Predicting Oral Reading Comprehension Abilities

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ABSTRACT

Reading comprehension is a skill that has been investigated for years, yet with much to still be researched in attempts to better understand this complex cognitive ability. Effective and efficient means of assessment of reading comprehension in children has been a frequent topic in the literature as well as treatment of reading disorders with deficits in reading comprehension. The purpose of this study was to investigate the predictive value of various reading skills to oral and silent reading comprehension in the attempts to suggest a more efficient manner of assessment. The various reading skills that were measured in this study include single-word reading accuracy, single-word reading fluency, textual reading fluency and accuracy, oral reading comprehension abilities, and silent reading comprehension abilities. This study involved 39 participants, 29 females and 10 males. At the time of data collection, the participants were in grades first through fifth grade and were 7 to 12 years of age. Each child participated in a reading evaluation involving administration of several standardized assessment tools of reading abilities. These tests included *Test of Word Reading Efficiency-Second Edition, Woodcock Reading Mastery Tests-Third Edition, Gray Oral Reading Tests-Fifth Edition,* and *Gray Silent Reading Tests.* Informal measures comprised of hearing and vision screenings. Passing scores on the screenings were required before administration of formal testing. Data was recorded in real-time, and scores were recorded later. All of the scores from the assessments were entered in a step-wise linear regression model. Oral reading comprehension as measured by the *GORT-V* was entered in as the measurement being predicted, while all other remaining scores were entered as predictors. Predictive values were obtained in regards to their relation to oral reading comprehension. Results

of the study revealed that *GORT-V* Rate (oral reading rate) was most related to oral reading comprehension abilities as measured by the *GORT-V*. When the *GORT-V* related variables were removed from the analysis, the results indicated that sight word reading abilities as measured by the Word Identification subtest of the *WRMT-III* were most related to oral reading comprehension as measured by the *GORT-V*. These findings indicate that reading rate is highly associated with oral reading comprehension abilities and that word reading accuracy is highly important for oral reading comprehension abilities. Accurate word reading facilitates fluent reading, and both are crucial reading skills needed for both oral and silent reading comprehension abilities. Word reading accuracy can act as an anchor for the higher cognitive skill of comprehending text to develop in a linear fashion.

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ACKNOWLEDGEMENTS

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Chapter I

INTRODUCTION

Reading

To articulate the concept of reading comprehension and the underlying components of this complex skill, the process of reading must first be clearly understood. The definition of reading and its mechanics set the foundation for the present discussion regarding indicators of reading comprehension as measured by commonly administered reading assessment tools in addition to other reading subskills that contribute to the act of oral and silent reading comprehension. Several views and models of reading are available in current literature, ranging from more simple definitions to relatively more complex definitions.

For the purpose of this paper, reading will be defined by using the Simple View of Reading proposed by Gough and Tunmer (1986). This view breaks down reading into two main components: decoding and linguistic comprehension (Kamhi & Catts, 2012). Furthermore, Gough and Tunmer (1986) reference decoding as the ability to recognize words and use that recognition in formulating words from print. The linguistic comprehension aspect of reading is the process of interpreting words, sentences, and dialogues in the presence of higher cognitive thinking and reasoning beyond the concrete symbols of words. Comprehension is considered to be the more important skill of the two, in which readers are able extract meanings from text. Decoding is the prerequisite skill needed to achieve the later developing skill—reading comprehension. Breznitz's

(2006) description of reading is parallel with that of Gough and Tunmer's. Reading is the active combination of decoding and comprehending, and each component includes a number of different brain processes that lead to the end result. Efficient readers do not rely heavily on decoding abilities, but rather depend on higher mental processes to understand the words at a deeper level. When viewing reading through Gough and Tunmer's theoretical framework, it must be noted that appropriate reading ability requires adequate decoding and comprehension processes. When there is a breakdown in one component skill of reading, there will consequently be a breakdown in the end result—reading comprehension ability.

Chapter II

REVIEW OF THE LITERATURE

Single-word Reading Accuracy

Single-word reading can be accomplished by two processes—phonological representation or visual representation (Besner & Smith, 1992). Emergent and early readers begin reading words by phonological representation. However, when the later literacy skills are developing, words are read based on visual representation. Phonological representation involves a reader "sounding out" the words (Carter, Walker, & O'Brien, 2014). This is the mental, cognitive, or acoustic representation of sounds and is included in the skill of mapping of sounds into graphemes. The reader must be able to separate the sounds in the words and put the sounds together, known as segmenting and blending, respectively. Decoding of words in such a way requires more cognitive attention and mental energy devoted to reading accurately. The latter of the two skills, reading by visual representation, requires the utilization of less mental resources because words are being holistically read by sight word reading abilities. This can allow more mental effort to be devoted toward reading comprehension. The visual representation route of single-word reading occurs more quickly and efficiently, requiring less attention being directed toward the individual sounds in a word. The level of familiarity with words increases the ability to read words by sight. An increase in both familiarity and sight word reading abilities also yields improvement in reading automaticity, a skill that facilitates successful reading.

Sub-component Skills Contributing to Single-word Reading Accuracy

Phonemic Awareness

Phonemic awareness, a skill classified underneath the umbrella term of phonological awareness, has been noted to be a strong factor in word reading accuracy for children. Emergent readers rely heavily on the ability to identify and manipulate the individual phonemes in words to read words accurately (Juul, Poulsen, & Elbro, 2014). It has been suggested that phonemic awareness is not as directly related to word reading in more experienced readers such as those in the adult population. Phoneme awareness is paramount in the acquisition of reading, but as reading skills increase, phonemic awareness becomes less and less reliant upon. Juul et al. (2014) stated that phonemic awareness and letter knowledge are both leading predictors of single-word reading accuracy.

Letter Knowledge

Letter knowledge is a subskill necessary for readers to begin understanding the alphabetic code. The ability to read words accurately develops from the knowledge that sounds and letters can be combined to make sound units and words. Appropriate letter knowledge enables early readers to segment and blend words, which are both prerequisite skills to reading development. Therefore, knowledge of the alphabetic code leads to the ability to make the connection between letters and sounds, which allows for the development of basic reading skills (Juul et al., 2014).

Rapid Automatized Naming (RAN)

RAN is a skill that contributes to reading speed and word reading accuracy. RAN is a task that places a time demand on the reader by having the individual name digits, colors, objects, words, and/or letters. Children with dyslexia often perform poorly on such tasks due to the time constraint that contributes to inaccurate naming speed (Meyer, Wood, Hart, & Felton, 1998). Not only is RAN predictive and indicative of early reading skills, but also of later developing reading skills that are expected to emerge in the late elementary to middle school years (Badian, Duffy, Als, & McAnulty, 1991; Wolf, Bally, & Morris, 1986; Wolf & Obregon, 1992).

Importance of Phonemic Awareness, Letter Knowledge, and RAN

Adding to the discussion, Juul et al. (2014) examined the predictive values of phonemic awareness and letter knowledge in relation to word reading accuracy as well as the predictive value of RAN to reading speed. In various studies, RAN has been considered a predictive component of reading fluency, which involves both word reading speed and accuracy. Unlike phonemic awareness, RAN has increasing importance as reading skills develop (Juul et al. 2014). Juul et al.'s study utilized the Danish language, which has an orthography similar to that of English. Juul et al. (2014) further state that Danish children do not enter school until the age of 6 and are not formerly taught the skill of reading at this time. However, the children in Grade 0 (when the children are at or around the age of 6) are exposed to activities incorporating letter knowledge and phonemic awareness.

The study began with 172 students with a mean age of 6 years and 10 months. The students were toward the end of completing Grade 0. At the end of Grade 0, participants were assessed on a range of skills considered to be possible predictors of later reading development. These skills include letter name knowledge, phoneme awareness, word reading accuracy, and RAN. Grade 1 and Grade 2 tests included measures of non-verbal reasoning, oral word reading accuracy, and reading speed. At the end of Grade 1, all participants performed above average on non-verbal reasoning (Juul et al., 2014).

Phoneme deletion was assessed by having the participants say a word that was created when a particular phoneme out of a previous word was deleted. For example, taking away the "t" in the word "task" would result in a new word, "ask." Phonemes were deleted in all positions of words, and testing was terminated when four consecutive incorrect responses were made. Phoneme matching was assessed by having the participants choose one out of four pictures that started with the same phoneme as the target word provided. Target phonemes included both consonants and vowels. Letter naming was assessed by presenting the 29 uppercase letters of the Danish alphabet on a sheet of paper and having the participants name each letter. Letter identification was assessed by presenting six written lowercase letters of the alphabet and having the child circle the correct letter the test examiner presented verbally. RAN was measured with both objects and digits; students named each digit in all ten rows provided and then named four rows of eight objects from Raven's Coloured Progressive Matrices (Raven, Court, & Raven, 1990). Word recognition accuracy and speed were tested by presenting six composed word lists to the children. All words were either CVC or CV/VC in structure and were considered to be within the vocabulary of average 6 year olds. Testing was terminated when all four words in a list were mispronounced or given up on. Speed was not accounted for if all words were mispronounced or not attempted (Juul et al., 2014).

The results of this study indicated that reading accuracy was low in Grade 0 but increased dramatically in the beginning of Grade 1 and plateaued in Grade 2. This could potentially be explained by the increase in reading instruction as the children progress from Grade 0 to Grade 1 or 2. However, word reading speed was found to increase from Grade 0 throughout Grade 2. Although progression of speed was noted when word reading accuracy was low, progression in speed was higher when there were high levels of word reading accuracy. As a result of the stepwise hierarchical regression analyses, each of the phoneme awareness tasks was predictive of word reading accuracy. Moreover, when combined, both phoneme awareness tasks were predictive of word reading accuracy more so than each task alone. In determining which skills were predictive of word reading speed, phoneme awareness was no longer a representative predictor. RAN and letter knowledge continued to show predictive value in relation to word reading speed. In a final analysis including basic achievement time of the tests, RAN was the only skill left in the model that proved to be predictive of word reading speed. The hypothesis that phoneme awareness would show strong predictive values to word reading accuracy and RAN as well as word reading speed was partially supported. However, it was unexpected that letter knowledge would not account for any variance in word reading accuracy. Juul et al. (2014) suggested that this finding is due to the participants already knowing much of the alphabet even at the end of Grade 0. In addition, RAN did account for a small variation in word reading accuracy. This could be explained by the children being instructed to read as fast as they could and unconsciously applying a time limit to their performance.

These findings coincide with the belief that word reading accuracy is a skill that precedes and therefore leads to word reading speed. Juul et al. (2014) suggested that addressing word reading speed in readers struggling with word reading accuracy would more than likely prove to be wasteful. However, researchers and specialists in the area of dyslexia might strongly disagree with this suggestion from Juul et al.

Phonological Awareness

Single-word reading accuracy, often times referred to as decoding accuracy, involves an array of skills such as alphabet letter knowledge and phonological awareness (Juul, Poulsen, & Elbro, 2014). Oakhill, Cain, and Bryant (2003) suggest that the understanding of the sound structure of words, phonological awareness, holds a direct relationship with decoding ability, and therefore, has an indirect effect on reading comprehension. Inaccurate word reading is most commonly expressed through decoding errors (Torgesen, 2000). If an individual does not recognize the letter combinations within a word and cannot accurately read the word, it is likely the ability to comprehend that word will be decreased. The early emerging literacy skills such as alphabet letter knowledge and phonological awareness are considered to be strong predictors of the proficiency level of reading comprehension abilities in children (Cain, Oakhill, & Bryant, 2004).

Assessments of word reading accuracy frequently include regular words as well as nonsense words in order to measure efficient single-word reading skills without the influence of surrounding contexts (Smith et al., 2014). The assessment of word reading ability is important when considering overall comprehension ability because if an individual struggles to read single words correctly, then much of their mental effort would be used for the task of decoding, taking away mental capacities that could instead contribute to interpreting and understanding the meaning of the words.

Importance of Phonological Awareness and Syntax to Word Reading Accuracy and Comprehension

In an attempt to explore the relationship between subskills and abilities of reading and how they may predict single-word reading ability, Oakhill et al. (2003) incorporated assessments of reading ability, vocabulary, phonological awareness, working memory, comprehension of complex sentences, general intellectual ability, and specific comprehension subskills. One hundred and two 7- and 8-year-old children were selected as the sample population for the first time frame of the study. The study also occurred during a second time frame in which the children were 10 to 11 years of age. Assessments of reading ability included the Vocabulary subtest *Gates-MacGinitie Reading Tests* (MacGinitie & MacGinitie, 1989), which requires the children to select one out of a possible four words that matches with the picture, and the *Neale Analysis of Reading Ability: Revised* (Neale, 1989) which assesses reading accuracy through word recognition in context, comprehension through answering series of questions, and reading rate through averaging the number of words read per minute. Vocabulary was measured through the assessment of the British equivalent to the Peabody Picture Vocabulary Test, the *British Picture Vocabulary Scales* (Dunn, Dunn, Whetton, & Pintille, 1982). During this test, the child is asked to point to a picture that matches the word verbally presented to him/her. Phonological awareness was assessed through two tasks. A phoneme deletion task required the child to say both real and nonsense words by deleting a sound in the word. For instance, the child would be instructed to say the word “grasp” without the “r” sound. An odd-one-out task was also administered and required the child to identify which word out of four words ended or began with a different sound than the other three (“cream,” “crisp,” “cracker,” and “grease”). This task involved both real words and nonsense words as well. Working memory was assessed through the children processing and storing both digits and words. Syntax was assessed during the task of comprehending complex sentences. The *Test for Reception of Grammar (TROG)* (Bishop, 1989) required the children to point to one picture out of four that matched the sentence the administrator presented verbally. Sentences ranged from simple sentences to complex sentences. General intellectual ability was assessed by the *Wechsler Intelligence Scale for Children-Revised (UK Edition)* (Wechsler, 1974). Verbal IQ was measured by two subtests, Vocabulary and Similarities, and nonverbal IQ was measured by two subtests, Block design and Object assembly. The specific comprehension subskills that were assessed included text inference and integration, knowledge of story structure, and comprehension monitoring. During assessment of textual interference and integration, the children listened to eight three-lined texts and were given sentences in order to identify which ones did or did not occur in the text presented. At the ages of 10 and 11, the children answered open-ended literal and inferential questions that went along with short stories. To assess knowledge of story structure, the children were asked to explain the purpose of story titles and were later asked to explain what a reader can gain by knowing the beginning and ending of a story. Secondly, the children were given sentences of short stories in a randomized order. The children were instructed to put the sentences in the order in which they would logically occur in the story. As the children became 10 and 11 years old, the stories increased in length from six sentences to eight sentences. Finally, comprehension monitoring was assessed by presenting stories to the children. The stories contained pieces of irrelevant information, and the children were asked to underline the information that did not match with the story as a whole.

Results indicated that Neale comprehension measures were correlated with all other comprehension measures included in the assessment as well as the odd-one-out task, the verbal working memory task, and the digit memory task. At the ages of 7 to 8 years, the Neale accuracy measures were correlated with Neale reading rate, the phoneme deletion task, and the Gates-MacGinitie sight vocabulary. From the results discussed thus far, each phonological awareness task was either highly correlated to reading comprehension measures or reading accuracy measures. A multiple regression analysis, in which Neale comprehension was entered in as a dependent variable, showed the odd-one-out task accounted for independent variance. Also, when the Neale accuracy measure was entered in the analysis as being the dependent variable, the phonological awareness task of phoneme deletion predicted independent variance.

The two phonological awareness tasks were expected to be more related to the Neale accuracy measure rather than the Neale comprehension measure. Oakhill et al. (2003) suggested that this unexpected finding could have been mediated by working memory, which is related to performance on reading comprehension measures as well as performance on the odd-one-out task. Scores on the *Test for Reception of Grammar (TROG)*, which measure syntactical knowledge, were related to both Neale comprehension and accuracy at age 10 to 11, but only accounted for variance in Neale accuracy at age 7 to 8. Therefore, this suggests that syntactical knowledge is related to word reading accuracy at both time points. Overall comprehension was shown to relate to skills such as textual integration, syntactical knowledge, working memory, and comprehension monitoring. Single-word reading accuracy was accounted for by both of the phonological awareness tasks. The findings support the notion that word reading abilities and comprehension abilities can be separated as each are found to be related to different sets of reading subskills. In treating reading deficits in children, it is important to identify which specific reading skill is causing a problem in order to treat the reading deficit or disorder in a rightful manner. Oakhill et al. (2003) suggests that the skills of word reading and comprehension should be taught separately due to the fact that successful word reading abilities must precede reading comprehension.

Continuing the discussion of phonological awareness and its relation to single-word reading accuracy, Liberman (1973) explored specific aspects of the skill. In an attempt to identify the level at which young children (4- to 6-year-olds) could segment words into syllabic and phonemic units, Liberman suggested that an inability to segment words into respective phonemes limits the acquisition of developmentally appropriate reading skills (Liberman, 1973). The findings from the study build on the fact that phonological awareness is a necessary component in becoming a successful reader (Liberman, 1991). Deficits in phonological awareness such as an inability to segment words can manifest into the developing word reading skills, therefore potentially leading to deficits in word reading accuracy.

Liberman's (1973) study included a sample population of 135 children ages 4 to 6 years. One group was assigned a phoneme segmentation task and the other group was assigned a syllable segmentation task. The children repeated words or sounds and tapped out the corresponding number of phonemes or syllables in the presented stimuli. Testing continued until the child identified the number of segments in all 42 words or until the child identified the word or sound segments six consecutive times without additional demonstration.

The results indicated more children were able to segment words into syllables rather than into phonemes. The number of children in the syllable segmentation group who reached the ending criterion exceeded the phoneme segmentation group. Thus, syllables were more readily able to be segmented than phonemes. At age 4, none of the participants were able to segment the presented stimuli into individual phonemes, but approximately half met the criterion for segmenting into syllables. The capacity to segment into phonemes was not apparent until age 5, in which a low percentage (17%) was capable of doing so. At age 6, approximately 70% could segment into phonemes, and nearly 90% could segment into syllables. The gap from 17% to 70% in the phoneme segmentation task in 5- to 6-year-olds could be explained by a much more concentrated focus of learning to read in first grade as compared to kindergarten. Though it cannot be sufficiently supported, Liberman (1973) suggests that an inability to segment words into respective phonemes could lead to deficiencies in reading acquisition. Words are composed of graphemes that represent the corresponding phonemes, and in order to become successful in reading, the individual needs to be knowledgeable of the grapheme-phoneme correspondence. As previously discussed, reading involves decoding of words, and without the realization of each phoneme in a word, reading accuracy and decoding abilities could suffer. As a result, reading acquisition could potentially become a much slower process for those individuals. Delays in reading acquisition may then have a domino effect on the later developing reading skills such as reading comprehension and reading sentences of varying complexity.

Phonological Decoding

It is no surprise that phonological decoding is a subskill required for word reading abilities (Oakhill et al., 2003). As mentioned previously, decoding is the ability to recognize and formulate words. Successful word reading and decoding abilities are also reliant on phonological awareness, the ability to identify the sound structure of words. From the literature discussed, phonological awareness shares a direct link to word reading abilities and an indirect link to reading comprehension abilities.

Reading nonsense words allows for the assessment of phonological decoding skills, also known as word attack. Nonsense words typically are not present in one's sight word vocabulary, therefore an individual is required to mentally break apart the sounds in a word and blend them together in order to correctly read the word (Carter et al., 2014).

Sight Word Reading

Including nonphonetic words within single-word reading assessment is important for determining one's visual representation process of reading. Nonphonetic words are those that look differently than how they are pronounced, for example the word "ocean." The reader should not depend on sounding out the individual sounds in the nonphonetic word because the production of the word will sound differently from the word's actualization (Carter et al., 2014). Allowing for the reading of nonphonetic words during the assessment of single-word reading assesses one's ability to read words based on sight.

Syntactic Knowledge

Syntax is also a key component in reading. Syntactic knowledge enables a reader to process the order of words in phrases and sentences to make sense of a topic. Knowledge and awareness of the structural components of words, phrases, and sentences facilitates decoding and reading of single words (Oakhill et al., 2003). Syntax can serve as an advantage or a disadvantage to a young reader, meaning that syntax can help advance or hinder one's reading outcomes. Reading comprehension becomes impaired when the word combinations and sentence structures are far too complex for the reader. Sentences high in complexity can interrupt word accuracy in struggling readers. This can be observed in students that read and comprehend modern texts with no difficulties. However, the difficulty may arise when the students are expected to read literature from the Renaissance period, for instance. The sentence structure and the writing style from the Renaissance period are drastically different from the post-modern period, which is what readers are typically more familiar with. When children are expected to read at a much higher syntactical level than they are proficient, the level of comprehending the text as well as the level of reading accuracy could significantly decrease.

Syntax is often the reason why many school-age readers struggle with reading comprehension. Factors such as subject and verb distance can cause cognitive processes to be devoted to "unpacking" the language that is present in the text. Complex noun clauses as well as complex verb clauses can also be difficult for a reader. In addition, children can also experience difficulties with epistemic verbs, those which require mental flexibility to interpret due to the lack of literal meaning. Conjunctions can be confusing for some readers because not only do conjunctions connect sentences and phrases, but they also explain relationships between clauses. If not understood correctly, this would require concrete instruction to teach the meaning of different conjunctive words. Multiple clauses embedded within sentences can also contribute to much confusion when reading complex texts. Syntactic knowledge can have a direct or indirect impact on the outcomes of reading such as reading fluency, reading accuracy, and reading comprehension.

The results from Oakhill's (2003) study mentioned previously, indicated that syntactic knowledge was related to both comprehension and reading accuracy measures at the second time frame when the participants were 10 and 11 years old. However, syntactic knowledge only accounted for variance in word reading accuracy during the first time frame at which the students were 7 to 8 years of age. These results highlight the importance of syntax in regards to word reading accuracy.

Importance of Word Reading Accuracy to Comprehension

The assumption that word reading accuracy is a better indicator of reading comprehension in the early childhood years rather than later childhood years is supported in the research findings of Cain et al. (2004). The longitudinal study included an initial sample of 102 children ranging from 7 to 8 years of age. Their progress was measured throughout their eighth, ninth, and eleventh years. Individual reading ability was assessed by the *Neale Analysis Reading Ability—Revised British Edition* (Neale, 1989), which focuses on word reading accuracy and reading comprehension (Cain et al., 2004). Vocabulary was assessed by using the appropriate levels Vocabulary subtest of the *Gates-MacGinitie Reading Tests* (MacGinitie & MacGinitie, 1989) depending on the ages of the participants. The *Wechsler Intelligence Scale for Children—Third UK*

Edition (Wechsler, 1992) was used to measure knowledge of word meanings, general knowledge, and reasoning skills. Working memory was assessed by activities involving the processing and storing of numbers through a digit task, and activities including sentences, and words. The digit task was included to assess the processing and storing capacity of information without reading sentences and comprehending written information. The purpose of the digit task was to assess memory without the use of language. This enables researchers to obtain information regarding working memory without the additional influence of written language. The digit task was used alongside the sentence and word task in which children were asked to complete sentences and later recall the words (Cain et al., 2004). Comprehension monitoring was measured by having the students read passages with incompatible information and underline any parts they did not understand. Inference and integration skill and knowledge of story structure was also assessed within the longitudinal study. Cain et al. (2004) found the working memory task involving sentences was more related to reading comprehension than the digit task at each time level. Perhaps, this is due to the relevance that sentences and words have to reading comprehension versus the lack of relevance that numbers have to reading comprehension. The relationship between word reading ability and comprehension was more evident in children ranging from 8 to 9 years old than children ranging from 10 to11 years old. This could be explained by the phenomenon that as children develop in their reading abilities, more independent readers rely less heavily on word accuracy to understand the text (Cain et al., 2004). The results led to the conclusion that working memory can influence reading comprehension ability and development, but are not sufficient for higher level processes such as inference making or comprehension monitoring (Cain et al., 2004).

Reading Fluency

Different views of reading fluency entail various underlying factors which contribute to the distinction between fluent versus dysfluent reading. Reading fluency can be viewed as the result of fluent oral reading as measured by accuracy, rate, and prosody. Fluent reading is mainly expressed through reading rate, and a slow decoding rate is suggestive of dysfluent reading (Breznitz, 2006, preface). From a different perspective, reading fluency can be approached through a more linguistic view as measured by reading accuracy and automaticity. Furthermore, reading fluency can be viewed as a skill that encompasses biological and cognitive processes leading to the speed of processing being the variable by which to measure reading fluency (Breznitz, 2006). In more relatively simpler terms for the sake of this study, reading fluency will be understood in terms of reading accurately at a particular speed for a duration of time. Ideally, reading fluency is a skill that matures on a continuum. Naturally, reading begins with slow, segmented, and robot-like prosody. As reading skills advance, it is expected, though not in all cases, that reading becomes smooth, fluent, and seemingly effortless. The accepted definition of reading fluency from Wolf and Katzir-Cohen (2001) elaborates on the idea that reading fluency is a developmental skill starting with the beginning steps and advancing to the level of maturation. Concerning reading fluency, speed refers to the correct number of words read per minute, and reading time represents the amount of seconds needed for each correct word (Jenkins, Fuchs, Van den Broek, Espin, & Deno, 2003).

Reading fluency is most often measured by oral reading tasks, which are used to both quantify and qualify the aspects of one's reading skills in addition to tracking progress in overall accuracy, fluency, and comprehension. However, reading fluency can also be measured in oral single-word reading tasks in which comprehension is not included. These measure focus primarily on the rate and accuracy of reading. Reading fluency is difficult to measure during silent reading, so oral reading fluency often serves as the proxy for the end goal of silent reading (Ashby, Dix, Bontrager, Dey, & Archer, 2013).

Phonological Processing

Phonological processing is a skill that describes the ability to use the sounds of one's oral language to process spoken and written language (Wagner & Torgesen, 1987). As addressed earlier, phonemic awareness is a predictive skill of word decoding accuracy and shows a strong correlation with overall reading accuracy, both at the single-word level and the text level. Phonemic awareness is known as the skill that allows one to focus on and manipulate individual sounds, or phonemes, within spoken words. This skill is known to contribute to early decoding abilities and word recognition. On the other hand, phonological awareness involves identifying and manipulating the sound structure of the oral language and focusing on word parts such as syllables, onsets, and rimes. Both phonological awareness and phonemic awareness and included underneath the umbrella term of phonological processing. Without adequate phonological processing skills, Wagner and Torgesen (1987) state that the reader will find the symbol to sound correspondences to be variable and unpredictable at best.

Discrepancies between reading fluency can be attributed to poor automatized naming speed or poor word decoding abilities. Slow naming speed is indicative of slow cognitive processing. However, slow phonological processing can also contribute to the slow naming speed, causing reading fluency to become deficient (Ashby et al., 2013).

Poor phonological processing can make it difficult for learning readers to make the grapheme-phoneme correspondence, causing word recognition to become slower, which in turn affects reading fluency. Based on research gathered, slow and dysfluent readers read less than fast/fluent readers and come in contact with fewer words, thus limiting their vocabulary and familiarity (Ashby et al., 2013). In contrast, good readers are able to quickly make the correspondence between letters and sounds, and therefore come in contact with more words in a shorter amount of time, enabling the reader to process, store, and retrieve words for accessible use. Research completed by Ashby et al. (2013) explored the relationship of phonological processing to reading fluency by examining reading fluency during silent reading tasks through the observation of eye movements.

Eye movements were measured using the Eyespy approach during phonemic awareness, receptive spelling, and silent reading tasks. Eye movements give insight to the speed it takes to process written text. Eye movements were measured and observed in two fashions by tracking hardware and software: when the eye moved and where the eyes moved. In addition, fixations were also measured in two fashions: total fixation time (amount of time spent looking at a particular word) and fixation count (total number of fixations). These measures were combined to provide the definition of silent reading fluency. Eye movements were measured in ten children at two different time frames, once in the fall semester of second grade and again in the fall semester of the third grade. If phonemic awareness contributes to textual reading fluency, it would be expected that processing time in the phonemic awareness task in second grade would correlate with the silent reading time in third grade. However, if textual reading fluency improves due to a cognitive shift from phonological processing to orthographical representation (sight word reading), then it would be expected that there would be no correlation between processing time of the phonemic awareness task and the silent reading task one grade later (Ashby et al., 2013). Furthermore, if reading fluency improvements are based on increased orthographical reliance, then the processing time on the receptive spelling tasks during the second grade time frame could predict later reading fluency.

During the phonemic awareness tasks, each child was given six experimental trials for the tasks of matching pictures that started with the same beginning sound and matching pictures with the same ending sound. The receptive spelling tasks totaled 12 trials, six with high-frequency words and six with low-frequency words. The children were asked to identify the correct spelling of a word presented verbally from a series of four printed word cards. The silent reading task included eight sentences composed of six to nine words each. The sentences were presented individually on a screen and were followed by a single yes/no question. During the oral reading task, children were presented short passages from the *Curriculum Based Measure* (CBM) of oral reading fluency (Alonzo, Tindal, Ulmer, & Glasglow, 2006). Each child read a total of three passages and the medium number of words per minute was used as the oral reading score. Eye movements on the correct target word were measured during the phonemic awareness task and the receptive spelling task. During the silent reading tasks, total fixation time and fixation count were measured (Ashby et al., 2013).

Based on the results that were obtained, children in Grade 2 who processed the target phoneme faster before making a selection also read at a faster rate during the silent reading tasks in Grade 3 compared to those children who processed the target phoneme at a slower rate. The results are similar in terms of the phonemic awareness task in relation to the oral reading task. The children who chose the target phoneme sooner also read orally at a faster rate compared to the children who spent more time processing the phoneme. However, time during the phonemic awareness task in which the children were to match the beginning sounds did not predict oral or silent reading rates in the second time frame. The time it took for each child to process the target phoneme in the phonemic awareness task correlated strongly with the total fixation time a year later during the silent reading task. Comparatively, the number of words read per minute during the oral reading task in Grade 2 correlated strongly with the total fixation time during the silent reading task a year later. Total time spent during the receptive spelling task during Grade 2 failed to predict both oral and silent reading fluency in Grade 3 (Ashby et al., 2013).

Using the Eyespy approach, efficient phonological processing was indicated by shorter fixation time on the target phoneme during the phonemic awareness tasks, and more efficient silent reading was indicated by shorter total reading time. In terms of phonological awareness and its relation to reading fluency, the main finding was that readers who spent less time processing the target phoneme during phonemic awareness tasks accounted for significant variance 1 year later during the silent reading tasks. This finding emphasizes that phonological processing and phonemic awareness instruction in emergent readers can contribute to the increase in silent reading fluency at the third grade level. The data from this study does not coincide with the shift hypothesis, which states that textual reading fluency improves due to a cognitive shift from phonological processing to orthographical representation (Dehaene, 2009; Shaywitz, 2003). The data does however support the hypothesis claiming that phonological processing skills continually contribute to efficient word recognition skills in fluent readers (Ashby et al., 2013). The clinical implications from these findings suggest that phonemic awareness instruction is a necessity in developing reading fluency, but does not seem to be sufficient in isolation. It is often thought that phonemic awareness contributes to initial reading development only, but the fact that phonological awareness predicts silent reading fluency from Grade 2 to Grade 3 suggests that phonological awareness can contribute to reading fluency even in more advanced readers (Ashby et al., 2013).

Rapid Automatized Naming (RAN)

Theories of various reading disorders explain that deficits in rapid automatized naming can occur independently or along with deficits in phonological processing skills. Thus, rapid automatized naming is thought to be an independent skill in its relation to phonological processing. RAN can serve as a predictor of reading fluency in both early and skilled readers (Jones, Ashby, & Branigan, 2013). RAN is the serial naming task of objects, letters, digits, or colors arranged in a 50-item array. This task is seemingly effortless for some. However, RAN can prove to be difficult for poor readers and those with reading deficits such as dyslexia. Dyslexia is often characterized by overall slower reading rates and slower performances on RAN tasks.

In attempts to further explore the relationship between RAN and reading fluency, Jones et al. (2013) investigated the effects of adjacent letters on RAN in both dyslexic and non-dyslexic readers. Individual letters were arranged in a 40-item array, and trials included both similar and non-similar orthographic and phonological letters in the matrix. The participant was required to name each letter while eye movements were measured by an eye tracking apparatus. From the results of investigating the influence of similar letters in parafoveal view (up to a five-degree angle), the dyslexic group would be expected to perform significantly poorer on RAN measures, single-word reading measures, and memory tasks (involving forward and backward digit span) compared to the non-dyslexic group. Each dyslexic reader obtained a RAN score that was at a minimum of 1.5 SD below the scores of the non-dyslexic readers (Jones et al., 2013). Slower processing time of letters that were viewed adjacent to orthographically similar letters ("p" and "q," for instance) was noted in the dyslexic group. However, phonologically similar letters revealed no difficulty for either the dyslexic or the non-dyslexic group of readers. Thus, slower processing times were noted in the dyslexic group when similar orthographic letters were viewed adjacent to the next letter in the array. This signifies that dyslexic readers have difficulty inhibiting the confusing information after viewing a letter and then viewing an orthographically similar letter. From the results of investigating the influence of information in the foveal view (within two-degrees of the target information), there are differences in the foveal processing between the two groups of readers. Dyslexic readers were confused by orthographically similar items, but non-dyslexic readers' RAN and fluency performances were not inhibited by orthographically similar items (Jones et al., 2013).

When naming items within a row, readers process the fixated, foveal item and even some information from the upcoming, parafoveal item. Thus, both foveal and parafoveal processing contribute to overall serial naming abilities. The results found in the dyslexic group of readers suggest that parafoveal and foveal information can have a detrimental impact to RAN and also to reading fluency. The data show that dyslexic readers process both phonological and orthographic information differently than non-dyslexic readers, thus leading to slower reading rates and inaccuracies in reading, affecting the overall reading fluency. RAN not only can serve as a predictor of reading fluency but also later reading abilities (Jones et al., 2013).

Double-deficit Hypothesis of the Developmental Dyslexias

The topic of reading fluency fosters the discussion of dyslexia. The complex combination of subskills that enable one to read can become deficient and overwhelming for beginning readers, potentially resulting in an array of reading deficits, one of those being dyslexia. Failures in reading often times manifest from inaccurate reading (deficits in decoding) and/or slow/nonfluent word reading (deficits in reading fluency). Breznitz (2006) addresses these failures as developmental dyslexia. Difficulties in reading leading to the diagnosis of dyslexia can occur in any of the linguistic areas associated with reading such as word reading accuracy, reading rate, metalinguistics, semantics, syntax, phonological awareness, rapid automatized naming (RAN), and reading comprehension. Three types of dyslexia are proposed—dyslexia characterized by naming speed deficits, dyslexia characterized by phonological abilities deficits, and dyslexia characterized by both naming speed and phonological abilities impairments. The latter of the three is what is referred to as the double-deficit hypothesis of the developmental dyslexias (Wolf &

Bowers, 1999). This type of reading impairment includes both a reading fluency component and a phonological component.

Reading fluency is one factor that can limit one's overall reading efficiency if impaired. Breznitz (2006) describes that impairments in reading are often exhibited through inaccuracies and dysfluencies. Wolf and Bowers (1999) examined how phonological abilities and naming speed relate to overall reading abilities in the population with dyslexia, leading to what is called the double-deficit hypothesis (DDH) of the developmental dyslexias. Through such a model, naming speed is considered a separate entity apart from phonological abilities. Phonological awareness was the primary focus, as mentioned previously, and is the awareness of the structure of sounds, words, and sentences and is extremely important in learning to read. This metalinguistic skill also involves the ability to manipulate the sound structure of words. Naming speed refers to the capacity to verbally recall labels that are given to visual stimuli such as pictures or objects. The importance this has to reading is seen in the connections of the verbal and visual relationship to the processing speed of identifying and recalling labels (Denckla & Cutting, 1999). Thus, those with more impaired naming speed are classified as having dyslexia characterized by naming speed deficits, and those with more impaired phonological awareness are classified as having dyslexia characterized by phonological awareness deficits. The double-deficit dyslexia profile presents with both naming speed and phonological awareness deficits, and is hypothesized as having the most impaired reading abilities. Wolf and Bowers (1999) suggest that the naming speed subtype of dyslexia is due to disrupted reading fluency rather than the phonological awareness subtype of dyslexia which is due to disrupted reading accuracy.

Nelson (2015) researched each of the three subtypes of the dyslexias in adults and adolescents who exhibited reading deficits affecting the areas of fluency and/or accuracy or who had dyslexia. The individuals included in the study presented with naming speed deficits but no comorbid disorders. It was hypothesized that the group with double-deficit dyslexia would exhibit increased reading difficulties when compared to the phonological awareness or naming speed dyslexia. Phonological awareness, naming speed, intellectual ability, reading skills, and spelling skills were all assessed in each individual by using various subtests from standardized assessment tools. Based on the results of the study, phonological awareness was predictive of real word reading and spelling. However, naming speed was only predictive of reading fluency. Thus, the importance of naming speed in overall reading fluency is illuminated. If naming speed is poor, it could be expected that reading fluency would be considered poor as well. The same logic would potentially be applied to those with average or above average naming speed and the relation to reading fluency. Overall, the double-deficit subgroup was not more impaired than the phonological awareness subgroup or the naming speed subgroup. However, the double-deficit subgroup exhibited a decrease in real word spelling skills (Nelson, 2015). Naming speed was highly predictive of reading fluency on more than one account, and is suggested to indirectly affect reading comprehension abilities. Thus, naming speed is a crucial component necessary for intact reading fluency and can result in negative consequences for reading comprehension.

Single-word Reading Fluency and Textual Reading Fluency

Just as reading fluency can be measured in silent reading tasks and oral reading tasks, reading fluency can also be measured in terms of single words and passages of text.

The two separate reading fluency tasks are referred to in this paper as single-word reading fluency (also known as context-free reading fluency) and textual reading fluency (also known as contextual reading fluency). Single-word reading fluency refers to words being read accurately in isolation at a certain speed in a certain amount of time. On the other hand, textual fluency can be described as words read accurately at a certain speed within a certain amount of time in the presence of surrounding text. Textual reading fluency and single-word reading fluency are two specific measurements of reading fluency. These two types of reading fluency are not the same, as they are measured differently and depend on different cognitive processes. However, whether assessing single-word reading fluency or textual reading fluency, both can only be observed through oral reading tasks. Oral reading tasks provide more objective measure of one's prosody, rate, and reading accuracy relative to silent reading tasks. More recently, silent reading tasks provide observation of the subskills of reading fluency by examining eye movements as the previously mentioned studies demonstrated.

Many studies have explored the relationship of reading fluency to word level reading leaving much to be investigated in the relationship between reading fluency to connected text level reading (Katzir et al., 2006). Skills such as phonological awareness and word reading accuracy have been shown to be the leading contributors to word reading fluency. Breznitz (2001) proposed an expanded definition of reading fluency to include factors such as reading rate and reading accuracy to each level of reading, letter naming, word identification, and comprehension of connected text. In the study conducted by Katzir et al. (2006), it was hypothesized that as letter naming, orthographic representation, and phonological processes showed correlations with word reading fluency, the subskills would also correlate to textual reading fluency. Furthermore, it was hypothesized that rapid letter naming would contribute more to rapid word and connected text reading and that phonological processing would contribute more to word reading accuracy. Both rapid letter naming and phonological processing were expected to have correlations with overall connected text comprehension abilities.

To assess reading fluency, researchers have stated that while listening to an individual read aloud, oral reading fluency should be measured with three aspects in mind: word reading accuracy, rate, and prosody (Hudson, Lane, & Pullen, 2005). Although Hudson et al. explain reading fluency as being composed of different components than Jenkins et al. (2003), it is understood that reading fluency is important because it has been found to demonstrate direct correspondence with reading comprehension abilities. Each aspect of reading fluency has an effect on textual comprehension. For instance, when words are read incorrectly, it can alter the meaning of not only the word, but also the surrounding text. This leads to a setback in the interpretation of the word and comprehension of the overall text (Hudson et al., 2005). The speed or rate at which a person reads can be a positive or negative indicator of reading comprehension. It cannot be automatically assumed that if a person is reading at a fast rate, the text is being understood. However, a person expressing slow rate during reading may exhibit problems in reading comprehension (Başaran, 2013). Hudson et al. (2005) suggested that slow and laborious reading may take away from the mental capacity needed to comprehend text.

Research findings from Jenkins et al. (2003) suggests textual reading fluency can predict reading comprehension ability more so than single-word reading fluency and context accuracy. The sample used in the research consisted of 113 fourth grade students from the southeastern United States. The students were exposed to a modified version of the folktale, "The Father, His Son, and Their Donkey." It was presented in its natural form, in a randomized word list, and in a randomized paragraph form without punctuation. From these, reading accuracy, speed, and time were calculated. The Reading Comprehension subtest of the *Iowa Test of Basic Skills* (*ITBS*) (Riverside, 1994), which includes reading short passages and answering comprehension questions, was also administered to the participants. After administration of the *ITBS* in large groups, the participants read each form of "The Father, His Son, and Their Donkey" for 1 minute. Results indicated textual reading speed was a stronger predictor of comprehension than was the word list reading speed. Although textual reading accuracy did not add to the prediction of reading comprehension, textual reading time indicated a higher relevance to comprehension than did word list reading time. Researchers concluded that single-word and textual reading fluency overlap to an extent, but textual reading fluency surpasses single-word reading fluency in measuring comprehension ability. In addition to this, it was indicated that single-word reading abilities contributed more to textual reading fluency in less fluent readers, but in more fluent readers, comprehension processes predicted textual reading fluency (Jenkins et al., 2003).

It is widely accepted that fluent reading, in terms of accuracy and speed, lessens cognitive restraints, allowing cognitive resources to be used for construction of higher order meaning of the text (Carter, Walker, & O'Brien, 2014). In other words, the ability to read text fluently, loosens the dependence upon decoding and allows for more comprehension connections to be made when words are being read efficiently. As addressed in the literature, single-word reading fluency is a separate construct from textual reading fluency, but both are highly related to one another due to the fact that single-word reading fluency fosters the development of the ability to read coherent sentences and paragraphs with relative ease. This relationship continues to unfold as textual reading fluency correlates strongly with reading comprehension more so than single-word reading fluency. This is not to suggest that single-word reading fluency shows no relation to reading comprehension abilities, but rather suggests that single-word reading fluency can indirectly contribute to reading comprehension abilities and predict this later developing reading skill (Kim, 2015).

Reading Comprehension

Reading comprehension is a relatively abstract skill, whereas skills such as single-word reading accuracy are more concrete. As previously mentioned, reading comprehension results from a combination of complex cognitive functions occurring in synchrony. The ability to read words and text both accurately and fluently facilitates the level of reading comprehension. Comprehension has been defined as "the process of simultaneously constructing and extracting meaning through interaction and engagement with print" by the Research and Development (RAND) Reading Study Group (RRSG) (RRSG, 2002). Furthermore, a proposed model of reading comprehension links the literal understanding of words and sentences to the understanding of complex texts (Snow, 2010). This circular model is composed of four concepts that build on one another in order to reach the highest level. Beginning with basic word-level reading, the model continues with text-based meaning, the processes leading to a higher level of understanding, and finally, highly elaborated comprehension skills needed for deep studies and learning from the text (Snow, 2010). In addition to the underlying pre-literacy skills that reading comprehension builds upon and the level of comprehension that can be achieved as one progresses on the continuum, comprehension can vary depending on the cognitive abilities/limitations within individuals and the purpose of the comprehension task of that individual.

Sub-processes that Influence Reading Comprehension

Much like single-word reading accuracy and reading fluency, reading comprehension entails subskills that are necessary in order for innate reading comprehension abilities. Comprehension occurs on a continuum. Thus, reading starts with letter recognition and identification, grapheme-to-phoneme correspondence, decoding, sight word reading, and progresses to skills such as reading fluency and reading comprehension. This is indicative of a bottom-up description of reading. When earlier reading skills are weak and deficient, reading comprehension skills could become interrupted due to inaccurate word reading resulting in altered meanings of words and text (Cutting & Scarborough, 2006). Short-term memory is thought to play a role in comprehension of text through recalling of text and remembering facts from stories (Oakhill et al., 2003). Word knowledge also contributes to reading comprehension, both in the pediatric and adult population. Knowledge of word meanings facilitates the ability to extract meaning from the text as a whole. Syntactic skills, such as identifying the structure of the sentences, share a relationship with reading comprehension. Oakhill et al. (2003) state that knowing the structure of the surrounding context of a novel word could help establish a meaning to the word. Grammatical knowledge also contributes to reading comprehension. Without understanding allowed combinations of words in order to make grammatically correct sentences, the understanding of a larger portion of text is limited. Syntax is crucial in not only decoding but also in reading comprehension (Oakhill et al., 2003). However, just as these skills can facilitate reading comprehension, they can also hinder reading comprehension if the child presents with language and/or reading delays/deficits which are affecting the understanding of word and/or sentence structure, phonological aspects of letters and letter combinations, and/or the meaning of words. If any of the underlying skills are delayed, reading comprehension could become delayed, as well. Reading comprehension, whether accomplished orally or silently, is the end goal. Many would argue that reading does not take place unless there is some level of understanding extracted from the text.

Reading comprehension has been viewed along with word recognition and reading fluency through a model derived from an information-processing theory (LaBerge & Samuels, 1974). In this model, reading fluency becomes more of an automatized task as certain subskills become mastered. As these subskills, such as letter, syllable, and word recognition become mastered, more attention can be allotted to the cognitive capacity needed to extract understanding from words and text. Thus, the attention that was once focused on the visual representation of words is decreased because it is now being devoted to understanding the text. In conclusion, reading comprehension cannot be obtained if the reader has to devote a disproportional amount of focus toward word recognition abilities. When unskilled readers are faced with the need to recognize and comprehend the words, switching takes place between each task. The switching between word recognition and comprehension occurs slowly and interferes with the overall ability to comprehend what is read (LaBerge & Samuels, 1974).

However, when a reader reaches the level of reading fluently and with automaticity, the reader is being detached from word decoding, allowing more cognitive resources to be used in comprehending passages as a whole (Kim, 2015). Some studies suggest the relationship between textual reading fluency and reading comprehension is bi-directional, meaning that comprehension can facilitate textual reading fluency and vice versa.

In Carver's (1997) rauding theory, connections are made between reading fluency and comprehension. According to Carver (1997), the rauding mode of reading is one in which the reader reads with the intention of understanding each thought. Reading in such a way involves the mental activation of the lexicon, application of meaning in the context in which it is presented, and sentential integration. According to this theory of reading rate and comprehension, reading rate is the end result of comprehension and decoding. Thus, the level of reading rate depends on the level of word decoding and reading comprehension. From this approach of viewing reading comprehension as it relates to reading fluency, it is expected that the better the decoding and comprehension, the better the reading rate will be. However, reading rate can also be an independent factor in the topic of reading comprehension. In this approach, reading rate is viewed as a factor that can negatively affect one's level of reading comprehension as well as one's word reading accuracy.

Theory of mind, a skill that is important in language development and social development, is also a skill that enables readers to comprehend text. In comprehension of narratives, theory of mind plays a crucial role. The aspect of understanding and relating to others' mental states is beneficial for children to make the connections between characters within a story and make inferences regarding future events. Making inferences regarding characters' changing emotional and behavioral profiles is a large aspect of reading comprehension (Kim, 2015). Theory of mind facilitates inferential comprehension because it involves a higher cognitive level to understand and relate to the changing character profiles within a story.

Variation of Comprehension

As stated previously, reading comprehension can occur as a result of both oral reading and silent reading. Within either manner in which comprehension is addressed, there are two main types of reading comprehension. These include literal comprehension and inferential comprehension. Literal comprehension involves understanding the factual components of text such as the who, what, when, and where aspects of a story. Literal comprehension questions address facts that are explicitly stated within the text and can be referred to as surface level comprehension. Inferential comprehension involves a higher level of cognitive processing in order to understand certain aspects of the story such as why, how, and the prediction of outcomes and is often considered deep comprehension due to the fact that you have to use reasoning and logic to formulate an answer. Inferential comprehension questions address information that is not explicitly stated within the text and therefore, must be inferred. Both of these types of comprehension can be addressed through the manner of oral or silent reading.

Also, comprehension varies as a result of both endogenous and exogenous factors. The endogenous factors (internal factors) influencing reading comprehension involve the level of abilities the child has cognitively. In other words, the level of comprehension a reader is able to achieve is affected by the level of mastery of pre-developing literacy skills. The level of reading often correlates with the level of comprehension the child is able to attain. The exogenous factors (external factors) are those explaining the purpose of comprehending written text. The purpose of written text influences the type of comprehension the reader is expected to obtain from reading the text. For instance, some written text is meant to persuade the reader to take action of any sort, while other texts may be written in a manner to explain a process or item. Both endogenous and exogenous factors exert influence on the way in which comprehension can vary and to what degree.

The style of writing has much to do with how comprehension can vary between texts. Expository or non-fictional texts allow for far more literal comprehension than inferential due to the style of writing. Expository texts use technical writing to explain the topic clearly while using specific vocabulary and images and/or graphs/charts to provide additional explanations to higher content topics. Due to the clear and concise manner in which these texts are written, there is expected to be none to very little content that would be left for the reader to infer. This genre requires the reader to use surface level comprehension more so than deep level comprehension and can lead to the reader relying heavily on semantic processes to understand vocabulary meaning, syntactic processes to recognize the relationships between the words, phrases, and syntax, and also word decoding skills in order to decode unfamiliar and/or nonphonetic words. Although non-fictional passages leave little for the reader to infer, the level of comprehension can be challenging to an individual due to the skills that the questions often rely so heavily upon (Marzban & Seifi, 2013).

On the other hand, fictional or narrative writing styles allow for additional variation within the realm of comprehension. The genre of fiction allows for both surface and deep level comprehension, meaning that comprehension can be geared toward the explicitly stated information or the information that has to be inferred. The latter of the two leads to more reliance upon higher cognitive skills that, as stated earlier, can hinder or benefit the reader. Inferential comprehension of narrative passages required the reader to rely heavily upon language processing, reasoning, and theory of mind. Fictional passages are written in a narrative writing style that leads much to be inferred by the reader, such as character's feelings, prediction of future events, and relating the story to self (Marzban & Seifi, 2013).

Silent Reading Comprehension Versus Oral Reading Comprehension

No matter the manner in which one is reading, either orally or silently, each entails multiple underlying processes that work together in order to allow one to grasp meaning from the text. Thus, it is expected that the process of learning to read and developing reading skills occurs on a continuum starting with the basic building blocks such as alphabet knowledge, phonological awareness, and single-word reading accuracy and expanding to reading with automaticity and comprehension (Snow 2010; Cutting & Scarborough, 2006). As mentioned previously, the end goal of reading is comprehension. Written text is meant for comprehension. Therefore, it is crucial for readers to not only learn the foundations of reading accurately and fluently, but to also develop cognitive skills that allow for obtaining meaning from written texts (Snow, 2010).

Oral reading comprehension has high correlations with word decoding abilities. During the process of oral reading, the individual is "forced" to decode each word more so than in silent reading tasks. The decoding abilities of an individual can heavily impact the overall oral reading abilities a child possesses because oral reading is, in simple terms, a combination of word reading accuracy and reading fluency. Thus, oral reading can be more difficult for an individual with reading difficulties because each word has to be decoded, whereas in silent reading, words can be skimmed over or even skipped (Ashby et al., 2013; Kim, Wagner, & Foster, 2011; Kim, 2015).

Oral reading fluency and comprehension has been a heavily researched topic in understanding the reading processes of young and emergent readers. However, relatively little focus has been devoted to the topic of silent reading fluency and silent reading comprehension, which are skills that are expected to be mastered as the emergent readers become proficient readers. From approximately the fourth grade level and on, it is expected that children become skilled at reading to learn rather than learning to read. Around this time, it is also expected that children begin to prominently read silently rather than orally. Silent reading abilities stem from oral reading abilities. Silent reading comprehension becomes the preferred method for skilled readers because it usually becomes a faster method of reading in comparison to oral reading (Kim et al., 2011). This is not to state that research of oral reading fluency and oral reading comprehension becomes irrelevant in the discussion of silent reading fluency and silent reading comprehension. Without becoming a proficient oral reader, including proficiency in oral reading fluency and comprehension, the reader will lack substantial silent reading abilities enabling the reader to use this as the preferred manner of reading. In other words, mastery in oral reading fluency and comprehension facilitates the mastery of silent reading fluency and comprehension. However, this should be approached with caution due to the fact that readers can participate in what is called “fake reading” (Kim et al., 2011). This idea encompasses those who pretend to read silently at a fast rate but exhibit poor silent reading comprehension abilities. This is not true in every case, but it is a present issue in developing silent readers and could contribute to struggles in academics.

It is thought that silent reading fluency and silent reading comprehension occur in a natural progression from oral reading fluency and comprehension, unless reading disorders or deficits in the underlying processes prohibit readers to develop on a continuum (Kim et al., 2011).

In terms of assessment, there may be instances in which silent reading comprehension scores differ in comparison to oral reading comprehension scores. The reason being that oral reading entails more cognitive processing devoted to the act of word decoding as compared to silent reading. Strengths in word reading accuracy, decoding, and fluency may yield higher scores on oral reading assessments such as the *GORT-V*. This test measures oral reading different than other oral reading assessments due to the differing values placed on skills of oral reading. If more cognitive processes are rendered to reading words accurately, then this takes away from the amount of cognitive attention devoted to actually grasping meaning from the text, weakening the comprehension aspect of oral reading. During silent reading, the reader has the opportunity to decode words faster due to the fact that the oral component is removed and the words can be skimmed over or mispronounced without directly affecting the comprehension of the text. Thus, the overall meaning of the story may still be obtained more so than during oral reading because more capacity is devoted to developing an understanding of the text. However, the component skills that silent reading is composed of differs from those of oral reading. Silent reading is a higher cognitive skill that requires simultaneous word reading fluency and attention, reasoning, and language processing skills. Depending on whether these skills are strengths or weaknesses, the scores on silent reading comprehension assessments can differ.

Assessment of Reading Comprehension

There is much debate as to what is considered adequate in assessing reading comprehension ability. Many researchers have agreed that reading accuracy and fluency, in addition to many other skills, were thought to be highly important in comprehensive reading assessments (Barr, Blachowicz, Katz, & Kaufman, 2002; Richek, Caldwell, Jennings, & Lerner, 2002; Ruddell, 2002). These included linking the text to previously stored knowledge, summarizing the text, using inferred ideas to interpret the text, interpreting the text literally, figuratively, and critically, determining whether or not comprehension is occurring, and using appropriate strategies to fix reading errors and comprehension breakdowns (fix-up strategies) (Kamhi, 2012). As stated previously, the value of each of these component skills differs between assessment tools, and depending on the strengths and weaknesses of the reader, the scores will differ as well.

Previous research studies and published literature provide mixed findings regarding the debate of whether or not oral or silent reading yields higher levels of reading comprehension (McCallum, Sharp, Bell, & George, 2004). Some researchers have found that oral reading and oral answering of questions yields better comprehension scores than does silent reading for readers in second and third grades. The reading passages were taken from a standardized assessment and used during the administration of the test as a whole (Swalm, 1972; Elgart, 1978; Fletcher & Pumfrey, 1988). Nevertheless, some results have been contradictory, finding that silent reading yields better reading comprehension scores in some pediatric populations, but not in others. The lower readers in the population performed better on oral reading comprehension tasks (Rowell, 1976; Miller & Smith, 1985). However, research from a continuation of Miller's and Smith's study has found that silent reading leads to better reading comprehension in lower level readers versus oral reading (Miller & Smith, 1990). There are multiple factors that could explain why one mode of reading would be superior than the other in regards to reading comprehension. During oral reading, the reader is required to focus on each word as a separate entity and decode the word correctly in order to make sense of the words and the text as a whole. For struggling readers, this task may be daunting, causing reading comprehension to suffer as a result. Advanced readers may perform higher on reading comprehension tests as a result of strengths in oral reading by relying on both the sight of the words and sound of the words. When reading orally, the reader is forced to read each word by not only visualizing the word, but also by reading aloud the word. This allows for less avoidances of words that may be unknown, resulting in words to be read that could normally be skipped over during silent reading tasks. On the other hand, silent reading could be superior in regards to reading comprehension because the reader is not forced or expected to pronounce each word correctly, including enunciations and pauses. In addition, more cognitive resources are being used for the motoric act of producing voice when reading aloud. Silent reading may be the better route for these readers because the child would not be faced with the exhausting task of decoding each word correctly (McCallum et al., 2004).

Due to the mixed results provided in the literature, it could be difficult for researchers and clinicians to determine an appropriate assessment route to assess comprehension in the most efficient manner. In the attempts to decipher which method of reading, oral or silent, is superior in regards to reading comprehension and to determine which method is more efficient, McCallum et al. (2004) conducted a study which administered the *Test of Dyslexia (TOD)* (McCallum & Bell, 2001) and the *Comprehensive Test of Basic Skills (CTBS)* (McMillan/McGraw Hill, 1989) to 74 elementary aged students. The oral and silent reading tests from the *TOD* were administered in an alternating fashion, and the Reading Comprehension subtest was administered to all students. The Reading Comprehension subtest required the students to read (either orally or silently depending on the assigned group) sentences and short passages and answer the questions that followed. Administration of the Reading Comprehension subtest was continued until five consecutive questions were answered incorrectly. The total number of questions answered correctly yielded the Total Comprehension score. The students' reading ability was accounted for by taking the Total Reading normal curve equivalent scores from the group administered *CTBS*. Each student was assessed in a one-on-one fashion.

Results indicated that there was no statistically significant difference between the number of oral reading comprehension questions answered correctly versus the number of silent reading comprehension questions answered correctly. However, results indicated that the overall time needed to read the passages and sentences was significantly lower for that of silent reading compared to oral reading. Thus, silent reading was shown to be the more efficient method of reading over oral reading. This finding can be relevant in the topic of reading assessment. If silent reading was shown to be more efficient (less time consuming) than oral reading, then researchers and clinicians could opt for silent reading comprehension tasks if time is a concern for either the clinician and/or the child. Professionals will more than likely choose the most efficient route of reading comprehension assessment due to this skill being difficult to assess comprehensively (McCallum et al., 2004). These results can be useful for the elementary population within the topic of individualized assessment of reading ability.

Many concerns arise when assessing reading comprehension ability. In order to effectively assess reading comprehension, the targeted reading skills for assessing reading comprehension need to align with the clinical goals for assessment. It is critical for clinicians to know the tests and what reading skills are being measured in order to determine what underlying factors are leading to the perceived deficits in reading comprehension (Keenan & Betjemann, 2006). The type of questions included in assessment tools for reading comprehension is an important factor to consider. In order to obtain the most valid scores on reading comprehension, the questions need to be passage-dependent, meaning that the participants would actually have to read the text in order to answer the questions correctly. On the other hand, passage-independent questions are those that can be answered correctly based on prior knowledge or without necessarily having read the entire text. Inclusion of passage-independent questions does not provide for an accurate indication of reading comprehension ability (Keenan & Betjemann, 2006).

The manner in which reading comprehension is assessed depends greatly upon which skills are thought to be predictors. It is accepted that without the development and mastery of the bottom-up skills of reading, reading comprehension will be significantly delayed or absent. Nonetheless, it is crucial to build upon the bottom-up skills, but this should never be the end goal of assessment and intervention. Addressing the foundational skills of reading can be beneficial in improving comprehension, but it does not always guarantee automatic improvements in comprehension (Cutting & Scarborough, 2006). This signifies that there are other skills apart from reading that allow for reading comprehension such as attention, memory, and world knowledge which can affect reading comprehension. Just as there are differences in what is thought to predict reading comprehension and what skills are more important than others, there is great variety in how comprehension is measured. This is evident by examining various reading comprehension assessment tools (Cutting & Scarborough, 2006).

Cutting and Scarborough (2006) investigated the importance of the predictive values of reading skills relative to reading comprehension. Assessment tools of reading measure reading comprehension differently. The way in which comprehension is measured depends heavily upon the predictive value of the precursors that are thought to contribute to reading comprehension relative to other subskills of reading. In their discussion of which reading skills are related to reading comprehension, Cutting and Scarborough (2006) address multiple skills such as decoding, linguistic comprehension, phonological awareness, vocabulary, reading speed, verbal memory, and reasoning skills. Each of these skills impacts reading comprehension in different manners, which leads to the variety of assessment tools of reading comprehension. The purpose of their study was to investigate the contribution of cognitive and linguistic abilities to reading comprehension by analyzing the way in which comprehension was measured by various instruments including the *Gates–MacGinitie Reading Test-Revised (G-M)* (MacGinitie, MacGinities, Maria, & Dreyer, 2000), *Gray Oral Reading Tests-Third Edition (GORT-3)*

(Wiederholt & Bryant, 1992), and the *Wechsler Individual Achievement Test (WIAT)* (Wechsler, 1992). On the *G-M* test, there are expository and narrative passages of increasing difficulty that are read silently. The reader then answers the multiple-choice questions that follow each passage while the text is still in view. The *GORT-3* requires the readers to read aloud passages of increasing difficulty and answer the five multiple-choice questions read aloud by the examiner after the passage is removed from view. During the *WIAT*, expository and narrative passages are read aloud by the examinee, and two open-ended questions (one inferential and one literal) are presented orally by the examiner for the examinee to answer.

Other assessment instruments were included in this study. The Basic Reading subtest from the *WIAT* and the Word Attack subtest from the *Woodcock Johnson Psychoeducational Battery-Revised* (Woodcock & Johnson, 1989) measured phonological decoding and word recognition skills. The *Peabody Picture Vocabulary Test-Third Edition (PPVT-3)* (Dunn & Dunn, 1997), *Boston Naming Test* (Kaplan & Goodglass, 1978), and the Word Classes subtest from the *Clinical Evaluation of Language Fundamentals-Third Edition (CELF-3)* (Semel, Wiig, & Secord, 1995) measured lexical knowledge by assessing receptive and expressive vocabulary and semantic knowledge. The Concepts and Directions, Formulating Sentences, and Recalling Sentences subtests of the *CELF-3* were used to measure sentence processing. The Rate subtest from the *GORT-3* was used to measure reading speed, and rapid automatized naming was measured using the *Comprehensive Test of Phonological Processing (CTOPP)* (Wagner, Torgesen, & Rashotte, 1999). IQ was measured by the *Wechsler Intelligence Scales for Children-Third Edition* (Wechsler, 1991). The

Immediate Recall subtest of the *Wide Range Assessment of Memory and Learning* (Sheslow & Adams, 1990), the Nonword Repetition test and the Memory for Digits test from the *CTOPP*, and a non-standardized sentence span assessment were included to measure verbal memory skills. Parents were required to answer three questionnaires including the Inattentive and Hyperactivity/Impulsive scales from the *ADHD-IV* rating scales (DuPaul, Power, Anastopolous, & Reid, 1998), the Attention Problem Index from the *Child Behavior Checklist (CBCL)* (Achenbach, 1991), and the Inattentive and Hyperactivity/Impulsivity scales on the *Conners' Parent Rating Scales-Revised* (Conners, 1997). Composite scores were created for phonological decoding/word recognition, lexical skills, sentence processing, and inattention, hyperactivity, and attention.

The sample included 97 children with 32 girls and 65 boys. The sample population was not selected for this specific study, but for another study examining reading and language deficits in children with Neurofibromatosis Type 1 (NF-1). The grade level ranged from Grades 1.5 to 10.8, and the age range was from 7.0 years to 15.9 years. Twenty-five children met diagnostic criteria for ADHD and were treated with medication during the time of testing.

From the correlation result of cognitive, reading, and language skills to reading comprehension, it was found that the *G-M* correlated highly with the *WIAT*, but the same could not be said for the *GORT-3*. Reading comprehension scores varied with their associations with phonological decoding/word recognition, sentence processing, and verbal memory. Regardless of which comprehension measure was entered in the analyses models, phonological decoding/word recognition skills contributed to prediction of reading comprehension (Cutting & Scarborough, 2006). This model of predictive value contributed for only 49% of the variance for the *GORT-3* relative to the 67% for the *WIAT* and 72% for the *G-M* tests. When reading speed was entered in this model, the variance for the *GORT-3* was only increased to 56%, leaving a substantial percentage of variance unexplained. Word recognition/decoding skills accounted for nearly twice as much variance in comprehension for the *WIAT*, indicating that this measure of comprehension depended more so on early literature, or bottom-up, skills than did the *GORT-3* or the *G-M* tests.

The relation of oral language skills including vocabulary knowledge and sentence processing to reading comprehension were found to exhibit similar results to those discussed previously. Oral language skills accounted for a higher percentage of variance in reading comprehension as measured by the *G-M* compared to the *WIAT* and the *GORT-3*. Again, these finding from Cutting and Scarborough (2006) indicate that assessments of reading comprehension place different demands on oral language proficiency.

Taken from the statistical results, adding the reading speed value to the word recognition/decoding value accounted for a 1-6% increase in the amount of variance between the three comprehension measures. This means that adding the reading speed component to bottom-up skills of reading comprehension can better predict comprehension abilities as measured by the tests included in this study. However, the prediction of reading comprehension was not increased by including verbal memory, rapid automatized naming, or IQ (Cutting & Scarborough, 2006). Findings also indicate that the age of the readers or readers' performance regarding specific skill sets does not contribute increased predictive value to reading comprehension.

The results from this study parallel with the fact that each measure of reading comprehension assesses this skill differently, with more emphasis placed on cognitive and linguistic skills than others and vice versa. Regardless of what skills are included in the assessment tools used for measuring reading comprehension, it is crucial to assess a variety of skills varying from cognitive to linguistic to print skills. When reading and/or comprehension deficits are at hand, it is best to use a combination of assessment methods to conclude which form of comprehension shows to be most troubling for the child. From this, the clinician will be able to grasp a better understanding of the level of performance of the underlying skills (attention, memory, reasoning skills, vocabulary knowledge, syntax, etc.) that different methods of comprehension (cloze sentence completion, multiple choice format, literal questions, inferential questions, etc.) assess. Cutting and Scarborough (2006) state that the strengths and weaknesses that are present depend greatly on the type of assessment tool chosen to measure reading comprehension.

Research from Ouelette (2006) addressed reading as involving decoding, visual word recognition (sight-word reading), comprehension, and oral vocabulary. In a study examining the importance of vocabulary in word reading abilities and reading comprehension, 60 fourth grade students were assessed to determine the level of receptive and expressive vocabulary as well as vocabulary knowledge, decoding, sight-word reading, and reading comprehension. Decoding was measured by the *Woodcock Reading Mastery Tests-Revised* (Woodcock, 1998), vocabulary was measured by four subtests of the *Test of Word Knowledge* (Wiig & Secord, 1992), reading comprehension was measured by the Passage Comprehension subtest of the *Woodcock Reading Mastery Tests-Revised* (Woodcock, 1998), and visual word recognition was measured by a modified word list from Adams and Higgins (1985). According to the results, decoding was found to relate to reading comprehension with word-recognition (sight-word reading) as the linking factor (Ouelette, 2006). When examining comprehension in the context of vocabulary, phonological decoding appeared to be less of a predictor compared to the semantic factor of vocabulary. With Ouelette's study focusing less on the direct relationship between decoding, single-word reading abilities, and comprehension and more focusing on the predictive value of vocabulary knowledge to reading comprehension, the results indicate visual word recognition, or sight-word reading, is highly correlated to vocabulary, which appeared to be the best indicator of overall reading abilities in children (Ouelette, 2006).

Sabanti, Sawaki, Shore, and Scarborough (2010) examined Gough and Tunmer's Simple View of Reading to determine how effective it is in accounting for reading comprehension. The results depicted the Simple View of Reading was an appropriate fit and accounted for reading comprehension quite well in adults with low reading abilities (Sabanti et al., 2010). In addition, the study also addressed how well a combination of textual fluency, single-word reading rate, and single-word reading accuracy relates to comprehension. The *Test of Word Reading Efficiency (TOWRE)* (Torgesen, Wagner, & Rashotte, 1999) measured single-word reading fluency (single-word reading rate plus accuracy), the *Woodcock-Johnson III Tests of Achievement* (Woodcock, McGrew, & Mather, 2001) Word Identification subtest measured single-word reading accuracy, and the Passage Comprehension (PCMP) subtest from *Woodcock Johnson III Tests of*

Achievement (Woodcock et al., 2001). In summary of their findings, approaching comprehension by examining textual fluency and single-word reading speed alone was not substantial. This does not indicate that fluency and rate provided no insight to predicting or assessing reading comprehension. However, it does suggest that these two constructs alone lacked value in in dicating reading comprehension ability. From this study, the researchers state that a single standardized measure for assessing reading comprehension is not sufficient to identify an individual's area of weakness (Sabatini, Sawaki, Shore, & Scarborough, 2010). Furthermore, vocabulary was found to add very little relevance to predicting reading comprehension. Nonetheless, vocabulary is highly correlated to language factors in measuring reading comprehension, but vocabulary knowledge alone does not provide an adequate explanation in contributing to reading comprehension. The speed component of single-word reading is considered to be another indication of sight-word reading and decoding ability. Results from this study indicate that word recognition and language comprehension were more related to overall reading comprehension than was vocabulary knowledge, single-word reading speed, or textual fluency constructs (Sabatini et al., 2010).

Rationale/Purpose

Discussions in the literature have been aimed at understanding the complex skill or reading and determining the importance of various other linguistic skills in relation to how each affects the end result of reading comprehension. Although there is research discussing how each skill relates to reading comprehension, there are also gray areas as to which literacy-related skills hold more value versus others. Much of this depends on the assessments and how each test assesses reading comprehension differently, placing more demands on some skills than others. Although many assessment tools claim to be designed to measure the same generic concept known as comprehension, no two assessments are the same in agreeing upon the underlying elements of reading comprehension abilities. Thus, multiple tests assessing a myriad of skills must be administered in an attempt to ascertain the deficient skills affecting reading effectiveness. The purpose of this study was to investigate the predictive value of single-word reading accuracy, single-word reading fluency, and textual reading fluency to oral reading comprehension as measured by commonly administered assessment tools of reading abilities in an effort to formulate a more efficient means of assessing reading comprehension abilities. Single-word reading accuracy and fluency have been shown to affect and predict reading comprehension ability, and they are relatively easier to assess than is reading comprehension. As aforementioned, reading comprehension is a complex cognitive skill that requires varying aspects of higher level thinking. Reading comprehension involves several mental capacities simultaneously operating including but not limited to word reading, reading fluency, working memory, attention, vocabulary, as well as other sublinguistic skills. The complexity of reading comprehension is what hinders professionals from being able to assess comprehension efficiently, thoroughly, and at times, accurately. It is important to understand which measures are most related to reading comprehension as those that are most related can have drastic impacts on the assessment results which are obtained. Ascertaining what skills are most directly related to the prediction of reading comprehension can theoretically reduce the amount of time spent with all-inclusive tests in determining why a person's reading comprehension ability is low. Also, rather than working on all areas (reading words accurately, reading words fluently, and reading text fluently) to increase comprehension, one skill might be associated with a greater impact on reading comprehension than the others depending on the individual's strengths and weaknesses within the realm of reading and comprehension. As a result, assessments could potentially focus on that one skill in lieu of gauging reading comprehension and its multiple components through multiple assessments. However, this is not to say that comprehensive assessments are to be downplayed. Comprehensive assessments of reading can provide much insight into the underlying deficits at hand if there is question regarding the cause of the reading and/or comprehension difficulties.

Although there are different measures for reading ability, assessment of comprehension is difficult because it is an abstract concept involving mental processes, rather than motoric processes. Therefore, the result from such tests can be difficult to interpret due to their reliance upon single-word reading accuracy, single-word reading fluency, and textual reading fluency, which have all been demonstrated to impact and predict comprehension. As a result, when a child struggles on an assessment tool which is described as assessing "reading comprehension," the investigator is often left to infer which explicit aspects of comprehension the child is actually experiencing difficulties with. This creates not only confusion in the interpretation of the results but also poses problems when attempting to individualize plans of care for those who exhibit deficits. Thus, interventionists are left providing cookie-cutter approaches to remediation due to an inability to sufficiently isolate and identify the deficits which the child is experiencing. The purpose of this study is to identify the linguistic sub-components which demonstrate the greatest relationship to oral reading comprehension. Based on previous research it is hypothesized that single-word reading accuracy would have the highest predictive value to oral reading comprehension. This prediction is based on the notion that young readers depend on earlier established skills of reading such as decoding to develop higher cognitive skills such as reading comprehension. However, just as all skills could hinder or facilitate comprehension, the same goes for word reading accuracy. If there are deficits in decoding, then comprehension could become deficient as well. Another supporting factor for the current hypothesis is that primary and elementary readers are not yet considered to be independent readers, meaning they often rely on early emergent skills such as decoding words and using phonological awareness skills during reading tasks.

Chapter III

METHODS

Participants

This study was approved by the Valdosta State University Institutional Review Board prior to recruitment of participants (see Appendix A). The sample included 39 participants, including 29 males and 10 females. The participants ranged from first through fifth grades with ages ranging from 7.0 years to 12.58 years (mean age = 8.98 years). All participants were native English speakers. Children varied in the levels of reading ability. Participants were recruited specifically for this study. Flyers were posted around and given to parents at Valdosta State University's Speech and Hearing Clinic, Valdosta State University's Sullivan Literacy Center, and The Boys and Girls Club in Valdosta, Georgia.

The inclusion criteria for included being at least 7 years of age and not older than 12 years of age. No participants were excluded from the study, resulting in a sample size of 39 participants.

Procedures

Parents of the potential participants were given a consent form (see Appendix B) to complete prior to each child's evaluation. In addition, each child was read a verbal assent statement (see Appendix C) by the primary researcher to indicate his/her participation in the research. The evaluations only occurred after parents signed the consent form and a "yes" response from each child was obtained. Following each evaluation, each child received a complimentary monetary compensation of $15, and each parent received a detailed reading evaluation report explaining how each child performed on the assessments administered during the evaluation with recommendations and referrals included as necessary. Parents were encouraged to contact the researchers if they had comments, concerns, or questions regarding the information included within each report.

The evaluations took place on-site at the Valdosta State University Speech and Hearing Clinic, Valdosta State University Sullivan Literacy Center, and The Boys and Girls Club. At the beginning of each reading evaluation, a hearing screening and a vision screening was conducted. Each participant's hearing was screened using the Earscan-3 with calibration completed within the previous year. The participants were screened at 20 dB at 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz. Each child's vision was informally screened utilizing the Eye Chart Pro iPad app from Dok LLC. The Snellen eye chart on the app was used and each child was instructed to read aloud one line of letters with the chart positioned and resized according to the distance from the eyes to the iPad. Only passing performance on both the hearing and vision screening allowed for the evaluation to take place.

Four measures of reading abilities were administered during each evaluation in the attempt to answer the following research question: what linguistic subskills are most related to oral reading comprehension abilities? Administration of test order was counterbalanced to reduce the likelihood of fatigue systematically affecting the results. The following subtests were administered: *Test of Word Reading Efficiency-Second Edition (TOWRE-2)* (Torgesen, Wagner, & Rashotte, 2012) Sight Word Efficiency and

Phonemic Decoding Efficiency subtests, *Wooodcock Reading Mastery Tests-Third Edition (WRMT-III)* (Woodcock, 2011) Word Identification and Word Attack subtests, *Gray Oral Reading Tests-Fifth Edition (GORT-V)* (Wiederholt & Bryant, 2012) Rate, Accuracy, Fluency, and Comprehension subtests, and *Gray Silent Reading Tests (GSRT)* (Wiederholt & Blalock, 2000). These four assessments allowed for observation and analysis of each skill as it relates to overall reading comprehension. Each assessment and subtest administered is listed in Table 1 provided below.

Table 1. *Assessment Tools and Subtests Administered*

Assessment Tool	Subtest
Test of Word Reading Efficiency-Second Edition (TOWRE-2)	Sight Word Efficiency Phonological Decoding Efficiency
Woodcock Reading Mastery Tests-Third Edition (WRMT-III)	Word Attack Word Identification
*Gray Silent Reading Tests (GSRT)**	
Gray Oral Reading Tests-Fifth Edition (GORT-V)	Rate Accuracy Fluency Comprehension

Note. * indicates there are no subtests included in the assessment tool

During administration of the *TOWRE-2* (Torgesen et al., 2012), the examiner measured how many real words and nonsense words the reader read aloud accurately and fluently in the allotted 45 seconds for each list. These word reading skills are vital in the development of overall reading ability (Torgesen et al., 2012). The creators of the *TOWRE-2* identify good readers as those who utilize the skills of phonemic decoding, blending together familiar spelling patterns, reading words by sight, making connections between unknown words and words that are already known, and using context clues to estimate a word's identity. Reading ability progresses from the most basic skill to the most complex skills. The *TOWRE-2* provided a quick and simple administration of the above critical word reading skills (Torgesen et al., 2012).

The Word Identification and Word Attack subtests of the *WRMT-III* (Woodcock, 2011) assessed the single-word reading accuracy of real words and nonsense words. These subtests of the *WRMT-III* were used in this study to assess single-word reading accuracy. The Word Identification subtest assessed sight-word reading by considering the examinee's ability to read words correctly with increasing difficulty. The examiner may or may not have known the definitions of the words provided (Woodcock, 2011). The Word Attack subtest assessed phonological decoding by having the examinee read nonsense words with increasing difficulty, and it measured the reader's ability to utilize phonological and structural analysis skills.

The *GORT-V* (Wiederholt & Bryant, 2012) allowed for measuring of textual reading rate, accuracy, fluency, and comprehension. There was no set amount of time for the reading tasks of this test, but the length of time the reader needed for each passage was recorded on the form. The test has two forms, A and B, each consisting of 16 stories and five comprehension questions following each story. This oral reading assessment allowed the examiner to observe any deviations from the print and analyze the deviations. This test also allowed for identification of correct or incorrect letter to sound correspondence, decoding of vowel and consonant combinations, identification of multi-syllabic words, and recognition of irregular words (Wiederholt & Bryant, 2012). Reading rate was measured by recording the length of time the reader took to read each passage. The comprehension portion of the test required the reader to answer open-ended questions without the passage in view. The *GORT-V* provided results for rate, accuracy, fluency, and comprehension during oral reading.

The *GSRT* provided a measure of silent reading comprehension abilities only. Each participant began at the appropriate story as stated by examiner's manual. Each story was read silently by the examinee and the child answered the five multiple-choice comprehension questions that followed by shading in the answers on the provided answer sheet. Silent reading comprehension abilities are measured only through the answers provided by the examinee, with no other contributing factors included. This test provides no measurement of reading rate or fluency. This test allows for the passages to be in view during answering of the multiple-choice comprehension questions that follow each passage, allowing the participants to look back in the story to help choose the best answer to the questions. Each child was given as much time as needed for each passage and the passage remained in view during answering of comprehension questions.

Measures

The Test of Word Reading Efficiency-Second Edition (TOWRE-2)

The *TOWRE-2* (Torgesen et al., 2012) was used to assess single-word reading accuracy and fluency. Data was collected in the form of scaled scores (average range = 90-110) which were computed from the raw scores obtained from the administration of each subtest (Torgesen et al., 2012). A Total Word Reading Efficiency Score, a composite score (average range = 90-110) of the raw scores combined, was obtained as well.

Woodcock Reading Mastery Tests-Third Edition (WRMT-III)

As a whole, the *WRMT-III* (Woodcock, 2011) assessed phonemic awareness, phonics, vocabulary, reading fluency, and comprehension (Woodcock, 2011). The absolute number of words read correctly during each subtest was converted to a raw score, and standard scores (average range = 85-115) were obtained. There was no time limit for each reading task, and time was not recorded for this particular test (Woodcock, 2011). The Basic Skills Cluster score, a composite score of the Word Identification and Word Attack raw scores, was also obtained.

Gray Oral Reading Tests-Fifth Edition (GORT-V)

The *GORT-V* (Wiederholt & Bryant, 2012) is a norm-referenced test used in this study to assess textual reading fluency and reading comprehension. The absolute number of deviations from the print was converted to an Accuracy Scaled Score. The time in which it took the reader to complete the reading task was converted to the Rate Scaled Score. These two scores combined to provide the Fluency Scaled Score. Finally, the number of questions that were answered correctly was used to calculate the

Comprehension Scaled Score. Data was collected in the form of scaled scores (average range = 8-12) for the accuracy, rate, fluency, and comprehension measures which were computed from the raw scores obtained from the administration of the *GORT-V* (Wiederholt & Bryant, 2012). The Overall score, a standard composite score of Fluency and Comprehension scores, was also obtained (average range = 90-110).

Gray Silent Reading Tests (GSRT)

The *GSRT* is a norm-referenced test used to measure silent reading comprehension abilities. The reading level of the passages included in this test range from beginning level to the advanced level. Raw scores of correct answers are obtained and converted to age and grade equivalents along with a standard score, the Silent Reading Quotient. A standard score (average range = 85-115), the Silent Reading Quotient, was obtained (Blalock & Wiederholt, 2000).

Data from all testing administration was collected in real-time on the corresponding record forms for each test. The participants completed the necessary components from all four tests independently in one sitting with breaks provided as necessary. Scoring of each test was completed by the primary researcher after administration of testing took place.

Analysis

As previously mentioned, the following scores were obtained: *TOWRE-2* Sight Word Efficiency, *TOWRE-2* Phonemic Decoding Efficiency, *TOWRE-2* Total Word Reading Efficiency Index, *WRMT-III* Word Attack, *WRMT-III* Word Identification, *WRMT-III* Basic Skills Cluster, *GORT-V* Rate, *GORT-V* Accuracy, *GORT-V* Fluency, *GORT-V* Comprehension, *GORT-V* Oral Reading Index, and *GSRT* Silent Reading

Quotient. Once the standardized scores from all three tests were recorded, the scores from the different tests were subjected to Pearson's product-moment correlations analyses. In addition, the prediction of oral reading comprehension (*GORT-V* Comprehension) was investigated utilizing a series of step-wise multiple regression analyses. In the first analysis, a step-wise linear regression model was utilized on the *GORT-V* Comprehension scaled scores with the *GSRT* Silent Reading Quotient, *GORT-V* Rate, Accuracy, Fluency, *TOWRE-2* Sight-Word Efficiency and Phonemic Decoding, and *WRMT-III* Word Identification and Word Attack being entered into the model as potential predictors of the Comprehension score obtained on the *GORT-V*. In the subsequent analysis, all scores that were obtained on the *GORT-V* were excluded from the step-wise regression analysis. In the final analysis, a step-wise linear regression model was utilized on the *GSRT* Silent Reading Quotient with the *GORT-V* Comprehension, Rate, Accuracy, and Fluency scores, the *TOWRE-2* Sight Word Efficiency and Phonemic Decoding scores, and the *WRMT-III* Word Identification and Word Attack scores being entered into the model as potential predictors.

Chapter IV

RESULTS

In order to address the objective of finding the predictive value of single-word reading accuracy, single-word reading fluency, and textual reading fluency to oral reading comprehension, the previously mentioned standardized assessments were administered to the 39 participants. The mean standard scores for each of the subtests are provided in Table 1. Individual participant data are provided in Appendix D.

Table 2. *Descriptive Statistics: Mean Standard and Scaled Scores*

Subtest	Mean Score (SD)	Minimum	Maximum
TOWRESWE+	99.41 (12.90)	70	123
TOWREPD+	93.18 (14.31)	62	123
TOWREOVERALL+	96.15 (13.38)	64	119
WRMTID+	103.97 (15.36)	70	132
WRMTATTACK+	99.44 (13.43)	72	129
WRMTBASICSKILLS+	101.90 (14.72)	72	129
GSRTSRQ+	93.79 (13.34)	71	134
GORTRATE-	9.31 (2.17)	5	13
GORTACC-	9.41 (2.53)	4	14
GORTFLU-	9.18 (2.23)	5	14
GORTCOMP-	8.56 (2.71)	2	14
GORTOVERALL+	93.67 (12.20)	73	118

Note. + denotes standard score, average = 100, standard deviation = 15
- denotes scaled score, average = 10, standard deviation = 2

In the first statistical step-wise analysis, all subtest scores from all assessment tools were entered into the model as potential predictors. The Comprehension subtest score from the *GORT-V* was entered into the analysis as the measure being predicted. When assessing which subtest best predicted reading comprehension as measured by the *GORT-V*, the results indicate that *GORT-V* Rate was found to be the leading predictor, $F(1,37) = 51.364, p = .000, R^2 = .762, R^2_{Adjusted} = .570$. From the results, it is suggested that the rate at which an individual reads orally on the *GORT-V* accounts for 76% of the variance in oral reading comprehension abilities as measured by the *GORT-V*.

When all *GORT-V* related variables were removed from the analysis as potential predictors of oral reading comprehension in the subsequent analysis, the *WRMT-III* Word Identification subtest was found to be the leading predictor of oral reading comprehension as measured by the *GORT-V*, $F(1,37) = 21.225$, $p = .000$, $R^2 = .604$, $R^2_{Adjusted} = .347$. This suggests that the accuracy at which one reads orally as measured by the *WRMT-III* can account for 60% of the variance in one's oral reading comprehension abilities as measured by the *GORT-V*. Correlational analysis results are provided in Table 2.

Table 3. *Correlations Among Predictors*

	1	2	3	4	5	6	7	8	9	10	11	12
TOWRESWE	-											
TOWREPD	.75	-										
TOWREOVERALL	.93	.94	-									
WRMTID	.67	.79	.78	-								
WRMTATTACK	.63	.86	.81	.82	-							
WRMTBASICSKILLS	.68	.86	.83	.96	.95	-						
GSRTSRQ	.26	.37	.33	.38	.30	.35	-					
GORTRATE	.79	.70	.79	.78	.69	.77	.37	-				
GORTACC	.61	.74	.72	.71	.71	.75	.39	.70	-			
GORTFLU	.74	.80	.82	.78	.76	.81	.40	.88	.95	-		
GORTCOMP	.51	.49	.53	.60	.43	.55	.39	.76	.66	.76	-	
GORTOVERALL	.65	.67	.71	.73	.62	.71	.41	.87	.84	.92	.95	-

Note. N = 39

Chapter V

DISCUSSION

It was to be expected that the Rate subtest of the *GORT-V* would be revealed to hold the highest predictive value of comprehension as measured by the *GORT-V*. Within any standardized test, it is expected that the subtests correlate highly with one another in measuring the skill the test is intended to measure. This indicates that the speed at which one reads the passages on the *GORT-V* predicts how well the individual performs on the comprehension subtest of that particular assessment more so that textual reading accuracy or textual reading fluency. The results suggest that the rate at which an individual reads, or the manner in which the *GORT-V* measures the rate at which we read, can be predictive of how well we understand what we read, so much so that we can explain 76% (R-value) of the variation in comprehension by looking at rate abilities. This is in the context of how the *GORT-V* utilizes basals and ceiling based upon rate in its measurement of both reading rate and oral reading comprehension. The examinees are required to meet a basal of two consecutive scores of 9 or 10 on the Fluency measure, which is a combination of the Rate and Accuracy subtest of the assessment tool. The ceiling is met when the examinees reach two consecutive scores of a 2 or below on the Fluency measure. The emphasis of the *GORT-V* is not necessarily placed on how well the reader performs on the comprehension portion of the test. It places high demands on textual reading fluency, which encompasses reading accuracy and reading rate. Knowing the values of these skills and how they are measured according to this test, it would be expected that rate, accuracy, or fluency be highly correlated with oral reading comprehension in comparison to the other skills that are included in the analysis as potential predictors. From the information gathered regarding the statistical correlations, there is a better understanding of the dynamics of how comprehension is assessed through the administration of the *GORT-V*. This particular assessment tool serves as perhaps more accurate indicator of textual reading fluency, while measuring comprehension indirectly through those previous skills. It is questionable whether or not the authors of the *GORT-V* have produced an assessment tool which independently assesses the multiple reading constructs, or if it simply assesses the rate at which we read. Cutting and Scarborough (2006) emphasis the importance of knowing how tests measure overall reading ability and reading comprehension so that scores can be interpreted and understood appropriately. Cutting and Scarborough (2006) also state that reading comprehension scores can vary by how this complex skill is measured through the various demands each test places on the subskills of reading comprehension. This can be seen by how *GORT-V* measures reading comprehension by placing high demands on the rate at which one reads orally and textual reading fleuncy. The abovementioned findings from the current study are supported by the previously mentioned research by Asby et al. (2013), Kim et al. (2011), and Kim (2015), which state that oral reading rate and oral reading fluency contribute highly to oral reading comprehension performance in young readers.

While the data gathered regarding the predictive value of Rate in relation to comprehension on the *GORT-V* is important, there were many other skills from the other assessment tools that were important in the discussion of their relation to oral reading comprehension. With no *GORT-V* measurements included as potential predictors to oral reading comprehension, single-word reading accuracy was shown to be highly predictive of oral reading comprehension relative to the other measurements entered into the analysis. Single-word reading accuracy was shown to hold statistically significant predictive value to oral reading comprehension in the sample population of this study. Oral reading places a higher demand on word decoding skills than does silent reading due to the fact that the text is read aloud versus silently, allowing for less error in word reading accuracy. The extent to which an individual can read single words accurately can account for much of the variance in their oral reading comprehension as measured by the assessments included in this study. With oral reading tasks placing higher demands on decoding skills, it is to no great surprise that single-word reading accuracy could account for higher or lower oral reading comprehension performances depending on the skill level of each individual. Scores on the Word Identification subtest of the *WRMT-III* could potentially explain the scores on the Comprehension subtest of the *GORT-V*, due to the high correlative value between the *WRMT-III* Word Identification subtest scores with the *GORT-V* Comprehension subtest scores. The results suggest that the accuracy at which an individual reads single words, or the manner in which *WRMT-III* measures single-word reading accuracy, can be predictive of how well we understand what we read, explaining 60% (R-value) of the variation in comprehension by looking at single-word reading accuracy abilities. These findings are supported by the research provided by Oakhill et al. (2003), which states that word reading accuracy is a better indicator of reading comprehension abilities in young children ages 8 to 9 years.

Limitations

The results of this study are limited to the four assessment tools included. The four standardized tests used for this research have not been researched in this same combination in any previous research, so results cannot be considered definitive. In addition, the reading level of the participants as well as their cognitive levels were not taken into account when considering the sample population for this research. Future studies investigating the relationship between the skills measured by these assessment tools in relation to silent reading comprehension are needed to add to the discussion of predictive relationships between oral reading comprehension and silent reading comprehension in hopes to provide beneficial information regarding comprehensive reading assessments. This would allow for recommendations during the evaluation process including deciding on which assessment tools to include over others and a clearer focus on treating reading deficits.

Implications

The results from both statistical analyses indicate that oral reading comprehension abilities (as measured by the *GORT-V),* can be predicted by one skill, either oral reading rate or sight word reading accuracy with high levels of accuracy. Previous research has demonstrated the relationship between word reading accuracy abilities and oral reading comprehension. Furthermore, oral reading fluency is considered to be a strong component in how well one comprehends. The findings gathered from the current study support that statement. However, the strong correlations that were found between comprehension and single word reading rate is also a cause for concern. Although reading comprehension is thought to represent the culmination of many skills, the current results indicate that the means by which the *GORT-V* assesses comprehension is highly predicated upon only one ability. It is possible that this finding is a result of the *GORT-V*'s utilization of fluency abilities to establish basals and ceilings which dictate test administration procedures. The current results can impact how the *GORT-V* scores are interpreted. This test is intended to be used for obtaining a measurement of comprehension ability through strengths and weaknesses noted throughout administration of the test. However, it appears from these results that the *GORT-V* is possibly more sensitive to word reading rate deficits affecting the overall reading fluency. For instance, a hyperlexic child who decodes without comprehension could advance to higher level stories and achieve a score that inaccurately represents the child's comprehension abilities. Their raw scores can continuously increase, although slowly, as they continue to read more and more texts. On the other hand, a child who has poor word decoding skills but can comprehend well could obtain lower scores that inaccurately represent the comprehension abilities. Although comprehending at high levels, the child will only be allowed to read a small amount of passages, thus reducing their potential to increase their comprehension raw scores as a result of the fluency basals and ceilings. These basals and ceilings are the determining factor of how far the reader can advance during administration of the test rather than actual scores on the comprehension portion. This potential shortcoming can lead to conflict when clinicians set out to use this test to obtain more information on a child's oral reading comprehension abilities and information above that of an individual's single-word reading abilities.

Scores on the *GORT-V* can be misleading in terms of the factors mentioned previously. This can result in inaccurate identification of struggling readers. For instance, a clinician may choose to administer a standardized reading assessment in attempts to gain more understanding of a reader's comprehension level. However, the clinician may instead gather information regarding reading rate. The structure and scoring method of the *GORT-V* can lead to an over-identification of the comprehension deficits in the individuals that decode poorly, while underestimating the comprehension abilities of individuals that experience deficits in comprehension. This is explained by the fact that many of the participants included in this study were able to advance to higher level stories on the *GORT-V* by simply obtaining a high fluency score due to the faster rate in which he/she was reading and/or the overall reading accuracy of each passage. Some of these same individuals were those that obtained for low scores from comprehension. With the inaccurate representation of those that decode well, yet comprehend poorly, the scores on the *GORT-V* are skewed in the direction of oral reading fluency versus oral reading comprehension. It seems that the *GORT-V* is best suited to identify only those students that exhibit fluency abilities that are truly highly related to their comprehension abilities. Otherwise, the *GORT-V* will essentially conflate the two separable skills into a singular reading construct.

This is why it is crucial for clinicians to become familiar with the tests being used for evaluations and eligibility purposes. However, it can be difficult to notice a pattern such as the one with the *GORT-V* if the clinician is not as experienced with administering the test. In the current study, this pattern became apparent only after examining the results of 39 different administrations of the *GORT-V*. Many clinicians have not administered an assessment tool on 39 different occasions and might not have the capabilities of statistically assessing these relationships. Being intentional in knowing how the scores on a test are related can benefit both the client and the clinician when it comes to interpreting results.

From the discussion regarding the implications of the results of this study, it can be observed that the assessment of reading comprehension can often be ineffective in determining underlying issues which are leading to reading difficulties. Ineffective identification of difficulties can affect the course of treatment and the potential progress that could be made during the course of therapy. This study aimed at reducing the confusion regarding the skills which oral reading comprehension tests actually assess by determining the skill(s) that were the most highly related. By finding what skills shown to be most highly predictive of oral reading comprehension abilities, clinicians can potentially understand individuals' reading deficits at a more precise level. By finding the one skill or skills that are deficient, yet hold a higher predictive value to oral reading comprehension, treatment can be more targeted to the skill(s) in hope to improve oral reading comprehension indirectly, as well. For example, if a child performs poorly on the comprehension score provided by the *GORT-V*, the clinician should go back and investigate if the child was truly having difficulty comprehending or if he had merely reached a rate based ceiling, which disallowed him to progress further.

From this study, it is recommended to gather a comprehensive assessment of reading abilities during the attempt to ascertain the underlying deficits affecting overall reading comprehension. It is not recommended that administration of testing be limited to targeting only the skills of oral reading rate and/or single-word reading accuracy. This would lead to an inefficient assessment of reading abilities due to the fact that each individual is a different reader. While some may have sufficient and appropriate word reading accuracy abilities, others may not. The same can be said about oral reading rate. In addition, other reading and/or cognitive skills can be impaired, leading to a different explanation for the deficits in reading comprehension. If reading assessments are targeted to either oral reading rate or sight word reading accuracy, the other skills will get overlooked, leading to a misinterpretation of the strengths and weaknesses the child has in regards to reading. As Sabatini et al. (2010) stated, a single standardized measure for assessing reading comprehension is not sufficient to identify an individual's area of weakness. However, selecting multiple assessment tools at random simply because their titles use a term that is related to reading is unlikely to yield the laser-focused results that are necessary to treat the myriad deficits that arise in a complex, multifactorial skill such as reading comprehension. For many years, clinicians have been selecting and administering assessment tools with the word "comprehension" in their titles, and assuming that they were gaining an accurate quantitative depiction of what the reader is experiencing on a daily basis during reading activities. As a result, students have been potentially inaccurately identified and more importantly, inaccurately treated. Clinicians must become acquainted with the actual content validity of the tests which they administer in order to provide individualized plans of care in an accurate and efficient manner.

Comprehensive assessments are vitally important because they are a key factor in determining the skills that either hinder or facilitate other developing skills. Reading assessments that include multiple skills are best for assessing what skills affect reading comprehension when there is very little information given on an individual's reading performance. A more broadly focused battery of assessment procedures of multifaceted abilities such as comprehension can cause many underlying skills to be neglected in the process, when in fact those are the very skills that perhaps need targeting the most. The findings from this study do no imply that clinicians should administer only the Word Identification subtest of the *WRMT-III* and the *GORT-V* to obtain an overall view of one's reading abilities and how they can affect reading comprehension, either negatively or positively. However, knowing the relationships between assessment tools used in comprehensive reading evaluations is beneficial in terms of gathering appropriate assessment materials to identify the true measure of specificity (those who do not have a reading disorder) and sensitivity (those who do have a reading disorder) within a population. Knowing how scores on different standardized assessment tools are related and to what degree can help a clinician make the best judgment as far as deciding what testing materials to administer. This is helpful when there is a certain time frame in which the evaluation has to be completed by, allowing for the clinician to administer an efficient amount of tests to the child. Understanding scores and how each score relates to other scores within the same test and between testing materials provides the clinician with a better view of the evaluation process. For instance, if the clinician is aware that scores from the *TOWRE-2* are not highly correlated with scores on the *GORT-V*, then the clinician might choose to administer both tests since they appear to be offering less redundant information. Or in contrast, the clinician might choose not to administer both of these tests if they are not focused upon the specific ability they intend to assess. With no knowledge regarding the relationship between these two tests, however, the clinician is left grabbing assessment tools in the dark, with little guidance toward how their time can be best spend in the appropriate service of their clients.

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APPENDIX A:

Institutional Review Board Approval

Institutional Review Board (IRB)
for the Protection of Human Research Participants

NEW PROTOCOL APPROVAL

PROTOCOL NUMBER: IRB-03330-2016 **RESPONSIBLE RESEARCHER:** Dr. Matthew Carter

PROJECT TITLE: Predicting Reading Comprehension Abilities

APPROVAL DATE: 03/24/2016 **EXPIRATION DATE:** 03/24/2017

LEVEL OF RISK: ☒ Minimal ☐ More than Minimal

TYPE OF REVIEW: ☒ Expedited Under Catetory/ies 4 & 6 ☐ Convened (Full Board)

CONSENT REQUIREMENTS:

- ☐ Adult Participants – Written informed consent with documentation (signature)
- ☐ Adult Participants – Written informed consent with waiver of documentation (signature)
- ☐ Adult Participants – Verbal informed consent
- ☐ Adult Participants – Waiver of informed consent
- ☒ Minor Participants – Written parent/guardian permission with documentation (signature)
- ☐ Minor Participants – Written parent/guardian permission with waiver of documentation (signature)
- ☐ Minor Participants – Verbal parent/guardian permission
- ☐ Minor Participants – Waiver of parent/guardian permission
- ☐ Minor Participants – Written assent with documentation (signature)
- ☐ Minor Participants – Written assent with waiver of documentation (signature)
- ☐ Minor Participants – Verbal assent
- ☐ Minor Participants – Waiver of assent
- ☐ Waiver of some elements of consent/permission/assent

APPROVAL: This research protocol is **approved** as presented. If applicable, your approved consent form(s), bearing the IRB approval stamp and protocol expiration date, will be mailed to you via campus mail or U.S. Postal Service unless you have made other arrangements with the IRB Administrator. Please use the stamped consent document(s) as your copy master(s). Once you duplicate the consent form(s), you may begin participant recruitment. **Please see Attachment 1 for additional important information for researchers.**

COMMENTS:

Lorraine Schmertzing 3/24/16

Lorraine Schmertzing, Ed.D., IRB Chair Date

Thank you for submitting an IRB application.

Please direct questions to irb@valdosta.edu or 229-259-5045.

Form Revised: 12.13.12

NEW PROTOCOL REVIEW REPORT
Attachment 1

ADDITIONAL INFORMATION FOR RESEARCHERS:

If your protocol received expedited approval, it was reviewed by a two-member team, or, in extraordinary circumstances, the Chair or the Vice-Chair of the IRB. Although the expediters may approve protocols, they are required by federal regulation to report expedited approvals at the next IRB meeting. At that time, other IRB members may express any concerns and may occasionally request minor modifications to the protocol. In rare instances, the IRB may request that research activities involving participants be halted until such modifications are implemented. Should this situation arise, you will receive an explanatory communiqué from the IRB.

Protocol approvals are generally valid for one year. In rare instances, when a protocol is determined to place participants at more than minimal risk, the IRB may shorten the approval period so that protocols are reviewed more frequently, allowing the IRB to reassess the potential risks and benefits to participants. The expiration date of your protocol approval is noted on the approval form. You will be contacted no less than one month before this expiration date and will be asked to either submit a final report if the research is concluded or to apply for a continuation of approval. It is your responsibility to submit a continuation request in sufficient time for IRB review before the expiration date. If you do not secure a protocol approval extension prior to the expiration date, you must stop all activities involving participants (including interaction, intervention, data collection, and data analysis) until approval is reinstated.

Please be reminded that you are required to seek approval of the IRB before amending or altering the scope of the project or the research protocol or implementing changes in the approved consent process/forms. You are also required to report to the IRB, through the Office of Sponsored Programs & Research Administration, any unanticipated problems or adverse events which become apparent during the course or as a result of the research and the actions you have taken.

Please refer to the IRB website (http://www.valdosta.edu/ospra/HumanResearchParticipants.shtml) for additional information about Valdosta State University's human protection program and your responsibilities as a researcher.

Form Revised: 04.10.2012

APPENDIX B:

Institutional Review Board Parent Consent Form

VALDOSTA STATE UNIVERSITY

Parent/Guardian Permission for Child's/Ward's Participation in Research

You are being asked to allow your child (or ward) to participate in a research project entitled "Predicting Reading Comprehension Abilities." This research project is being conducted by Taylor Struble, a graduate student in Communication Sciences and Disorders at Valdosta State University. The researcher has explained to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks to your child (or ward). You may ask the researcher any questions you have to help you understand this study and your child's (or wards) possible participation in it. A basic explanation of the research is given below. From this point on in this form, the term "child" is used for either a child or a ward. Please read the remainder of this form carefully and ask the researcher any questions you may have. The University asks that you give your signed permission if you will allow your child to participate in this research project.

Purpose of the Research: This study involves research. The purpose of the study is to investigate which reading skill(s) is/are most predictive of overall reading comprehension abilities.

Procedures: If you agree to allow your child participate in the research, he/she will first complete a hearing and vision screening. After obtaining a passing score on the hearing and vision screenings, your child will be administered various tests of reading abilities. Such tests will involve *Gray Oral Reading Tests-Fifth Edition (GORT-V), Test of Word Reading Efficiency-Second Edition (TOWRE-2), Woodcock Reading Mastery Tests-Third Edition (WRMT-III)*, and *Gray Silent Reading Test (GSRT)*.These tests will be measuring your child's reading fluency, reading accuracy, and reading comprehension.

During testing, your child will read lists of words and short reading passages. The researcher will make any notes on the testing manual while listening to your child read. Break will be offered and provided as needed.

Administration of assessment tools will occur on site at the Boys and Girls Club of Valdosta, Ruby R. Sullivan Literacy Center at Valdosta State University, or at Valdosta State University. The total administration time for all assessment tools could range from at most 1 hour and 30 mins to as little as 50 minutes, depending on the developmental level of your child. Once your child has completed all tasks as specified by the researcher, your child will be dismissed from testing. A detailed evaluation report will be provided to you indicating your child's performance on the assessment tools that were administered. In addition to this, your child will receive $15 for participating in this research study. There are no alternatives to the experimental procedures described here. The only alternative is to choose for your child not to participate at all.

Possible Risks or Discomfort: Although there are no known risks to your child associated with these research procedures, it is not always possible to identify all potential risks of participating in a research study. However, the University has taken reasonable safeguards to minimize potential but unknown risks. By granting permission for your child to participate in this research project, you are not waiving any rights that you or your child may have against Valdosta State University for injury resulting from negligence of the University or its researchers.

Potential Benefits: You will receive a detailed description of your child's reading ability after your child has completed all of these tasks. Should you have further concerns regarding your child's reading abilities after this study, the researchers will offer appropriate referrals. In addition, your child will receive $15 in payment for their time.

Parent/Guardian's Initials: ________

Costs and Compensation: There are no costs to you or your child for your child's participation in this research project. There will be monetary compensation given to you upon completion of your child's participation in this research project.

Assurance of Confidentiality: Valdosta State University and the researcher will keep your child's information confidential to the extent allowed by law. Members of the Institutional Review Board (IRB), a university committee charged with reviewing research to ensure the rights and welfare of research participants, may be given access to your child's confidential information.

Your child will be assigned a code number as a way to identify and keep track of data. Numbers assigned to your child with not be associated with his/her name or any other identifying information. Participants will only be identified by an assigned code number. This is to ensure that individuals remain unidentifiable. Your child's birth date will be recorded as a way to calculate your child's chronological age in order to interpret scores and results of this study. All information obtained from testing will be kept in Dr. Carter's office secured by lock and key. Only those individuals that YOU choose to share the results with will have access to the results.

Data from this study will be reported in combination with testing information obtained from other participants. None of the participants will be identified in this study by name or birth date.

Voluntary Participation: Your decision to allow your child to participate in this research project is entirely voluntary. If you agree now to allow your child to participate and you change your mind later, you are free to withdraw your child from the study at that time. Even if you give your permission and want your child to be part of the study, your child may decide not to participate at all, or he/she may leave the study at any time. By not allowing your child to participate in this study or by withdrawing him/her from the study before the research is complete, you are not giving up any rights that you or your child have or any services to which you or your child are otherwise entitled to from Valdosta State University. Likewise, if your child decides on his/her own not to participate or to drop out of the study later on, he/she is not giving up any rights, including rights to services from Valdosta State University to which he/she is otherwise entitled. If you decide to withdraw your child from the study after data collection is complete, the child's information will be deleted from the database and will not be included in research results.

Information Contacts:

Questions regarding the purpose or procedures of the research should be directed to Matthew Carter at mdcarter@valdosta.edu or by phone at 229-219-1328. This study has been approved by the Valdosta State University Institutional Review Board (IRB) for the Protection of Human Research Participants. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your child's rights as a research participant, you may contact the IRB Administrator at 229-333-7837 or irb@valdosta.edu.

Agreement to Participate: The research project and my child's (or ward's) role in it have been explained to me, and my questions have been answered to my satisfaction. I grant permission for my child to participate in this study. By signing this form, I am indicating that I am either the custodial parent or legal guardian of the child. I have received a copy of this permission form.

I would like to receive a copy of the results of this study: _____ *Yes* _____ *No*

Mailing Address: ______________________________

e-mail Address: ______________________________

This research project has been approved by the Valdosta State University Institutional Review Board for the Protection of Human Research Participants through the date noted below:

VALDOSTA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD
APPROVAL DATE 3/24/2016
IRB # 03390-2016
EXPIRATION DATE 3/24/2017

____
Printed Name of Child/Ward

____
Printed Name of Parent/Guardian

____
Signature of Parent/Guardian Date

____
Signature of Person Obtaining Consent Date

APPENDIX C:

Institutional Review Board Child Verbal Assent Form

Verbal Assent Script for Children Ages 5-12

Hi. My name is Taylor. I'm a student at a college. Right now, I'm trying to learn about how to help kids better understand what they read. I would like to ask you to help me by being in a study, but before I do, I want to explain what will happen if you decide to help me.

I will ask you to read words and short stories. I will ask you some questions about what you read. By being in the study, you will help me understand how to help kids better understand what they read.

Your parents will not know what you have said during reading and answering questions. When I tell other people about my study, I will not use your name, and no one will be able to tell who I'm talking about.

Your mom/dad says it's okay for you to be in my study. But if you don't want to be in the study, you don't have to be. What you decide won't make any difference with your grades. I won't be upset, and no one else will be upset, if you don't want to be in the study. If you want to be in the study now but change your mind later, that's okay. You can stop at any time. If there is anything you don't understand, please tell me so I can explain it to you.

You can ask me questions about the study. If you have a question later that you don't think of now, you can call me or ask your mom/dad to call me or send me an email.

Do you have any questions for me now?

Would you like to be in my study and read and answer questions?

NOTES TO RESEARCHER: The child should answer "Yes" or "No." Only a definite "Yes" may be taken as assent to participate.

Name of Child: ______________________________ **Parental Permission on File:** ☐ Yes ☐ No
(If "No," do not proceed with assent or research procedures.)

Child's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher:______________________________ **Date:** __________________

(Optional) Signature of Child:______________________________

APPENDIX D:

Individual Participant Data

Data Sheet

Participant #: 1 DOB: 02/25/2005 Age: 11;1 Grade: 5 MALE FEMALE Date: 04/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	79	13-0	7.5	68	107	Average
Phonemic Decoding	47	13-9	9.5	70	+108	Average
	Sum of Scaled Scores =				215	XXXXXX
Total Word Reading Efficiency Index				70	108	Average

2. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>36</td><td colspan="2">115</td><td>14:7</td><td>9.0</td><td>Average</td></tr>
<tr><td>Word Attack</td><td>23</td><td colspan="2">+114</td><td>18:6</td><td>12.9</td><td>Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">15:4</td><td rowspan="2">9.9</td><td rowspan="2">Above Average</td></tr>
<tr><td>=229</td><td>116</td></tr>
</table>

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	51	>18-0	>12-2	99%	134	Very Superior

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	36	11-3	5.4	50	10	Average
Accuracy	34	10-9	5.4	50	10	Average
Fluency	70	11-0	5.4	50	10	Average
Comprehension	32	10-0	4.7	50	+9	Average
Sum of Scaled Scores (Fluency + Comprehension)					=19	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 2 DOB: 10/15/2008 Age: 7;5 Grade: 1 MALE FEMALE Date: 04/11/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	58	8-6	3.0	84	115	Above Average
Phonemic Decoding	16	7-0	1.8	35	+94	Average
	Sum of Scaled Scores =				209	XXXXXX
Total Word Reading Efficiency Index				63	105	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	28	123		9:11	4.4	Above Average
Word Attack	12	+105		8:1	2.5	Average
Basic Skills Cluster		Test Sum	Cluster	9:1	3.6	Average
		=228	115			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	18	8-0	2.2	73%	109	Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	24	8-6	3.0	84	13	Above Average
Accuracy	24	8-3	3.0	75	12	Average
Fluency	48	8-3	3.0	75	12	Average
Comprehension	28	9-0	3.0	84	+13	Above Average
Sum of Scaled Scores (Fluency + Comprehension)					=25	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
25	81	113	Above Average

Data Sheet

Participant #: 3 DOB: 09/25/2006 Age: 9;7 Grade: 3 MALE FEMALE Date: 05/05/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	78	12-6	7.2	84	115	Above Average
Phonemic Decoding	45	13-0	8.0	81	+113	Above Average
	Sum of Scaled Scores =				228	XXXXXX
Total Word Reading Efficiency Index				84	115	Above Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	36	126		14:7	9.0	Above Average
Word Attack	21	+113		14:4	8.6	Average
Basic Skills Cluster		Test Sum	Cluster	14:3	8.8	Average
		=239	121			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	25	9-3	3.5	42	97	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	40	12-3	6.4	84	13	Above Average
Accuracy	40	12-9	6.7	84	13	Above Average
Fluency	80	12-6	6.7	84	13	Above Average
Comprehension	40	12-9	7.0	91	+13	Above Average
Sum of Scaled Scores (Fluency + Comprehension)					=26	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
26	84	115	Above Average

Data Sheet

Participant #: 4 DOB: 4/21/2005 Age: 11;0 Grade: 5 MALE FEMALE Date: 05/05/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	64	8-9	3.5	18	86	Below Average
Phonemic Decoding	40	11-3	5.5	47	+99	Average
	Sum of Scaled Scores =				185	XXXXXX
Total Word Reading Efficiency Index				30	92	Average

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	35	123		13:9	8.3	Above Average
Word Attack	22	+116		16:1	10.2	Above Average
Basic Skills Cluster		Test Sum	Cluster	14:3	8.8	Above Average
		=239	121			

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	37	12-6	6.8	68	107	Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	38	11-9	6.0	63	11	Average
Accuracy	34	10-9	5.4	50	10	Average
Fluency	72	11-3	5.7	50	10	Average
Comprehension	35	11-3	5.7	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=20	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
20	50	100	Average

Data Sheet

Participant #: 5 DOB: 07/27/2006 Age: 9;9 Grade: 3 MALE FEMALE Date: 05/06/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	65	9-0	3.5	39	96	Average
Phonemic Decoding	40	11-3	5.5	68	+107	Average
	Sum of Scaled Scores =				203	XXXXXX
Total Word Reading Efficiency Index				55	102	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	30	105		10:10	5.3	Average
Word Attack	21	+112		14:4	8.6	Average
Basic Skills Cluster		Test Sum	Cluster	11:8	6.1	Average
		=217	109			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	21	8-9	3.8	27	91	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	28	9-3	3.7	37	9	Average
Accuracy	28	9-3	3.7	37	9	Average
Fluency	56	9-0	3.7	37	9	Average
Comprehension	24	8-3	2.7	16	+7	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average

Data Sheet

Participant #: 6 DOB: 04/01/2008 Age: 8;1 Grade: 2 MALE FEMALE Date: 05/11/2016
Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	63	8-9	3.2	73	109	Average
Phonemic Decoding	30	8-6	3.2	58	+103	Average
				Sum of Scaled Scores =	212	XXXXXX
			Total Word Reading Efficiency Index	65	106	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	30	121		10:10	5.3	Above Average
Word Attack	19	+115		11:4	5.8	Average
Basic Skills Cluster		Test Sum	Cluster	11:0	5.4	Above Average
		=236	120			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	11	<7-0	1.0	25	90	Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	30	9-9	4.2	84	13	Above Average
Accuracy	31	9-9	4.4	84	13	Above Average
Fluency	61	9-9	4.2	84	13	Above Average
Comprehension	31	9-9	4.4	84	+13	Above Average
				Sum of Scaled Scores (Fluency + Comprehension)	=26	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
26	84	115	Above Average

Data Sheet

Participant #: 7 DOB: 01/13/2006 Age: 10;3 Grade: 4 MALE FEMALE Date: 05/12/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	86	15-9	10.5	94	123	Superior
Phonemic Decoding	44	12-9	7.5	70	+108	Average
	Sum of Scaled Scores =				231	XXXXXX
Total Word Reading Efficiency Index				86	116	Above Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	34	115		13.3	7.7	Average
Word Attack	19	+104		11.4	5.8	Average
Basic Skills Cluster		Test Sum	Cluster	12.8	7.1	Average
		=219	110			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	32	10-9	5.0	68	107	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	31	10-0	4.4	50	10	Average
Accuracy	25	8-6	3.2	25	8	Average
Fluency	56	9-0	3.7	37	9	Average
Comprehension	24	8-3	2.7	16	+7	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average

Data Sheet

Participant #: 8 DOB: 01/22/2006 Age: 10;3 Grade: 4 MALE FEMALE Date: 05/12/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	45	7-6	2.2	3	72	Poor
Phonemic Decoding	17	7-3	1.8	5	+75	Poor
				Sum of Scaled Scores =	147	XXXXXX
			Total Word Reading Efficiency Index	3	72	Poor

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	23	83		8.3	2.8	Below Average
Word Attack	11	+82		7.8	2.2	Below Average
Basic Skills Cluster		Test Sum =165	Cluster 81	8.0	2.6	Below Average

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	19	8-3	2.5	19	87	Below Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	16	7-3	1.7	5	5	Poor
Accuracy	17	7-3	2.0	5	5	Poor
Fluency	33	7-0	1.7	5	5	Poor
Comprehension	21	7-9	2.2	9	+6	Below Average
				Sum of Scaled Scores (Fluency + Comprehension)	=11	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
11	5	76	Poor

Data Sheet

Participant #: 9 DOB: 04/09/2007 Age: 9;1 Grade: 3 MALE FEMALE Date: 05/16/2016
Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	64	8-9	3.5	37	95	Average
Phonemic Decoding	28	8-3	3.0	30	+92	Average
				Sum of Scaled Scores =	187	XXXXXX
			Total Word Reading Efficiency Index	32	93	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	35	126		13:9	8.3	Above Average
Word Attack	19	+108		11:4	5.8	Average
Basic Skills Cluster		Test Sum =234	Cluster 118	13:1	7.6	Above Average

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	19	8-3	2.5	35	94	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	31	10-0	4.4	63	11	Average
Accuracy	22	8-0	2.4	25	8	Average
Fluency	53	8-9	3.2	37	9	Average
Comprehension	23	8-0	2.7	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
17	30	92	Average

Data Sheet

Participant #: 10 DOB: 11/04/2008 Age: 7;6 Grade: 1 MALE FEMALE Date: 05/16/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	62	8-9	3.2	90	119	Above Average
Phonemic Decoding	21	7-6	2.2	53	+101	Average
	Sum of Scaled Scores =				220	XXXXXX
Total Word Reading Efficiency Index				77	111	Above Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	26	118		9:1	3.6	Above Average
Word Attack	14	+110		8:7	3.1	Average
Basic Skills Cluster		Test Sum =228	Cluster 115	8:11	3.4	Average

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	1	<7-0	1.0	5	75	Poor

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	21	8-0	2.4	63	11	Average
Accuracy	20	7-9	2.2	50	10	Average
Fluency	41	7-9	2.2	50	10	Average
Comprehension	21	7-9	2.2	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=20	XXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
20	50	100	Average

Data Sheet

Participant #: 11 DOB: 02/26/2009 Age: 7;2 Grade: 1 MALE FEMALE Date: 05/17/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	62	8-9	3.2	91	120	Above Average
Phonemic Decoding	20	7-6	2.2	61	+104	Average
	Sum of Scaled Scores =				224	XXXXXX
Total Word Reading Efficiency Index				81	113	Above Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	22	112		8:0	2.6	Average
Word Attack	9	+102		7:4	1.8	Average
Basic Skills Cluster		Test Sum	Cluster	7:9	2.3	Average
		=214	107			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	10	<7-0	1.0	37	95	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	24	8-6	3.0	84	13	Above Average
Accuracy	15	7-0	1.7	50	10	Average
Fluency	39	7-6	2.2	63	11	Average
Comprehension	22	8-0	2.4	63	+11	Average
Sum of Scaled Scores (Fluency + Comprehension)					=22	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
22	63	105	Average

Data Sheet

Participant #: 12 DOB: 11/13/2007 Age: 8;6 Grade: 2 MALE FEMALE Date: 05/18/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	65	9-0	3.5	77	111	Above Average
Phonemic Decoding	25	8-0	2.5	42	+97	Average
	Sum of Scaled Scores =				208	XXXXXX
Total Word Reading Efficiency Index				61	104	Average

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	29	114		10:4	4.8	Average
Word Attack	18	+110		10:6	5.0	Average
Basic Skills Cluster		Test Sum =224	Cluster 112	10:5	4.8	Average

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	20	2.8	8-6	53	101	Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	25	8-6	3.0	50	10	Average
Accuracy	23	8-3	2.7	37	9	Average
Fluency	48	8-3	3.0	37	9	Average
Comprehension	27	8-9	3.4	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=19	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 13 DOB: 02/23/2008 Age: 8;3 Grade: 3 MALE FEMALE Date: 05/23/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	69	9-9	4.5	84	115	Above Average
Phonemic Decoding	39	10-9	5.0	82	+114	Above Average
	Sum of Scaled Scores =					XXXXXX
Total Word Reading Efficiency Index				84	115	Above Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	31	124		11:4	5.9	Above Average
Word Attack	22	+123		16:1	10.2	Above Average
Basic Skills Cluster		Test Sum	Cluster	12:5	6.9	Above Average
		=247	126			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	13	7-0	1.2	32	93	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	30	9-9	4.2	84	13	Above Average
Accuracy	24	8-3	3.0	50	10	Average
Fluency	54	8-9	3.4	63	11	Average
Comprehension	26	8-6	3.2	63	+11	Average
Sum of Scaled Scores (Fluency + Comprehension)					=22	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
22	63	105	Average

Data Sheet

Participant #: 14 DOB: 04/16/2007 Age: 9;1 Grade: 4 MALE FEMALE Date: 06/09/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	61	8-9	3.2	27	91	Average
Phonemic Decoding	15	7-0	1.5	5	+76	Poor
				Sum of Scaled Scores =	167	XXXXXX
			Total Word Reading Efficiency Index	13	83	Below Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	20	80		7:8	2.2	Below Average
Word Attack	11	+87		7:9	2.2	Average
Basic Skills Cluster		Test Sum	Cluster	7:8	2.2	Below Average
		=167	82			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	5	<7-0	1.0	3	71	Poor

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	24	8-6	3.0	37	9	Average
Accuracy	13	6-9	1.4	5	5	Poor
Fluency	37	7-6	2.0	16	7	Below Average
Comprehension	20	7-6	2.2	16	+7	Below Average
				Sum of Scaled Scores (Fluency + Comprehension)	=14	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
14	14	84	Below Average

Data Sheet

Participant #: 15 DOB: 06/03/2009 Age: 7;0 Grade: 2 MALE FEMALE Date: 06/09/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	31	6-9	1.2	35	94	Average
Phonemic Decoding	8	6-3	1.0	18	+86	Below Average
	Sum of Scaled Scores =				180	XXXXXX
Total Word Reading Efficiency Index				25	90	Average

4. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>15</td><td colspan="2">96</td><td>7:0</td><td>1.5</td><td>Average</td></tr>
<tr><td>Word Attack</td><td>5</td><td colspan="2">+92</td><td>6:8</td><td>1.3</td><td>Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">7:0</td><td rowspan="2">1.5</td><td rowspan="2">Average</td></tr>
<tr><td>=188</td><td>93</td></tr>
</table>

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	9	<7-0	1.0	32	93	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	8	6-3	1.0	25	8	Average
Accuracy	11	6-6	1.2	37	9	Average
Fluency	19	6-3	1.0	25	8	Average
Comprehension	12	6-6	1.2	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average

Data Sheet

Participant #: 16 DOB: 10/6/2006 Age: 9;8 Grade: 4 MALE FEMALE Date: 06/22/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	51	7-9	2.5	8	79	Poor
Phonemic Decoding	19	7-6	2.0	10	+81	Below Average
	Sum of Scaled Scores =				160	XXXXXX
Total Word Reading Efficiency Index				8	79	Poor

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	27	97		9:6	4.0	Average
Word Attack	9	+79		7:4	1.8	Below Average
Basic Skills Cluster		Test Sum	Cluster	8:6	3.0	Average
		=176	87			

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	18	8-0	2.2	21	88	Below Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	20	7-9	2.2	16	7	Below Average
Accuracy	25	8-6	3.2	25	8	Average
Fluency	45	8-0	2.7	16	7	Below Average
Comprehension	18	7-3	2.0	9	+6	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=13	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
13	10	81	Below Average

Data Sheet

Participant #: 17 DOB: 03/06/2008 Age: 8;3 Grade: 3 MALE FEMALE Date: 06/27/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	58	8-6	3.0	55	102	Average
Phonemic Decoding	28	8-3	3.0	53	+101	Average
	Sum of Scaled Scores =				203	XXXXXX
Total Word Reading Efficiency Index				55	102	Average

2. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>28</td><td colspan="2">115</td><td>9:11</td><td>4.4</td><td>Average</td></tr>
<tr><td>Word Attack</td><td>11</td><td colspan="2">+95</td><td>7:9</td><td>2.2</td><td>Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">8:11</td><td rowspan="2">3.4</td><td rowspan="2">Average</td></tr>
<tr><td>=210</td><td>105</td></tr>
</table>

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	16	7-9	2.0	42	97	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	16	7-3	1.7	25	8	Average
Accuracy	17	7-3	2.0	25	8	Average
Fluency	33	7-0	1.7	25	8	Average
Comprehension	18	7-3	2.0	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average

Data Sheet

Participant #: 18 DOB: 05/14/2009 Age: 7;1 Grade: 2 MALE FEMALE Date: 06/28/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	41	7-6	1.8	58	103	Average
Phonemic Decoding	6	6-0	1.0	12	+82	Below Average
	Sum of Scaled Scores =				185	XXXXXX
Total Word Reading Efficiency Index				30	92	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	16	98		7:1	1.7	Average
Word Attack	2	+83		6:4	1.0	Below Average
Basic Skills Cluster		Test Sum	Cluster	6:11	1.4	Average
		=181	90			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	6	<7-0	1.0	23	89	Below Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	13	7-0	1.4	37	9	Average
Accuracy	10	6-6	1.0	37	9	Average
Fluency	23	6-6	1.7	37	9	Average
Comprehension	17	7-0	1.7	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=13	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 19 DOB: 07/15/2006 Age: 9;11 Grade: 5 MALE FEMALE Date: 06/28/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	61	8-9	3.2	27	91	Average
Phonemic Decoding	24	7-9	2.5	19	+87	Below Average
	Sum of Scaled Scores =				178	XXXXXX
Total Word Reading Efficiency Index				21	88	Below Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	25	91		8:9	3.3	Average
Word Attack	11	+84		7:9	2.2	Below Average
Basic Skills Cluster		Test Sum	Cluster	8:4	2.8	Average
		=175	87			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	37	12-6	6.8	91	120	Above Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	26	8-9	3.2	37	9	Average
Accuracy	30	9-6	4.2	50	10	Average
Fluency	56	9-0	3.7	37	9	Average
Comprehension	29	9-3	4.0	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=19	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 20 DOB: 03/21/2006 Age: 10;3 Grade: 5 MALE FEMALE Date: 07/06/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	56	8-3	2.8	12	82	Below Average
Phonemic Decoding	10	6-3	1.2	1	+66	Very Poor
				Sum of Scaled Scores =	148	XXXXXX
			Total Word Reading Efficiency Index	3	73	Poor

1. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>20</td><td colspan="2">74</td><td>7:8</td><td>2.2</td><td>Below Average</td></tr>
<tr><td>Word Attack</td><td>7</td><td colspan="2">+72</td><td>7:0</td><td>1.5</td><td>Below Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">7:5</td><td rowspan="2">2.0</td><td rowspan="2">Below Average</td></tr>
<tr><td>=146</td><td>72</td></tr>
</table>

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	18	8-0	2.2	18	86	Below Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	22	8-3	2.7	16	7	Below Average
Accuracy	13	6-9	1.4	2	4	Poor
Fluency	35	7-3	2.0	5	5	Poor
Comprehension	20	7-6	2.2	9	+6	Below Average
				Sum of Scaled Scores (Fluency + Comprehension)	=11	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
11	5	76	Poor

Data Sheet

Participant #: 21 DOB: 01/21/2006 Age: 10;5 Grade: 5 MALE FEMALE Date: 07/07/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	65	9-0	3.5	32	93	Average
Phonemic Decoding	28	8-3	3.0	23	+89	Below Average
	Sum of Scaled Scores =				182	XXXXXX
Total Word Reading Efficiency Index				27	91	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	26	90		9:1	3.6	Average
Word Attack	16	+94		9:5	3.9	Average
Basic Skills Cluster		Test Sum	Cluster	9:3	3.7	Average
		=184	91			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	19	8-3	2.5	19	87	Below Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	21	8-0	2.4	9	6	Below Average
Accuracy	18	7-6	2.0	9	6	Below Average
Fluency	39	7-6	2.2	9	6	Below Average
Comprehension	16	7-0	1.4	2	+4	Poor
Sum of Scaled Scores (Fluency + Comprehension)					=10	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
10	4	73	Poor

Data Sheet

Participant #: 22 DOB: 01/21/2006 Age: 10;5 Grade: 5 MALE FEMALE Date: 07/072016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	72	10-9	5.2	55	102	Average
Phonemic Decoding	28	8-3	3.0	23	+89	Below Average
	Sum of Scaled Scores =				191	XXXXXX
Total Word Reading Efficiency Index				37	95	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	28	96		9:11	4.4	Average
Word Attack	20	+106		12:5	6.8	Average
Basic Skills Cluster		Test Sum	Cluster	10:6	5.0	Average
		=202	101			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	24	9-3	3.5	32	93	Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	25	8-6	3.0	25	8	Average
Accuracy	28	9-3	3.7	37	9	Average
Fluency	53	8-9	3.2	25	8	Average
Comprehension	9	6-0	<1.0	<1	+2	Very Poor
Sum of Scaled Scores (Fluency + Comprehension)					=13	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
10	4	73	Poor

Data Sheet

Participant #: 23 DOB: 12/21/2007 Age: 8;6 Grade: 3 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	67	9-3	3.8	81	113	Above Average
Phonemic Decoding	24	7-9	2.5	39	+96	Average
	Sum of Scaled Scores =				209	XXXXXX
Total Word Reading Efficiency Index				63	105	Average

4. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>28</td><td colspan="2">111</td><td>9:11</td><td>4.4</td><td>Average</td></tr>
<tr><td>Word Attack</td><td>16</td><td colspan="2">+105</td><td>9:5</td><td>3.9</td><td>Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">9:9</td><td rowspan="2">4.2</td><td rowspan="2">Average</td></tr>
<tr><td>=216</td><td>108</td></tr>
</table>

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	13	7-0	1.2	27	91	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	25	3.0	50	10	10	Average
Accuracy	31	9-9	4.4	75	12	Average
Fluency	56	9-0	3.7	63	11	Average
Comprehension	24	8-3	2.7	37	+9	Average
Sum of Scaled Scores (Fluency + Comprehension)					=20	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
20	50	100	Average

Data Sheet

Participant #: 24 DOB: 09/19/2006 Age: 9;9 Grade: 4 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	66	9-0	3.5	42	97	Average
Phonemic Decoding	30	8-6	3.2	37	+95	Average
	Sum of Scaled Scores =				192	XXXXXX
Total Word Reading Efficiency Index				39	96	Average

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	26	94		9:1	3.6	Average
Word Attack	20	+109		12:5	6.8	Average
Basic Skills Cluster		Test Sum	Cluster	9:9	4.2	Average
		=203	101			

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	12	<7-0	1.0	10	81	Below Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	26	8-9	3.2	37	9	Average
Accuracy	33	10-6	5.2	63	11	Average
Fluency	59	9-3	4.0	50	10	Average
Comprehension	30	9-6	4.2	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=20	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
20	50	100	Average

Data Sheet

Participant #: 25 DOB: 02/04/2008 Age: 8;5 Grade: 3 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	53	8-0	2.5	42	97	Average
Phonemic Decoding	18	7-3	2.0	21	+88	Below Average
				Sum of Scaled Scores =	185	XXXXXX
			Total Word Reading Efficiency Index	30	92	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	25	102		8:9	3.3	Average
Word Attack	13	+97		8:4	2.8	Average
Basic Skills Cluster		Test Sum	Cluster	8:7	3.1	Average
		=199	99			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	13	7-0	1.2	32	93	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	19	7-9	2.2	37	9	Average
Accuracy	17	7-3	2.0	25	8	Average
Fluency	36	7-3	2.0	25	8	Average
Comprehension	21	7-9	2.2	37	+9	Average
			Sum of Scaled Scores (Fluency + Comprehension)		=17	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
17	30	92	Average

Data Sheet

Participant #: 26 DOB: 03/17/2009 Age: 7;3 Grade: 2 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	39	7-3	1.8	53	101	Average
Phonemic Decoding	7	6-0	1-0	14	+84	Below Average
	Sum of Scaled Scores =				185	XXXXXX
Total Word Reading Efficiency Index				30	92	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	17	102		7:2	1.8	Average
Word Attack	4	+89		6:7	1.2	Average
Basic Skills Cluster		Test Sum =191	Cluster 95	7:0	1.6	Average

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	2	<7-0	1.0	9	80	Below Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	9	6-6	1.2	37	9	Average
Accuracy	15	7-0	1.7	50	10	Average
Fluency	24	6-6	1.2	37	9	Average
Comprehension	9	6-0	<1.0	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=17	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
17	30	92	Average

Data Sheet

Participant #: 27 DOB: 01/24/2008 Age: 8;5 Grade: 3 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	52	8-0	2.5	39	96	Average
Phonemic Decoding	14	6-9	1.5	12	+82	Below Average
	Sum of Scaled Scores =				178	XXXXXX
Total Word Reading Efficiency Index				21	88	Below Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	21	90		7:10	2.4	Average
Word Attack	7	+82		7:0	1.5	Below Average
Basic Skills Cluster		Test Sum	Cluster	7:6	2.0	Average
		=177	88			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	5	<7-0	1.0	10	81	Below Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	16	7-3	1.7	25	8	Average
Accuracy	11	6-6	1.2	16	7	Below Average
Fluency	27	6-9	1.4	16	7	Below Average
Comprehension	10	6-0	1.0	9	+6	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=13	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
13	10	81	Below Average

Data Sheet

Participant #: 28 DOB: 10/26/2006 Age: 9;8 Grade: 4 MALE FEMALE Date: 07/08/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	66	9-0	3.5	42	97	Average
Phonemic Decoding	22	7-9	2.2	16	+85	Below Average
	Sum of Scaled Scores =				182	XXXXXX
Total Word Reading Efficiency Index				27	91	Average

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	25	91		8:9	3.3	Average
Word Attack	17	+100		10:0	4.5	Average
Basic Skills Cluster		Test Sum	Cluster	9:1	3.6	Average
		=191	95			

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	15	7-6	14	16	85	Below Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	25	8-6	3.0	25	8	Average
Accuracy	29	9-3	4.0	50	10	Average
Fluency	54	8-9	3.4	37	9	Average
Comprehension	12	6-6	1.2	2	+4	Poor
Sum of Scaled Scores (Fluency + Comprehension)					=13	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
13	10	81	Below Average

Data Sheet

Participant #: 29 DOB: 12/05/2003 Age: 12;7 Grade: 7 MALE FEMALE Date: 07/11/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	81	13-9	8.5	61	104	Average
Phonemic Decoding	50	16-6	11.0	73	+109	Average
	Sum of Scaled Scores =				213	XXXXXX
Total Word Reading Efficiency Index				68	107	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	36	110		14:7	9.0	Average
Word Attack	22	+107		16:1	10.2	Average
Basic Skills Cluster		Test Sum	Cluster	14:9	9.3	Average
		=217	109			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	22	8-9	3.0	10	81	Below Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	38	11-9	6.0	37	9	Average
Accuracy	48	16-0	9.7	75	12	Average
Fluency	86	13-3	7.7	63	11	Average
Comprehension	30	9-6	4.2	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=19	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 30 DOB: 04/09/2007 Age: 9;3 Grade: 4 MALE FEMALE Date: 07/11/2016
Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	69	9-9	4.5	53	101	Average
Phonemic Decoding	35	9-9	3.8	53	+101	Average
	Sum of Scaled Scores =				202	XXXXXX
Total Word Reading Efficiency Index				53	101	Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	28	105		9:11	4.4	Average
Word Attack	15	+97		9:0	3.5	Average
Basic Skills Cluster		Test Sum	Cluster	9:8	4.1	Average
		=202	101			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	35	11-6	5.8	95	124	Superior

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	31	10-0	4.4	63	11	Average
Accuracy	39	12-6	6.4	84	13	Above Average
Fluency	70	11-0	5.4	75	12	Average
Comprehension	38	12-3	6.4	91	+14	Above Average
Sum of Scaled Scores (Fluency + Comprehension)					=26	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
26	84	115	Above Average

Data Sheet

Participant #: 31 DOB: 12/03/2007 Age: 8;7 Grade: 3 MALE FEMALE Date: 07/11/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	63	8-9	3.2	55	102	Average
Phonemic Decoding	30	8-6	3.2	47	+99	Average
	Sum of Scaled Scores =				201	XXXXXX
Total Word Reading Efficiency Index				53	101	Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	22	93		8:0	2.6	Average
Word Attack	13	+97		8:4	2.8	Average
Basic Skills Cluster		Test Sum	Cluster	8:1	2.6	Average
		=190	94			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	17	7-9	2.0	39	96	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	27	9-0	3.4	50	10	Average
Accuracy	25	8-6	3.2	50	10	Average
Fluency	52	8-9	3.2	50	10	Average
Comprehension	21	7-9	2.2	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=18	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
18	34	94	Average

Data Sheet

Participant #: 32 DOB: 04/12/2005 Age: 11;2 Grade: 5 MALE FEMALE Date: 07/11/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	70	10-3	4.8	32	93	Average
Phonemic Decoding	17	7-3	1.8	3	+72	Poor
	Sum of Scaled Scores =				165	XXXXXX
Total Word Reading Efficiency Index				12	82	Below Average

1. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	31	100		11:4	5.9	Average
Word Attack	15	+88		9:0	3.5	Average
Basic Skills Cluster		Test Sum	Cluster	10:6	5.0	Average
		=188	93			

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	36	12-0	6.2	65	106	Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	28	9-3	3.7	25	8	Average
Accuracy	31	9-9	4.4	37	9	Average
Fluency	59	9-3	4.0	25	8	Average
Comprehension	27	8-9	3.4	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average

Data Sheet

Participant #: 33 DOB: 06/22/2009 Age: 7;0 Grade: 2 MALE FEMALE Date: 07/13/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	31	6-9	1.2	35	94	Average
Phonemic Decoding	11	6-6	1.2	27	+91	Average
	Sum of Scaled Scores =				185	XXXXXX
Total Word Reading Efficiency Index				30	92	Average

2. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	18	102		7:4	1.9	Average
Word Attack	8	+100		7:2	1.7	Average
Basic Skills Cluster		Test Sum	Cluster	7:4	1.9	Average
		=202	101			

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	2	<7-0	1.0	9	80	Below Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	4	<6-0	<1.0	16	7	Below Average
Accuracy	12	6-9	1.2	37	9	Average
Fluency	16	6-3	1.0	25	8	Average
Comprehension	20	7-6	2.2	63	+11	Average
Sum of Scaled Scores (Fluency + Comprehension)					=19	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
19	42	97	Average

Data Sheet

Participant #: 34 DOB: 09/08/2009 Age: 7;10 Grade: 2 MALE FEMALE Date: 07/11/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	36	7-0	1.5	14	84	Below Average
Phonemic Decoding	4	<6-0	<1.0	2	+70	Poor
	Sum of Scaled Scores =				154	XXXXXX
Total Word Reading Efficiency Index				5	76	Poor

3. WRMT-III

<table>
<tr><th></th><th>Raw Score</th><th colspan="2">Standard Score</th><th>Age Equiv.</th><th>Grade Equiv.</th><th>Descriptive Term</th></tr>
<tr><td>Word ID</td><td>13</td><td colspan="2">82</td><td>6:9</td><td>1.4</td><td>Below Average</td></tr>
<tr><td>Word Attack</td><td>3</td><td colspan="2">+78</td><td>6:5</td><td>1.1</td><td>Below Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">6:9</td><td rowspan="2">1.3</td><td rowspan="2">Below Average</td></tr>
<tr><td>=160</td><td>79</td></tr>
</table>

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	1	<7-0	1.0	7	78	Poor

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	8	6-3	1.0	16	7	Below Average
Accuracy	7	6-0	<1.0	16	7	Below Average
Fluency	15	6-0	1.0	16	7	Below Average
Comprehension	9	6-0	<1.0	16	+7	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=17	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
14	14	84	Below Average

Data Sheet

Participant #: 35 DOB: 02/14/2007 Age: 9;4 Grade: 4 MALE FEMALE Date: 07/11/2016
Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	41	7-6	1.8	2	70	Poor
Phonemic Decoding	5	6-0	1.0	<1	+62	Very Poor
	Sum of Scaled Scores =				132	XXXXXX
Total Word Reading Efficiency Index				1	64	Very Poor

2. WRMT-III

<table>
<tr><th></th><th>Raw Score</th><th colspan="2">Standard Score</th><th>Age Equiv.</th><th>Grade Equiv.</th><th>Descriptive Term</th></tr>
<tr><td>Word ID</td><td>17</td><td colspan="2">70</td><td>7:2</td><td>1.8</td><td>Below Average</td></tr>
<tr><td>Word Attack</td><td>10</td><td colspan="2">+82</td><td>7:7</td><td>2.0</td><td>Below Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">7:4</td><td rowspan="2">1.9</td><td rowspan="2">Below Average</td></tr>
<tr><td>=152</td><td>75</td></tr>
</table>

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	16	7-9	2.0	25	90	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	13	7-0	1.4	5	5	Poor
Accuracy	11	6-6	1.2	5	5	Poor
Fluency	24	6-6	1.2	5	5	Poor
Comprehension	15	6-9	1.4	5	+5	Poor
Sum of Scaled Scores (Fluency + Comprehension)					=10	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
10	4	73	Poor

Data Sheet

Participant #: 36 DOB: 11/14/2006 Age: 9;7 Grade: 4 MALE FEMALE Date: 07/13/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

3. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	73	11-0	5.5	65	106	Average
Phonemic Decoding	52	17-6	12.5	94	+123	Superior
	Sum of Scaled Scores =				229	XXXXXX
Total Word Reading Efficiency Index				84	115	Above Average

4. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	32	114		11:10	6.4	Average
Word Attack	23	+119		18:6	12.9	Above Average
Basic Skills Cluster		Test Sum	Cluster	13:3	7.8	Above Average
		=233	118			

1. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	24	9-3	3.5	39	96	Average

2. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	28	9-3	3.7	37	9	Average
Accuracy	39	12-6	6.4	84	13	Above Average
Fluency	67	10-6	5.0	63	11	Average
Comprehension	24	8-3	2.7	16	+7	Below Average
Sum of Scaled Scores (Fluency + Comprehension)					=18	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
18	34	94	Average

Data Sheet

Participant #: 37 DOB: 08/16/2007 Age: 8;10 Grade: 4 MALE FEMALE Date: 07/13/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

4. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	54	8-0	2.5	30	92	Average
Phonemic Decoding	33	9-3	3.5	58	+103	Average
	Sum of Scaled Scores =				195	XXXXXX
Total Word Reading Efficiency Index				42	97	Average

1. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>36</td><td colspan="2">132</td><td>14:7</td><td>9.0</td><td>Well Above Average</td></tr>
<tr><td>Word Attack</td><td>22</td><td colspan="2">+119</td><td>16:1</td><td>10.2</td><td>Above Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">14:9</td><td rowspan="2">9.3</td><td rowspan="2">Above Average</td></tr>
<tr><td>=251</td><td>129</td></tr>
</table>

2. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	19	8-3	2.5	47	99	Average

3. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	26	8-9	3.2	50	10	Average
Accuracy	38	12-3	6.4	91	14	Above Average
Fluency	64	10-0	4.7	75	12	Average
Comprehension	26	8-6	3.2	50	+10	Average
Sum of Scaled Scores (Fluency + Comprehension)					=22	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
22	63	105	Average

Data Sheet

Participant #: 38 DOB: 02/06/2009 Age: 7;5 Grade: 2 MALE FEMALE Date: 07/18/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

1. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	62	8-9	3.2	91	120	Above Average
Phonemic Decoding	31	8-9	3.2	86	+116	Above Average
	Sum of Scaled Scores =				236	XXXXXX
Total Word Reading Efficiency Index				90	119	Above Average

2. WRMT-III

<table>
<tr><td></td><td>Raw Score</td><td colspan="2">Standard Score</td><td>Age Equiv.</td><td>Grade Equiv.</td><td>Descriptive Term</td></tr>
<tr><td>Word ID</td><td>25</td><td colspan="2">115</td><td>8:9</td><td>3.3</td><td>Average</td></tr>
<tr><td>Word Attack</td><td>16</td><td colspan="2">+115</td><td>9:5</td><td>3.9</td><td>Average</td></tr>
<tr><td colspan="2" rowspan="2">Basic Skills Cluster</td><td>Test Sum</td><td>Cluster</td><td rowspan="2">8:11</td><td rowspan="2">3.4</td><td rowspan="2">Above Average</td></tr>
<tr><td>=230</td><td>116</td></tr>
</table>

3. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	19	8-3	2.5	75	110	Average

4. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	27	9-0	3.4	84	13	Above Average
Accuracy	28	9-3	3.7	91	14	Above Average
Fluency	55	9-0	3.4	91	14	Above Average
Comprehension	26	8-6	3.2	84	+13	Above Average
Sum of Scaled Scores (Fluency + Comprehension)					=27	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
27	88	118	Above Average

Data Sheet

Participant #: 39 DOB: 07/15/2009 Age: 7;0 Grade: 2 MALE FEMALE Date: 07/20/2016

Hearing Screening: PASS / FAIL Vision Screening: PASS / FAIL

Assessments

2. TOWRE-2

	Raw Score	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Sight Word	27	6-6	1.2	25	90	Average
Phonemic Decoding	8	6-3	1.0	18	+86	Below Average
	Sum of Scaled Scores =				176	XXXXXX
Total Word Reading Efficiency Index				19	87	Below Average

3. WRMT-III

	Raw Score	Standard Score		Age Equiv.	Grade Equiv.	Descriptive Term
Word ID	17	100		7:2	1.8	Average
Word Attack	4	+89		6:7	1.2	Average
Basic Skills Cluster		Test Sum	Cluster	7:0	1.6	Average
		=189	94			

4. GSRT

	Raw Score	Age Equiv.	Grade Equiv.	%tile	Silent Reading Quotient	Descriptive Term
Silent Reading Comprehension	3	<7-0	1.0	13	83	Below Average

1. GORT-V

Oral Reading Comprehension	Raw Total	Age Equiv.	Grade Equiv.	%tile Rank	Scaled Score	Descriptive Term
Rate	5	6-0	<1.0	25	8	Average
Accuracy	9	6-3	1.0	25	8	Average
Fluency	14	6-0	<1.0	25	8	Average
Comprehension	12	6-6	1.2	25	+8	Average
Sum of Scaled Scores (Fluency + Comprehension)					=16	XXXXXXXX

Sum of Scaled Scores	Oral Reading %tile Rank	Oral Reading Index	Descriptive Term
16	23	89	Below Average