Fluency in Silent Reading

Stanford E. Taylor

What is it?
Oral Reading Influences
How to Develop it
Role of Reading Technology

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Overview:

Fluency in reading today is widely recognized as a critical need in terms of reading competency. Fluency in reading is stressed in the "No Child Left Behind" (NCLB) legislation, in the 2000 report of the National Reading Panel (56) and in numerous research reports by the Scientific Study of Reading Journal in 2001 (73). In this journal Kame'enui and Simons (40) stated, "Clearly, the ability to read accurately and rapidly is so fundamental in reading success that it just has to be right." Further, the National Assessment of Educational Progress (61) found that 44% of a national representative sampling of 4th grade students were found to be disfluent. The National Reading Panel concludes, "Children who do not develop reading fluency, no matter how bright they are, will continue to read slowly and with great effort." Stahl and Kuhn (82) in a Center for the Improvement of Early Reading Achievement report stated, "If children fail to make the transition to fluent reading, they will encounter significant difficulties in contracting meaning from the text." Reutzel and Hollingsworth (68) reinforce the need for fluency development with their statement, "The development of reading fluency has been a neglected part of reading instruction despite the fact that many reading authorities consider it to be an important part of the reading curriculum."

Understanding the Nature of Fluency:

One reasonable definition of fluency in silent reading is the ability to read with sustained attention and concentration, ease and comfort, at adequate reading rates (for various grade levels) and with good understanding. One is then led to ask what factors permit sustained attention and ease and comfort in reading. Then, too, what factors permit adequate reading rates to be achieved? What factors contribute to adequate understanding and meaningful comprehension? What is the role of oral reading practice in developing fluency in contrast to other practices? This paper will attempt to answer some of these questions.

When addressing the need for fluency in reading there are many references today to automaticity of word recognition (instant word recognition) and rates of reading. So it is essential to look first at the national normative silent reading rates children exhibit at various grade levels and also at reasonable and achievable silent reading rate goals for each grade level. The following chart, based on a study by Taylor, et al. (90) involving over 12,000 students throughout the grades, shows normative rate performances as well as Taylor projections as to reasonable silent reading rates at all levels. These rate goals have proven to be achievable by thousands of students who have used fluency development technology over the years.

Silent Reading Grade Norms/Goals (90)

Grade Level	1	2	3	4	5	6	7	8	9	10	11	12	Col.
Usual Rate (wpm)	80	115	138	158	173	185	195	204	214	224	237	250	280
Adequate Rate (wpm)	125	150	180	220	250	270	300	320	350	380	420	450	480

For additional perspective, typical reading rates involved in the studies by Buswell (10), Taylor (88), and Gilbert (26) are also presented.

	Grade 1 wpm	Grade 2 wpm	Grade 3 wpm	Grade 4 wpm	Grade 5 wpm	Grade 6 wpm
(10) Buswell (1922)	89	153	214	300	352	333
(88) Taylor E. (1937)	55	90	115	168	190	200
(26) Gilbert (1953)	88	120	153	206	250	272

In the primary grades, only when children can read silently with ease and understanding at the same rates at which they listen and speak (125-175 wpm), will communication be usual, rates acceptable, and reading enjoyable. And only when intermediate, secondary, and college level students can read with good comprehension at rates that transcend vocalization, will they be able to complete reading and study assignments with reasonable expenditure of time, energy, and efficiency.

Oral Reading:

Because there are so many references today to the use of oral repeat reading practices to build fluency in oral reading, it is critical to clarify many of the performance differences between oral reading and silent reading. It is also essential to better understand some of the influences oral reading practices can have on silent reading rates and comprehension. While oral and silent readings do employ many of the same sub-skills of reading, there are pronounced differences. Consider the following:

Attention

During oral reading, attention must necessarily be primarily focused on perceiving and recognizing print (visual input process) and producing acceptable oral expression. Comprehension is necessarily de-emphasized.

Oculo-Motor Behavior

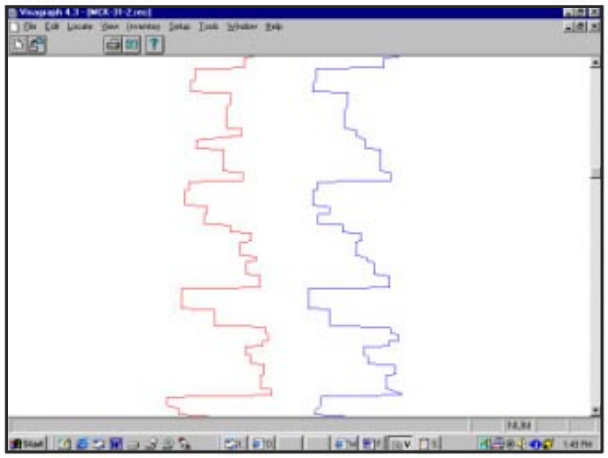
It is first essential to understand that beginning readers, when they enter school, do employ an already formed and relatively habitual oculo-motor (eye-movement) behavior. A study by Taylor and Robinson (94) revealed that kindergarten and first graders typically move their eyes three times per second in most visual tasks, an oculo-motor activity conditioned by pre-school observation activities in general. They then carry this habit of frequently moving their eyes into reading. However, beginning readers cannot typically identify and recognize words in their usual eye-pause time of .33 seconds and so they resort to making multiple fixations (eye-stops) to recognize words. Typically, first graders will make an average of 2.2 fixations per word during silent reading as determined in the extensive norm study of oculo-motor behavior in reading by Taylor (90).

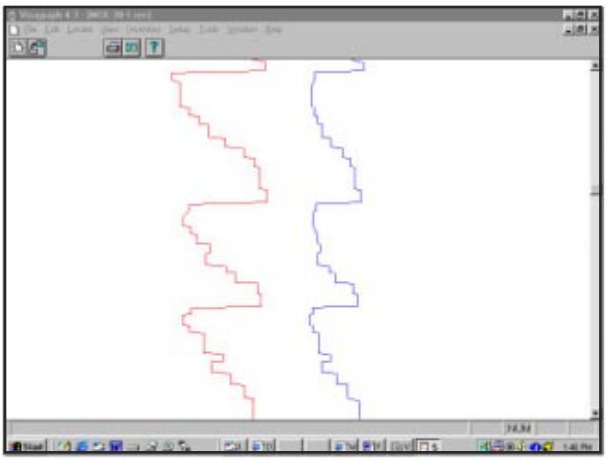
Because oral reading is typically slower than usual silent reading, oral reading will typically condition even more visual wandering and multiple fixations per word. It has long been established by such researchers as Gilbert (24), who, using eye-movement recording techniques, documented the detrimental effect of slow or non-fluent oral reading on the visual intake process of better readers as they listened to poorer readers read aloud. Better readers nearly doubled the number of fixations (eye-stops) and regressions (reverse eye-movements) while listening to poorer readers read aloud. And a poorer oral reader, who is slow in recognizing words, will likewise employ considerable visual wandering when reading aloud. As a result, Gilbert recommended that oral reading, though helpful to the teacher in evaluating word recognition, be limited. Gilbert points out that poor oral reading can condition a poor oculo-motor behavior and that this can not be of benefit to children learning to read.

In a recent web based review of research with regard to oral reading by Velinda Thompson, the statement was made that, “The data are unmistakable in condemning the routine practice of requiring silent readers to follow the oral reading of poor or mediocre students.” Frank Smith (76) states also, “Even the oral reading of excellent students is questionable because the eye-movements of the best oral readers are undesirable for a silent reader.” These comments and findings strongly suggest the need for more eye-movement research in conjunction with oral rereading practices at various levels of proficiency.

Visual/Functional Performance

Recently, eye-movement recording data reports of some (not all) students’ performances in both oral reading and silent reading, show a loss of binocular coordination and accuracy in visual tracking when they read aloud as contrasted with their visual performance when reading silently. The sample Visagraph recordings that follow show one reader’s difference in visual performance when reading orally and silently.





Oral Reading	
Fixations/100 Words	181
Regressions/100 Words	45
Rate w/Comprehension (wpm)	134

Silent Reading	
Fixations/100 Words	138
Regressions/100 Words	18
Rate w/Comprehension (wpm)	166

Not only are a greater number of fixations typically employed during oral reading, but the process of "seeing and saying" with some students seems to disturb the oculo-motor process and decrease the efficiency of their binocular coordination. Certainly, this area needs more exploration through eye-movement recording techniques.

Rate of Reading

This is the area of greatest confusion and lack of agreement. For perspective, it is essential to understand that the usual speaking and listening rates for beginning readers range between 125-175 wpm, according to Taylor (89). The stated goal of most reports related to oral rereading is for students to read expressively in a proper prosadic manner at what is termed fluent oral reading rates. But what are fluent oral rates? A recent research report by Kame'euni and Simons (40) states, "A first grader orally reading a grade level passage at the uncommon rate of 90 wpm is an awesome sight." Another study by Hasbrouck and Tindel (27) cited final oral reading rates of Grade 2 students that ranged between 78 and 106 wpm and Grade 3 students between 93-123 wpm. A report from the Center for the Improvement of Early Reading Achievement cites norm reading rates for oral reading as low as 60 wpm for Grade 1, 90-100 wpm for Grade 2, and 114 wpm for Grade 3. Another research report from Edformation, Inc., an educational data gathering company, cites oral reading fluency standards for the winter period as shown below. (Winter rates were selected in order to compare oral reading rates with the normative silent reading rates by Taylor (90) which were also secured during winter months.)

Grade 1 –	50th %	-	21 wpm
	90th %	-	60 wpm
Grade 2	50th %	-	49 wpm
	90th %	-	95 wpm
Grade 3	50th %	-	73 wpm
	90th %	-	125 wpm

Additionally, a study by Taylor (92) with 2,742 Grade 1, 2 and 3 students found that Grade 1 students rereading previously read and familiar basal reading content aloud achieved median reading rates of only 90 wpm. Grade 2 students' median aural rate was 105 wpm and Grade 3 students' was 125 wpm.

Even the higher referred to oral reading rate of 90 words per minute for Grade 1 students is very slow and does encourage students to average two fixations (eye-stops) for every word. The lower rate cited of 60 words per minute would encourage 3 or more fixations per word. One is then led to question the rate goals to be achieved by oral reading and their transfer to silent reading performances. Contrast these low oral rates with the silent reading rate norms established by Taylor (90).

For perspective, a study to develop higher levels of silent reading by Taylor (93) involving 3,142 primary grade students showed that fluency development training involving left and right projection of basal content, reading along while listening to basal recordings and "flash" training (rapid timed exposures) of basal vocabulary, led to Grade 1 students achieving

median silent reading rates of 146 wpm (S.D. ranging from 120 wpm to 194 wpm) and Grade 2 students achieving median silent reading rates of 162 wpm (S.D. ranging from 128 wpm and 207 wpm). Certainly, a realistic goal of oral reading should have, as a rate goal, to allow primary grade students to achieve silent reading rates equal to their usual speaking and listening rates (125-175 wpm). **However, the reports to date regarding oral reading and silent reading rate goals are quite vague and presently do not show adequate transfer of reading proficiency to fluent silent reading performances.**

Vocalization

During oral reading there is necessarily an emphasis on vocalizing, and this cannot help but result in a carryover of more vocalization during silent reading which will limit reading rate and, ultimately, comprehension. In silent reading, students vocalize to reinforce word recognition (a form of word recognition rehearsal). But saying words during oral or silent reading does slow down the reading process and can become habitual and overly depended upon.

Most educators agree that vocalization must be discouraged during silent reading (both saying aloud and internally) if reasonable silent reading rate goals are to be acquired and good comprehension is to be achieved. As a consequence, teachers have, for years, been encouraged to employ techniques to discourage vocalizing during silent reading in order to achieve reasonable rates of reading and good comprehension.

It is evident that more study needs to be devoted to the carryover of vocalization from oral reading into silent reading.

Comprehension

When attention is largely focused on word recognition and good expression in oral rereading practices, attention to comprehension must, necessarily, be diminished. Saying what is read during the majority of rereading practice does lessen attention to understanding. We have all had the experience of listening to a child read aloud and then when a sentence is completed, noting his/her lack of ability to recall the meaning of what was just read. Attention was totally devoted to word recognition and comprehension suffered.

Realize also that oral reading does require additional time to pronounce the words in an acceptable, expressive manner in contrast to the time involved in silent reading. And during this additional time many extra fixations (eye-stops) and regressions (reverse eye-movements) will just naturally occur. This additional time will tend to encourage a “wandering” oculo-motor (visual intake) activity. As a result, short-term memory will logically be overtaxed by virtue of the longer time required to “receive the message,” the straightening away of out-of-order sequences of word impressions caused by visual wandering to properly realize syntax, and perhaps a student’s limited ability to “chunk” word impressions into large syntactical units such as phrases because of extreme focus on recognizing words. When short-term memory is over-taxed, literal comprehension is diminished.

Consider also that expressive oral reading requires that a student employ an eye voice span (distance from the word being pronounced and the fixation point of the reader) of about

1.5 to 3 words according to Buswell (10). This means words must be stored in short-term memory accurately and remembered well (visual memory) as oral expression takes place or the oral reader will be encouraged to make many regressions during oral expression to double check on what was originally perceived. Any such excessive regressions will continue to create a visual "wandering" approach to reading that will prove detrimental to perception and understanding.

In summary, any reading practice that encourages excess fixations and regressions will encourage the development of an inefficient oculo-motor activity which will, later, limit reading rate and ultimately diminish comprehension in silent reading.

Interest

The process of rereading previously read content orally would not appear to be a very stimulating task for children. Even when they understand that the goal of rereading is to read more rapidly with good expression, this practice can not be very interesting. Rasinski (64) in his study of "Repeated Reading and Listening while Reading" commented, "Repeated reading may have several practical drawbacks; over the long term students may tire from its use. Students may lose interest in and motivation for the repetition of previously read material."

New content, which repeats high frequency vocabulary, would certainly seem preferable and would be more stimulating. Fluency development content such as that provided in today's Guided Reading software in which new selections (containing many repetitions of Core Reading Vocabulary) are read to build fluency in reading will prove more highly involving in terms of interest and will promote sustained attention.

Transfer

Finally, there is the question of the transfer of fluency in oral reading to both fluency in reading new content orally and to silent reading. Stahl and Kuhn (82) found, "Repeated reading did not seem to make an impact on children's oral reading or comprehension." Rashotte and Torgesen (63) stated, "If stories have few shared words, repeat reading is not more effective for improving reading speed than an equivalent amount of non-repeated reading." **Thus far the aspect of transfer of fluency to the reading of new content to be read orally and to silent reading has not been adequately demonstrated.**

But there is more to consider beyond what might be acceptable in terms of oral fluency when considering transfer to silent reading. In silent reading much higher levels of automaticity of word recognition are required (perhaps only .10 sec. to perceive a word out of the usual eye-pause time of .33 sec.). Additionally, much less visual wandering and more sequential realization of syntax at higher rates of association, reduced vocalization, and increased levels of visual/functional competence (binocular coordina-tion, ocular motility and accuracy of tracking or directional attack) are requisites.

The Center for the Improvement of Early Rereading (83) states, "There are many unanswered questions. What the role of repetitive reading is and whether increasing the amount of reading

would have similar effects." This report questions the various kinds of practices employed or those that might be employed. "We know that the time spent reading is an important variable in learning to read, but time spent reading what? Is reading difficult material more useful than reading easy material? Is reading the same material more useful than reading new material? Are there different effects for oral and silent reading?"

It would seem logical that one of the primary goals of employing oral rereading practice would be to assure that primary grade students will be able to read silently in a more fluent manner. But research, to date, does not support this finding.

Appraisal

The principal outcomes of using oral reading as an appraisal technique would seem to judge rate and accuracy of word recognition, realization of syntax, and acceptable prosadic delivery. However, a more definitive measurement of the process of reading can be made using the Visagraph Eye-Movement Recording System (95) which allows an evaluation of the underlying oculo-motor and perceptual processes which produced a student's reading performance, and the judgments that can then be made as to the efficiency of this performance in relation to national silent reading norms and attainable goals. In essence, eye-movement recording evaluates "how" a reader reads. To date, the Visagraph is the only definitive means of measuring and analyzing what is termed a reader's Fundamental Reading Process (visual/functional, perceptual and information processing proficiency). It is important to realize that for over a hundred years beginning with Muller (54) in 1826 and Javal (38) in 1879, eye-movement behavior in reading has been evaluated by hundreds of researchers to make judgments as to a reader's efficiency and fluency in silent reading. There are over 100 such eye- movement references cited by Carmichael and Dearborn (13), E.A. Taylor (88) and Yarbus (108). And there are a multitude of references to the use of the "Visagraph" eye-movement system in most web browsers today ("Google" for example displays some 114 references to Visagraph use).

While many educators today feel that oral rereading is beneficial, and while there are many studies that cite benefits from its use, all of the above considerations should serve as a caution not to overstress oral reading. A certain amount of oral reading will help students realize words as components of syntax as they learn to read expressively. Oral reading can, thus, serve as a "modeling" experience in relation to oral communication. However, oral reading should be carefully balanced with sustained silent reading practice, and certainly there is a need to investigate the advantages offered by fluency development software for the expeditious development of fluency in silent reading. The Visagraph eye-movement recording system can be effectively used to definitively document pre and post differences in the reading process as children are encouraged to develop fluency via both silent and oral reading performances.

Read Along Experiences:

Because there is a close relationship between oral reading and read along (reading while listening) techniques, this latter practice should also be considered. It has long been demonstrated by Carbo (12); Chomsky (15); Heckleman (30); and Ven di Leiv (99) that read along experiences are beneficial with many students. This is especially true when the rate of a narration is very close to a student's usual silent reading rate. If narration rates, however, are too slow, excess fixations and regressions will emerge, as will be the case with listening to any oral reading that is slower than an individual's silent reading rate. On the other hand, if the rate is too fast, students will be inclined to depart from reading and simply start listening. For these reasons, this author recommended, in a "Bimodal Reading Methods Patent" (96), that a variable playback rate be used during read along practice to allow students to select their own 'best' playback rate. Biemuller, Bowden, Mackinnon and Weinberg (7) indicate that the speed (in words per minute) of the tape narration could be no faster than the child could read the same material orally. In the study by Shany and Biemuller (75), tape speeds were varied between 80 to 120 wpm, and "each child selected the rate which was most agreeable to him or her." Reitsma (67) commented that poorer readers profited less than better readers from read along practice because presentation rates were too high for the less gifted readers." Carbo (12) and Neville (58) found that slowing narration rate could be beneficial but that slowing it too much seemed to result in comprehension problems. McMahon (52) commented that, "If the rate is too slow, the children may become bored and lose interest in the story and activity." Bergman (5) stated, "Talking books should be narrated at a rate that matches or slightly exceeds the listener's reading rate."

If a proper rate balance is maintained between a narration and a student's silent reading, bimodal reinforcement will be achieved, which will allow either aural preparation for word(s) to be encountered (pronunciation just ahead of fixation on a word) or a beneficial "rehearsal" process (hearing the word just fixated on). When there is only a slight difference (perhaps one word) between a student's reading of content and hearing it, word recognition will be reinforced and the listening experience will then lead to an appreciation of proper expression of syntax and punctuation by the fluent expressive narration. **Thus, narration rates (hopefully adjustable) must be carefully considered in the future with regard to read along approaches to reading development.**

Decoding:

Invariably when addressing the reading needs of beginning readers, the consideration of decoding, or the use of phonics, will arise.

It is important to realize that decoding is not reading. Decoding will assist a student involved in independent reading to unlock unfamiliar words when they are encountered. But decoding development and practice, no matter how approached in terms of pedagogy, should be carried out largely apart from reading, especially when fluency in reading is the goal. This position is well stated by G. Glass in his publication, "Teaching Decoding as Separate from Reading."

When a student encounters an unfamiliar word in reading, he/she will depart from reading to analyze the word in terms of graphene/phoneme relationships to sound out, and thus recognize the word, and then return to reading. A critical consideration is the time spent on decoding to recognize a word. Every second spent in conscious decoding will result in 3 fixations spent studying a given word as cited by Taylor and Robinson (94). If just 2-3 seconds were spent in decoding (a very short time), a child will have made 6-9 fixations (excessive visual wandering) to unlock the word. Thus, excessive decoding, both in time and the visual process required, will inhibit fluency in reading, both silent and oral. Eye-movement studies of students who have become overly preoccupied with sounding out most words during reading, will display slow and labored eye-movement behaviors.

This is not to say that decoding competence is not essential. But, it is critical to reduce the instances and time required for prolonged decoding when developing fluency in reading. This means that reading fluency practice, with reading selections employing more familiar vocabulary (independent reading content or lower), should be stressed during fluency in reading practice with separate decoding mastery practice.

Regardless of the approach used to develop decoding competence, all reading vocabulary must eventually be translated into instant sight vocabulary if fluency in reading is to emerge. This will require either frequent word recognition practice, or more appropriately, “flash” techniques, to ensure automaticity, or instant word recognition, now widely acknowledged as essential to fluent reading, both oral and silent.

This need for instant word recognition is expressed by William Honig in his school administrator article, “Reading the Right Way” which states, **“This research shows that in proficient reading, word recognition is primarily an automatic, unconscious, and rapid process.”**

Fluency in Silent Reading:

The section that follows is a brief elaboration on the nature of each of the key sub-skills or components of fluency in silent reading. It is acknowledged that many of these sub-skills impinge upon and interact with each other, and so references will be made back and forth between these considerations at times.

In addition, numerous references will necessarily also be made to Taylor Associates’ Reading Plus programs which have been specifically designed to improve these essential sub-skills that are so vital to fluency in silent reading. It should be noted that this author has been involved with the aspect of fluency development, reading improvement technology, and eye-movement recording for many decades, beginning with EDL: Educational Developmental Laboratories (1954-70), later ICT: Instructional Communi-cations Technology (1971-94) and now, Taylor Associates/Communi-cations, (1954-present).

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To better understand the nature of fluency in silent reading and the sub-skills that must be adequately developed for meaningful levels of fluency to emerge, consider the following:

1. **Adequate vision (at near-point)**
2. **Attention and concentration**
3. **Visual/functional proficiency (binocular coordination and vergence, ocular motility, and accuracy in tracking)**
4. **Perceptual accuracy and word recognition automaticity (accuracy in perceiving letters and letter order, instant recognition, and visual memory)**
5. **Information processing efficiency (rapid and sequential recognition of word impressions)**
6. **Comprehension capability**
7. **Language experience and Experiential background**

All of the items 2 through 6 comprise what is termed the "Fundamental Reading Process" which can be developed directly and effectively through the use of a systematic fluency development course of study as provided for in Taylor's Reading Plus system. **The visual/functional, perceptual and information processing sub-skills that allow fluency in silent reading to emerge can only be improved through the use of reading technology software.** A teacher cannot direct this subliminal process (which occurs 3 to 5 times per second as students shift their eyes across lines of print in reading). Nor can a student control his/her reading process. Only through the visual/functional and perceptual adjustments a student makes while engaged in Guided Reading, will a student alter his/her Fundamental Reading Process that influences his/her efficiency in silent reading.

1. Adequate Vision

Beyond testing for adequacy of distance vision (typically what is evaluated today, at best), near-point vision must also be screened for and ensured. There are many students who can see well at a distance (20-20 at 20 feet) but who still see words as a blur or in a less distinct fashion than desirable at usual reading distances (16-21"). Then too there are the learning and studying tasks of looking back and forth from the blackboard to the page that requires good accommodation (quick change of focus). And finally, there is the student's ability to use both eyes as a team without suppression of vision in one eye or the other. Good vision is an essential first requirement in reading and learning and certainly a key consideration when considering the development of fluency in reading. There are screening techniques such as The New York Optometric Examination (55) and the Bernell Deluxe School Screening Kit (6) that can be used to evaluate a student's near-point competence. Such screen-ings are essential if other factors of reading learning are to take place adequately.

The COVD (College of Optometrists in Vision Development) states very logically that "Vision is a contributing factor to an individual's ability to attend and respond to classroom instruction." The AOA (American Optometric Association) states that, "Approximately one-half of those three years of age or older require treatment for a vision problem." The

National PTA Association (57) recently adopted a resolution calling for more adequate visual screening procedures. Now, it is also recommended by COVD that students be given an eye-movement recording appraisal such as that provided for by Taylor's Visagraph to screen for visual/functional impediments.

2. Attention and Concentration

To better understand human cognition and comprehension, a consideration of attention, memory, and what is termed the "executive function," as cited by Lyons and Krasnegor (46) is critical.

A first consideration is a student's ability to focus attention on the task of reading, direct the eyes toward print, and become actively involved in the reading task and understanding. Many children lack this very basic ability to focus and direct their attention in learning activities. These children must be given practice activities that require and build strong attention such as Taylor's PAVE: Perceptual Accuracy and Visual Efficiency training and Auditory Memory training. Attention can be trained!

Next, there is the aspect of concentration or the ability to sustain attention. This is described by James (37) as "dependent upon repeated redirection of effort to the focus of attention and resistance to attractions that co-exist in the process." It is essential to first consider a student's visual adjustment to the near-point activity of reading. Attention and concentration will naturally be greatly influenced by a student's visual ease and comfort in reading. Studies by Carmichael and Dearborn (13) document that students should be able to read in a sustained manner for up to two hours without visual fatigue. However any extraordinary energy consumed to maintain binocular coordination (resulting in clear and single vision) or expended in head movement (as opposed to the rotation of the eyes) or oculo-motor efforts to stay on lines of print can cause discomfit that will lead to "breaks" in concentration. Research reports by Schlange (72) and Johnson, Nottingham, Stratton and Zaba (39) suggest that attentional difficulties with ADD and ADHD students may, in part, stem from visual/functional inadequacies. Donald Getz, O.D. (23) states, "Where vision is difficult and requires greater effort than normal, the child will usually exhibit an avoidance reaction to near-point work, and thus appear not to be trying or 'day-dreaming.'" If the process of reading overall is too slow and laborious, which is the case with many beginning readers who typically read at rates far below their usual listening and speaking rates, there is the tendency for "minds to wander."

Consider situations in reading in which your mind wanders. Suddenly, you realize that you've been moving along lines of print and perhaps covered entire paragraphs without attending to what was being read. These instances indicate the relative automaticity of the oculo-motor activity you launch into to initiate reading. These periodic lapses in attention will be more prevalent with poor readers. Further, poor readers who are usually handicapped by inefficient visual skills will often find excuses to start looking around the room to become more visually comfortable and to avoid the discomforts of the near-point activity of reading. These lapses in focus of attention and concentration will result in the tendency to reread

frequently to maintain comprehension. And while rereading in study type activities is certainly acceptable at times to reflect, visualize, and analyze, excessive or compulsive rereading is not acceptable.

The ability to concentrate is very dependent on visual ease, perceptual efficiency, and the rate and efficiency with which information is pro-cessed. A recent study by Solan (81) shows that attention increased as students developed greater reading proficiency using Taylor's Reading Plus programs.

To ensure greater ease and comfort, training in basic visual coordination, ocular motility and tracking, increased perception and efficiency in processing information can be enhanced by the use of fluency development software today. But even with the use of these reading development approaches, it should be acknowledged that some students will still require more intensive visual training by a vision specialist. Such services should be sought wherever continued discomfort in near-point activities is reported by a student.

The relationship between visual ease and comfort and concentration is reinforced by numerous reports over the years by teachers using Controlled Reading or Guided Reading technology which indicated that as greater ease and comfort are experienced in reading and higher levels of perceptual efficiency were achieved, a student's ability to attend and concentrate grew significantly. So many times a child is blamed for poor attention when the underlying conditions of lack of visual ease and comfort in near-point activities and poor perception are to blame.

A third consideration of memory in relation to attention and concentration, relates to the ability of a student to continue to read if continuous understanding and recollection of what has been read is not achieved. It is evident that inefficient processing of visual information and its translation into memory will greatly affect a student's comprehension and ultimately his/her ability to continue to attend to the reading task. Considerations of necessary information processing capabilities and comprehension skills are treated in later sections.

The fourth consideration cited by Pennington, Bennitto, McAlear and Roberts (60), is termed the executive function which would seem to relate to a student's ability to direct attention in relation to specific cognitive needs and apply strategies to achieve certain goals of understanding. In reading there is a dual need to maintain attention and concentration as an ongoing function to achieve literal comprehension as well as the flexibility to direct the mind to the ideas and suggestions being expressed by the author and to relate information to personal experiences and need. This executive function of attention may signal the need to reread for clarification of what has been read, pause to think about what had been suggested but not stated, or simply to reflect and organize. In essence, the executive function exerts more influence as higher level cognitive skills of analysis, evaluation and appreciation are required. This executive function in reading is also greatly influenced by a student's experiential background and is also quite responsive to teacher educative activities such as those that will develop language and experiential background, providing

guidelines for approaching reading that will lead to more appreciation of content, putting forth suggestions for more purposeful reading approaches, and encouraging a more personalized interpretation of what is read.

For perspective, Taylor's Reading Plus fluency development programs focus initially on creating high levels of efficiency or fluency in a student's Fundamental Reading Process (visual/functional, perceptual and information processing efficiency and effectiveness). This greater efficiency will permit higher levels of attention and concentration, memory, and increased use of the executive function to be employed during reading.

3. Visual/Functional Proficiency

First, it is important to understand that the near-point activity of reading is not a natural human act. However, we must accomplish necessary usual adjustments in order to become fluent readers. As stated previously, The National PTA Association's 1999 resolution (57) related to "Learning Related Vision Problems" states, "Knowledge regarding the relationship between poorly developed visual skills and poor academic performance is not widely held among students, parents, teachers, administrators and public health officials." The PTA resolution recommends more adequate visual screening of both vision and visual/functional proficiency.

It is essential that a student maintain both good binocular coordination and vergence (team use of both eyes), possess acceptable ocular motility (the ability to rotate the eyes and not the head) and track accurately (staying on the line and progressing sequentially across lines of print with good left to right directional attack). Studies by Atzmon (3), Getz (23), Heath, Cook and O'Dell (28), Punnet and Steinhauer (62), and Steinman, S. and Steinman, B. (86), in which only visual/functional training was admin-istered, showed distinct improvement in reading even though remedial reading instruction was not provided. And, in studies by Seiderman (74), Solan (78), Streff (87), and Waldstricker (101), in which visual training was combined with reading instruction, substantial gains in reading were achieved by the students involved.

Further, in-school visual training programs such as those administered by Hellerstein (31) and Hoover & Harris (34) also document the value of visual training combined with reading development training and both involved the use of the Visagraph eye-movement recording system in pre and post testing. Finally, in an eye-movement study by Schlange (72), in which Taylor's Guided Reading provided timed and directed left to right presentations of print without the support of visual/functional training did also develop higher levels of visual/functional efficiency as revealed by pre and post eye-movement measures using the Visagraph.

In summary, it is critical that visual/functional efficiency be developed for meaningful levels of fluency in silent reading to emerge and for ease and comfort in reading to be experienced.

4. Perceptual Accuracy and Word Recognition Automaticity

A student's ability to accurately discriminate letters, realize letter order, and recognize words instantly is a basic requirement for fluency in reading to emerge. In reading, the reader's eyes will typically move three to five times per second as the previously cited study by Taylor and Robinson (94) showed. Beginning readers arrive at school with observational habits which prompt them to keep their eyes in motion three times a second. If words cannot be instantly recognized in l/3 of a second or less, a beginning reader will resort to multiple fixations (eye-stops) to perceive words. Over time the tendency to make multiple fixations and regressions (more eye-movements) will become part of a student's conditioned oculo-motor activity which will become relatively habitual as a student progresses to the intermediate grades. These multiple fixations and regressions, and the wandering visual approach to reading, will ultimately inhibit a reader's ease and comfort in reading, limit reading rate, as well as reduce comprehension.

LaBerge and Samuels (44) and Logan (45) cite the need for automaticity in word recognition in order that time and attention be devoted during each eye-pause to the realization of syntax and understanding of what is read. In essence, if word recognition is overly time consuming, and especially if multiple fixations are required to recognize words, there is little time and attention left to devote to the meaning of what is being read. It is essential that word recognition in silent reading must be accomplished in only a fraction of the length of a typical eye-pause time (perhaps only .10 sec out of the usual eye-pause time of .33 sec. for beginning readers) for attention to be devoted to realizing syntax and to achieving good understanding. The National Reading Panel (56) further reinforces this need in their report which states, "Skilled readers also get better at seeing a word in a single fixation; therefore evidence fewer re-fixations on the same words and fewer regressions in which they have to look back at a word again after they have read other words." The supporting studies they refer to are Frazier and Rayner 1982 (21); Kennedy and Murray 1988 (41); Kennedy and Murray 1987 (42 and 43); McConkie and Zola 1979 (49); and Rayner, McConkie and Zola 1980 (66).

Further, a study by Gilbert (25) indicated that multiple fixations to recognize words are especially detrimental in reading with poorer readers. The shifting to different viewing points (multiple directions) to recognize words was perceptually confusing with poorer readers.

Consider that in a typical Grade 1 beginning reading program, an average of 16 to 20 new words are typically introduced in basal reading or reading anthology approaches each week without "flash" training to make these words instantly recognizable (automatic). Delayed or slow word rec-ognition will just naturally encourage the need for multiple fixations and eventually condition a random oculo-motor activity. Then, too, slow or less efficient oral reading as cited previously, can also encourage multiple fixations and random visual wandering during reading. And finally, any tendency to "over decode" or to direct too much conscious attention to the decoding process, which necessarily requires more time away from the act of reading, can result in multiple fixations per word that will eventually become habitual.

It is acknowledged that extensive reading, and encouraging students to read more, is one approach to improving word recognition. But most poor readers will not typically read extensively, for they are not efficient and they do not enjoy reading. Stanovich (85) cites the Matthew's effect in reading, taken from the Bible chapter on Matthew, "The rich get richer and the poor get poorer." He states poor readers read less than good readers and so after years the gap increases between poor readers and those who are more accomplished.

Over the years it has been demonstrated again and again that "flash" or tachistoscopic techniques can be used very effectively and directly to develop instant word recognition of all reading vocabulary. It should be clarified that flash training, in which words are exposed for such brief intervals as .10 sec. or faster, does not allow time for a student to move his or her eyes. Thus, the flashed material must be retained from a single "glimpse" or eye-stop. With such single impression training, students can acquire proficiency in letter identification, realization of letter order, and a stronger visual memory.

As early as Aiken 1896 (1); Cattel 1886 (14); and Volkman 1859 (100); and later Davis (18); Rusk (71); Weber (103); and Wilkins (106) all documented the value of tachistoscopic or "flash" practice on word recognition, reading, and learning. Presently, Taylor's PAVE: Perceptual Accuracy/Visual Efficiency software can be used to develop high levels of visual discrimination and to build a strong visual memory. Following this, Taylor's Word Memory "scan" and "flash" training techniques can make the recognition of Core or high frequency reading vocabulary considerably more instant. Finally, Taylor's Guided Reading program then continues to develop rapid word recognition as a continuous perceptual process while simultaneously encouraging a more sequential left to right visual intake process, all of which allows more rapid and successful association of words ("chunking" of words to realize larger syntactical units) which in turn leads to a more complete realization of what is read.

Eye-movement studies as early as 1937 by Taylor (87) and Witzeman (104) (and more recently the use of the Visagraph eye-movement recording technique) document the dramatic changes that can be made by developing visual/functional proficiency, word recognition automaticity and improved ocular motor functions. Changes in these basic sub-skills do result in more rapid information processing which produce improved comprehension and eventually lead to better standardized test per-formance.

Additional studies by Arundel (2); Beckly (4); Bottomly (8); Brickner (9); Gelzer & Santore (22); Hetrich (32); Hoffman (33); Malone (48); McDowell (51); Ruck (70); Solan (77); Solan (78); Solan, Feldman & Tajak (79); and Thompson (97); have all shown conclusively that Controlled Reading, Guided Reading and/or tachistoscopic training (flash training) can lead to improved ocular-motor behavior and improved comprehension. Interestingly, the judgment that reading research had produced sufficient documentation to support the use of reading technology to improve reading was stated by Traxler (98) in the Journal of Education as early as 1943. However, in the last 10 years, there have been many more research reports or studies by schools and universities citing the gains made through the use of Taylor's Reading Plus system and reading performance improvement as measured by the Visagraph eye-movement recording system and on Standardized Reading Tests (17).

To better understand the specific changes that Taylor's fluency training produces, consider the following measurable characteristics revealed through eye-movement recording that change as a reader's perceptual accuracy and visual efficiency improves.

Fixations/Regressions

A fixation is an eye-pause interval during which perception occurs. **As a reader develops the capacity to recognize words more rapidly and develops a strong visual memory, less fixations and regressions in reading will be required.** Excess fixations and regressions (reverse fixations) to recognize words result in the expenditure of more time and energy which in turn will reduce reading rate and inhibit ease and comfort in reading. A poor directional attack (wandering fixations) can also be proved detrimental, as previously cited in a study by Gilbert (25) who also showed that numerous overlapping impressions can, with the case of poor readers, reduce accuracy of word recognition. And as words are perceived more instantly and accurately there is a lessening of the need to regress to reconfirm word impressions as cited by the National Reading Panel (56). Taylor's (90) normative and goal performances for fixations and regressions are as follows:

Fixation/Regression Grade Norms/Goals (90)

Grade Level	1	2	3	4	5	6	7	8	9	10	11	12	Col.	1	2	3	4	5
Grade Norms																		
Fixations/100Words	224	174	155	139	129	120	114	109	105	101	96	94	90	77	65	57	48	44
Regressions/100Words	52	40	35	31	28	25	23	21	20	19	18	17	15	11	8	5	4	2
Grade Goals																		
Fixations/100Words	155	139	129	101	94	90	77	77	77	65	65	65	57	57	57	57	48	44
Regressions/100Words	35	31	28	19	17	15	11	11	11	8	8	8	5	5	5	5	4	2

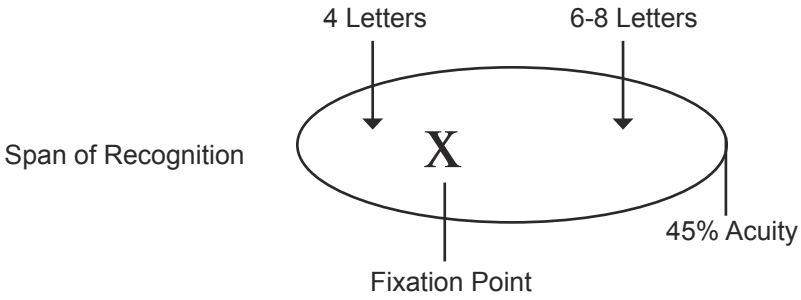
Average Span of Recognition

Average span of recognition is simply the result of a calculation of the number of fixations required to read a given number of words. Research, over the years, has hopefully dispensed with the concept of phrase reading (seeing complete phrases in a single fixation).

Approximately 8 letter spaces out (in either direction), a reader's vision will drop to about a 45% level of acuity as cited in the study by Feinberg (20). This results in print being blurred or less distinct this distance away from a reader's fixation point. Thus the concept of a student being able to perceive entire phrases (3 to 4 words) or entire sentences in a single fixation

is without any research basis. There are no eye-movement recording studies that support phrase perception in a single fixation.

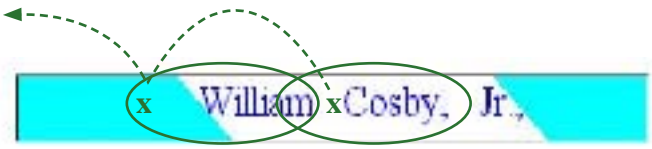
Research by McConkie and Raynor (50) showed that the usual span of recognition is approximately 10 letter spaces. Span in part is limited by the fall-off of vision which drops in resolution away from a fixation point as shown by Feinberg (20). With English speaking individuals, the usual span of recognition is 4 letters to the left of the fixation point and approximately 6-8 letters to the right. This leading of attention to the right is primarily an English language characteristic. The reverse condition is true as stated by Hebb (29) with Hebrew readers who "lead to the left" in terms of attention and perception.



To better understand the nature of span of recognition, realize that as a reader becomes more efficient he/she will also learn to respond to the word being fixated upon more quickly and then develop the ability to direct visual attention to the right periphery to sense the spatial orientation of the lines of print he/she is to track across and perhaps perceive some beginning letters of an upcoming word (later to be confirmed by the next fixation as the next fixation span overlaps the existing one). This redirection of attention does not mean an additional change of fixation point on the part of the reader, merely a shifting of what is being focused on in terms of attention.

As a reader's competence in word recognition grows, the average span of recognition will increase but typically not beyond one word or two. This ability to use upcoming information is suggested by Ikeda and Saida 1978, (35); McConkie and Zola (1987) (49); McConkie and Raynor 1978 (50); and Raynor 1983 (65). It is important to realize that truly accomplished readers will perform both the act of perceiving words fixated on and also be able to shift their attention to the right to gain some letter clues information. At this point it should be mentioned that any tendency to make regressions (reverse eye-movements) will both confuse perception and eliminate any benefit the right periphery might provide.

In Guided Reading, this phenomenon of more sequential intake of print is facilitated by the use of the guided slot which unveils in the following manner:



During Guided Reading a reader will fixate and perceive print within his/her foveal area (5 to 6 letters with clearest vision) and some portion of the parafoveal area. As the rate of the guided slot increases, and the reader tends to be somewhat habitual in eye-pause time, his/her fixation point will be obliterated by the occluding left side of the guided slot which is moving more rapidly than the reader is reading. The students will then be encouraged to become more aware of what is presented to the right or more of the parafoveal area (though not consciously), and the reader will also be encouraged to move to a new fixation point to the right within a reasonable distance (constrained by the right edge of the slot). This reasonable distance of refixation will ensure a desirable overlap of spans and result in more visual impression reinforcement. In addition, with the occluding of the area to the left of a reader's fixation point the tendency to regress into "blankness" is certainly reduced, and this will result in a reduction of regressions (reverse eye-movements) during reading and the usual "recovery moments" that typically follow regressive fixations. It should be clarified that regressions, as a general rule, do not typically contribute to accuracy in perception or improved comprehension. Regressions are usually simply carryover oculo-motor habits stemming from the slow word recognition during beginning reading experiences.

As a reader becomes more fluent through Guided Reading training, and as the number of fixations and regressions diminish, the span of recognition will increase. But the change in the span will be quite nominal:

Span of Recognition Grade Norms (90)

Grade Level	1	2	3	4	5	6	7	8	9	10	11	12	Col.	1	2	3	4	5
Avg. Span of Recognition in Words	.45	.57	.65	.72	.78	.83	.88	.92	.95	.99	1.04	1.06	1.11	1.30	1.53	1.76	2.08	2.27

Even superior readers, reading at rates of 500-600 wpm, will seldom average more than 2 words per fixation.

Average Duration of Fixation

The length of a student's duration of fixation (length of eye-pause time) will be effected by his/her vision, visual/functional competency and certainly by his/her perceptual efficiency in recognizing words. Slowness in recognizing words will tend to increase the length of a reader's duration of fixation. Guided Reading training encourages higher levels of attention and decreases in eye-pause time. Further, tachistoscopic (flash) training will develop word recognition automaticity and this will decrease the duration of fixation time required in reading.

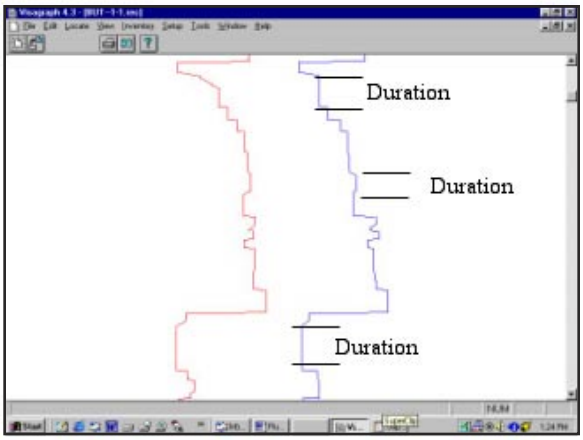
It is interesting to take note that during Guided Reading training a reader might temporarily lengthen his/her average duration of fixation as the number of fixations and regressions are diminished. This is a temporary perceptual adjustment. But as training continues this slightly

extended duration of fixation will tend to shorten again to a reasonable interval of time. The following chart shows the typical average duration of fixations for the various grade levels.

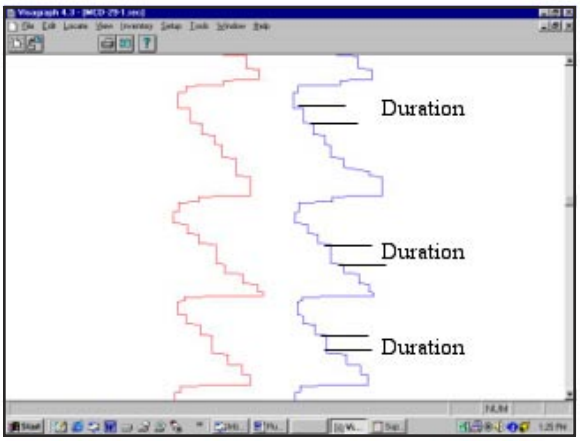
Average Duration of Fixation Grade Norms (90)

Grade Level	1	2	3	4	5	6	7	8	9	10	11	12	Col.
Avg. Duration of Fixations in Seconds	.33	.30	.28	.27	.27	.27	.27	.27	.29	.26	.26	.25	.24

It should also be noted that Visagraph recordings will show that beginning or less accomplished readers will vary considerably in their duration of fixations as they read. However, as a reader becomes more accomplished, the length of all durations will become more consistent and more regular. Carmichael and Dearborn (13) reported in their eye-movement studies that superior readers read in a more "regular" manner. Following are graph recordings that show the differences in the oculo-motor activity with both poorer readers (inefficient duration of fixation) and superior readers (efficient duration of fixation) as recorded by the Visagraph.



In third grade, less efficient
average duration .31 sec.
Range of duration: 1.15 - .17 sec.



In third grade, more efficient
average duration .25 sec.
Range of duration: .47 - .15 sec.

Buswell (10) also stated years ago that a more accomplished reader tends to read in a more "rhythmical" fashion. Similar results have been shown on almost all eye-movement studies conducted with various grade level readers over the years. It is apparent that as the visual intake process becomes more efficient, duration of fixation becomes shorter and more regular. Obviously, this more regular performance indicates that the mental processes are

doing more “flexing” without any negative feedback that would influence a reader’s oculo-motor activity adversely.

“Flash” training can make word recognition instant (automatic) and Guided Reading can increase the efficiency of the visual intake of print which will result in shortened average duration of fixation and more regularity in eye-pause time.

5. Information Processing Efficiency

It is evident that word recognition automaticity (instant word recognition) and an improved directional attack will permit more rapid and sequential realization of syntax. Should word recognition be slow and a reader’s visual intake process be wandering, realization of syntax is inhibited. Smith (76) stated, “Reading comprehension is reduced below listening comprehension when reading is slow, causing overload to short-term memory.”

In usual silent reading, visual impressions are fed to the mind (short-term memory) 3 to 5 times per second. The ability of short-term memory to maintain and interpret the information is influenced by levels of attention and concentration, reading rate (time to receive visual information and store this in short-term memory) and the sequence of impressions (influenced by the nature of directional attack) which results in orderliness or lack of it in the word intake process as well as the ability to “chunk” information to decrease the number of units to be held in short-term memory as cited by Miller (53). Thus, the information processing capability of a student is highly dependent on the accuracy, speed and orderliness of the visual input process. Many have referred to Guided Reading training as ocular motor training. While this is undoubtedly true to some extent, the ultimate value of Guided Reading lies in developing a more orderly visual input process (directional attack), instant recognition of words (automaticity) and the encouragement of more rapid associated processes, all of which lead to improved reading rate and comprehension as well as greater ease and comfort in reading.

Some have even referred to the left to right presentation of print in Guided Reading as providing a “modeling” visual intake experience for beginning readers. One child reported, “It’s just like someone speaking to you.”

6. Comprehension Capability

Comprehension competence is first influenced by a student’s ease and comfort in reading, level of attention, and ability to concentrate. Next, the visual input process must be truly efficient for short term memory to function efficiently to produce good information processing and understanding. Beyond this, there are the considerations of the specific cognitive processes and comprehension skills to consider.

There are two fundamental means of developing more effective cognitive processing. One is that of inductive practice (learning by doing), in which a more global comprehension approach is employed during reading. If a broad array of cognitive skill questions are posed

in conjunction with each new reading experience, a student will soon learn to read in a global and comprehensive manner and will grow in overall comprehension com-petency. This age old "practice reading" approach has been used for years effectively. In this regard, research by Stanovich (85) strongly suggests that a truly fluent reader should read with complete "openness" to what will be encountered without trying to anticipate the nature and the direction of the printed message. Anticipation of information, and different information actually experienced can cause reorganization or rejection, and this can cause a student to realign his/her thinking. This is non-productive in time and counterproductive in terms of good com-prehension.

A second approach to building comprehension competence is to provide single skill instruction in particular cognitive processes (i.e. specific lessons in drawing conclusions, comparing and contrasting categorizing, etc.). As a student recognizes what is required in these specific cognitive processes, he/she will store away this awareness for later use in global inductive reading experiences. Remediation of specific skills has also been employed for years. But when considering this remedial approach to comprehension development, it should be noted that many skills relate to other skills and are not totally exclusive in nature. For this reason, this single skill remediation is limited and is best employed as a supplement to "global inductive approaches."

In Taylor's Guided Reading and Comprehension Power approaches, there is strong emphasis on developing a wide diversity of comprehension skills. These skills are treated again and again in global inductive reading exercises and their accompanying question activities.

1. Literal Understanding
- 1-1 Recalling Information and Details
- 1-2 Following Sequence of Ideas or Events
- 1-3 Identifying Speaker

2. Interpretation
- 2-1 Main Idea
- 2-2 Making Inferences
- 2-3 Predicting Outcomes
- 2-4 Drawing Conclusions
- 2-5 Interpreting Figurative Language
- 2-6 Visualizing
- 2-7 Paraphrasing

3. Analysis
- 3-1 Comparing and Contrasting
- 3-2 Recognizing Cause and Effect
- 3-3 Classifying
- 3-4 Reasoning
- 3-5 Identifying Analogies

4. Evaluation
- 4-1 Detecting Author's Purpose
- 4-2 Understanding Persuasion
- 4-3 Recognizing Slant and Bias
- 4-4 Distinguishing Between Fact and Opinion
- 4-5 Judging Validity
- 4-6 Determining Relative Importance

5. Appreciation
- 5-1 Interpreting Character
- 5-2 Recognizing Emotional Reactions
- 5-3 Identifying Mood and Tone
- 5-4 Identifying Setting

In addition, in Taylor's CRL: Critical Reading and Listening Skills, single skill lessons are provided in which explanations and applications of specific cognitive processes are explored and then practiced. Teacher intervention in offering guidance about skill explanations can also be reinforcing.

Then too, from an analytical reading standpoint, Taylor's CLOZE-PLUS and Reading Around Words also provide meaning completion reading experiences and vocabulary improvement activities. These emphasize the following context clue strategies in non-timed reading activities:

1. Same Meaning/Synonyms
2. Opposite Meaning/Antonym
3. Association/Synthesis
4. Categorization/Classification
5. Time/Order
6. Signal Words, Phrases/Transitions
7. Pronoun Referents
8. Similarities/Differences
9. Form/Function
10. Conclusion/Summary
11. Definition

Learning to become sensitive to contextual clues can only be truly mastered through intensive practice. While a teacher might describe a particular contextual analysis strategy, its use repeatedly during actual reading practice is essential for true mastery.

Lastly, it should be emphasized again that a student's ease and comfort and efficiency in reading will bear directly on his/her attention and concentration and reading rate and this, in turn, will affect comprehension capability. Thus, improving comprehension is not just a matter of ex-panding awareness of and competence with certain cognitive processes. There must be training to ensure that visual efficiency, perceptual accuracy and information processing competence are developed, for this will allow higher level cognitive strategies to be effectively employed.

7. Language Experiences and Experiential Background

Language experience, developed adequately prior to reading, undoubtedly influences a reader's ability to realize information during reading. It is essential that teachers, especially when complying to the needs of ESL and other students with limited oral language background, adequately prepare students in both language and concepts for the reading experiences to follow. These activities are best provided through teacher guided oral language development activities. Then when students become involved with Taylor's Reading Plus programs, they will capitalize on this expanded language experience as a basis for better understanding in reading. Taylor does provide an Aural Language Development Guide for teachers to use with the earliest levels of Guided Reading for use with ESL and other students requiring more

language preparation.

It is undoubtedly true that experiential background, in general, is a key determinant of the student's ability to understand and apply what is read. It then follows that extensive reading experiences can provide a wealth of language experience development. **But extensive reading will only occur if the student is truly an accomplished fluent silent reader and finds "real freedom to read and learn."**

Technology and Fluency Development:

For over a period of more than 60 years and with over 50 million students it has been shown again and again that reading technology is the only direct and efficient means of developing fluency in silent reading. While many other techniques have been tried, there is nothing that produces such a dramatic change in the silent reading fluency of students as the use of the reading technology employed in Taylor Associates' Reading Plus fluency development programs.

The results of the Reading Plus systematic and comprehensive program to develop fluency in silent reading has produced these goals and im-provements in reports and studies over the last 6 years.

1 Attention and Concentration – Teachers consistently report considerable improvement in their students' ability to focus attention and maintain concentration for extended periods of time.

2. Ease and Comfort – Students report to teachers that reading and studying is now easier and requires less effort.

3. Adequate Reading Efficiency – The following chart is a brief summary of the results of school reports to date in terms of grades involved, changes in Grade Level Equivalent (GLE), improvements typically made in reading rates (wpm), and reductions of fixations and regressions as measured by the Visagraph.

Typical Visagraph Eye-Movement Improvement by Grade Level (17)

Grade	GLE Gain	Beginning Rate (WPM)	Rate Gained (WPM)	Beginning Number of Fixations	Fixation Reduction	Beginning Number of Regressions	Regression Reduction	Average Number of Sessions
2	1.2	106.5	+26.5	198	-32.0	41.5	-12.0	31.5
3	1.5	112.7	+27.3	192.8	-30.7	41.5	-11.8	25.7
4	2.4	135.0	+44.0	176.7	-39.7	37.1	-15.4	34.5
5	2.6	122.9	+50.6	194.6	-44.9	45.5	-19.3	42.5
6	1.8	111.7	+39.7	231.0	-56.7	53.7	-19.3	36.8
7	3.4	145.7	+66.5	195.5	-54.8	40.0	-17.5	45.0
8	3.2	123.4	+66.5	126.5	-54.8	22.8	-17.5	44.0
9	3.6	180.0	+61.9	136.0	-45.3	21.0	-14.1	37.3
College/ Adults	4.4	216.5	+147.8	107.2	-39.0	15.4	-9.9	23.5

Note: Taylor Associates recommends a minimum of 40 fluency development training sessions two times a week for most students (a higher number of sessions for those with poor reading efficiency).

4. Standardized Test Improvement (17) – Typical gains that have been reported in recent studies are as follows:

Grade	Test	Gains	Average Period Of Time
2 Average Population	Stanford 9	Gain of 5.7 compared with a decline of 4.7 for a control group	One School Year
3 Includes at-risk and Title 1 Students	ITBS	Average gain of 1.05 years	One School Year
4 Includes at-risk and Title 1 Students	ITBS	Average gain of 1.3 years	5.5 Months
Average Population	TAAS	TLI gain of 5.5, which was 48.6% better than the Texas state average improvement	One School Year

5 Remedial Students	ITBS	A gain of 1.61 years	Three Months
Average Population	TAAS	TLI gain of 1.4, which was 75% better than the average Texas state improvement	One School Year
6 At-risk and Bilingual Students	ITBS	Average of 1.32 years	Three Months
Average Population	Gates-MacGinitie	Average gain of 2.4 grades compared to the students' previous average yearly gain of .6 grades	Seven Months
7* At-risk and Remedial Students	ITBS	Average gain of 1.57 years	6.5 Months
8* At-risk and Remedial Students	ITBS	Average gain of 1.50 years	6.5 Months
9* At-risk and Remedial Students	ITBS	Average gain of 1.5 years	One School Year
Adults Includes college freshman who scored under the 12th grade level on the Nelson-Deny test	Nelson-Deny	Gain of 12.2%, or 1.5 levels on the Comprehension portion of the test	Three Months

ITBS=Iowa Test of Basic Skills - TAAS=Texas Assessment of Academic Skills - TLI=Texas Learning Index
*Includes data from a study done in Great Falls, Montana 1996-98 where students who were instructed with Reading Plus gained an average of 1.4 years compared with a control group who only gained 0.4 years.

5. Improvement in Self-Esteem – As students' competency and confidence in their reading competency emerges, their self-esteem improves considerably as they find greater success and realize that they are not "dumb."

Today's need is unparalleled in terms of the demand for greater literacy if students are to face the challenge of today's technological and information age. Certainly, one of the key needs for meaningful levels of literacy to develop would be the attainment of higher levels of fluency in silent reading. **This will necessarily involve the combination of good "teaching" and the use of reading technology if the goals cited in this paper are to be achieved in today's schools.**

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