"The pattern of results was clear across nine cohorts and three grades, totalling more than 425,000 students in all. Well **under 1 percent of first- through third-grade students were poor at reading comprehension yet adequate at both decoding and vocabulary**. … "Our results are consistent with the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) in that nearly all cases of poor reading comprehension were associated with inadequate decoding, oral language (i.e., vocabulary), or both. Our results also support Catts et al.'s (2006) recommendation to use a framework based on the simple view (see Table 1) when assessing and intervening with poor readers. When assessing poor readers, it is important to target oral language and decoding in addition to reading connected text for meaning because students' poor reading comprehension scores alone are not sufficiently informative for the purposes of remediation. It would be important to identify how much of the poor reading comprehension is attributable to poor decoding and to poor oral language skills such as limited vocabulary knowledge" (p.7, 8)."

Spencer, M., Quinn, J. M., & Wagner, R. K. (2014). Specific reading comprehension disability: Major problem, myth, or misnomer? *Learning Disabilities Research & Practice*, 29(1), 3-9. doi: 10.1111/ldrp.12024. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/ldrp.12024/pdf

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"The results revealed that phonics instruction is not only the most frequently investigated treatment approach, but also the only approach whose efficacy on reading and spelling performance in children and adolescents with reading disabilities is statistically confirmed. The mean effect sizes of the remaining treatment approaches did not reach statistical significance" (p.1).

Galuschka, K., Ise, E., Krick, K., & Schulte-Korne, G. (2014) Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. PLoS ONE 9(2), 1-12. e89900. doi:10.1371/journal.pone.0089900

"The idea that neuroscience research might provide guidance for teachers sounds promising. However, as with any new and aspiring research field, educational neuroscience has suffered to some extent from over-optimism and wishful thinking. A huge demand for improving educational practice has been a fertile ground for misconceptions around the question of how neuroscience can be applied to education. Speculative educational applications have emerged in the name of neuroscience (p.136) … In contrast with some of the ideas behind the whole language approach, reading is therefore not innate; brain regions that have evolved for tasks such as object (not letter) recognition, or understanding spoken (not printed) language, need to be combined to form a new skill. Reading is, after all, an acquired human ability that emerged only after the cultural invention of the alphabet" (p.138).

Weigmann, K. (2013). Educating the brain. EMBO Reports, 14(2), 136-9. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3566840/

"Three complementary sources of evidence suggest that words are the units of reading. First, eye movements during fluent reading are made mostly by making saccades from one word to the next. Second, the reading time of a single word is relatively independent of the number of letters. Third, a single letter may be more easily detected in brief presentations when embedded in a word. A possible inference of these findings is that

education should be organized to teach children to read entire words instead of focusing in letter-by-letter identification. This procedure, usually termed holistic reading, led to concrete implementations that turned out to be a major pedagogical fiasco. As it turns out, the neuroscience of visual learning could actually have predicted this failure. The development of literacy is a case of pop-out learning, a process by which, after extensive practice, one can identify a specific set of shapes in cluttered fields very rapidly and with a subjective feeling of automaticity and lack of effort. For non-readers, reading is a slow, effortful and serial process that becomes automatic after many hours of training. What sort of transformation elicits this type of learning in the brain and what material is optimal for this learning process.

Constitutive elements of shapes are represented by pools of neurons encoding basic traits (strokes) that recombine to form new elements of intermediate complexity, which are subsequently recombined to encode more complex objects69. This notion was incorporated into a model of neural codes for written words, based on a hierarchy of increasingly complex neuronal detectors, from individual letters to bigrams and morphemes. Only specific patterns that conform certain letters from strokes (as opposed to other patterns with similar regularities, but which do not occur in the alphabet) are trained by visual experience64. The hypothesis was that this process relies on the same learning mechanisms that carve a cortical circuitry for grouping contours and segmenting textures, namely the assembling of object statistical regularities in the visual world62. This hypothesis was tested by measuring brain responses to visual strings that progressively disrupt the 'natural statistics' of the alphabet at different scales: JZWYZK (infrequent letters), QOADTM (frequent letters), QUMBST (frequent bigrams) and AVONIL (frequent quadrigrams). Results showed a gradient of selectivity spanning the left occipito-temporal cortex, with increasing selectivity for higher level stimuli toward the anterior fusiform region70.

The importance of this finding for education is that even after extensive practice with reading, words are still represented by their constitutive components. This process goes all the way to what appears to be the constitutive elements of all alphabets, that is, oriented elements or strokes. For this reason, one aspect that may impair fluent reading is the inability to parse words into letters. In agreement with this prediction, the remarkably simple intervention of increasing letter spacing substantially improves text reading in some kinds of dyslexic children71. An additional piece of evidence required to bring these data together is that visual crowding, the inability to identify objects in clutter, is more severe in dyslexic children, making it hard to parse letters from continuous words" (p.500).

Sigman, M., Peña, M., Goldin, A.P., & Ribeiro, S. (2014). Neuroscience and education: Prime time to build the bridge. *Nature Neuroscience, 17*(4), 497-502.

"Browder, Wakeman, Spooner, Ahlgrim-Delzell, and Algozzine (2006) reported that almost 90% of published research studies examining reading instruction for students with moderate to severe disabilities (MSD) focused on acquisition of functional sight words. Sight-word instruction has been and remains the dominant form of literacy instruction to increase the functional independence of students with MoID. … A small body of research over the last 3 decades suggests that with effective instruction, students with MoID can learn **generalizable word-analysis skills** (Allor, Mathes, Roberts, Jones, & Champlin, 2010; Bracey, Maggs, & Morath, 1975; Browder, Ahlgrim- Delzell, Courtade, Gibbs, & Flowers, 2008; Cossu, Rossini, & Marshall, 1993; Davis, Fredrick, Alberto, & Gagné, 2010; Davis et al., 2013; Hoogeveen, Smeets, &

Lancioni, 1989; Katims, 1996; Nietupski, Williams, & York, 1979; Waugh, Fredrick, & Alberto, 2009)." (p.49).

Fredrick, L. D., Davis, D. H., Alberto, P. A., & Waugh, R. E. (2013). From initial phonics to functional phonics: Teaching word-analysis skills to students with moderate intellectual disability. Education and Training in Autism and Developmental Disabilities, 48(1), 49-66.

"Teachers of children with DS and ID need to incorporate more than sight-word only approaches in their reading instruction. The small but growing research base indicates that classroom teachers should no longer be asking: "Should I use a sightword program or a phonics program?" Instead, teachers should be providing comprehensive reading interventions that extend beyond the reading of sight words to include phonological awareness and phonics instruction. Even early proponents of sight-word approaches have suggested that reading instruction needs to include additional components if higher levels of reading are to be attained (Buckley, Bird, & Byrne, 1996). Evidence-based programs hold some promise for children with DS and ID. However, as our results indicate, the programs may need to be modified in important ways for meaningful improvements to be seen. There are several areas in which potential modifications could enhance the effectiveness of the interventions for children with DS and ID. First, due to the relatively low rates of retention for learned items, an additional focus on review and practice may be needed. Second, increasing the amount of time students spend applying newly acquired reading skills with novel words and reading connected text will likely increase generalization" (p. 88).

Lemons, C. J., Mrachko, A. A., Kostewicz, D. E., & Paterra, M. F. (2012). Effectiveness of decoding and phonological awareness interventions for children with Down Syndrome. *Exceptional Children, 79*(1), 67-90.

"In a research update on reading instruction for English learners that included 20 studies published since 2002, August and Shanahan (2010) reviewed 12 additional studies on phonological awareness and phonics instruction. Similar to the Shanahan and Beck review, theirs found that systematic and explicit instruction has a positive impact on a range of student reading outcomes. English learners develop word-level skills in a similar manner to native English speakers, and they benefit from instructional features that have been found effective for native English-speaking children (Shanahan & Beck, 2006). Several early reading interventions for English learners with a strong phonics component have reported benefits for word-level skills (Denton, Anthony, Parker, & Hasbrouck, 2004; Gunn, Biglan, Smolkowski, & Ary, 2000). This growing body of research suggests that young English learners benefit from the same instructional features and phonics components that support early reading development in their native English-speaking peers (Ehri et al., 2001)" (p. 2).

Vadasy, P. F., & Sanders, E. A. (2012). Two-year follow-up of a kindergarten phonics intervention for english learners and native english speakers: Contextualizing treatment impacts by classroom literacy instruction. Journal of Educational Psychology, 104(4), 987-1005.

How reading develops

Posted: 27 May 2014 02:17 AM PDT

This article first appeared at on April 29, 2014.

Do children learn to read by translating letters into sound, or by perceiving the spelling of the word? The answer has an indirect bearing on teaching; it would presumably be best to instruct kids in a way consonant with how most perform the task. The last fifteen years has seen an increasing consensus among researchers: children initially learn via the letter-sound translation mechanism. As they gain reading practice, they acquire the spelling mechanism as well, although the letter-sound translation method continues to make a contribution to reading. Now a new study of 284 French children in grades 1 through 5 offers support to this model (Ziegler et al, 2014).

From the child's perspective, the experimental task was simple. They sat before a computer screen. An asterisk appeared at the center for one second, and then a string of letters replaced the asterisk (I'll call this the "response letter string.") Children were to push one button if the response letter string formed a word, and another if it did not.

What the kids were not told was that another letter string actually appeared between the asterisk's disappearance and the appearance of the response letter string. This letter string (called the prime) appeared for just .07 seconds, so the children didn't consciously see it—if anything, they might have thought the screen flickered.

Even though you're unaware of it, the prime can influence your response. If the prime is "MOP" and then the response letter string is also "MOP," you're faster to verify that "MOP" is indeed a word, compared to how fast you respond if the prime were a non-matching word, say, "DOG." Even though you were unaware of the prime, you read it, and so you're a bit faster to read it a second time.

But what if the prime were "MAWP?" Would you still be faster to verify that "MOP?" is a word when it appears? If you think that people read via letter-sound translation, the answer ought to be yes. When "MAWP" appears, you read it and generate the right sound, and if sound is the basis of reading, you should get the advantage when "MOP" appears.

Using a comparable method, the researchers tested whether kids read via spelling. They used a prime with nearly the same spelling as the response letter string: for example "TALBE" followed by "TABLE." Other work has shown the readers are pretty resistant to spelling errors like this one, where letters are off by just one position (McCusker et al, 1981). So if you're using the spelling of a word to identify it, we can expect that you'll be faster to verify that "TABLE" is a word if the prime was "TALBE," compared to a prime like "CAIRH."

So take a moment and guess. Do first graders read mostly by sound or by spelling? How about fifth graders?

The data indicated that first graders read by sound. With each successive year, kids showed more and more evidence of using the spelling of words in their reading. BUT there was no diminution of the influence of sound. Experienced readers use both the sound and the spelling mechanisms.

This result fits with the following view of reading: most kids will learn to read by learning to sound out words. With practice over the course months and years, they develop an increasing number (and increasingly robust) mental representations that allow them to identify words by their appearance, i.e., by their spelling. These representations form as a consequence of reading practice and don't require any special instruction. This general view accords with other behavioral data showing that methods of reading instruction that emphasize phonics have an edge over other methods.

Daniel Willingham

References:

McCusker, L. X., Gough, P. B. & Bias, R. G. (1981). Word recognition inside out and outside in. *Journal of Experimental Psychology: Human Perception and Performance, 7*, 538-551.

Ziegler, J. C., Bertrand, D., Lété, B., & Grainger, J. (2014). Orthographic and phonological contributions to reading development: Tracking developmental trajectories using masked priming. *Developmental Psychology, 50,* 1026-1036.

"The practice of referring to letters by their sounds was motivated by the idea that letter sounds are more useful than letter names in learning to read and spell (e.g., Feitelson, 1988). However, letter names may be worth learning because most of them, in English as in other languages, contain a phoneme that the letter symbolizes (Treiman & Kessler, 2003). Children who are familiar with the names of letters take advantage of this fact (Ellefson et al., 2009; McBride-Chang, 1999; Treiman et al., 1998). A further benefit of conventional letter names is that they follow the same phonological patterns as other words of the language. Some sound-based labels, such as /æ/ for a, do not; normal English words never end with short vowels. Informal and formal instruction that stresses letter names as opposed to sounds leads to different patterns of performance and different types of errors for young learners of English. However, one set of practices does not make mastering this complex writing system markedly easier than the other" (p.485-486).

Treiman, R., Stothard, S.E., & Snowling, M.J. (2013). Instruction matters: Spelling of vowels by children in England and the US. Reading and Writing, 26(3), 473-487.

Several national reports have suggested the usefulness of systematic, explicit, synthetic phonics instruction based on English word structure along with wide reading of quality literature for supporting development in early reading instruction. Other studies have indicated, however, that many in-service teachers are not knowledgeable in the basic concepts of the English language. They may be well versed in children's literature but not know how to address the basic building blocks of language and reading. The authors hypothesized that one of the reasons for this situation is that many instructors responsible for training future elementary teachers are not familiar with the concepts of the linguistic features of English language. This hypothesis was tested by administering a survey of language concepts to 78 instructors. The results showed that even though teacher educators were familiar with syllabic knowledge, they performed poorly on concepts relating to

morphemes and phonemes. In a second study, 40 instructors were interviewed about best practices in teaching components and subskills of reading. Eighty percent of instructors defined phonological awareness as letter-sound correspondence. They also did not mention synthetic phonics as a desirable method to use for beginning reading instruction, particularly for students at risk for reading difficulties. In conclusion, providing professional development experiences related to language concepts to instructors could provide them the necessary knowledge of language concepts related to early literacy instruction, which they could then integrate into their preservice reading courses.

Malatesha Joshi, R., Binks, E., Hougen, M., Dahlgren, M. E., Ocker-Dean, E., & Smith, D. L. (2009). Why elementary teachers might be inadequately prepared to teach reading. *Journal of Learning Disabilities, 42*(5), 392-402. doi:http://dx.doi.org/10.1177/0022219409338736

The synthetic approach has been exciting much interest in Great Britain due to some very powerful and long-lasting effects reported from Clackmannanshire in Scotland (Johnston & Watson, 2003; Watson & Johnston, 1998). Three hundred Scottish school beginners were taught by either synthetic or analytic phonics programs over an intensive 16-week period at school commencement. Those who were taught by the synthetic phonics method were seven months above their chronological age and similarly advanced beyond their analytically taught peers. Seven years later the synthetic group's word-reading ability was three-and-a-half years advanced, and almost two years ahead in spelling, and disadvantaged children achieved similar progress. Unaccountably, the progress of boys exceeded that of girls (by 11 months), and only 5.6% of the students taught synthetic phonics were behind in word reading at the five year follow-up.

Below are some recent follow-up findings from Johnston, McGeown, and Watson (2012).
Overall, the group taught by synthetic phonics had better word reading, spelling, and reading comprehension. There was no evidence that the synthetic phonics approach, which early on teaches children to blend letter sounds in order to read unfamiliar words, led to any impairment in the reading of irregular words (p. 1365).

"It was found in Study 1 that, after 6 years at school, children taught by the synthetic phonics approach read words, spelt words and had reading comprehension skills significantly in advance of those taught by the analytic phonics method. This shows that despite English being an opaque orthography, children are not impaired when taught by an approach to reading that is common in transparent orthographies"(p.1378).

"The analytic phonics approach, having an early sight word element and late teaching of sounding and blending, may lead to some children reading largely by a form of sight word reading underpinned only by superficial connections between print and sounds" (p.1382).

"This present study makes an important contribution to documenting the long term effects of synthetic phonics teaching. Maintaining the gain in word reading for age would have been noteworthy, but in fact it increased over time, leading to a high level of attainment at the age of 10" (p. 1384).

Johnston, R.S., McGeown, S., & Watson, J.E. (2012). Long-term effects of synthetic versus analytic phonics teaching on the reading and spelling ability of 10 year old boys and girls. Reading & Writing, 25(6), 1365-1384.

The authors examine the reassessments of the National Reading Panel (NRP) report (National Institute of Child Health and Human Development, 2000) by G. Camilli, S. Vargas, and M. Yurecko (2003); G. Camilli, P. M. Wolfe, and M. L. Smith (2006); and D. D. Hammill and H. L. Swanson (2006) that disagreed with the NRP on the magnitude of the effect of systematic phonics instruction. Using the coding of the NRP studies by Camilli et al. (2003, 2006), multilevel regression analyses show that their findings do not contradict the NRP findings of effect sizes in the small to moderate range favoring systematic phonics. Extending Camilli et al. (2003, 2006), the largest effects are associated with reading instruction enhanced with components that increase comprehensiveness and intensity. In contrast to Hammill and Swanson, binomial effect size displays show that effect sizes of the magnitude found for systematic phonics by the NRP are meaningful and could result in significant improvement for many students depending on the base rate of struggling readers and the size of the effect. Camilli et al. (2003, 2006) and Hammill and Swanson do not contradict the NRP report,

concurring in supporting comprehensive approaches to reading instruction. (PsycINFO Database Record (c) 2010 APA, all rights reserved)

Stuebing, K.K., Barth, A.E., Cirino, P.T., Francis, D.J, & Fletcher, J.M. (2008). A response to recent reanalyses of the National Reading Panel report: Effects of systematic phonics instruction are practically significant. *Journal of Educational Psychology, 100*(1), 123-134.

Phonics (the method of teaching children to read and pronounce words by associating letters with the sounds they represent) should be prescribed in a national curriculum for students in the early years of school. Professor Barry McGaw, chairman of the National Curriculum Board in:

Tomazin, F. (2008). Stop holding back top students: Curriculum chief. *The Age (Education),* 1 February 2008, p.3.

But isn't English too complex for phonics to be useful?

"An old but influential study by Clymer (published in 1963) has persuaded many people that the phonic generalizations commonly taught to young children are not very useful. Francine Johnston (University of North Carolina) re-examined the data and reached rather different conclusions, in spite of the fact that she set herself a hard task in focusing only on vowel patterns, which are recognised as more difficult than consonant patterns. She found that the rules could be restated to make them much more reliable. For example, the first vowel has its 'long' sound over 95% of the time with ay, ai and oa. Words with -air and –oar can be considered either separately as 'r-controlled' or, at least in American accents, as needing only minor adjustment in pronunciation if initially sounded out with the first vowel's `long' sound. With some digraphs for vowel sounds, the fact that the first letter does not 'do the talking' is compensated for by the near-100% reliability of the sounds in words (e.g. the -–aw, -oy and -oi in saw, boy and join) or else by the fact that there is usually only a two-way choice (e.g. the ow, ew, and oo in snow/how, blew/view, boot/book). Johnston recommends that children should be encouraged to adopt a 'flexible strategy...such as trying more than one sound and checking the results with their oral language and context'. Some of her solutions work better in American accents than in British, but the general principles she offers would be easily adaptable".

Johnston, F.P. (2001). **The utility of phonic generalizations:** Let's take another look at Clymer's conclusions. The Reading Teacher, 55(2), 132-143.

"Theodore Clymer conducted research nearly 45 years ago and asserted that "only 18 out of 45 phonic generalizations met the criteria of usefulness" (Johnston 132). One's perspective and the value one places on phonological, and phonetic instruction in reading comprehension would determine one's reaction to Clymer's conclusion. After Clymer's study was completed in the early 1960's, there were a number of researchers who, more or less, replicated his findings. The research seemed to fall into two categories: those that simply changed the collection of words that Clymer had used for analysis, and those who attempted to restate the generalizations (Johnston 133).

Francine Johnston asserts that of the "45 generalizations investigated by Clymer, 10 involved consonants and all but one of those had a utility of 95% or better" (Johnston 134). Johnston suggests that vowel generalizations are much less regular than are consonant generalizations. The research she conducted was limited to several vowel generalizations: vowel pairs, long vowels marked with silent e, and final y (Johnston 134). Johnson's research lead her to the conclusion that Clymer's theory of when 2 vowels are next to each other, the "long sound of the first one is heard, and the second is usually silent" (135) is accurate only 45% of the time. In her study (see attached table), she grouped vowel pairs into four categories: one sound, two sound alternate, three or more sounds, and other (which accounted for 17 words). From her research, Johnston concluded that 5 vowel pairs could "be considered highly regular and worth teaching: ai, ay, oa, ee, and ey" (137). Additionally, Johnston asserts that teachers "do need to listen for the regional variations in dialect that influence . . . sounds. . . . The purpose of phonics instruction is not to teach children the correct pronunciation, but to help them apply letters and letter combinations to their own pronunciation" (139).

Ultimately, Johnston claims that Clymer's research should be respected, because it drew attention to the problems of "broad phonic generalizations" (139). However, she states that "Clymer's decision to ignore generalizations that did not apply to more than 20 words in 2600 he analyzed is also questionable" (139). Due to phonic over-generalizations, according to Johnston, Clymer's research "does not offer a useful guide to what needs to be taught" (140). The implication for educators is that it is necessary to know which phonic patterns have high rates of usage, and focus on those phonic patterns. Also, the educator should consider which students really need phonic instruction. The article concludes that "English must be examined . . . as a complex system that is basically phonetic, but also relies on patterns and meaning to provide an optimal system" (Johnston 142)".

http://buckhoff.topcities.com/Role%20of%20Phonemic%20and%20Phonetic%20Awareness%20to%20Increase%20Reading%20Comprehension.htm

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"At least 80% of English spellings are regular or predictable".

Hanna, P.R., Hodges, R.E., & Hanna, J.S. (1971). *Spelling: structure and strategies.* Boston: Houghton Mifflin.

"The low aptitude children learn the phonics they are taught, and do not pick it up as a by-product of more general reading". (p.14)

Barr, R., & Dreeben, R. (1983). *How schools work.* Chicago. Ill.: U. of Chicago Press.

"Direct, systematic instruction about the alphabetic code is not routinely provided in kindergarten and first grade, despite the fact that, given what we know at the moment, this might be the most powerful weapon in the fight against illiteracy".

Blachman, B. (1996). Preventing early reading failure. In S. C. Cramer and W. Ellis, (Eds), *Learning disability: Lifelong issues.* Baltimore: Paul C. Brookes.

"It might be prudent to tell children directly about the alphabetic principle since it appears unwise to rely on their discovery of it themselves. The apparent relative success of programs that do that (Bradley & Bryant, 1983; Byrne & Fielding-Barnsley, 1991, 1993, 1995) support the wisdom of direct instruction" (p.424).

Byrne, B. (1996). *Applied Psycholinguistics, 17,* 401-426.

"Such results suggest that direct instruction in sound-spelling patterns in first and second grade classrooms can prevent reading difficulties in a population of children at-risk of reading failure."… "Once decoding skills are automatized, growth in text comprehension follows (Foorman, Francis, Shaywitz, et al., 1997)" (p.68).

Foorman, B., Francis, D., Beeler, T., Winikates, D., & Fletcher, J. (1997). Early interventions for children with reading problems: Study designs and preliminary findings. *Learning Disabilities: A Multidisciplinary Journal, 8,* 63-71.

From: "mcnee" <mcnee@rapid.co.uk>
To: <readbygrade3@egroups.com>
Date: Fri, 29 Jan 1999 14:36:35 -0000

Reading to small children is a nice thing to do. I did it. But it is not the same thing as teaching them HOW to read, yet the Progressives and Whole Language supporters have led people to think that shared reading is the be-all and end-all, and phonics got lost. This is where the wrong teaching came in, as set out plainly by Rudolf Flesch in 1955. It comes from attributing virtues and powers to shared reading that do not work universally. **But some children cannot learn without phonics, most children do better with phonics, and phonics does not hurt anybody**. Nobody has ever told us just how many children can actually learn to read just from shared reading. Carry on enjoying reading to your child, Tony and Liana, but after about 4th birthday try phonics, just to be on the safe side. Mona.

"Again, scientific research argues incontrovertibly that becoming a good reader depends on understanding and using spellings and spelling-sound correspondences and, conversely, that poorly developed knowledge or facility with spellings and spelling-sound correspondences is the most pervasive cause of reading delay or disability (Rack, Snowling, & Olson, 1992; Stanovich, 1986). **Research further demonstrates that, with the exception of no more than 1-3% of children, reading disability can be prevented through well-designed early instruction (Vellutino et al., 1996).** However, such instruction must include attention to phonics, and is most effective when it includes explicit, systematic instruction on the alphabetic principle, including phonemic awareness and on the spelling-sound patterns and conventions of English, as well as an active emphasis on practicing and using that knowledge both in isolation and in the context of meaningful reading and writing (Bond & Dykstra, 1966; Brown & Felton, 1990; Chall, 1967; Foorman et al., 1997)".

Adams, M. J. (1998). The three-cueing system. In F. Lehr and J. Osborn (Eds), Literacy for all: Issues in teaching and learning (p. 73-99). New York: Guilford Press. http://www.balancedreading.com/3cue-adams.html

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"We have discovered that the Government's focus on early literacy interventions and phonics-based teaching is based on the best available evidence. We have also found that the Government's use of Reading Recovery is based on evidence, but a lower quality of evidence than we, as a Science and Technology Committee, are comfortable with. The Government's decision to roll out Reading Recovery nationally to the exclusion of other kinds of literacy interventions was, however, not evidence-based, and we have suggested that the Government should commission some high quality research, such as randomised controlled trials, in this area. … We have identified the Government's approach to teaching children diagnosed with dyslexia to read— namely, a structured phonics-based programme—is evidence-based on the best available evidence. But we discovered that the evidence base could be much stronger in this area".

House of Commons Science and Technology Committee Evidence Check 1: Early Literacy Interventions http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/44/4402.htm

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"Plasticity of brain response has been observed across the life span: (a) in younger students in response to explicit phonological awareness and phonics instruction (Shaywitz et al., 2004; Simos et al., 2002), (b) in upper elementary and middle school students in response to instruction designed to increase the precision of phonological and orthographic word representations and the efficiency of the working memory architecture (Aylward et al., 2003; Richards et al., 2000, 2002), and (c) in adults in response to explicit instruction in sound and articulatory awareness and phonics training (Eden et al., 2004)".

Richards, T., Aylward, E., Berninger, V., Field, K., Grimme, A.C., Parsons, A., Richards, A.L., Nagy, W. (2006). Individual fMRI activation in orthographic mapping and morpheme mapping after orthographic or morphological spelling treatment in child dyslexics. *Journal of Neurolinguistics, 19*(**1**)**,** 56–86.

"Beginning primary teachers are not confident about teaching specific aspects of literacy such as spelling, grammar and phonics".
Louden, W., Rohl, M., Gore, J., Greaves, D., Mcintosh, A., Wright, R., Siemon, D., & House, H. (2005). *Prepared to teach: An investigation into the preparation of teachers to teach literacy and numeracy.* Canberra, ACT: Australian Government Department of Education, Science and Training.

"The Premier's 10-year plan concedes that the overall performance of Victorian students in literacy lags the world's best. … The literacy revamp includes a stronger focus on phonics and phonemic awareness in the teaching of reading".
Milburn, C. (2007). Schools 'slip behind' in basics. Education, The Age, p.3 5 March 2007

"2. The Committee recommends that teachers provide **systematic, direct and explicit phonics instruction** so that children master the essential alphabetic code-breaking skills required for foundational reading proficiency".
National Inquiry into the Teaching of Literacy (2005). Teaching reading - A review of the evidence-based research literature on approaches to the teaching of literacy, particularly those that are effective in assisting students with reading difficulties. *Australian Government: Department of Education, Science and Training.* Retrieved November 1, 2007, from www.dest.gov.au/nitl/documents/literature_review.pdf.

"The sheer volume of words that children are expected to read quickly and accurately is daunting. According to Carroll, Davies, and Richman (1971) and Adams (1990), if children successfully negotiate all the texts normally encountered by the end of third grade, they are expected to recognize and know well over 80,000 different words. A child is quickly faced with an orthographic avalanche of printed words. From the start, children will be expected to read words they have never before seen in print. Only a few thousand words usually receive direct instruction in the primary grades. It would be impossible to directly teach children all the words they will encounter in print. It is also impossible to directly teach children all the letter-sound correspondences which they will need to be able to "sound out" novel words. Even the most comprehensive phonics programs rarely provide direct instruction for more than about 90 phonics "rules." Yet, over 500 different spelling-sound "rules" are needed to read (Gough & Juel, 1990; Juel, 1994)".

Juel, C., & Minden-Cupp, C. (1999). *Learning to read words: Linguistic units and strategies.* CIERA Report #1-008. University of Michigan: Center for the Improvement of Early Reading Instruction Retrieved 12/2/03 from http://www.ciera.org/library/reports/inquiry-1/1-008/1-008.pdf

"Because decoding works, children will rely on a decoding strategy. Decoding makes learning sight words roughly nine times easier than rote memorization; children can learn about nine sight words by decoding with the same effort it takes to learn a single word by rote (Gates, 1931; Reitsma, 1983)".
Murray. B. (no date). *Using decodable text* http://www.auburn.edu/%7Emurraba/decodable.html

"… the phonic aspect of word level work is not always being systematically taught or given the emphasis that it requires" (p. 3).
Office for Standards in Education. (1998). Her Majesty's Chief Inspector of Schools in England.
http://www.standards.dfes.gov.uk/literacy/publications/?pub_id=119&atcl_id=643

"Processing letter-sound relations in the words through decoding or analogizing creates alphabetic connections that establish the words in memory as sight words (Ehri, 1992; Share, 1995). Systematic phonics instruction is thought to contribute to the process of learning to read words in these various ways by teaching readers use of the alphabetic system. Alphabetic knowledge is needed to decode words, to retain sight words in memory, and to call on sight word memory to read words by analogy. In addition, the process of predicting words from context benefits from alphabetic knowledge. Word prediction is made more accurate when readers can combine context cues with letter-sound cues in guessing unfamiliar words in text (Tunmer & Chapman, 1998). … **For children with learning disabilities and children who are low achievers, systematic phonics instruction, combined with synthetic phonics instruction produced the greatest gains".**
National Institute of Child Health and Human Development (2000*). National Reading Panel: Teaching children to read.* [On-Line]. Available: http://www.nationalreadingpanel.org.

Below is lifted from Jennifer Chew, RRF, Britain http://www.rrf.org.uk/index.htm
The study for which the OST detailed results are given compared three groups of Scottish Primary 1 (i.e. Reception) children: the first group was taught by `a systematic but gradual analytic method' (one letter-sound per week in the initial position of words). The second group had this same teaching plus separate training in the `analysis and synthesis of sounds in spoken words without reference to print'. The third group (synthetic phonics) was taught at the rate of six letter-sounds in eight days and was taught to read simple words by producing sounds for all letters and blending the sounds. By March of Primary 1, the synthetic phonics group was reading and spelling about seven months ahead of the other groups.
Watson, J.E., & Johnston, R.S. (1998). Accelerating reading attainment: The effectiveness of synthetic phonics. *Interchange, 57.* Edinburgh: SOEID.

"Landerl followed up an earlier experiment by Wimmer and Goswami. She found that English children taught synthetic phonics were much better at reading non-words than the eclectically-taught children in the original experiment. She notes that the English phonics school, like German schools but unlike many English schools, emphasised blending as well as letter-sound correspondences. She notes, too, that even with good phonics teaching, the complexity of English letter-sound correspondences makes decoding harder for English children than for German children, but suggests that systematic phonics teaching is all the more important in English, as children are less likely to crack the code by themselves".
Landerl, K. 2000. Influences of orthographic consistency and reading instruction on the development of nonword reading skills. *European Journal of Psychology of Education, XV*, No.3, pp. 239-257.

"It is often claimed that whole-language teaching fosters better comprehension in children, even though phonics-taught children may be better at word-recognition. Connelly et al., however, found the reverse: phonics-taught children were better not only at word-recognition but also at comprehension. The researchers compared Scottish phonics-taught children with a group in New Zealand who were matched on word-recognition ability but were taught by the characteristic New Zealand 'book

experience' method, which encouraged reliance on context rather than on sounding out and blending. A particularly interesting finding was that 'Phonics taught children produced more contextually appropriate errors, and in both single word and text reading made more attempts at reading unknown words' – *in other words, it seems that children actually make better use of context if they have first extracted all the information they can from the letters in the target word.* **'Compared with the non-phonics group, the phonics group spent more time in attempts at identifying unknown words and this included using contextual information, which apparently resulted in more rehearsal of the meaning and hence better reading comprehension performance'."**

Connelly, V., Johnston, R., & Thompson, G.B. (2001). The effect of phonics instruction on the reading comprehension of beginning readers. *Reading and Writing: An Interdisciplinary Journal, 14*, 423-57.

These findings support the need to consider the type of instruction in relation to the children's skill levels, as suggested by Connor, Morrison, and others (e.g., Connor et al., 2004). Morrison and Connor (2002) stressed the need to give explicit instruction focused on decoding skills to weaker readers and less explicit (more implicit) means of instruction focusing on comprehension to those children with stronger decoding and vocabulary skills. Similarly, Foorman and her colleagues (e.g., Foorman et al., 1998) have stressed the need to tailor what is done in the classroom to the skills displayed by the children. In particular, they emphasized phonics instruction during the early years especially for children starting school with fairly limited experience with literacy. Such a focus with at-risk readers can remove some of the differences in competencies related to children's demographic background. Thus, although young children may need instruction in both decoding skills and comprehension, the exact balance between the two should vary depending upon the child's skills.

Sonnenschein, S., Stapleton, L.M., & Benson, A. (2010). The relation between the type and amount of instruction and growth in children's reading competencies. *American Educational Research Journal, 47*(2), 358-389.

From a Florida Centre for Reading Research summary: "We must conclude that, although the *Orton-Gillingham Approach* contains many of the characteristics of effective intervention programs that have been identified in scientifically based research on reading, there are no studies available at present to provide an estimate of its impact on the reading growth of young children."

Torgesen, J.K., Foorman, B.R., & Wagner, R.K. (2008). *Dyslexia: A brief for educators, parents, and legislators in Florida*. FCRR Technical Report #8, Florida Center for Reading Research. Retrieved May 11, 2008, from http://www.fcrr.org/TechnicalReports/Dyslexia_Technical_Assistance_Paper-Final.pdf

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"No studies of unbranded *Orton-Gillingham*–based strategies that fall within the scope of the Students with Learning Disabilities review protocol meet What Works Clearinghouse (WWC) evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of unbranded *Orton-Gillingham*–based strategies for students with learning disabilities".

WWC (2010), July). *Orton-Gillingham–based strategies (Unbranded).*
http://ies.ed.gov/ncee/wwc/reports/learning_disabilities/orton/

"In synthesizing the results of 24 code-focused early childhood intervention studies meeting inclusion criteria, the NELP study found an overall average effect size of 0.38 (95% confidence interval = 0.18 to 0.58) on alphabet knowledge outcomes. Effects on alphabet learning were found to vary based on demographic

characteristics (child age, ethnicity, extent of literacy knowledge, population density of the location in which the study was conducted) as well as whether letter instruction was combined with training in phonological awareness. Other types of interventions investigated by the Panel (e.g., shared reading, general preschool/kindergarten programs) showed no reliable impact on children's alphabet knowledge" (p.9).

"For instance, the present synthesis does not support the use of current instructional practices to close this gap in alphabet knowledge; effect sizes were no larger for children at risk for reading difficulties than those who were not. Similar to findings regarding instruction in other early literacy skills such as decoding (Foorman, Fletcher, & Francis, 2002), more intensive, explicit alphabet instruction may be necessary to lessen the achievement gap. These facts may call for greater attention to the effectiveness of alphabet instruction during the early years. … In examining effects according to the alphabet and phonological components taught, larger effects were often noted when (a) the alphabet components taught matched the outcome, and (b) alphabet and phonological awareness instruction was combined. … One interesting finding deserving of further examination and replication concerns the impact of letter name instruction on letter sound learning. Studies providing letter name instruction as the only alphabet component showed reliable, positive impacts on children's letter sound learning. This result lends causal support to the argument for letter name-to-sound facilitation, discussed within the context of letter names that provide cues for learning letter sounds (Evans et al., 2006; McBride-Chang, 1999; Share, 2004; Treiman, Tincoff, & Richmond-Welty, 1996; Treiman et al., 1998)" (p.23).

Piasta, & Wagner, R.K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning and instruction. *Reading Research Quarterly, 45*(1), 8-38.

"The third point is that if the 90% of monosyllabic words, which can be read through 61 grapheme-phoneme relationships, had been taught through onsets and rimes, children would need to learn 334 onsets and rimes to read the children's literature and 534 to read the adult literature. Clearly it would take considerably longer to teach this amount of information than learning the 61 ERR grapheme-phoneme correspondences. Thus, teaching grapheme-phoneme relationships through onset-rime places greater demands on children's memories and potentially confuses them if taught alongside GPCs."

Deavers, R., Solity, J.E. & Kerfoot, S. (2000). The effect of instruction on early nonword reading strategies.' *Journal of Research in Reading, 23*(3), 267-286.

Share (1995) sees this alphabetic period as crucial, and he developed a self-teaching hypothesis in which " ... each successful decoding encounter with an unfamiliar word provides an opportunity to acquire the word specific orthographic information that is the foundation of skilled word recognition and spelling" (Share & Stanovich, 1995, p. 18). This gradual "lexicalization" (p. 18) occurs through repeated opportunities to use letter-sound correspondences for decoding. The strategy is used with less frequency as the range of familiar word patterns increases, through a "self-teaching" (Share, 1995, p. 155) mechanism. The phonological recoding strategy remains useful for decoding unfamiliar words - and of course, our language has many low frequency words. Eighty percent of English words have a frequency of less than one in a million (Carroll, Davies, & Richman, 1971, cited in Share & Stanovich (1995). Thus, the phonological recoding mechanism has a usefulness beyond its initial ability to provide the opportunities for the formation of orthographic representations.

Hempenstall, K. (1999). Miscue analysis: A critique. *Effective School Practices, 17*(3), 85-93.

"We concluded from our research that the bulk of phonemic awareness is acquired when children learn how the alphabetic system works to represent speech phonemically. … Sight word learning is at root an alphabetic process in which spellings of specific words are secured to their pronunciations in memory".

Ehri, L. (1998). Presidential address. In Joanna P. Williams (Ed.), *Scientific Studies of Reading*, Vol. 2, No. 2, pp. 97 - 114. Mahwah. NJ: Lawrence Erlbaum.

"In order for keywords to be used to read new words by analogy, the keywords must become sight words. That is, readers must possess complete representations of the keywords so that they can recognize spelling parts shared with new words. Students who have learned keywords by analyzing their grapho-phonemic constituents will have better memory for the keywords compared to students who lack grapho-phonemic representations of keywords, and this will facilitate decoding new words by analogy and retaining the new words in memory for reading and for spelling" (p.164).

Ehri, L.C., Satlow, E. & Gaskins, I. (2009). Grapho-phonemic enrichment strengthens keyword analogy instruction for struggling young Readers. *Reading & Writing Quarterly, 25*(2), 162-191.

Phonics alone isn't a complete program:

"For children with language challenges, little is known about effective early reading interventions, because most studies have used language scores as exclusionary criteria. We randomly assigned 78 kindergartners with poor language skills to small group reading interventions that included phonemic awareness, alphabetic understanding, and oral language. The groups began in September or mid-February. Nearly half the students were English learners. MANOVA between these groups found that **earlier intervention led to significantly better outcomes than the same interventions begun later in kindergarten**. We found similar rates of growth between students who were English only or English learners. Twice as many students in the immediate as in the delayed treatment scored in the average range at the end of the year. Pretests did not predict who would be a good or poor responder to the treatments; however, January scores in letter knowledge and phonemic awareness were reliably different for good and poor responders. … Several implications from this study relate directly to classroom instruction in kindergarten. First, students with poorly developed English language, whether the deficit is related to experience and exposure, to cognitive development, or to learning English as a second language, responded well to instruction very similar to what the field considers best practice in kindergarten literacy instruction. Specifically, **intervention that focuses on letter knowledge, phonemic awareness, the alphabetic principle, and oral language** appears to be successful for the majority of students with limited vocabulary in English." (p.220, 233).

O'Connor, R.E., Bocian, K., Beebe-Frankenberger , M., & Linklater, D.L. (2010). Responsiveness of students with language difficulties to early intervention in reading. *The Journal of Special Education*, 43(4), 220-235.

"Early intervention for children with oral language difficulties is effective and can successfully support the skills, which underpin reading comprehension. … The study has shown that **oral language skills** can be promoted during the early school years and that this produces effects that generalize to standardized tests of oral language skills and reading comprehension. The study is one of the first to deliver language intervention during the transition from preschool to primary school … " (p.280, 288).

Fricke, S., Bowyer-Crane, C., Haley, A.J., Hulme, C., & Snowling, M.J. (2013). Efficacy of language intervention in the early years. *Journal of Child Psychology and Psychiatry*, 54(3), 280–290

"As Nagy explained it to children, words live in families just like children do; to learn to read and spell, children need to learn how families of sounds, families of word parts for meaning, and families of letter units work together harmoniously. **Explicit instruction in word forms and their interrelationships** can be embedded in instruction that also teaches vocabulary (Stahl & Nagy, 2006) and comprehension (Carlisle &

Rice, 2002), as recommended by the National Reading Panel (2000) and implemented in our instructional treatment (Berninger, 2000; Berninger & Abbott, 2003; Berninger et al., 2003)" (p.581).

Richards, T., Aylward, E., Raskind, W., Abbott, R., Field, K., Parsons, A., Richards, A., Nagy, W., Eckert, M., Leonard, C., & Berninger, V. (2006). Converging evidence for Triple Word Form Theory in child dyslexics. *Special issue on brain imaging in Developmental Neuropsychology*. 30, 547-590.

"Early vocabulary acquisition is highly important because of the very strong relationship between vocabulary knowledge and reading comprehension. Conventional wisdom would suggest that the more words one knows and can understand while reading, the greater will be the understanding of that reading. This belief has been supported by robust research findings (Becker, 1977; Blachowicz et al., 2006; Hoyt, 2005; Just & Carpenter, 1985; Stahl & Fairbanks, 1986), with the National Reading Panel (National Institute of Child Health and Human Development, 2000) concluding based on its review of the research that **vocabulary understanding plays a major role in reading comprehension**. The relationship between vocabulary knowledge and reading comprehension is an extension of the relationship between receptive vocabulary understanding and listening comprehension. One argument for enhancing oral language facility in the early years is that a child's highest level of reading comprehension is tempered by the child's highest level of listening comprehension (Biemiller, 2003a)" (p.335).

Sinatra, R., Zygouris-Coe, V., & Dasinger, S. (2011). Preventing a vocabulary lag: What lessons are learned from research. *Reading & Writing Quarterly*, 28(4), 333-357.

"As early as first grade, a pattern is established whereby children with strong early reading skills engage in reading more than their less skilled peers. Through reading, they strengthen not only their reading skills but also reading-related and cognitive skills such as spelling, vocabulary, listening comprehension, and declarative knowledge. The roots for this productive habit can be seen in early exposure to print through caregiver shared reading experiences and effective early reading instruction in which strong decoding skills are established. Some researchers have conceptualized this relationship between strong reading skills, engagement in reading, and development of reading-related and cognitive abilities as a ''virtuous circle'' (Snowling & Hulme, 2011). Other researchers have described the process by which children who fail to establish early reading skills find reading to be difficult and unrewarding, avoid reading and reading-related activities, and fail to develop reading-related and cognitive abilities as a ''vicious circle'' that is disastrous for their cognitive development and school achievement (Pulido & Hambrick, 2008). An early start in learning to read is crucial for establishing a successful path that encourages a ''lifetime habit of reading'' (Cunningham & Stanovich, 1997, p. 94) and for avoiding the decline in motivation for reading that can have devastating effects on reading growth and cognitive development over time" (p.209-210).

Sparks, R. L., Patton, J., & Murdoch, A. (2014). Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later'. *Reading and Writing*, 27(1), 189-211.

"In a recent meta-analysis examining the effect of print exposure from infancy through young adulthood, Mol and Bus (2011) found that the **role of print exposure becomes stronger (additive) as children get older.** Their findings showed that print exposure explained increasing amounts of variance in the oral language skills of preschoolers and kindergarteners (12 %) and students in primary school (13 %), middle school (19 %), and high school (30 %). At the postsecondary level, print exposure explained 34 % of the variance in the oral language skills of undergraduate and graduate students. Although the aforementioned evidence suggests that reading should start early to take advantage of the positive effects of print exposure, Stanovich et al. (1996) have indicated that exposure to print is helpful regardless of children's cognitive ability or their level of reading comprehension. Therefore, it is crucial to ensure that young children are taught the **word recognition skill**s needed for successful reading early in school so that they have the opportunity to become active and engaged readers. Likewise, it is equally important to provide broad and frequent reading experiences for older children, particularly those with low verbal abilities, because reading itself improves the language skills they need to become strong readers (Cunningham & Stanovich, 2001)" (p.190-191).

" … like those of Cunningham and Stanovich, our findings indicate that early success in reading and early development of language skills by 2nd grade may be indicative of a predilection toward **the habit of reading** and more engagement in reading-related activities. Likewise, the findings suggest that children who fall behind in reading in 1st grade but catch up with their peers by 2nd or 3rd grade may have a positive prognosis for engaging in reading that will further develop both their reading and language skills" (p.208). … "The results suggest that there may be an ongoing relationship **between reading volume and declarative knowledge**; that is, students who read well are likely to read more and increase their store of declarative knowledge. The findings also suggest that **print exposure** may be important for developing a fund of general knowledge regardless of a student's cognitive ability (Cunningham & Stanovich 1998; Stanovich & Cunningham, 1993; Stanovich, 1993) (p.209).

Sparks, R. L., Patton, J., & Murdoch, A. (2014). Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later'. *Reading and Writing*, 27(1), 189-211.

"Based on the findings reported, the researchers of the eight investigations offered a number of collective suggestions with regard to young children's language and vocabulary development, particularly for young children of limited word knowledge. In particular, the findings indicate that low vocabulary children can profit from the direct instruction activities. … Children's storybooks provide an excellent source of new vocabulary for very young children. Read-alouds of storybooks by teachers and/or parents can be an effective activity for increasing young children's word awareness and overall language development.

Read-alouds of storybooks accompanied by rich explanation of sophisticated words, questioning, and discussion increases the likelihood that new vocabulary words will be learned. Presentation of new words occurred before, during, and after a read-aloud across the eight studies. The before-reading introduction included such activities as the pronunciation of target words so that kindergartners could visibly acknowledge these during the oral reading (Coyne et al., 2007) and the use of prop boxes containing hands-on realia connected to words in the story (Wasik et al., 2006).

During-reading activities generally took place in the context of a second or third rereading of the story (Boling et al., 2002; Collins, 2005; Silverman, 2007; Wasik et al., 2006). In this way, questions, conversation, and retellings of story parts helped children identify word meanings in context after they had experienced the enjoyment and meaning of the whole story. After-reading activities generally focused on extending word-meaning consciousness by eliciting story reconstructions of how words were used and by eliciting children's reactions, feelings, and judgments regarding the appropriateness of word use in oral contexts (Beck & McKeown, 2007; Coyne et al., 2007; Dickinson & Smith, 1994).

Because word learning is a difficult process requiring multiple exposures and time, Beck and McKeown (2007) showed in their second study that the addition of 3 days of direct instruction resulted in even stronger vocabulary acquisition than 3 days of instruction. Thus, more instruction after reading produces better vocabulary knowledge. Also, the Whitehurst, Arnold, et al. (1994) results indicate that training parents in a vocabulary acquisition procedure can be quite beneficial and deserves strong consideration as a follow-up to a classroom procedure. . Besides verbal interaction, the use of nonverbal means such as pictures, gestures, artifacts or concrete objects, and pointing to storybook illustrations can assist in the learning of new words (Collins, 2005; Silverman, 2007; Wasik et al., 2006). .

Pronouncing and showing spellings of words allows young children to focus on words' phonological and orthographic properties (Coyne et al., 2007; Silverman, 2007). . Computer-assisted instruction utilizing viewing, listening, typing, and reading along holds promise for the learning of new vocabulary (Boling et al., 2002). . ELLs can learn new vocabulary from storybook readings at the same or a faster rate than English-proficient children, and storybook reading is a valuable means of helping ELLs in English-language learning (Collins, 2005; Silverman, 2007). . In young children's school settings, book-reading time focusing on new word learning can effectively occur with minor adjustments made to instructional practice and staffing patterns (Wasik et al., 2006; Whitehurst, Epstein, et al., 1994). Choosing books that contain high-frequency words and limited use of new vocabulary may not serve to enhance young children's language and vocabulary growth (Dickinson & Smith, 1994)" (p.347-8).

Sinatra, R., Zygouris-Coe, V., & Dasinger, S. (2011). Preventing a vocabulary lag: What lessons are learned from research. *Reading & Writing Quarterly*, 28(4), 333-357.

"Older students demonstrate a broad and complex range of difficulties related to reading. These include problems in **recognizing words, understanding word meanings, and understanding and connecting with text**; students often lack **background knowledge** required for reading comprehension (Biancarosa & Snow, 2004). We examined several syntheses on interventions for secondary students with reading difficulties to identify effective interventions to meet this range of reading difficulties. Edmonds et al. (2009) conducted a meta-analysis examining the effects of adolescent reading interventions (Grades 6 through 12) that included instruction in decoding, fluency, vocabulary, or comprehension on reading comprehension outcomes. Analyses revealed a mean weighted effect size in the moderate range in favor of treatment students over comparison students. Promising approaches were those that provided targeted reading intervention in comprehension, multiple reading components, or word-recognition strategies" (p.392).

Vaughn, S., Wexler, J., Roberts, G., Barth, A.A., Cirino, P.T., Romain, M.A., Francis, D., Fletcher, J., & Denton, C.A. (2011). Effects of individualized and standardized interventions on middle school students with reading disabilities. *Exceptional Children*, 77(4), 391-407.

"Older students with reading difficulties benefit from interventions focused **both at the word level and at the text level**. Identifying need and intervening accordingly in the appropriate areas (e.g., vocabulary, word reading, comprehension strategies, and so on) is associated with improved outcomes for older students with reading difficulties".

Scammacca, N., Roberts, G., Vaughn. S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. K. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from http://www.centeroninstruction.org/interventions-for-adolescent-struggling-readers-a-meta-analysis-with-implications-for-practice