Part IIIb

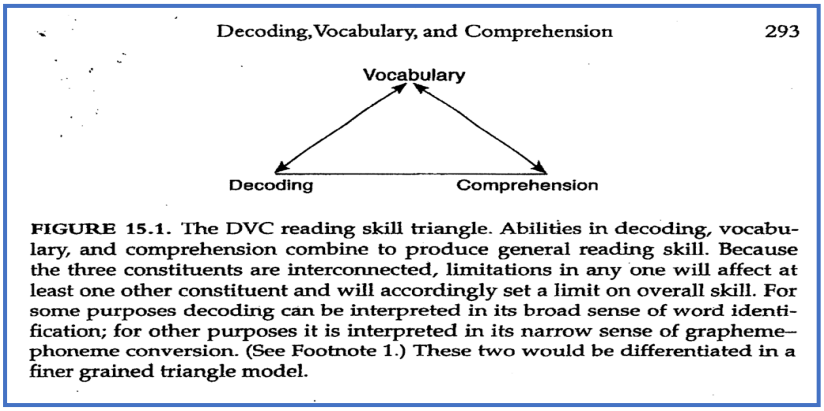
A Framework for the Essentials Derived from or Consistent with Theory

Six Principles with relevant research-based samples of instructional practices

1. Because of the relationship of reading and speech, all learning of reading words begins with oral vocabulary.
2. The letter/sound bonding theory of Ehri confirms the importance of the alphabetic principle. Learning the basics of this principle and the beginnings of its vast application in new words in text is the most important starting goal for teaching beginning reading.
3. In order to learn skills in applying the alphabetic principle, young readers need to learn information coming from two basic components of language (phonemes and graphemes) and how to bond them together (phonics).
4. Given the brain's action in reading, young readers need to begin to transition or shift from decoding words to automatic phonetic sight-word reading within the first year of instruction.
5. The GPC theory needs to be applied to reading words on a grand scale with complicated and unique spellings.
6. The GPC theory needs to be applied with additional care, explicitness and intensity for teaching children who are at-risk with potential phonological weaknesses in order to prevent or remedy word reading difficulties.

1st Principle: directly drawn from theory. Reading is built on a storage of oral language. Children need to learn an increased number of oral vocabulary as a source of words for reading. Words seen in print, can be read easier if they are part of a child's oral language. (see Part Ib) Thus, increasing a reading vocabulary depends largely on increasing a child's oral vocabulary.

Theorist, Charles Perfetti has pointed out that a strict phonological concept of word recognition is in danger of neglecting the recognition that an oral vocabulary is an important dimension to reading words. To show how vocabulary adds a dimension, Perfetti uses the DVC triangle diagram, shown below. It shows how decoding indirectly affects comprehension. Decoding a word successfully requires prior knowledge of the word and its meaning. Decoding the correct pronunciation of a word that is not part of the reader's vocabulary, by working out a particular learned decoding strategy, would not result in word recognition unless the word is previously a part of the oral vocabulary stored in memory. [31.]



This consideration must address individual differences in vocabulary knowledge among young children. Longitudinal studies indicate a wide disparity among kindergarten children that can cause serious differences in learning decoding and word recognition skills. These differences can amount to as much as 32 million words experienced by some children entering kindergarten. Levels of vocabulary experience of 3 year old children can predict language skills of 9-10 age children. [32.]

Thus, teaching vocabulary, in all of its various ways, from kindergarten on up the grades, must be considered an important factored in instruction. It is the base of the GPC theory, a phonological concept of reading. How directly or incidentally oral vocabulary can or should be taught is examined by Andrew Biemiller, Teaching Vocabulary, Early, Direct, and Sequential (2012). (available electronically) [33.]

A beautiful, color power-point presentation on this disparity of vocabulary among children and on the various ways of teaching vocabulary has been created by Anita Archer, available electronically on request. (also see: Bringing Words to Life, by Beck, McKeown, and Kucan, 2002) 34.

2nd Principle: The relationship between alphabetic knowledge and spoken language is made explicitly clear in the GPC theoretical base. The alphabet is what links reading and speech. The recognition of the importance of this goal has become almost universally held. This is made clear in several large reports on early literacy such as:

the 2000 National Reading Panel (NRP) report, the 2006 UK Primary National Strategy, and the 2005 Australian National Inquiry into the Teaching of Literacy.

According to the NRP report, the over-arching goal of learning to read is learning….

> "the alphabetic system, …… and learning how to apply this knowledge in their reading."
> "In order for children to be able to link their knowledge of spoken language to their knowledge of written language, they must master the alphabetic code, that is, the system of grapheme-phoneme correspondences that links the spellings of words to their pronunciations" (2000 NRP report)

Ehri also identifies the importance of alphabetic knowledge as the initial and over-riding goal for teaching how to read all words as sight words.

> "To remember how to read sight words, knowledge of the alphabetic system is required to establish connections between spellings of words and their pronunciations in memory."

This goal stands alone as a primary objective for principles 3-6. It provides focus and criteria for evaluating how well other instructional goals are reached. These goals begin with Principle #3.

3th Principle: As quoted above from the NRP report, Mastering the alphabetic code means learning the grapheme-phoneme correspondences (GPC) "the system of grapheme-phoneme correspondences that links the spellings of words to their pronunciations". This means gaining knowledge and skill in both components (letters and speech sounds) and how they are linked together (phonics) to make up written words. This is the what, not the how.

The need for this learning is derived directly from theoretical research. It specifies what is involved in word reading. (See Part I) It serves as a criteria for judging methods of instruction. How this is accomplished in instruction, the how, requires a separate kind of research and development.

The GPC theory demonstrates how phonetic connections provide the grounds, or "set-up", in learning and reading words skillfully. As the theory reveals, reading words in an alphabetic language is made possible by a learned bonded connection of letters and speech sounds. This includes gaining knowledge and sensitivity with speech sounds that extends beyond what is known from learning to speak and listen. From this learning, follows gaining knowledge of the identity and purpose of letters, i.e., learning shapes and what individual sounds heard in pronunciation they represent. From brain imaging, it has been learned that if this bonding is firm, the brain is able to, eventually, identify words instantly in the same manner it does for speech.

This theory places constraints on teaching methods. Any other kind of learning of whole words or larger units of words, non-alphabetically or analytically, that would bypass the innate specialized neurological mechanism provided by speech would result in using a different part of the brain that is not well suited for reading. This would result in, to some degree, handicapping the learner until the more neurologically sound phonetic sight-word reading is learned, by accident, discovery or directly planned.

> "…the evidence is overwhelming that to read, the beginning reader must connect the letters and letter strings to something that already has inherent meaning – the sounds of spoken language." [35.] Shaywitz, 2013. P.647

Based on the NRP review of successful teaching, the explicit systematic approach at this level is essential. A recent study by Stanford Professor, Bruce McCandliss, found that teaching words through explicit letter/sound relationships vs. some kind of whole word teaching had direct impact on brain activity in areas in the left side, also used for speech. Words learned as wholes activated the right side, non-language side and took longer to identify even after they were learned.

> "McCandliss noted that this strong left hemisphere engagement during early word recognition is a hallmark of skilled readers, and is characteristically lacking in children and adults who are struggling with reading." [36.]

To serve the new reader best, instructional methods that impact the area of the brain that innately operates speech, and stands ready to be used for reading, must be preferred. This is the ingeniousness of an alphabetic writing system. Starting with an approach that focuses on this learning on the left side of the brain, at the very beginning, will produce quicker and more reliable results than one that starts with teaching whole words by memory from the right side. This would eventually require a correction in order to focus on the left side, for normal reading. To get reading started, a phonics approach teaches a way of decoding the alphabetic system. Teaching each component, letters and speech sounds, can be discussed separately, but in reality, aspects of each can be taught simultaneously, in parallel, within the same lessons until they are joined in a phonetic relationship.

As critical as learning how to apply alphabetic knowledge to reading is to the new learner, this is precisely the area of learning that is the most difficult for most learners. This is mainly due to the alphabet's imperfect representation of all speech sounds. This acts as an obstruction in learning how letters and sounds match and combine to form words. Marilyn Adams, in her 1990 landmark book on Beginning Reading, refers to this as an "inherently intractable" impasse that is presented to children at the very beginning that must be overcome. (See "Where Research has Failed", artherreadingworkshop.com) The GPC theory suggests that teaching the phonological basis for reading provides a key to avoiding this impasse. This gives importance to how the phonological basis is taught. Without an effective way of avoiding the possibility of an impasse at this point, reading will be a discouraging and unpleasant experience.

3.1 Teaching Speech Sounds, Phonemic Awareness

Finding the most effective and efficient way of teaching knowledge of and sensitivity with the phonology of speech is critical to a successful start to reading. The methods used must avoid making the alphabet an obstruction. In the early learning process, the phonological base for reading words takes priority. Reasons for possible difficulties in learning this aspect of reading has been described in Part Ia &b.

> "In the course of 30 years or so, the idea that reading words requires phonology has ascended from a minority view to one with such a substantial majority that it now amounts to a conventional wisdom." [37.] Perfetti, 2011

As described in the theory, in order to attach letters to phonemes of words, the phonemes must be readily distinguished and accessible from the pronunciation of the words. In other words, the reader must learn to hear the individual sounds as they are spoken and vocalized as they are needed for reading words. A competent reader must eventually have, in memory, firm attachments of the print to the correct phonemes in the order the print is presented. All of this assumes a certain facility with phonemes of speech that extends beyond the normal functions with speech.

Attaining an increased facility with speech sounds, from teaching, is aslo due to the fact that humans naturally attend to the meanings of the larger unit of spoken words. The smallest units of speech are meaningless and are rarely paid much attention to because the brain does all of that work for the reader in the speech process. The human brain manages this aspect of speech. This is done during hearing and speaking without the person being aware. In fact, without some training with an

alphabetic written language, it is nearly impossible to accurately detect these small units of speech sound so that they can become attached to the correct letters.

So when a child needs to learn to read an alphabetic writing system, s/he will need to also learn about the sound system of speech. New readers need to strengthen the abilities in hearing and vocalizing phonemes. This enables the reader to learn the correct match or pair-up the appropriate sounds in the pronunciations of words with the spellings. Because of the difficulty with the phonemes, to whatever degree within individual readers, careful instruction is necessary for everyone and even crucial for some.

The **National Reading Panel** devoted a whole chapter on ways of teaching increased phonemic knowledge and sensibilities skills. [38.] The Panel did an exhaustive search of a total of 1,962 potentially relevant articles to see what activities were used in teaching these skills. From these articles, they found six different tasks in which skills with phonemes were used to test or to teach phonemic awareness.

The six tasks that were found are as follows:

Phoneme…..

1. isolation, i.e. "Tell me the first sound in 'paste'."
2. identity, i.e. "Tell me the sound that is the same in bike, boy, and bell."
3. categorization, i.e. "Which word does not belong? Bus, bun, rug.
4. blending, "What word is /s/ /k/ /u/ /l/ ?" (school)
5. segmentation, "How many phonemes are there in ship?" (three)
6. deletion, "What is smile without the /s/ ?" (mile)

From the surveyed articles, the Panel found 52 studies of phonemic awareness that met their strict scientific control procedures. From these studies, 96 instructional comparisons were found on how PA was taught. The Results showed:

> "…that teaching children to manipulate phonemes in words was highly effective across all the literary domains and outcomes. …. Children acquire PA successfully under all conditions, but some conditions produced larger effects than others. Effect sizes were larger when children received focused and explicit instruction on one or two PA skills than when they were taught a combination of three or more PA skills. Instruction that taught phoneme manipulation with letters helped normally developing readers and at-risk readers acquire PA better without letters. Students in the lower grades, preschool, and kindergarten, showed larger effect sizes in acquiring PA than children in 1st grade and above."
>
> "Blending and segmenting instruction (as described in the above) exerted a significantly larger effect on reading development than did multiple-skill instruction….. Teaching children to blend phonemes with letters helps them decode. Teaching children phonemic segmentation with letters helps them spell. ..PA instruction does not need to consume long periods of time to be effective…..Training in PA produced twice as great transfer to reading when focused on just one skill."
>
> "The reason teaching phoneme blending is to help 1st graders decode."…"children receiving explicit training in PA gained much more PA and reading skill than children in control groups."

Among their recommendations were,

> "adding well-designed PA instruction to a beginning reading program or a remedial reading program is very likely to yield significant dividends in the acquisition of reading and writing skills."

These are important, well tested, findings. It is important to note that tasks 4 and 5, blending and segmenting were most effective, according to the report. The results have been well received and have found their place in published reading programs. Phonemic blending and segmentation procedures for research purposes are described as follows.

1. "Phoneme blending, which requires listening to a sequence of separately spoken sounds and then combining them to form a recognizable word.
   For example, 'What word is /s/ /k/ /u/ /l/?'"

2. "Phoneme segmentation, which requires breaking a word into its sounds by tapping out or counting the sounds or by saying and positioning a marker for each sound. For example, 'How many phonemes are there in ship?'" "Say each sound and touch the mark."

Problems in the NRP report on PA

Sadly, in all of the survey of articles and studies that met the scientific criteria, drawn from both theoretical and instructional research, somehow the Panel did not find and identify all of the ways in which phonemic awareness was being taught or researched. In so doing, they miss finding the most effective and efficient method in use by a successful program since the beginning of research on phonemes.

This task was described in pages 2-3 in Part I of this syllabus. It functions as an "introductory or lead-up" phonemic awareness procedure for kindergarteners. It is easier to learn and teach, and leads to the primary goal, which is applying the alphabetic principle in decoding words. The slow blending part involves stretching out continuous sounds in spoken single-syllable words, without making breaks between each sound, and then fast "blending" them back into a word.

This activity is an easier way of identifying and vocalizing individual phonemes than segmenting with breaks found in the Panel's report. It establishes beginning phonemic awareness and skills that lead directly into beginning decoding skills, a major objective of the tasks recognized by the Panel. For spelling, an easier task for segmenting phonemes is taught that adds to the phonemic skills in matching them to individual letters with spaces. (See attached, 31 Teaching Progressions)

Problems with how to teach the segmenting and blending, recommended by the Panel, are alluded to in a puzzling statement by the Panel on page 2-20.

> "Comparison of specific PA skills acquired during training indicated that effects (of the training) were larger for segmentation and deletion outcomes than for blending. Perhaps blending was harder to teach, or perhaps it was easier for controls (groups) to pick up without instruction."

Perfetti noted problems with phonemic segmenting as early as 1985, used earlier by Isabell Liberman . They were cited and described in a recent book by Isabelle and Mark Beck, well before the Panel's report.

> "According to Perfetti, phoneme segmentation may be even a more cognitively demanding process than reading. In fact, it is likely that, when engaging in phoneme segmentation activities, children are doing something that is harder for them than decoding simple CVC words." [39.]

The tasks recommended for both PA skills, blending and segmenting, are difficult and less effective because they do not start with what a child already is able to do with phonemes in their speech in the seamless form, and build from there. Instead of starting with tasks that a child already is familiar with in speech, the six tasks in the report start with what a child should be able to do at the end of the first year of teaching. The six tasks were first used for research and assessment of a

child's ability with phonemes at the end of kindergarten, not initially as teaching devices. Tasks that are good for assessment and research are not necessarily good for instruction, especially at the very beginning. Putting breaks in between the phonemes is eventually necessary, inserted into programs later in the year, (for example in lesson 50 of 160 for the year) to demonstrate the printed form of separated letters, especially for spelling.

Slowly connecting the sounds makes it easier for the child to hear and to hold each sound in memory for "blending" the sounds back into a word. Breaks in between sounds, at the very beginning of learning, can create breaks in memory, making final blending difficult. This presents an obstacle to the beginning reader. This is particularly true for a child having difficulty and is "at-risk" for dyslexia. The dyslexia weakness in phonemic awareness often comes with weakness in "short term" working memory, necessary in learning to read as well as more advanced fluent reading. This simpler procedure is easier because it is a task that builds on what the child already knows from speech. Hearing the phonemes with breaks is a strange, unfamiliar experience.
The easier, lead-up phonemic task , can meet this need for greater initial success in learning to read. It can be easily inserted in beginning programs. It has been well researched for this purpose in two studies, not found by the Panel, published in 1989 and 1993, and conducted by a group of researchers led by Paul Weisberg. [40.] The 1989 study concluded,

> "When the segmented sounds in a word were presented without any intervening pause, both age groups (kindergarteners and first graders) responded at much higher levels, although first graders still did better (from 50% to 73% accuracy) than the kindergartener (from 16% to 60%).

The 1993 Weisberg study demonstrated that assorted skills that correlated highly with word recognition, such as letter sound identity, orally segmenting words into sounds, orally blending sounds from separated phonemes to form words and sounding out letters with pauses, all did not lead to "constructive blending or word recognition, whereas segmenting by not pausing did". Saying the sounds and sounding out without stopping showed to be the critical tasks in learning to decoding words.

Studies by Carnine in 1977 and 1980 also demonstrated how both strategies, blending from continuous sounds and sounding out spellings without stopping, improve "correctly identifying more transfer words, both regular and irregular, than students taught a whole word strategy."

This omission may seem trivial, but it is critical in teaching beginning skills for PA, which leads directly to decoding and phonics. It has had serious consequences. All six tasks have been made into Common Core standards. This means that for a teaching practice to meet the "research-based" standard, it needs to have the full range of phonemic-awareness exercises (including activities that are ill-suited for beginning at-risk students, like phoneme deletion). This has resulted in a significant weakening of programs for teaching young children critical foundational skills of reading at the very beginning. It also results in taking more time to teach PA and the phonics skills that follow. The omission from the Panel's report of these more useful and effective strategies is puzzling.

Reaching back to the early and historic 1970 studies by Isabelle Liberman may find that this omission could have occurred because of their primary theoretical concern. Concerns about the science of reading may have resulted in not making a thorough examination of the separate

instructional issues. Recommendations for instruction came directly from the theoretical work without separately being tested in instruction . As stated earlier, instructional questions cannot be answered by theoretical findings. This resulted in ineffective instructional practices. Theoretical findings can only give direction to possible instructional practices, that need sorting and testing.

It appears that theorists make an incorrect assumption about effective phonemic awareness practice from their discovery about the nature of phonemes. They assume that the seamlessly bunched up phonemes in speech will make them difficult to match with separate letters, with space. This assumption should be tested like it was by the Weisberg group. This research found that it is easier for new learners to hear and learn about the phonemes in their connected form, as in speech. Separating them is an added tasks, more relevant to spelling. Of course the key to this practice will depend on how decoding, or sounding out words in print, is taught. This must also match the phonemic teaching, as will be seen in the discussion on phonics.

The simpler PA lead-up task existed in effective programs during this same early period of the Panel's review, and could have been identified and considered. This same omission had consequences in how decoding was taught as well. This resulted in decoding continuing to be an obstacle in teaching, to be avoided for many children and teachers. (see a more complete discussion of this issue, "Where Research has Failed", on arthurreadingworkshop.com.)

3.2 Teaching letters. (graphemes)

As stated in Part I, page 24, The Print Side, "the connection between speech and reading is a two-way street and that one is well advised to look in both directions before proceeding". [41.] Information coming from both sides is interactive. Each source of information interacts and supports the other. As firm letter/sound bonding requires clear PA in order to bond the letters to phonemes, a clear and accurate visual image of individual letters and strings of letters in words is also required from the print side of the process. Knowledge of letters, sounds and shapes, also contribute to strengthening the young reader's sensitivity to and knowledge of the phonemes. As seen in the Panel's report on PA, letters give the reader something concrete to assist oral memory.

Perfetti, in his concept of the Lexical Quality Hypothesis (LQH), writes about the importance of this aspect of learning to read words. Guidelines for teaching letters include:

1. increased repetition of seeing a word and
2. increased quality of detail, how well it has been seen or how much detail is noticed.

The quality of visual imagery in memory is increased by the number of repetitions made with various practicing routines, up to the point of learning the full detail. The question for instruction is: what kind of activities and sequencing of introduction can best provide repetitions and increased quality detail to create this imagery in the bonding process?

Virginia Berninger's research is cited in NYTimes article on the role of hand writing, as a means of improving quality detail. The Times reports: [42.]

> "Virginia Berninger, a professor of educational psychology at the University of Washington and the lead author on the study, told me that evidence from this and other studies suggests that "handwriting — forming letters — engages the mind, and that can help children pay attention to (details of) written language."
>
> "This myth that handwriting is just a motor skill is just plain wrong," Dr. Berninger said. "We use motor parts of our brain, motor planning, motor control, but what's very critical is a region of our brain where the visual and

> language come together, the fusiform gyrus, where visual stimuli actually become letters and written words." You have to see letters in 'the mind's eye' in order to produce them on the page, she said. Brain imaging shows that the activation of this region is different in children who are having trouble with handwriting."
>
> "What we're advocating is teaching children to be hybrid writers," said Dr. Berninger, "manuscript first for reading — it transfers to better word recognition — then cursive for spelling and for composing. Then, starting in late elementary school, touch-typing."
>
> "Virginia Berninger, a professor of educational psychology at the University of Washington, says handwriting differs from typing because it requires executing sequential strokes to form a letter, whereas keyboarding involves selecting a whole letter by touching a key."
> How Handwriting Trains the Brain Forming Letters Is Key to Learning, Memory, Ideas.
> By GWENDOLYN BOUNDS, The Wall Street Journal, Updated Oct. 5, 2010 12:01 a.m. ET
>
> "…an MRI machine using a specialized scan called "functional" MRI spots neural activity in the brain. The kids were shown letters before and after receiving different letter-learning instruction. In children who had practiced printing by hand, the neural activity was far more enhanced and "adult-like" than in those who had simply looked at letters.

Careful, teacher directed pencil tracing activities where a child traces the dotted lines of letters, while saying the sounds, are the beginnings of learning letter shapes and sounds that reinforce letter/sound bonding. This activity calls the child's attention to small details of letters as well as the sequencing of letter groups in words. The handwriting help the short-term, working memory hold memory until the word or letter is finally stated.

"(In order) to secure complete representations of sight words in memory, readers need sufficient familiarity with letter shapes. They need to know how to distinguish the functional (letter) units that typically symbolize phonemes in words. They need to know how to segment pronunciations into constituent phonemes that match up to the (letters) they see in spellings. It is in performing this grapho-phonic (letter/sound) analysis for individual words that the spellings of words penetrate and become attached to reader's knowledge of spoken words in a way that links written language to the central mechanism governing spoken language." [43.]

Carnine has provided guidelines for systematic teaching of letters, aligned with the previous more general principles of sequencing.

1. Separate visual or auditory similar letters.
2. Introduce more useful letters first.
3. Introduce lowercase letters first.
4. Introduce only one sound initially for a new letter.
5. Introduce a new letter every 3 to 4 days.
6. After introducing five letters, test before going on. Periodically review and test.

He suggests the following sequence of letters.

a m t s i f d r o g l h u c b n k v e w j p y T L M F D I N A R E H Q B x q z J Q

Vowels are listed as short sounds. Some programs introduce long vowel sounds sooner when they diacritical marking, with the silent letters printed smaller. This allows for a more varied reading vocabulary, where words with more varied long-vowel spellings can be included from a child's

spoken vocabulary. Charts for the order presentation of letter combinations that spell one sound are listed, from most to least frequency, on page of 60 of Carnine's book. [44.]
(also see, Making Sense of Phonics, the Hows and Whys. Isabelle and Mark Beck. 2013)

3.3 Teaching Phonics, the letter/sound connections, bonding, in words.
The second part of Chapter 2 on Alphabetics, of the NRP report, reviews research on programs that taught phonics.

- The hallmark of programs of systematic phonics instruction is the direct teaching of a set of letter-sound relationships in a clearly defined sequence. The set includes the major sound/spelling relationships of both consonants and vowels.
- Systematic phonics instruction produces the greatest impact on children's reading achievement when it begins in kindergarten or first grade.
- Both kindergarten and first-grade children who receive systematic phonics instruction are better at reading and spelling words than kindergarten and first-grade children who do not receive systematic instruction.
- Systematic and explicit phonics instruction significantly improves children's reading comprehension.
- To be effective with young learners, systematic instruction must be designed appropriately and taught carefully. It should include teaching letter shapes and names, phonemic awareness, and all major letter-sound relationships. It should ensure that all children learn these skills. As instruction proceeds, children should be taught to use this knowledge to read and write words.

In Ehri's published summary of the Panel's report on phonics, she states that learning letter/sound correspondences, i.e., decoding, is the means by which the alphabetic principle is learned.

> "Phonics instruction teaches beginning readers the alphabetic code and how to use this knowledge to read words. …Decoding words involves converting graphemes into phonemes and blending them to form recognizable words, or blending larger subunits into words. ." [45.]

In making reference to her own theory and studies, Ehri describes the importance of teaching phonics, decoding by sounding out and blending letters. .

> "Sight words may be retained in memory as a result of several word reading events. If students decode the word by sounding out and blending letters, this will activate connections and secure the spelling in memory. When students decode words on their own as they encounter unfamiliar words in text, this strategy serves as a self-teaching mechanism to store words in memory (Share, 1995, 2005)."
>
> "Reading words by sight involves retrieving from memory words that the reader has already learned to read. To remember how to read sight words, knowledge of the alphabetic system is required to establish connections between spellings of words and their pronunciations in memory (Berninger et al., 2001; Ehri, 1992, 1998; Perfetti, 1992)."

On the subject of phonics, 75 studies were identified and located in the NRP report that met the scientific criteria. From these, 38 survived the final cut. To be included in their report, all studies had to be conducted after 1970. Only one had been conducted in the 70s. All but 10 had been conducted in the 1990s.

> "From the 38 studies entered into the database, 66 treatment-control group comparisons were derived." Comparisons were measured by a statistical procedure call the effect size. "The primary statistic used in the analysis of performance on outcome measures was effect size, indicating whether and by how much performance of the treatment group exceeded performance of the control group, with the difference expressed in standard deviation units. The formula used to calculate raw effect sizes for each treatment-control comparison consisted of the mean of the treatment group minus the mean of the control group divided by a pooled standard deviation."

> "Few studies included measures of all the outcomes. The most commonly assessed outcome was word identification, consisting of 59 effect sizes."

The Report included a wide variety of phonics methods. "Phonics programs vary considerably in exactly what children are taught and how they are taught…. In teaching phonics explicitly and systematically, several different instructional approaches have been used." The different approaches identified are: synthetic phonics, analytic phonics, embedded phonics, (phonics in context) analogy phonics, onset-rime phonics, and phonics through spelling. Even within the class of "explicit and systematic" approaches, significant differences existed, such as: "the content covered ranges from a limited to an elaborate set of letter-sound correspondences and phonics generalizations", as well as in the "application procedures taught" and "the extent that controlled vocabulary (decodable text) is used in practicing reading connected text". Daily time devoted to teaching phonics in comparison to other aspects of instruction and length of time for treatment are also factors that the Panel identified as variables between programs and studies.

From this broad concept of explicit and systematic approaches, one would wonder what constitutes a non-systematic approach for the control groups. They included whole-language programs and some basal programs that "focus on whole-word or meaning-based activities with limited attention to letter-sound constituents of words and little or no instruction in how to blend letters to pronounce words". These programs were described as "building a reading vocabulary of 50-100 words, and then later … learn about the alphabetic system".

In the NRP report both terms synthetic and systematic are used interchangeably.

> "Synthetic phonics programs teach children to convert letters into sounds or phonemes and then blend the sounds to form recognizable words. … A key feature… is in the identification of a full array of letter-sound correspondences to be taught. …It is not sufficient just to teach the alphabetic system. Children need practice in applying this knowledge in reading and writing activities…Phonics programs may teach children decoding strategies that involve sounding out and blending individual letters and diagraphs, or pronouncing and blending larger subunits such as initial blends and final stems of words. Programs may provide children with text whose words can be decoded using the letter-sound relations already taught. Panel REPORT

> "In systematic phonics programs, a planned set of phonics elements are taught sequentially."
> "The current view is that, because research suggests that systematic phonics approaches are more effective than non-systematic approaches, children should be provided with systematic phonics instruction as part of a balanced reading program. "
> "Synthetic phonics programs teach children the grapheme-phoneme blending routine explicitly." Ehri

·In describing the approach to teaching phonics, summarized above, **the approach of explicit systematic is defined broadly, allowing for the variety of practices.** Thus, to put the concept into practice that address crucial potential problem areas of instruction, teachers need to decide on particular details to implement the broad concept, such as described by Carnine.

The same problems with phonics

Detailed procedures, in the report, similar to that found in the chapter on phonemic awareness, identified as problematic, are also found in recommendations for teaching phonics. The purpose of PA tasks, according to the Panel's report, were to increase phonemic awareness and skills, use tasks that are most easily taught and, finally, to lead directly into very beginning sounding-out decoding skills. As described above, the six kinds of PA tasks in the report don't do this. They don't do this because they teach the separation, or segmentation, of phonemes as a beginning teaching tasks,

described above. This same procedure is found in the Panel's description for teaching phonics or decoding skills.

The recommendation from the Panel's report on phonics starts out appropriately.

> "**To be effective with young learners, systematic instruction must be designed appropriately and taught carefully.** It should include teaching letter shapes and names, phonemic awareness, and all major letter-sound relationships. It should ensure that all children learn these skills. As instruction proceeds, children should be taught to use this knowledge to read and write words."

The report acknowledges the wide variety of differences in teaching phonics.

> "Although these differences exist, the hallmark of systematic phonics programs is that they delineate a planned, sequential set of phonic elements, and they teach these elements, explicitly and systematically. ….they differ across a number of other features. For example, the content covered ranges from a limited to an elaborate set of letter-sound correspondences and phonic generalizations. The application procedures taught to children vary. …some phonics programs combine two or more of these types of instruction. In addition, these approaches differ with respect to the extent that controlled vocabulary (decodable text) is used for practicing reading connected text. "
>
> "Synthetic phonics programs teach children to convert letters into sounds or phonemes and then blend the sounds to form recognizable words. … A key feature… is in the identification of a full array of letter-sound correspondences to be taught. …It is not sufficient just to teach the alphabetic system. Children need practice in applying this knowledge in reading and writing activities…Phonics programs may teach children decoding strategies that involve sounding out and blending individual letters and diagraphs, or pronouncing and blending larger subunits such as initial blends and final stems of words. Programs may provide children with text whose words can be decoded using the letter-sound relations already taught. Programs may have children write their own text using the letter-sounds taught and then have children read their own and other's stories….In some phonics programs, beginners are taught a routine for transforming spellings into blends of phonemes that are recognized as words. Learning about letter-sound associations helps beginners break the code in learning to read."

In spite of all of these descriptions, the report is not explicit about what an appropriately designed, systematically and carefully taught, instruction really is. In Ehri's writing, she referred to "a grapheme-phoneme blending routine" without describing what "routines" are used for "transforming spellings into blends of phonemes". Just like the above discussion on the various meanings for "explicit systematic" in the over-all approach to teaching, there is a problem with what is meant by "programs that teach children the grapheme-phoneme blending routine explicitly".

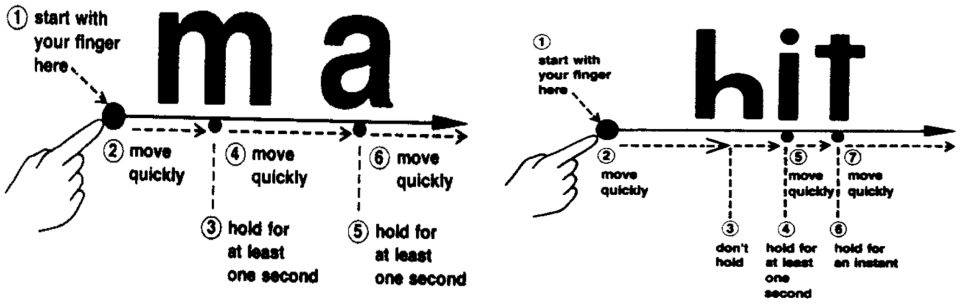
The most common explicit procedure, reported by Ehri and others, employed saying each letter sound separately and then blending them into one word, in a similar way that phonemes are orally presented and blended for phonemic awareness. In sounding out the letters, researchers often mistakenly assume that, because letters in printed words have spaces, the phonemes with letters also need to have breaks between the letters. This has become the dominant practice among newly published beginning reading programs.

Separating the sounds for letters in "sounding out" is difficult for many children to learning. I t contributes to difficulties in learning to read words that many children already have from birth. The difficulty is in remembering each sound in their short-term, working memory, in order to blend them into a word. This often happens even though the letters are there to see. The letters need to be blended slowly to connect the spaces between letters. This helps the child to "hold on to" the sounds before blending them into words. Teaching with breaks between the letters, at the very

beginning, creates another obstacle, similar to what is found in teaching PA. It makes learning the alphabetic principle from decoding difficult. Both tasks can be obstacles.

The more effective way to sound out letters is to sound them out the same way phonemes were continuously vocalized in the Weisberg PA studies-- Not /m/-/a/-/t/., but /mmmmaaaaat/, without stopping. Then blend the letters, or "say the word", mat. This techniques also trains the eye movement from left to right with the coordination of the production of the sound with the movement of the eye from letter to letter. The teacher slowly demonstrates this with her finger and voice and then slashes her finger when she says the whole word. The students then touch and slide their finger in the same manner, slow and then fast. This procedure is explicit. It forces the child to visually attend to the details of the word and articulate the slow and fast blending of the sounds. It reinforces the bonding with the speech sounds needed for eventual word reading at the appropriate rate.

If the beginning reader is taught to decode words by sounding out, in the same manner learned with PA, **letters are added to the same procedure**. Thus the PA tasks taught can lead directly into learning decoding, which as Ehri has found, sets-up phonological instant word reading. This makes beginning decoding much easier to learn than sounding-out with breaks between the letters and sounds. It becomes a workable teaching tool for the first half of the year. (see full description in Part I, pgs, 2 and 3)



This routine also solves a problem with the difficulty of pronouncing individual stop phonemes for letters like T, B, and C, without adding the extra vowel sound, /u/, that is often referred to by researchers. As described in Part I, there are two kinds of beginning decoding procedures, one with continuous sounds and one for stop sounds. Both of these decoding skills have wide application in beginning reading that can be used as "self-teaching" strategies by the young reader, and can be learned much easier if the PA tasks lead directly into decoding. It allows children to apply the skills learned for PA, which is close to what is familiar in speech, to sounding out words.

The whole idea is to teach the alphabetic principle with the most common and simple 40 letter/sound correspondences and then gradually, little by little, adding on new spelling applications and complications to this base. (Teaching Progressions #2-4)

Like what was found by the Stanford researchers, [47.] teaching detailed letter/sound relationships explicitly, systematically, little by little, piece by piece, with physical action, assures strong neurological pathways and connections for reading words for all kindergarteners and especially for children having difficulty learning reading at the word level, i.e. dyslexia. [48.]

Happily the 2013 Isabelle Beck book, Making Sense of Phonics, does recognize this difficulty in holding sounds in memory during the sounding out process. They describe a similar continuous, connected way of teaching the sounding out decoding strategy with very beginning readers.

The **Panel Report** calls attention to possible difficulties with their recommended sounding-out, or blended, approach. "When the sounds to be blended exceed two or three, it becomes harder to remember and manage the ordering of all those sounds." (Chapter2-p. 104) This is true. For phonics teaching to be effective, programs must eliminate this possible obstacle or hurdle. Given the importance of letter/sound correspondence found in the Panel's report, more refined research would be welcome in how these very small, but critical, skills in PA and phonics can be more successfully taught. These teaching methods can make the difference of success or struggle for children with difficulties in learning, at very start. More attention and research can be helpful in clarifying this point.

Brain imaging studies illustrate the effectiveness of the explicit systematic process. It has found that early explicit instruction can strengthen possible weaknesses in neurological pathways devoted to phonological aspects of sight word reading and correct possible weakness that may exist. It is the alphabetic writing systems' capability to connect with speech sounds that make the reading of words the same quick and efficient way as speech possible. Understanding this relationship to speech helps clarify why direct and early instruction in phonetic decoding skills, preceded by oral phonemic awareness, is the most effective way of achieving the goal success for all. This "attention to small units in early reading instruction is helpful for all children, harmful for none, and crucial for some." [49.]

In looking at Ehri's 1998 description of her five-phase theory, it becomes clear that she calls for explicit/systematic sequence of teaching decoding skills, in some form, **only in phase three and four. To her, phases one and two are a natural development that all children go through.** Like Gough, this practice comes from studies on how some pre-reading children learned to read. Ehri only studied children that were taught to read in an unsystematic way, with words of a mixed phonetic difficulty. Once they start learning letters, they first recognize some words from both partial letter/ sound correspondences and visual cues. This leads to the difficulty of initially learning two methods of reading words, visual memory and phonological decoding.

The approach to teaching beginning reading, studied by Ehri and others, therefore mistakenly assumes that a partial use of letter/sound connections is a natural process for most children, and does not require specific teaching. This is inconsistent with the NRP report that Ehri helped write. It uses a Look-Say approach at the beginning. This consumes valuable time and risks failure with many children. Clearly, many children, for a wide variety of reasons, do not learn to read well this way. This is a puzzling position for Ehri to take, in light of her participation in the Reading Panel. [50.]

> "The hallmark of programs of systematic phonics instruction is the direct teaching of a set of letter-sound relationships in a clearly defined sequence. The set includes the major sound/spelling relationships of both consonants and vowels." [51.]

The partial phase seems altogether unnecessary and problematic. Explicit, systematic programs, identified in the Reading Panel's report, can start with the full alphabetic phase,

using carefully selected words, as new letters are introduced. Most of this can be completed by the end of kindergarten. The question of the extent to which explicit/systematic methods can be effective in beginning reading as well as how a transition from decoding to automatic reading are critical instruction implications from theory that should be considered.

The Report does acknowledge the lack of research among systematic phonics programs that specifically focuses on "important topics that have received little or no research attention" or that "require further research to refine our understanding". This would include the identification of "active ingredients….to determine whether some properties are essential" or not and "which ingredients of phonics programs yield the most benefit".

A key ingredient, that the Panel did identify as potentially significant, regards the degree to which decodable books contribute to the effectiveness of phonics programs. This all speaks to the limited scope of the Reading Panel's report in finding the most effective phonics programs and their most essential component parts. It would be important to know if the effect sizes with particular ingredients in relation to non-phonics or other phonics programs would increase significantly with particular components.

A good place to start further research to "refine our understanding" would be to more clearly define what is meant by explicit systematic and then check approaches and programs to see which ones meet the definition. Carnine et al. have put forth a definition for both terms.

Phonetically-based sight word reading can start as early as kindergarten. Thus, this early start will not waste valuable time with a gradual and confusing partial decoding phase that would teach a reading strategy that will need to be unlearned later. It also avoids the unpleasant experience of young readers being confused and frustrated with their first attempts at learning to read – not a pleasant beginning to learning to read and leads to failures.

A Sample outline of explicit systematic steps for teaching Kindergarteners
phonemic-awareness and phonics.
(from Handout, 31 steps….)
Adapted from Carnine, et al, Teaching Struggling and At-Risk Readers, (2006)

1. Learn to hear and say individual phonemes in words by stretching out slow sounds and then saying them fast. (with three lead-up steps, TP #1-4)
2. Learn to say the most common sound for individual letters presented in a pre-planned systematic sequence, presented over a full year period of teaching. (TP #5-9)
3. As letters are learned, sound out words that are composed of these letters, as they have been learned, and that start with slow sounds -- in lists and in short passages. (TP #10-15)
4. As stop consonants are learned, sound out words that are composed of these letters, as they have been learned, but start with fast sounds, -- in lists and in short passages. (TP #16)
5. As words are learned, learn to spell, in writing, from reading vocabulary. (TP #17)
6. Transition from decoding to reading words without sounding out. (TP #18, a-d)
7. Use Strategies that apply sounding out skills to selected irregularly spelled words. (TP #19)
8. Read all words without sounding out and with increased fluency, from short stories composed from the 400 previously learned reading vocabulary . (TP #20-21)

Explicit instruction is direct and systematic as defined by Carnine and others, leaves nothing to chance. This requires constructing comprehensive programs that specifically identify all

necessary components organized into careful daily programs sequenced and spread out over a school year from year to year. All of this programmed construction must be the result of careful analysis, planning, and testing with real children and finally researched in comparison to other complete programs, all beyond a teacher's capacity. It is necessary to assure that all children, especially those with some risks of failure, be taught successfully.

4th Principle: Given the brain's action in reading, young readers need to begin to transition or shift from decoding words to automatic phonetic sight-word reading within the first year of instruction.

A Bridge from decoding to sight word reading

This transition refers to the final link between speech and print to make explicit/systematic teaching work successfully. Instruction for fluent reading must go beyond detailed decoding skills. The need for this progression in word recognition to fluency was observed in the 1983 Ehri and Wilace study, "Development of word identification speed in skilled and less skilled beginning readers". However, in this study, the "shift" to proficient, sight word reading was observed as a gradual "catching on" to the workings of the alphabet rather than a planned, explicit, step-by-step program that assures that all children make this transition. **A carefully planned sequence of activities and strategies can accelerate and assure this shift, rather than leaving it up to unpleasant confusion and chance discovery?**

A comprehensive program includes a planned transition, a bridge, from sounding-out reading to fluent sight-word reading. Young readers are not left to discover how to progress or shift from decoding to sigh-word reading on their own. As fluency is taught and practiced in this transition, the phonological basis is in place for full automatic, sight word (or cipher) reading that fully represents spoken language, beyond strict phonetic decoding rules and thinking.

Children need to advance from sounding out words to instant sight word reading, with a large, and varied, reading vocabulary by the end of second grade, referred to by the Panel as fluency. Building these skills begins in kindergarten and prepares children to be able to spend far more attention to reading for meaning in a variety of increasingly more complex texts, beginning in earnest by second grade and concentrated in grades three and up, where content subjects and more serious literature are a part of classroom programs and found in the new common core standards.

As long as decoding instruction is well-planned and sequential in terms of text difficulty and complexity that are within the skill level of a child, the young reader can progress without confusion, frustration or fear of failure. Comments by Snow and Juel are also applicable here as well.

> "…as argued earlier in this chapter, structured phonics instruction never covers all the spelling rules of English; many children "get the point" after having had only a few spelling-sound correspondences taught explicitly, and most are reading independently well before all the rules have been taught."
>
> "The two views of reading represent, further, perspectives that should receive different levels of emphasis at different points of reading development. Accurate and fluent reading is a challenge for young readers, and they have few cognitive resources to devote to reaction or interpretation while still struggling with the challenges of decoding. They are, of course, fully capable of reacting and interpreting – but to texts that are read aloud, not to those they are reading themselves. Furthermore, interpretation and reaction are irresponsible if applied to

> texts that have been only semi-accurately read, and are themselves skills that need to be nurtured and taught throughout the school years."p.519-520 [52.]

5rd Principle: The degree of **alphabetic transparency in English** complicates this learning. Young readers need to learn strategies for learning to read words with complicated and unique spellings – regular variations within 200+ and less frequent and unique correspondences. This involves learning more advanced and nuanced decoding techniques beyond kindergarten sounding-out of words. These techniques must call attention to the inner parts of words and trouble or unusual spellings.

Given the finding that even the more complicated and uniquely spelled words are phonologically read, decoding continues to be the dominant method used to learn these words. Switching to visual memorization is less reliable and efficient, (uses a different part of the brain) and is confusing to the young reader. Systematic sequencing of when and how new words and levels of difficulty are introduced and taught is most critical with this goal. This goal extends from grade two and up as readers constantly add to their reading vocabulary.

Given the difficulty children with dyslexia have with simply reading words with common letter combinations, words with complications and variation give these children serious problems. They will need very explicit presentations of these words as well as careful systematic sequencing from the simplest, most familiar to the more difficult, less familiar. Carnine has provide some guidelines that applies to all learners, but especially for those with dyslexia or any other cause of difficulty.

Carnine's suggested sequential teaching progression: words with VCe pattern, words with common suffices, multisyllabic words, irregular, most problematic words.

Words that are most problematic are words that have spellings that are low frequency, that have inconsistent sounds for spellings (e.g., *duel, build, ceiling*), or that have common letters or letter combinations that don't represent their usual, most common sounds. (For example, for the word *break*, the *ea* is not its most common sound.) New or handicapped learners need specific procedures that help them to visually attend to the letters in these words, particularly the peculiar aspects, in order to create the difficult letter/sound bonding needed. A list of words with these kinds of letter combinations is found in Carnine's book, Teaching Struggling …, pg 130.

6th Principle: Given variance in neurological capabilities for reading, **known as dyslexia**, instruction must take this weakness into account for prevention and remediation of reading difficulties. Children exhibiting possible weaknesses in the phonological requirements for reading words are in a unique position where achieving all the above goals are at risk. Weaknesses in this area creates a situation where, because the small margin of error with these children, it is imperative that they be taught with the very best methods for all the above goals and given whatever additional support is possible. This means added intensity in terms of setting, time, practice and explicitness and preciseness of delivery.

> **All readers must take the same steps (in learning to read). The difference is simply in the effort involved and the time it takes to master the alphabetic principle." [53.] Shaywitz**

Success For All, even those having difficulties at the word level i.e. dyslexia

Understanding the science of reading at the word level, makes it possible to understand what can go wrong that creates a condition called dyslexia. This is one of the benefits that came with solving the mystery of reading words over the last three decades. From four authorities on the subject, writing within the last decade:

> "Indeed, the **same theory** that explains how children develop reading skills explains why some fail, unifying the research on LDs in reading and the normative development of reading ability. One goal in this book is to integrate science and practice." Fletcher and Lyon et. al. 2007. [54.]

In order that all children be included in grade-level programs, special considerations are needed for those children that experience difficulties in learning to read. This includes more than just children with dyslexia. If these considerations are present in k and 1st classrooms, many children showing indications of difficulties in learning can fade into later grades with normal growth.

Teaching children in higher grades, who continue to have difficulties and have experienced poor progress, will need more time and more special attention in order to master the word level competencies of reading.

Many dyslexic children have normal capabilities with **reading comprehension**, once the word reading level is improved. Their strengths with listening comprehension, during this remedial phase, should be recognized and drawn out in classroom lessons. Their ability to improve word accuracy precedes word fluency. As accuracy is improved, these children will need more time in their reading to accomplish comprehension tasks.

The cause of dyslexia and needs of children with dyslexia is now well known. In a 2008 special report from the Florida Center for Reading Research (FCRR) Researchers, Torgensen, Foorman and Wagner conclude. [55.]

> "…because of their weaknesses in the area of phonological processing (specifically their delayed development of phonemic awareness), children with dyslexia require explicit and systematic instruction to help them acquire the knowledge and strategies necessary for decoding print."

> "Specifically, instruction for children with severe dyslexia must be more *explicit and comprehensive*, more *intensive*, and more *supportive* than the instruction provided to the majority of children."

> "Not only do children with dyslexia require more explicit instruction (meaning that more things must be directly taught), they also acquire skills and knowledge in the phonological domain more slowly than average students. Both of these teaching/learning challenges make it necessary to provide students with dyslexia much more *intensive instruction* than other students in order to maintain normal growth patterns in reading."

They tell how this can work.

> It is important to note here that science has shown it is incorrect to think of dyslexia as an "all or none" phenomena. That is, the phonological processing abilities required for acquisition of early reading skills are normally distributed in the population, just like musical talent, athletic ability, or most other human abilities. It is possible to have extremely weak phonological processing skills, or to be only mildly impaired in this area. It is also possible to have above average skills in the phonological domain. If students have extreme phonological processing weaknesses, it is very, very difficult for them to acquire early reading skills, while students with mild difficulties in this area often require only a moderate amount of extra instruction to become good readers.
>
> From their classroom teacher, children with dyslexia need engaging, systematic, and explicit instruction in all the critical components of literacy development (i.e. phonemic awareness and phonics, fluency, comprehension, vocabulary, spelling, and writing), and they will also need extra support during the time when small group instruction is differentiated based on student needs.

At this point, it is useful to remember that children with dyslexia are only *one subgroup* of all the students in a school that that may be at risk for reading failure.

In many schools, there will be another large group of students "at risk" for reading difficulties. These children come largely from families of lower socio-economic or minority status, or they are English Language Learners, and they enter school significantly delayed in a much broader range of pre-reading skills. These children have weaknesses in both the broad oral language knowledge that supports reading comprehension and in the phonological and print-related knowledge required in learning to read words. Classroom instruction that explicitly teaches how letters and sounds relate with ample opportunities to practice these relations by reading text are important for such children.

Children with general oral language weaknesses plus phonological weaknesses will require interventions in a broader range of knowledge and skill than those who come to school impaired only in phonological ability. However, because both groups have weaknesses in the phonological and print-related domain, *both kinds of children* will require special support in the growth of early word reading skills if they are to get off to a strong start in learning to read.

The primary differences between appropriate instruction for all children in the classroom and that required by children with relatively severe dyslexia are related to the manner in which instruction is provided. Explicit instruction is direct, systematic, and leaves nothing to chance. ….However, because of their weaknesses in the area of phonological processing (specifically their delayed development of phonemic awareness), children with dyslexia require explicit and systematic instruction to help them acquire the knowledge and strategies necessary for decoding print.

The most practical method for increasing instructional intensity for highly at-risk students is to provide small group instruction both during, and in addition to, the instruction the students receive during the reading block. Although there are many different ways to organize this instruction, there can be no question that children with dyslexia will learn more rapidly **under conditions of greater instructional intensity than they will in typical classroom settings**. **Effective early interventions, as well as remedial instruction that is powerful enough to accelerate students' rate of reading growth, almost always involve extra small group or 1:1 instruction for periods of time varying from 20 minute a day to 90 minutes a day, four or five days a week**

Can reading difficulties in dyslexic students be prevented?

The best answer to this question from current research is that serious reading difficulties can be prevented in most students with dyslexia if the right kind of instruction is provided with sufficient intensity early in development.

"…studies suggest that prevention programs that explicitly focus on phonemic awareness, phonics, and meaning of text in the earliest grades of reading instruction reduce the base rates of at-risk students to below 5%. …these systematic programs can significantly improve core reading skills in the weakest readers at these ages." p. 463 shaywitz 2008 [56].

The authors estimated that, if interventions and classroom instruction as strong as those provided in this study were available for all students who needed them, only 2% of students would remain seriously impaired in phonemic decoding and reading accuracy at the end of first grade.

Conclusion

The theory of Grapheme-Phoneme Correspondence (GPC) with the supportive experiments, and the clarifying details from neurological investigations, shows **why** the more direct kind of instruction can be effective and efficient for most children, crucial to some and "harmful to none". The phonological concept of reading words, provided by this theory, provides a theoretical explanation for the importance of learning firm letter/sound connections. It also explains what happens in the

minds of children when they are able to shift from well learned and practiced decoding skills in their reading to more fluent and, even, automatic reading of words that make good comprehension possible. This whole process of learning can be broken down in detail and progressively taught in programs with well planned daily lessons.

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