A Review of Intervention Research for Phonological Awareness,
Phonics and Decoding Instruction for Delayed Secondary School Readers

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Many authors have identified the poor prognosis for students who do not reach reading proficiency by third grade. The Mathew Effect (Juel, 1988; Nathan & Stanovich, 1991; Stanovich, 1986) describes the reason for this poor outlook, "Skilled readers actually increase their word knowledge through the independent reading they do in each reading experience, but many of our students are not skilled readers" (Allen, 2000, p. 6). The prognosis is poor for delayed readers in middle school or high school, despite increasing interest in embedding literacy strategies throughout secondary content area classes. These strategies are designed to increase the amount of time students spend reading and to improve students’ comprehension.

The No Child Left Behind Act emphasizes the importance of reading by focusing the nation’s attention on reading, and focusing the nation’s schools on ensuring that all children leave third grade reading at grade level. However, 67% of 8th grade students in Oregon read below proficient levels; 69% of 8th grade students nationwide read below proficient levels (US Department of Education, 2003). Secondary school students who don't read well don't like to read (Ivey, 1999; Ley, Schaer, & Dismukes, 1994; McKenna, Kear, & Ellsworth, 1995; Swanborn & de Gloper, 1999) and they especially don't like to read textbooks (Ivey, 1999). Anderson, Wilson and Fielding (1988) found that poor readers in general read 96% less daily than expert readers (1.6 minutes per day compared to 40.4 minutes per day).

Students in secondary grades (grades six through twelve) whose reading skills are below third grade proficiency level need to learn to read. In this article, I review the intervention research conducted regarding instruction in the foundational skills of phonemic awareness, phonics, and decoding skills designed to accelerate the reading outcomes for delayed secondary school readers.

Reading Instruction in Secondary School Classrooms
Reading is perhaps the most important skill taught in schools. The ability to read is an essential skill required in work, education, and leisure activities for children and adults. An individual’s reading skills, leading to adult literacy, predict educational opportunities and future income (Haycock & Ames, 2001). Despite our nation’s efforts in improving the reading skills of young children, many students are unable to read at or above proficient level after third grade. The National Assessment of Educational Progress (US Department of Education, 2003) defines reading proficiency in the eighth grade as an ability to “show an overall understanding of the text, including inferential as well as literal information” (p. 6). The authors describe reading at the basic level in eighth grade as ability to “demonstrate a literal understanding of what they read and be able to make some interpretations” (p. 6). Since 1994, the number of children in eighth grade who read below the basic level has remained alarmingly high (US Department of Education, 2003, p. 24).

Despite the nation’s emphasis on children leaving third grade proficient readers of third grade texts, by the end of fourth grade, only three in ten students could read at or above the proficient level. The reading proficiency of students in eighth grade and in twelfth grade is likewise dismal.

(Insert Table 1 here)

In this paper, I will define the skills required by readers in secondary classrooms, the available theories of reading instruction and support at the secondary school level, and the component skills required by skilled readers in middle school through high school. Next, I identify experimental and quasi-experimental studies that investigated instruction with secondary students in phonemic awareness or phonics and decoding; results are summarized and analyzed in terms of applicability with older delayed readers. Finally, I identify future research that would
assist educators as they design or implement reading instruction for secondary students who read below the third grade level.

Definition of Reading

What is reading? The primary purpose of learning to read is to construct meaning from print (Dole, Duffy, Roehler, & Pearson, 1991; Moje, Dillon, & O'Brien, 2000). Reading is a "dynamic process that is accomplished by the reader in interaction with the text, task, purpose, and setting conditions of the reading situation, and reading efficiency requires active and flexible approaches to the task" (Lipson & Wixson, 1986, p. 129). Reading is a combination of skills and strategies that allow a reader to gain meaning from printed words. The National Reading Panel determined that the components of reading instruction with strong research bases included Alphabetics (phonemic awareness and phonics), Fluency, and Comprehension (vocabulary and comprehension) (US Department of Health and Human Services [NRP], 2000, p. 2).

O'Shaughnessy and Swanson (2000) described the reading process as a series of skills that lead to successful comprehension of text: phonemic awareness leads to decoding skills, fluency, automaticity, and improved vocabulary, which then lead to comprehension of text and inferred meaning. Juel (1988) stated "In the Simple View, reading ability is composed of two factors, decoding and comprehension. Decoding is the process that leads to word recognition... (p. 437).

Comprehension is the process by which the meanings of words are integrated into sentences and text structures" (p. 438). Several researchers (Apel and Swank, 1999; Bruck, 1992; Lovett, Steinback and Frijters, 2000) have defined the reading skills needed by older readers as being similar to those skills identified by the National Reading Panel, that is, phonological awareness, phonics/decoding, fluency, vocabulary and comprehension,

Reading Skill Demands for Older Readers
Reading purposes in primary school (grades K – 3) differ from the reading purposes in elementary (grades 4 – 5) through secondary school (grades 6 – 12). "Though the focus on reading development is most intensive at the elementary level, it has become increasingly apparent that many students leave the primary grades without a solid foundation of reading skills" (CCSSO, 2000, p.2). The purpose of reading changes at about fourth grade from “decoding text to learning content from text” (p. 222). Chall (1983) also defined the differences between reading in the primary grades and expectations of the upper elementary and secondary grades as the difference between learning to read and reading to learn. Beginning in fourth grade, and increasingly more prevalent through middle school and high school grades, students are expected to learn subject matter primarily through textbooks. Reading demands in secondary classrooms require that students learn new vocabulary and complicated concepts from printed materials. An important skill in secondary school is the ability to acquire a wide vocabulary of multi-syllabic, previously unknown words (Lenz & Hughes, 1990; Vachon, 1998) from texts written at the 10th to 17th grade level (Lenz & Hughes, 1990). Bryant, Ugel, Thompson, and Hamff (1999) explained, "Textbook-based instruction is based on the assumption that students can read and derive meaning from text” (p. 284).

Two Theories of Reading Instruction After Grade Three

In addition to an increased expectation placed on young readers to be skilled readers, unskilled readers have few resources available to them to help them improve their reading skills after third grade. An expectation of the curriculum in the primary grades is that reading instruction occur throughout the day, and that children be given multiple opportunities to read (Langer, 2000). Whether they employ whole language methods, phonetic instruction, or a blend,
teachers believe it is a responsibility of primary teachers to instruct children in the skills of decoding text (Spor & Schneider, 1999).

Teachers of upper elementary and secondary students who do not read at a proficient level have two theoretical frameworks available to guide reading instruction: 1) a holistic focus on supporting access to content through reading comprehension and content discussion strategies or 2) direct instruction of targeted reading skills and practice in their application (Hearn, 1993).

Holistic Strategy Instruction. Holistic literacy strategies that are designed to improve a student's content area understanding or text comprehension include instruction in use of contextual clues; use of pre-reading strategies such as text surveys, scaffolding, and graphic organizers; and post-reading strategies such as summarization and identification of main idea, details, and inference; either independently or in a small group of two or more students. Although middle and secondary schools are working to better embed supportive literacy strategies throughout content area classes, research shows that reading instruction is most effective when taught in an explicit and direct manner, with ample opportunity to practice skills in decodable text. Reading instruction is not a part of the general education instructional focus for children in middle school and high school (Allington, 2001, Nierzheimer, Hopkins, Dillon & Schmitt, 2000). Middle school and high school teachers are not trained in reading instruction (Alvermann & Moore, 2000). Rather, literacy is embedded in content areas, with the expectation that children already know how to read. Those who are poor readers are often included in content courses in middle school (Schumm, Moody, & Vaughn, 1998), even though they cannot read the texts. "When placed full-time in general education classrooms, students with LD who are emergent readers make minimal progress in reading even when extensive professional development is provided for the participating teachers" (Klingner, 1999, p. 23). There are few
opportunities to read and receive error correction or decoding instruction in middle school. One case study of a middle school student with deficient reading skills revealed only two minutes per week of reading, despite reading instruction being a goal of his IEP (Delquadri, Greenwood, Whorton, Carta & Hall, 1986).

Additionally, teachers use few adaptations or accommodations for emergent readers in regular classes or in resource rooms (Klingner, 1999; Moody, McCray, Vaughn, & Neal, 2001; Spor & Schneider, 1999; Vaughn & Schumm, 1994) even though students don’t feel that adaptations are unfair (Klingner, 1999). In a study of three regular educators in a middle school, Vaughn and Shumm (1994) found that adaptations requiring preplanning are least likely to be implemented. When secondary teachers do teach reading skills or strategies, they often teach strategies that are not effective with emerging readers such as “sound it out” and determining meaning from context clues (Klingner, 1999).

Many middle school and secondary school administrators address the reading deficits of their poorest readers through pull out services, reading instruction delivered in a class or area separate from the general education classroom. However, resource room teachers often don’t use research-based instruction (Moody, Vaughn, Hughes, and Fischer, 2000); teach to large groups of children, up to 15, rather than more effective instructional sizes of 3 to 7; don’t employ direct instruction; and relegate much instruction to their paraprofessionals (Allington, 2001; Johnston & Allington, 2000). Furthermore, students who receive reading instruction in special education resource rooms are not “catching up” with their peers. Vaughn, Moody, and Schumm (1998) found that students in resource room reading programs made little or no growth in reading relative to their non-disabled peers. Researchers have also found that, on average, the difference in reading skills between students placed in resource rooms and their non-disabled peers grew
greater each year (Klingner, 1999; Moody, Vaughn, Hughes & Fischer, 2000; Vaughn, Moody & Schumm, 1998).

**Direct Instruction in Targeted Alphabetic Skills.** In contrast to instruction in strategies to improve a delayed reader’s comprehension (of text he can not decode), curriculum that focuses on targeted skill instruction is designed to improve the component skills necessary in reading. Efficient reading in children depends on effective reading instruction from adults (Lyon and Moats, 1997). Middle school students who read below the third grade level are least likely to improve their reading skills from strategy instruction in content area courses. These students benefit from targeted, direct, explicit reading instruction that is designed to accelerate their reading skills. Students who read at a deficient level are often referred to special education (Kos, 1991), although intensive, research-based reading instruction reduces the number of children referred for special education (Vaughn, 2002).

The building blocks of an effective reading instruction program in middle school are intensive instruction (Bryant, Vaughn, Linan-Thompson, Ugel, Hamff, & Hougensen, 2000; Lovett, et al., 2000; Showers, Joyce, Scanlon, & Schnaubelt, 1998; Vaughn, Moody, & Schumm, 1998); direct instruction -- structure, clarity, explicit and overt prompts, redundancy, careful task sequencing and feedback (Billingsley 1998; Mastropieri and Scruggs, 1997) in phonemic awareness (Ehri, Nunes, Stahl & Willows, 2001; Greene, 1998; McCray, Vaughn & Neal, 2001); and direct instruction in decoding and fluency (Bryant, Ugel, Thompson, & Hamff, 1999; Ivey & Broaddus, 2000; Mastropieri & Scruggs, 1997; Nathan & Stanovich, 1991; Vaughn, et al., 2000).

**Alphabetic instruction or comprehension instruction.** Targeted and direct instruction in reading may address one or more discrete alphabetic skill (phonemic awareness, phoneme- grapheme connection, or phonics and decoding) or provide directed practice in one or more
Theoretical and empirical questions. Comprehension skill (fluency, vocabulary, and comprehension). Because alphabetic skills are a necessary precursor to a student’s ability to apply comprehension skills to the text he reads (Allington, 1977), I differentiate between instruction in alphabetic skills (phonemic awareness and phonics – which includes phoneme-grapheme connections and decoding) and instruction in comprehension skills (fluency, vocabulary, and comprehension instruction). This concept paper will investigate the outcomes of targeted alphabetic skill intervention on the reading proficiency of middle school and high school students who are delayed readers.

Method

Definitions

For purposes of this review, I define secondary readers and foundational or component reading skills.

Secondary readers. This review focused on intervention research conducted with middle school or high school aged students. Middle school consists of grades six through eight, typically for children who are aged 11 through 14. High schools educate students aged 14 through 18 or 21, in grades nine through twelve. The students in some studies were identified by age but not by grade; they were included if the students’ ages fell within the defined age range.

Foundational reading skills. Foundational reading skills are phonemic awareness and letter-sound correspondence, also called decoding or phonics. The National Reading Panel categorized phonemic awareness and phonics as Alphabetic Principle, and defined Comprehension as including fluency, vocabulary and comprehension skills (NRP, p. 2).

Phonemic Awareness is defined as “teaching children to focus on and manipulate phonemes in spoken syllables and words” (p. 7) Phonics and decoding instruction “stress the acquisition of letter-sound correspondences and their use in reading and spelling” (p. 8).
Search Parameters

Computer searches of PsychInfo, ArticleFirst and ERIC were conducted between January 2003 and May 2004. Key words used in the computer searches included phoneme, phonemic, phonemic awareness, alphabetic principle, phonic, phonics, phoneme and grapheme, and decoding. In addition to the computer searches, reference lists from studies or syntheses of studies were reviewed to identify additional resources that would fit the criteria and purpose of this review. The titles and abstracts of the search results were reviewed and a set of selection criteria was applied: 1) the subjects in the research fit within the identified age or grade range; 2) the subjects' reading ability was below the third grade equivalent; 3) treatment instruction included phonemic awareness, alphabetic principle or phonics/decoding as the independent variable in the study; 4) the research was either experimental or quasi-experimental in design; and 5) the study was published between 1985 and 2004 in an English-language peer-reviewed journal.

Studies that included subjects in grades 6 through 12 (ages 11 through 18 or 21) were reviewed. Studies were included if one or more of the independent variables related to instruction in either phonemic awareness or phonics/decoding. Studies were excluded if none of the independent variables directly related to one of these foundational skills in reading or if the participants' initial reading skill was greater than the third grade proficient level. The dependent variable measured by the identified research included a variety of component reading skills, including fluency, accuracy, spelling, and comprehension. Additionally, studies were included if they adhered to experimental or quasi-experimental design methodology, included a control group or multiple-baseline design, and were reported between January 1985 and May 2004 in a peer-reviewed journal. Several studies used the treatment group's previous progress in reading
in grades Kindergarten through fourth or fifth grade as the “control” group and measured expected gain (determined by historic yearly gain by these children) compared to intervention gain in reading skills. These studies were included, though effect size could not be determined in the traditional manner of dividing the difference between the mean of the treatment group and the mean of the control group by the standard deviation of the control group.

Coding

Based on a review of titles and abstracts, studies that met all five of the above selection criteria were investigated further. The studies are each described in the following categories: a) study purpose, b) comparison and treatment group demographics, c) treatment and comparison descriptions, d) measurement tools, and e) results, either in effect size or in growth beyond the growth that could be expected, based on previous years’ response to instruction.

Results

Table 2 and 3 list studies that met the selection criteria. Table 2 reports those studies whose independent variable was phonemic awareness training and Table 3 reports studies related to phonics or decoding instruction. The columns in each Table are similarly ordered: the first column lists the study author and date of the study and a brief description of participant demographics. The second column lists a description of the study design and duration of treatment. Column three lists the dependent measures and the fourth column describes the results of the intervention. The dependent variables examined by these studies included a range of reading measures, including phonemic segmentation, letter-sound correspondence accuracy, real and non-word reading accuracy and rate, sentence and passage reading accuracy and rate, and spelling. Where possible, effect size or growth beyond expected growth are recorded in the results column.
Phonological Awareness Interventions

Juel (1988) described phonological, or phonemic, awareness as necessary in decoding in an alphabetic system. One study examined the effects of phonemic awareness training with delayed older readers. Hook, Macaruso and Jones (2001) investigated the effectiveness of computerized phonemic training on thirty-one children aged seven to twelve. Eleven children participated in Fast ForWord (FFW) training for 100 minutes per day for 22 to 44 days (2200 to 4400 minutes of training). A comparison group of nine similarly matched children participated in an Orton-Gillingham (OG) treatment program that focused on explicit instruction in the alphabetic code (including phonemic awareness), rule acquisition and rule application. These students participated in training for 60 minutes a day, five days a week, for five weeks (approximately 1500 minutes). A control group of eleven students, matched to the characteristics of the FFW group was identified.

Results indicated that there was a significant effect of time in student progress in phonemic awareness and no effect by time or group in word attack for the Fast ForWord group. A significant interaction in group by time in word attack skills for the Orton-Gillingham group was identified. The Fast ForWord group did not exhibit a significant gain in passage reading. The authors investigated the same issues in a two year follow up of participants. Students in both groups made significant gains in phonemic awareness, word attack, word identification and passage comprehension, averaging more than one year gain in each of the two years. Neither group made gains in spelling or verbal working memory. The authors found significant effect size by time (effect size = .33) for both the Fast ForWord and Orton Gillingham groups on the Lindamood Auditory Conceptualization test, but no effect by intervention. There were no significant effect sizes for the Word Identification subtest of the Woodcock Reading Mastery
Test-R. The Orton-Gillingham group reached significant effect size (.22) in the Word Attack subtest of the Woodcock Reading Mastery Test-R.

(Insert Table 1 here)

Decoding/Phonics Interventions

Older delayed readers appear to benefit from decoding instruction in letter patterns pronounceable units, such as syllable or rime. Penny (2002) tutored 21 delayed high school students with the Gray Analysis word identification skills, indirectly instructing decoding errors; 12 students, serving as a control group, received instruction in reading for meaning. Although the authors reported neither the effect size nor the statistics necessary to compute effect size, students in the treatment group gained the equivalent of three grade levels in reading skills as measured by the Word Identification, Word Attack and Passage Comprehension subtests of the Woodcock Reading Mastery Test, while the students in the control group improved by 1.3 grade levels, a significant acceleration of reading skills.

A Phono-Graphix program was studied by McGuinness, McGuinness and McGuinness (1996) to identify the effects of training in phoneme awareness and letter to sound correspondence. Eighty-seven students, ranging in age from six years to almost sixteen years, with no control group were taught in one to one sessions of one hour. Each age group had a similar number of participants. Thirty-one students received three to six hours of intervention, fifty-five students received twelve hours or instruction and one student received fifteen hours. Intervention included instruction in basic code (regular spelling of most common sound) including segmenting, encoding, sound manipulation, segmenting and blending, and practice reading in decodable text. Student gains were analyzed by age groupings of 6-7, 8-9, and 10-16 year olds. Growth was measured on the word identification and word attack subtests of the
Woodcock Reading Mastery Tests-Revised, on phonemic awareness test adapted from the Auditory Analysis Test, and a test of phoneme/phonogram decoding. This study did not identify a control group; rather the staggered implementation of intervention served as a multiple baseline design. Results were significant, and fairly consistent across age groups, independent of beginning phonological or reading test scores. The authors computed average standard score gains per hour of instruction for each student. Students were engaged in training for three to fifteen hours. Improvement on the Woodcock Reading Mastery Test, Word Identification subtest was a standard score gain of 1.70 per clinical hour; improvement on the standard score of the Word Attack subtest was 2.57 per clinical hour. Data were analyzed by age group (6-7 years old, 8-9 years old and 10-16 years old). Age did not predict performance on Word Identification, although students aged 10 to 16 made significantly greater gains in Word Attack.

Rashotte, MacPhee and Torgesen (2001) studied the effectiveness of a commercially available program (Spell, Read, P.A.T.®) that integrates reading and spelling instruction with phonological auditory training with 115 students in grades one through six. Student gains and program effect sizes were computed for three grade groupings of children – grades 1 and 2, 3 and 4, and 5 and 6. Student groups were divided into two treatment groups, with Treatment Group 2 acting as control while Group 1 received eight weeks of instruction. At the end of eight weeks, both groups were given Posttest 1, and Group 2 began eight weeks of intervention. At the conclusion of this second intervention period, both groups completed Posttest 2. Daily instructional sessions were 50 minutes with small groups of three to five students. Results for each grade group of children were significant in phonological awareness, phonetic decoding skills, word-level reading accuracy, spelling, and comprehension. The authors report the effect size for each of the three grade groups; the effect size for students in grades 5 and 6 are recorded
here. On measures of accuracy (WDRB Letter-Word, GORT-3 Accuracy, WDRB Word Attack), effect sizes of .64, .38 and 2.20 were reported. Effect sizes on the WDRB and GORT-3 Comprehension measures were .43 and .64. Fluency effect sizes on Word Efficiency, Phonemic Decoding Efficiency and the GORT-3 Rate measures were -.22, .88 and .92. Measures of Phonological Awareness CTOPP (Elision, Blending Words, and Segmenting Words) produced effect sizes of .51, 1.80, and 2.38. Spelling scores on the Pseudo-Spell and Schonell Spelling measures produced effect sizes of 2.65 and .06.

Lovett and Steinbach (1997) also found no significant difference in the performance of young children compared to fifth and sixth grade students in a study that investigated the strengths of two word identification training programs. The first treatment protocol, Phonological Analysis and Blending/Direct Instruction (PHAB/DI) focused the attention of 48 students on basic phonological analysis and blending deficits. The second treatment group of 38 students were instructed with Word Identification Strategy Training (WIST). A control group of 36 students received instruction in Classroom Survival Skills (CSS). All students received 35 hours of instruction in groups of either 2:1 or 3:1. Both intervention programs resulted in significant and important improvement in decoding real and non-words, phonological analysis and blending. Children in the WIST training program outperformed children in the PHAB/DI and CSS groups on exception (irregular) word identification and on reading multisyllabic words. Children in the PHAB/DI program showed significant gain over the other children in speech-based phonological segmentation and blending and on print-based letter/sound skills. The authors reported the statistics necessary to compute effect sizes on a variety of dependent measures; significant effect sizes were found in a number of measures. In Letter-Sound, Sound Combination and Key Words measures, effect sizes were computed at 1.70, .52 and .52 for
children trained in WIST and 1.81, -.20 and .14 for children trained in PHAB conditions. Significant effects of .47 on Test of Transfer and .30 for Regular Word Reading were found for PHAB trained children. No significant effect sizes were found in the remaining measures, including reading, word identification, word attack. Students in the PHAB intervention group exhibited a significant effect size of .33 on the Goldman-Fristoe-Woodcock (GFW) Nonword Reading measure, .27 on the GFW Sound Analysis measure, .11 on the Woodcock Reading Mastery Test-R (WRMT-R) NonWord Reading, and .15 on the WRMT-R Word Attack subtest.

An investigation of the Great Leaps fluency intervention program (Mercer, Campbell, Miller, Mercer & Lane, 2000) documented significant and substantial improvement in reading fluency, and recorded effect sizes on grade level reading scores of 2.01, 2.67 and 13.43 for groups of students receiving treatment for 6 to 9 months, 10 to 18 months and 19 to 25 months. These effect sizes are even more impressive because instruction was limited to 5 to 6 minutes per school day of 1:1 instruction.

The Orton-Gillingham approach to remedial reading instruction with older delayed students was investigated by two groups of researchers (Simpson, Swanson & Kunkel, 1992 and Vickery, Reynolds & Cochran, 1987). The Orton-Gillingham procedure provides instruction in the alphabet and dictionary skills, phonology, letter recognition and letter sequence, syllabication, cursive handwriting, and reading fluency and comprehension.

Simpson and his colleagues (Simpson, Swanson & Kunkel, 1992) enrolled students in two detention facilities to participate in a study comparing the Orton-Gillingham approach to typical daily reading instruction. Participants were instructed in groups of one to six students. After controlling for attrition and interaction effects of time in instruction, these researchers documented a significant increase in reading growth as measured on the Woodcock Test of
Reading Mastery. Students in the experimental condition gained as much as .93 year growth after three months of instruction compared to .07 year growth for the comparison group. The students in the treatment group also had a significantly lower recidivism rate. The authors did not measure interaction effects of group size on reading growth, nor did they report the statistics necessary to compute effect size.

Vickery’s group expanded the Orton-Gillingham method to allow instruction of small groups rather than one to one instruction. The expanded program, Alphabetics Phonics included additional materials based on Orton Gillingham, called the Multisensory Teaching Approach for Reading, Spelling and Handwriting (MTARSH). Students in grades 3, 5, and 6 made significant gains in reading and spelling. The control group was not equivalent in mean reading achievement to the treatment group, so effect size could not be computed.

Corrective Reading is a reading program designed for older delayed readers and consists of two phases of instruction: decoding (including repeated reading for fluency) and comprehension. Harris, Marchand-Martella and Martella (2000) recorded an average grade equivalent reading improvement of more than 2 grades in vocabulary and almost 2 grades in comprehension in response to 66 days of instruction in Corrective Reading delivered by high school peer tutors in 1:1 instruction. The authors did not report the means of the treatment or control groups, nor were the standard deviations of the control group reported. Thus, effect size could not be calculated. Grossen (2004) investigated the results of school-wide implementation of Corrective Reading; nonreaders were grouped in Level A with gifted readers in Level F (Reasoning and Writing). The study was conducted in Goethe Middle School, which “had the reputation of being the poorest performing school in one of the poorest performing districts in California” (163). Growth was measured by the Multilevel Academic Survey Test and
Woodcock-Johnson-Revised Word Attack subtest. In addition, raw scores for Goethe Middle School were compared to raw scores of a matched school on the California Achievement Test; Goethe Middle School recorded the highest gains of all low-performing schools in California after one year of Corrective Reading implementation. Although effect size was not reported, impressive gains were documented for students learning English and students with disabilities. The author reports subsequent replication in six additional middle schools in California, with similar success.

Meyer (1982) investigated the effects of word-analysis training compared to word-supply strategy in remediating the delayed reading skills of students in grades four through seven. Using the Decoding Strategies lessons of the Corrective Reading Program, the author found no significant difference between word-analysis and word-supply treatments on measures of reading skills that included the Wide Range Achievement Test, the Gray Oral Reading Test, the Corrective Reading Placement Test and criterion-referenced measures of reading rate and accuracy. Instructional groups ranged in size from two to nine students with instruction for 70 lessons of 45 minutes length.

A third curriculum available to improve the reading skills of delayed readers is LANGUAGE! (Greene, 1996 and Moats, 2004), a structured language program which includes direct instruction in phonemic awareness, letter/sound correspondence, vocabulary and comprehension in reading selections controlled for difficulty. Students are individually placed in one of 6 levels based on performance on program placement tests. In the pilot study of this program, Greene (1996) enrolled 45 students aged 13 to 17 as a treatment group and 51 students in a control group. All students were enrolled in one of six juvenile offender programs. Students in the control group received intensive educational programs that were not structured language
programs. Growth was assessed after six months on three measurements: Gray Oral Reading Test – Total Oral Reading score and Rate, Accuracy and Comprehension subtests; Written Expression subtest of the Peabody Individualized Achievement Test, and the Wide Range Achievement Test – Spelling and Reading subtests. Students in the treatment condition gained an average of three grades in measured reading skills. The mean performance at pretest of the control group was much greater than the mean performance of the treatment group; effect sizes could not be calculated meaningfully.

A large scale study of LANGUAGE! was conducted in two low-performing Sacramento middle schools and one low-performing Sacramento high school (Moats, 2004). Though no comparison group was constituted, student gains were compared to expected gains. Significant growth was shown on comprehension, word attack and word identification. Moats describes several shortcomings of this study, including the selection of instructors, the amount of training instructors received, and instructional group sizes of ten to 28 students instead of the recommended group size of fifteen or fewer. Despite these issues, effect size was significant. On the Multilevel Academic Survey Test (MAST) short form, effect sizes for students in grade 6, 7, 8 and 10 were .45, .55, .57, and .56. Performance on the MAST Long Form indicated effect sizes of .37, .50, .50 and .59. The Woodcock Johnson-Revised subtests of Letter-Word Identification and Word Attack skills were administered to students in 6th, 7th, 8th and 10th grades with reported effect sizes of .34, .23, .50 and .48 in Letter-Word Identification and .49, .04, .46 and .58 in Word Attack.

(Insert Table 2 about here.)

Discussion
The stakes are high. Middle school students who read poorly have low self-esteem, greater disciplinary referrals and are more likely to drop out of school. (Oregon Department of Education, 1999; Showers, Joyce, Scanlon and Schnaubelt, 1998). Adults who are unskilled readers have limited educational opportunities and greatly reduced earning power (Haycock and Ames, 2000). Significant numbers of older readers read below third grade proficiency. The purpose of this study was to provide examine the of the research on component skill instruction in foundational reading skills (i.e., phonemic awareness and phonics) with students in middle school or high school who are reading below third grade proficiency. The goal was to locate all experimental or quasi-experimental studies that measured the impact of improving reading proficiency by focusing on component skills of reading on older struggling readers.

The effectiveness of Phonemic Awareness training, alone and in conjunction with decoding skills training will be discussed. The findings of the identified researchers will be examined in terms of the common features of programs that successfully accelerated reading growth and the applicability of results from reading research with young children (grades K through 3) to instructional planning for older delayed readers.

*Common Features of Successful Reading Acceleration Programs*

*Phonemic awareness combined with phonics instruction is effective.* In their study comparing the effects of phonemic awareness training, Hook and her colleagues (Hook, Macaruso and Jones, 2001) found no significant difference between outcomes for students trained for 2200 to 4400 minutes in phonemic awareness through Fast ForWord compared to students trained for 1500 minutes in Orton-Gillingham. They concluded that phonemic awareness training is effective in improving the reading skills of delayed readers, and that
phonemic awareness training combined with instruction in the alphabetic code, as in the Orton-Gillingham procedure, is a more efficient curriculum for these students.

MacGuinness, MacGuinness, and MacGuinness (1996) found that baseline phonological processing predicted between 16% and 35% of the variance in post-test reading scores. However, the authors concluded that phonological awareness could be remediated, noting that “the lower a child’s reading score at intake, the greater the gains. We conclude that none of the diagnostic tests, nor initial test scores, predict gains/hour” (pp. 90-91). The paucity of studies investigating phonemic awareness in older readers as an isolated independent variable may be explained by the integration of this skill within research and curricula with a wider focus for older readers.

Programs that train students in the alphabetic code either directly or indirectly train in phonemic awareness. Yale University’s research (Shaywitz, 2003) into the brain patterns of dyslexic readers before and after phonics instruction indicates that older delayed readers, even those readers with significant dyslexia and reading disabilities, can be taught to decode and comprehend text by systematic and direct instruction in phonics. Further, instruction in phonics causes the brain patterns of dyslexic readers to more closely resemble the brain patterns of fluent reader, indicating that the functioning of the neural pathways can be enhanced through reading instruction that emphasizes phonics. Several studies investigated the results of phonics instruction with delayed older readers.

Meyer’s (1982) research indicated that decoding of regular words in older delayed readers are improved equally by word analysis and word supply teaching methods. The author concluded that there may have been “an intriguing interaction between program emphasis and correction technique” (p 554). In other words, supplying the pronunciation of a regular, one- or two-syllable word in a program that controls the reading passages to one- or two-syllable words
does not require additional word analysis skills. In addition, both groups in Meyer’s study received 20 minutes daily of word analysis training. However, Archer’s research (2004) shows that older delayed readers require word analysis instruction for more difficult, multisyllabic words. This conclusion is supported by Mercer’s investigation in Great Leaps (Mercer, Campbell, Miller, Mercer & Lane, 2000). The findings from the research in phonological awareness and phonics/decoding reading skills suggest that both of these skills are required for skilled reading of regular, irregular, and multisyllabic words after third grade, and that students with deficits in these two skills improve their reading outcomes after direct instruction in phonological awareness and phonics instruction. Isolated instruction in Phonological Awareness does not appear to be an effective or efficient program for older delayed readers. Concurrent instruction in Phonological Awareness with phonics, letter-sound, and decoding instruction appears to significantly accelerate reading skills.

*Small group instruction is effective.* The reading skills of older delayed readers may be effectively and efficiently remediated in small groups rather than in the more expensive 1:1 instructional model (Grossen, 2004; Lovett & Steinbach, 1997; Meyer, 1982; Rashotte, MacPhee & Torgesen, 2001; Vickery, Reynolds & Cochran, 1987). Further, peer tutors are an effective resource in reading instruction (Penney, 2002). Moats found that too many students in a group (ten to twenty-eight members) had a negative effect on remediation using LANGUAGE! (Moats, 2004).

*Research findings with young children may be applied to program planning with older delayed readers.* Finally, it appears that findings from research conducted with young children in kindergarten through fifth grades may be applicable to understanding the reading development and instructional needs of older delayed students. Two groups of researchers (Lovett &
Steinbach, 1997 and Rashotte, MacPhee & Torgesson, 2001) compared the results of phonologically based reading instruction on three groups of children – grades 1 and 2, 3 and 4, and 5 and 6, and found no simple grade effects. McGuinness, McGuinness, and McGuinness (1996) also found no significant differences in the effect of instruction in alphabetic principle across three age groups of students: 5-6 year olds, 7-8 year olds, and 10-16 year olds.

Future Research

This review included studies of the effectiveness of four commercially available reading programs: Fast ForWord, Corrective Reading, Great Leaps and LANGUAGE! Archer (2004) compared Corrective Reading, Read Naturally, LANGUAGE! and REWARDS in terms of fluency building among secondary students reading between the 2.5 and 5.0 grade level and found that teachers may choose to use aspects of each and all of these programs to remediate reading and comprehension deficits in older delayed readers with basic decoding skills.

However, a significant number of students may require training in Alphabetsics before they would benefit from fluency training. Educators would benefit from rigorous investigations comparing two or more commercially available curricula with older readers who decode below the third grade proficiency level.

Despite the importance of phonemic awareness and phonics skills in developing reading proficiency, relatively little is known about the strengths and deficits of older delayed readers in these two foundational skills. What are the component skills and deficits of very delayed middle school readers? What are the most efficient and effective program components to accelerate the reading growth of these students?

Commercially available reading instruction programs should be thoroughly reviewed and categorized as Comprehensive, Supplemental, or Intervention based on the criteria developed by
the Oregon Reading First Center’s Review of Programs for kindergarten through grade 3 (Oregon Reading First Center, 2003).

Direct instruction in the alphabetic principles of phonological awareness and phonics/decoding, provided on an intensive schedule, might best be provided in a small group, resource room setting. Investigations into the optimal group size and frequency of instruction for secondary school students with very delayed reading skills would assist school administrators in designing school-wide interventions most likely to achieve accelerated reading gains.