading for children with cerebral palsy followed by phonological awareness.

Peeters, M., Verhoeven, L., de Moor, J., van Balkom, H., & van Leeuwe, J. (2009). Home literacy predictors of early reading development in children with cerebral palsy. Research in Developmental Disabilities, 30(3), 445-461.

In this study, the authors sought to determine the role home literacy environment and reading precursors had in predicting early reading development in 35 children with cerebral palsy. All children were assessed at the end of preschool and at the beginning of first grade on a battery of assessments designed to measure reading precursors and early reading skills. These included measures of rhyme, phonemic awareness, vocabulary, syntactic skills, letter knowledge, and word recognition. Speech intelligibility and nonverbal intelligence was also assessed.

Additionally, parents completed a home literacy environment questionnaire that targeted variables pertaining to the child's use and interest in printed materials, parental interaction and reading behaviors, and the availability of written materials. Parent literacy mediation (e.g., frequency of rhyming games, involving children in reading activities), child word orientation (e.g., naming pictures, pointing at letters or words), and child story orientation (e.g., asking questions about the story, retelling the story) related to the measures of reading precursors and early reading skills.. Further analysis showed that these three variables were not directly related to the measures of early reading skills at the end of Grade 1. Rather, they were related to the reading precursors of rhyme and phoneme awareness. This analysis revealed that phonemic awareness was the best predictor of early reading skills in these students.

Peeters, M., Verhoeven, L., van Balkom, H., & de Moor, J. (2008). Foundations of phonological awareness in pre-school children with cerebral palsy: The impact of intellectual disability. Journal of Intellectual Disability Research, 52(1), 68-78.

The purpose of this study is to examine the foundations and predictors of phonological awareness ability in children with cerebral palsy. Measures of non-verbal reasoning, speech ability (i.e., intelligibility of pseudo and real words), auditory perception, auditory short term memory, receptive vocabulary, and rhyme perception (used to measure emergent phonological awareness) were given to all participants. Performance was compared between a group of 54 children with cerebral palsy (ages 5;0 - 6;5) and a control group of 71 typically developing children matched on chronological age. The children with cerebral palsy scored below the control group on all foundation measures of phonological awareness and the phonological awareness task. However, there was great variation within the cerebral palsy group on these measures. Analysis of this group revealed that nonverbal reasoning was the strongest predictor of performance on the rhyme perception task. The authors further examined this relationship by splitting the group of children with cerebral palsy into below-average and average IQ groups. They found that not all children in the below-average IQ group scored lower than children in the other group on rhyme perception. This suggests that other foundation measures such as pseudo word articulation should also be taken into account when predicting phonological awareness in children with cerebral palsy.

Pufpaff, L. A. (2008). Barriers to participation in kindergarten literacy instruction for a student with augmentative and alternative communication needs. Psychology in the Schools, 45(7), 582-599.

This study is a qualitative examination of a 7 year-old participant with mild intellectual disability, a communication disorder necessitating augmentative and alternative communication (AAC), and fine motor impairments. Participant observation techniques and unstructured and structured interviews were used describe the participation of the participant and those around him in a kindergarten classroom that used a balanced literacy approach in their reading and writing instruction. Observation occurred over 25 sessions from September to May in both general and special education settings The results revealed access barriers due to the participant's lack of functional speech, fine motor impairment, and challenging behaviors. Additionally, opportunity barriers were observed that resulted in poor collaboration, planning, delineation of roles, teacher training, and teacher supports. The participant was also not provided with appropriate supports to facilitate participation in the classroom (e.g., an appropriate AAC system). Possible solutions designed to increase participation were included.

Reynhout, G., & Carter, M. (2007). Social story™ efficacy with a child with autism spectrum disorder and moderate intellectual disability. *Focus on Autism and Other Developmental Disabilities, 22*(3), 173-182.

This study aims to determine if the use of Social Stories are efficacious for reducing inappropriate behaviors in individuals who have moderate intellectual disabilities. A single-subject design was employed to determine if the use of a Social Story reduced improper repetitive tapping behaviors in an 8 year, 9 month old boy with severe autism, moderate intellectual disability, and language impairment. The results suggest that the use of the social story did likely reduce the tapping behaviors, although a clear causal link could not be established. Interestingly, reduction of the tapping behavior was tied to an increase in the boy's ability to answer comprehension questions about the Social Story. This suggests that monitoring comprehension of a Social Story in students who have similar disabilities may increase its effectiveness.

Roch, M., & Jarrold, C. (2008). A comparison between word and nonword reading in Down syndrome: The role of phonological awareness. *Journal of Communication Disorders, 41*(4), 305-318.

This study aimed to determine whether the relationship between phonological awareness skills and word reading in students with Down syndrome reflect the relationship found in typical development. Twelve children and young adults with Down syndrome (10;5 to 26;7, average age 18;11) were compared to 14 typically developing word reading matched controls (6;3 to 7;3, average age 6;10). The group with Down syndrome had impaired nonword reading and phonological awareness skills, but the relationship between these two abilities was consistent across the Down syndrome and control group. In other words, this study suggests that individuals with Down syndrome have delayed rather than different phonological awareness development and do utilize phonological information when reading.

Roch, M., & Levorato, M. C. (2009). Simple view of reading in Down's syndrome: The role of listening comprehension and reading skills. *International Journal of Language & Communication Disorders, 44*(2), 206-223.

The “simple view of reading” holds that reading comprehension is composed of listening comprehension and decoding ability. As listening comprehension is known to be a weaknesses and word reading is known to be a strength in individuals with Down syndrome, this study aims to determine the relative contribution of each to reading comprehension by comparing a group of 23 individuals with Down syndrome’s (ages 11;3 to 18;2) scores on a battery of listening comprehension and decoding measures with a group of 23 typically developing children (ages 6;2 to 7;4) matched on reading comprehension ability. To determine decoding ability the word-reading fluency and non-word reading accuracy were assessed. In the group with Down syndrome, listening comprehension was shown to predict reading comprehension while the decoding measures did not. In the group of typically developing children, both decoding and listening comprehension predicted reading comprehension. The profile exhibited by the individuals with Down syndrome is similar to profiles exhibited by typically developing “poor comprehenders” who read fluently and have deficits in listening and reading comprehension.

Skotko, B.G., Koppenhaver, D. A., and Erickson, K. A. (2004). Parent reading behaviors and communication outcomes in girls with Rett syndrome. *Exceptional Children, 70*(4).
The mothers of 4 girls with Rett syndrome were taught to use simple assistive technologies and augmentative communication strategies to improve the quality of book sharing interactions with their daughters. The results of the study suggest that the mother-child book sharing can lead to improved communication for the girls with Rett syndrome. Furthermore, results reveal an important relationship between parent behaviors and child outcomes. As mothers asked more prediction and inferencing questions, pointed more to the communication symbols to model responses, labeled and described pictures in the book, and related storybook events to their child's life experience, the children communicated more often and more successfully. However, the behaviors that elicited the most change in child outcomes varied from one mother-child dyad to another.

Trudeau, N., Cleave, P. L., & Woelk, E. J. (2003). Using augmentative and alternative communication approaches to promote participation of preschoolers during book reading: A pilot study. Child Language Teaching & Therapy, 19(2), 181-210.
The aim of this study was to investigate the effect of using adapted books and scaffolding techniques in a shared book reading context on the reaction of children and the book reading behavior of parents. Four dyads of mothers and children participated in the study. The ages of the children ranged from 3;10 to 5;10. Two of the dyads included children that were typically developing and two of them included children with disabilities including complex communication needs. Individual sessions were conducted with mother-child dyads. During the first session, they were observed in their home reading a conventional book and adapted books with no intervention from the researchers. After the initial sessions, all mother-child dyads attended group sessions once a week for six weeks (60 to 90 minutes in length),where they were exposed techniques in using adapted books, picture symbols, appropriate vocabulary, props, scaffolding, prompting, and modeling. Data collected for group sessions focused on the children's reaction to the adaptations, rate of participation, communicative intent expressed by the children, and the children's interaction with communication partners. A second individual session then occurred where data were collected only on the child's reaction to the adaptations,

rate of participation, and the types of communicative intent expressed. Children in both groups used the adaptations in the individual and the group contexts. In the group context, 3 of the children had high rates of participation and 1 of the participants with a communication disorder had low rates. In terms of the types of communicative intent in the group session, neither of the children asked questions and both used repetitive lines from storybooks a majority of the time. In the group session all children interacted with all addressees and with adults more than peers. In the individual sessions, all children participated more with the adapted books than with the regular books, but this rate was significantly higher for the typically developing children. The only type of intent observed in this condition was protoreading (e.g. choral reading, using props to act out a story line, use of repetitive lines) with the exception of one of the children with a communication disorder. When the second individual intervention occurred, all of the dyads used the props more frequently but other adaptations were used with less frequency.

Truxler, J. E., & O'Keefe, B. M. (2007). The effects of phonological awareness instruction on beginning word recognition and spelling. *AAC: Augmentative & Alternative Communication, 23*(2), 164-176.

Four children (ages 8-9) with cerebral palsy, complex communication impairments, and cognitive delays participated in a multiple baseline across subjects intervention targeting initial letter/sound correspondence and phoneme awareness for six letters/sounds. These sounds were first taught at the beginning of words. Then the ability of children to generalize their knowledge of those sounds to different positions in words and to new sounds at the beginning of words was measured. While 3 of the 4 children met criteria in learning the six letters/sounds, a second experiment suggests that they were unable to use their knowledge of those sounds to recognize and spell consonant-vowel syllables and consonant-vowel-consonant words comprised of those sounds. The letter sounds were initially taught during a storybook interaction during which the adult called attention to words that began with the target sound and asked the child to point to the corresponding letter on the keyboard. When children did not make progress in the storybook interaction alone, booster sessions where skills were practiced in isolation were introduced.

Van de. Bijl, C., Alant, E., & Lloyd, L. (2006). A comparison of two strategies of sight word instruction in children with mental disability. *Research in Developmental Disabilities: A Multidisciplinary Journal, 27*(1), 43-55.

This investigation compared three word reading conditions: printed words, words embedded in pictures, and a combination of printed words with words embedded in pictures. Thirty-three children ages 9-13 with moderate to severe intellectual disabilities who spoke Afrikaans as their home language participated in the study. They were matched in groups of 3 based on gender, receptive language, and alphabet knowledge. Each member of the group was then assigned one of the three word reading conditions. Participants were taught 10 sight words over the course of 2 weeks during 2 daily sessions using a constant time delay procedure. Results indicate that the order of effectiveness for the three interventions from most to least successful was: a combination of printed words with words embedded in pictures, printed words, and words embedded in pictures.

Verucci, L., Menghini, D., & Vicari, S. (2006). Reading skills and phonological awareness acquisition in Down syndrome. *Journal of Intellectual Disability Research, 50*, 477-491.

The purpose of this study was to investigate the relationship between reading and phonological awareness skills in children with Down syndrome. Seventeen individuals with Down syndrome with an average chronological age of 16;5 and mental age of 6;2 were compared to a group of word-reading ability matched children with an average chronological age of 7;0 and mental age of 7;0. The two groups performed similarly on word reading and passage reading tasks, but the group with Down syndrome had poorer performance on text comprehension, nonword reading, and phonological awareness tasks (syllable deletion, syllable segmentation, and rhyme recognition). There was a similar relationship between phonological awareness and reading ability between the two groups. The authors conclude that educational programs for individuals with Down syndrome should include more emphasis on the development of phonological awareness skills in early childhood and more emphasis on text comprehension throughout the school years.