READING FLUENCY INSTRUCTION WITH STUDENTS WHO HAVE PHYSICAL DISABILITIES

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ABSTRACT

Although fluency instruction is an essential part of teaching reading, there is limited information on providing this type of instruction with students who have physical disabilities. This article examines three case studies across two students, one with cerebral palsy and the other with both arthrogryposis and spina bifida. In the first study, the use of repeated readings with error correction was found to increase oral reading fluency. In the second study, the use of unison reading with error correction increased reading fluency across practiced and unpracticed passages. The third study used an alternating treatment design to compare the two types of fluency instruction, with unison reading appearing to more effective. Teachers are encouraged to implement fluency instruction with their students with physical disabilities, although further studies are needed.

Reading fluency is an essential part of the reading process. Students who are slow readers read less text in the same amount of time as more fluent readers, which exposes them to less vocabulary and fewer concepts from written materials (Mastropiere, Leinart, & Scruggs, 1999). Slow readers often avoid reading because it is laborious, resulting in less practice; this can negatively impact the development of fluent reading skills. These slower reading rates can result in frustration and poor academic performance. Students with physical disabilities are especially at risk for slower reading rates due to potential differences in their background and reading experiences, possible learning differences, and motor-related speech impairments (Heller, 2005; Koppenhaver & Yoder, 1993). In addition, students with physical disabilities may have difficulty with the physical aspects of the reading process such as: maintaining proper body position to access a book, having adequate motor control and range of motion to turn pages of a book, having good hand use to hold a book or point to the words, and having adequate attention to text without fatiguing (Heller, 2005). Teachers need to use effective instructional strategies and adaptations with their students with physical disabilities who exhibit slow reading rates.

The three main characteristics of fluent reading are accuracy, speed, and proper phrasing (Samuels, 2002). In the area of accuracy, fluent readers attain automatic word recognition skills and can immediately and correctly read words without having to sound them out (although they can decode words) (Samuels, 2004). The speed associated with fluent reading is characterized as being fast, effortless, and autonomous (Logan, 1997). Fluent reading is also characterized as having the proper phrasing of text with pauses and intonation associated with the rise and fall in pitch that is present when reading with expressions (Schwanenflugel, et al, 2004).

Oral reading fluency develops naturally for most students throughout early elementary school years and is evidence of reading competency (Fuchs, Fuchs, Hosp, and Jenkins, 2001). According to LaBerge and Samuel's (1974) model of automatic information processing in reading, advanced reading essentially involves achieving automaticity of the words and deriving meaning from text. In order to understand the meaning of a word, the word must first be identified. Beginning readers observe the word and apply phonological skills in order to identify the word. For poor readers, this process is often slow and laborious. Advanced readers observe a word, "automatically" recognize it, and immediately comprehend it.

Reading fluency can be classified into three levels: nonaccurate, accurate, and automatic (Samuels, 2002). Students on the nonaccurate level struggle to decode most of the words in a passage. In the accurate level, the

student is decoding correctly, but still has a great deal of effort put into the decoding process. Students at either one of these stages have so much attention placed in the decoding process that they are often unable to focus on comprehension. The goal of fluency instruction is to help the student move to the final level of automatic fluency in which the reader immediately recognizes the words being read and can focus on comprehension of the text.

Students with physical disabilities may have difficulty with fluent reading due to multiple factors. They often have more restricted exposure to text due to motor disabilities that restrict retrieving or manipulating books, as well as possible fatigue and endurance issues that may result in an inability to attend to the reading material for as long as other students (Heller, 2005). Children with physical disabilities may have large amounts of time devoted to medical treatments, daily care, and related services which can result in fewer literacy experiences at home and interrupted literacy experiences at school. Also, students with physical disabilities may have less exposure to different environments (e.g., going to a movie, or playing in a sandbox) which can affect word comprehension and comprehension of text. Other factors that can impact fluent reading include learning problems, speech impairments, and additional disabilities (such as vision impairments) which will require the teacher to provide specialized strategies to promote fluent reading.

STRATEGIES TO INCREASE READING FLUENCY

Some strategies proposed to increase reading fluency include: increased opportunities to read easily decoded text, reading predictable books and patterned books, having a fluent reader model reading, and repeated reading (Chard, Vaughn, & Tyler, 2002; Samuels, 2002; Samuels, 1997). One strategy that has gained a great deal of interest is repeated reading. According to LaBerge and Samuels (1974), one way for poor readers to obtain automaticity in decoding, and thereby improve oral fluency, is through repeated reading of the same text. Just as beginning readers are encouraged to reread passages to obtain fluency, struggling readers can obtain the ability to read with automaticity through repeated readings (Archer, Gleason, & Vachon, 2003). There now exists nearly a 30 year literature base on the efficacy of repeated reading since LaBerge and Samuels (1974) introduced their theory of automaticity of reading fluency and Samuels introduced the practice of repeated readings in 1979. Two types of repeated reading are: a) repeated reading with error correction and b) repeated reading with a reading model (including unison reading).

In repeated reading with error correction, the student reads the material a specific number of times. The teacher provides error correction when a student has mispronounced a word, omited a word, or indicated a need for help. Error correction may be given immediately or after a student has completed a reading passage. Some researchers have found corrective feedback, in combination with repeated readings, to be an essential component in improving reading fluency (Therrien, 2004). Providing only corrective feedback without repeated readings reduces the number of errors per minutes, but has no significant increase on fluency rates unless combined with repeated readings (Nelson, Alber, and Gordy, 2004).

In the strategy of repeated reading with a model, students repeat reading a passage after hearing a model read a passage, or students and the model read in unison (known as unison reading). The strategy of reading with a model can employ several different types of model readers, including teachers (Rose & Beattie, 1986; Smith, 1979), peers (Vaughn et al, 2000), tape recorders (Daly & Marten, 1994; Gilbert, Williams, & McLaughlin, 1996) and computers (Mosley, 1993; Patillo, Heller, & Smith, 2004). Supporters of repeated reading with a model stress that having a model reader provides the student with the prosodic cues (e.g., sound, duration, stress, pitch), natural phrasing, reading rate, and automatic word recognition to increase reading fluency (Richards, 2000).

Chard, Vaughn and Tyler (2002) reviewed multiple studies using variations of repeated reading interventions, including repeated reading with a model. The studies they examined used all types of models (e.g., teacher, peer, computer) with some having better results than others. However, they concluded that repeated reading with a model (especially a teacher model) was an effective method to increase fluency, and appeared to be more effective than without a model. Although most reading fluency studies involving students with disabilities use students with learning disabilities, Mefferd and Pettegrew (1997) demonstrated gains in fluency with fourth and fifth grade students with developmental delays using unison reading with repeated readings within a treatment package.

Questions arise as to how many times should the student reread the same passage when using a repeated reading approach. Therrien (2004) found that reading the passage three or four times resulted in 30% greater gains than only rereading the passage twice. He also found that reading the passage four times was slightly better than three times, but over four times did not result in significant comprehension gains. In another study (O'Shea, Sindelar, & O'Shea, 1987) that compared a single reading, three readings, and seven readings, the seven readings resulted in significantly higher levels of reading

fluency as compared to three readings which was significantly higher than one reading. In a different study, Sindelar et al. (1990) also found that three readings result in higher rates of fluency over reading the passage one time.

The goal of fluency instruction may focus on obtaining nontransfer or transfer results (Therrien, 2004). When the outcome is focused on assisting students to read more fluently and comprehend a particular passage, it is referred to as nontransfer results. When the goal is higher reading rates of unknown passages, it is known as transfer results. One analysis by Therrien (2004) found that students with no disabilities and those with learning disabilities were able to improve their reading fluency and comprehension using repeated readings, and that the repeated reading had the potential to improve reading fluency to new material (i.e., had positive transfer results). In the study by Patillo, Heller, and Smith (2004), all five students with visual impairments increased their oral fluency rates on their practiced passages (i.e., positive nontransfer results) and had positive trends across unpracticed passages (i.e., positive transfer results). This is consistent with the findings of Layton & Koenig (1998) that students were able to generalize their faster reading rates to the classroom after instruction with repeated readings. However, not all studies have found positive transfer results, such as the study by Steventon and Fredrick (2003) which had increases in fluency on the practiced passages after being exposed to repeated readings (without a model), but there was no increase in fluency to unpracticed passages.

Regardless of the precise methodology used to increase fluency, appropriate adaptations need to be put in place when a student has a physical disability. First, the student needs to be properly positioned to allow optimal access to the reading material. When the student has range of motion issues or impaired motor movements, the positioning of the book becomes important. The book needs to be placed where the student can easily see it and access it (e.g, on an adapted desk, on a slant board, positioned to one side for better hand access). This may also require work surface modifications, such as stabilization of the item (e.g., taping the reading material to the desk, using dycem or other nonslid material). The book itself may be adapted for easy turning of the pages (e.g., page fluffers), or the book may be scanned into the computer so the student can go to the next page by activating a switch. In some cases a teacher or peer may assist with turning the pages. For students who lose their place when reading and are not able to use their hands to follow the print, several different strategies may be used such as having a teacher or peer point to the words, using the Color Line Prompting Strategy, making the print larger, or retyping the print and have more spacing between the lines (Heller, 2005). When the book is scanned into the computer, a soft-

ware program can be used to highlight the words to assist the student is keeping his place. Some physical disabilities may also result in fatigue and the lesson may need to be shortened or rest breaks given. Augmentative communication devices and alternate ways of responding may be used when discussing the reading material or answering questions about it. Depending on the type of physical disability, other forms of assistive technology or modifications may be needed to make reading accessible to the student.

Research on fluency instruction with students with physical disabilities is lacking. This article provides three case studies of students with physical disabilities using: a) the repeated reading with error correction strategy, b) unison reading with error correction, and c) a comparison of repeated reading with error correction and unison reading with error correction. The effect of these strategies on reading fluency and error rate was examined.

CASE STUDY 1: REPEATED READING WITH ERROR CORRECTION

PARTICIPANT

To be selected for this first study, the participant had to: a) meet the criteria for orthopedic impairments (which in Georgia is mild intellectual disability to gifted intelligence accompanied with a physical disability that interferes with educational performance), b) receive reading instruction from a special education teacher, c) have no articulation or speech disorders, d) have a slow reading rate, e) have no sensory impairments, and f) have an interest in increasing reading fluency. Bella, an 11 year old Hispanic student, met this criteria and was selected for this study.

Bella was a student in the fourth grade who received most of her instruction in a self-contained classroom for students with orthopedic impairments (OI). She had a diagnoses of arthrogryposis and spina bifida, with a full scale IQ of 80 (on the Universal Nonverbal Intelligence Test). Two years ago Bella came into the OI classroom reading only twenty words and had limited English exposure. Since then, she received reading instruction using the SRA Reading Mastery Series. She made rapid progress and read with high levels of accuracy, but at a slow pace. According to the Brigance Comprehensive Inventory of Basic Skills–Revised, she scored in the lower 2nd grade level for oral reading, the 2nd grade level for word recognition, the 3rd grade level for listening, and the upper 2nd grade level for reading comprehension. To establish a fluency baseline, Bella was given three first grade reading passages. First grade reading passages were selected since fluency

instruction usually occurs on material that is at the student's instructional level (about 95% accuracy) or better. She had a mean oral fluency score of 34 words per minute.

Procedure

All sessions took place in a corner of the OI classroom. The teacher sat with Bella who had her back to the other students who were working on other activities with a paraprofessional in order to minimize distractions. To make reading accessible for Bella, she was well positioned in her wheelchair, and she used an adapted table with the height adjusted for reading and wheelchair positioning. No other accommodations were needed since she had good hand functioning with adequate range of motion. Reading passages were placed directly in front of her. The teacher had an identical copy of the passage in front of her on which she marked errors. The reading material used during this study consisted of the oral reading fluency passages of the "Dynamic Indicators of Basic Early Literacy Skills" (Good & Kaminski, 2001). This was selected since it was specifically designed to monitor oral reading fluency.

Bella was presented with one passage and given one minute to read orally as much of the passage as possible. As she read, the teacher marked on her own copy of the passage the errors Bella was making: mispronunciations, omissions, substitutions, and additional words. After the minute, she was stopped and provided corrective feedback on all of the errors. The teacher reviewed the errors the student made by pointing to the word, telling Bella that it was missed, saying the correct word, and having the student repeat the correct word. After the feedback was completed, Bella read orally the same passage a second time for one minute. Corrective feedback was then discussed with her. Bella then read the passage a third (final) time. This is consistent with the literature which recommended that passages should be read three or four times when using the repeated reading procedure (Therrien, 2004). This continued for 16 sessions.

Correct words per minute (cwpm) were calculated for each of Bella's readings by counting the total number of words read in one minute and subtracting the errors. Also, the number of errors per session and the percentage of errors out of the total number of words read were noted. The types of errors were examined for possible patterns.

Results

There was an increase in fluency between Bella's first reading of each passage to her third reading of each passage (positive nontransfer results). (See

Figure 1). The initial readings ranged from 19 to 45 cwpm, with a mean of 30.4 cwpm. The last repeated readings ranged from 35 to 63 cwpm with a mean of 46.88 cwpm. There was a mean increase of 16.48 cwpm between the first and third reading.

The first reading rates across each new session in which she read a new passage for the first time were examined for possible transfer results. No clear positive trend occurred across these first readings. The quarter-intersect method (Alberto & Troutman, 2006) was used to evaluate increases in reading rate across first readings in the sessions. In this method, the median value of the first half of the initial sessions is compared to the median value of the second half of the initial sessions. In this study, no increase in reading rate was found across the first readings.

The number of errors made by Bella decreased between the first and last reading of the same passage in each session. In the first reading she had a range of 0 to 32.1% errors across sessions with a mean of 13.24%. On the final reading, her errors ranged from 0 to 7.8% errors with a mean of 1.92%. When examining whether Bella made less errors as the study progressed, no difference was present between the number of errors she made the first half and the last half of the study.

An error analysis of her performance on reading passages revealed that 45% of errors were omitted words. Bella also had difficulty with the middle of words, which constituted 17% of the errors. Problems with endings of words made up 16% of the errors. Although name errors (problems pronouncing names) was only 4%, Bella consistently missed proper names which is not uncommon when English is a second language.

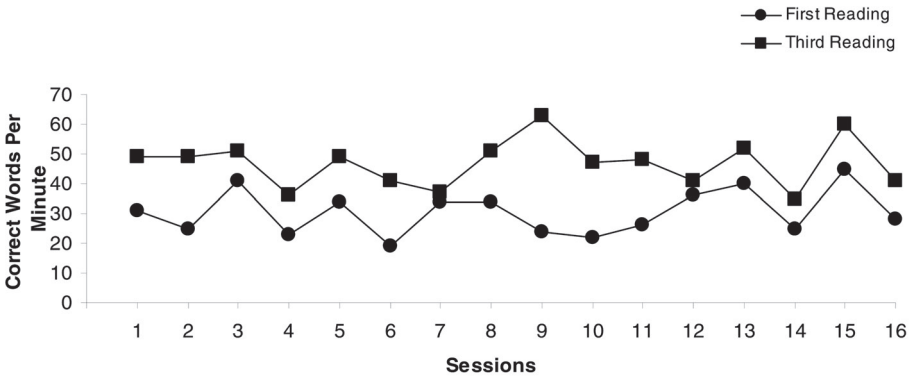

Figure 1.

Correct words per minute for Bella during repeated readings with error correction.

CASE STUDY 2: UNISON READING WITH ERROR CORRECTION

A second investigation took place using a unison repeated reading procedure. Since students with physical disabilities may have less background knowledge and fewer reading experiences than their same age peers, there may be a need for an adult to model fluent reading. Unison reading provides a simultaneous model that can be adjusted to the student's current reading rate and increased as appropriate. As with the repeated reading procedure in the first case study, error correction was provided in the unison reading procedure.

PARTICIPANT

The participant criteria was the same as in the first study and Al was selected as the participant. Al was a nine year-old African-American student with a diagnosis of cerebral palsy. His last IQ scores on the Stanford Binet were: verbal reasoning 91, abstract/visual reasoning 52, quantitative 60, short term memory 81, composite 65. He attended a self-contained classroom for students with orthopedic impairments and was mainstreamed into a 3rd grade general education class for one period daily. Al used a manual wheelchair for mobility and had difficulty with fine motor tasks. His handwriting was slow and laborious and he had difficulty manipulating small objects.

Al had received reading instruction in the SRA Reading Mastery series for three years. He was able to read with high levels of accuracy, but read slowly because he still needed to decode most of the words. He also had difficulty with reading comprehension, possibly due to his lack of fluency. On the Brigance Comprehensive Inventory of Basic Skills–Revised, Al scored at the lower first grade level in oral reading and the second grade level for listening and word recognition. His oral fluency rate was measured at 14 cwpm.

PROCEDURE

All sessions took place in the classroom for students with orthopedic impairments. In order to make reading accessible for Al, he was well positioned in his wheelchair and used an adapted table with the height adjusted for reading and wheelchair positioning. The reading material was placed on a slant board which held the material in place. Dycem was placed under the slantboard to keep it from moving. Although Al could turn the pages of a book, he often had difficulty following a line of print unless the print was larger (as it was in this study). The reading material consisted of the passages from the SRA reading series in storybooks one, two, and three. Al had previous expo-

sure to these reading material earlier in the year, but they were selected to be repeated due to his poor fluency.

In this procedure, Al engaged in the same repeated reading with corrective feedback format, except with the addition of two unison readings interspersed among the three times he read the same passage on his own. The procedure was: 1) Al reads alone and then receives corrective feedback, 2) Al and the teacher read together in unison, 3) Al reads alone and then receives corrective feedback, 4) Al and the teacher read together in unison, and 5) Al reads alone and then receives corrective feedback. Unlike the previous study, Al read the entire passage instead of reading for just one minute. Each passage was completed in approximately $1^1/_2$ to $3^1/_2$ minutes. To address his fatigue issues, frequent breaks were scheduled between the reading repetitions.

After each reading, the teacher gave feedback to Al on his errors. When the story was read in unison, the teacher would read at a faster pace than Al had previously read, but adjust the speed so that Al was able to read in unison with the teacher. This intervention consisted of 10 sessions.

Correct words per minute (cwpm) were calculated each time Al read alone by counting the total number of words read, subtracting the errors and dividing by the total number of minutes. Also, the number of errors per session and the percentage of errors out of the total number of words read were calculated. The types of errors were also noted.

Results

When comparing Al's first reading of each passage to the third reading of the same passage, there was an increase in cwpm in every session except the last one in which he read at the same rate. (See Figure 2). For seven of the sessions, there was an additional increase between the third and final reading (while two remained the same and one was lower). The initial readings had a range of 17 to 38 cwpm with a mean of 27.7 cwpm. The final reading had a range of 31 to 62 cwpm with a mean of 47.8. This resulted in a mean increase of 20.1 cwpm between the first and last reading.

Not only is there an increase in reading rate between the first and last reading for each sessions (i.e., positive nontransfer results), but there is a gain in reading rate as Al read unpracticed passages at the beginning of each session (i.e., positive transfer results). The quarter-intersect method (Alberto & Troutman, 2006) was used to evaluate the presence of an increase in rate. The median value of the first half of the initial reading was 20 cwpm and the last half of the data was 32 cwpm. The positive trend indicates an increase in

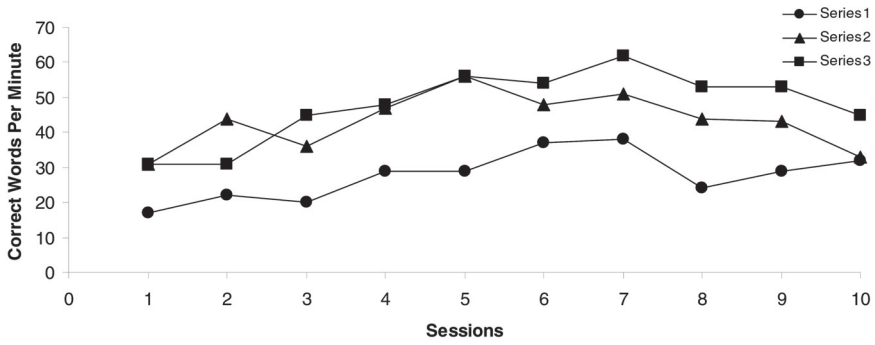

Figure 2.

Correct words per minute for Al during unison reading with error correction.

reading rate across initial sessions. This unison method with error correction appeared to increase fluency across unpracticed passages.

The number of errors made by Al decreased between the first and last reading of the same passage in each session. In the first reading he had a range of 0 to 12.3% errors across sessions with a mean of 5.0%. On the final reading, he had a range of 0 to 8.6% errors across sessions with a mean of 1.36% errors. When examining whether Al made less errors as the study progressed, no difference was present between the number of errors he made the first half and the last half of the study. Al's errors tended to be word substitutions that made sense (e.g., "store" instead of "shop"), or could logically come next (e.g., "she wanted" instead of "she went").

CASE STUDY 3: COMPARISON OF REPEATED READING AND UNISON READING

Although unison reading appeared to be an effective method for increasing reading fluency for Al, it was more time consuming than a repeated feedback with error correction. The question arose as to whether the repeated reading with error correction would be just as effective for Al as the unison reading. This study applied an alternating treatment design to compare the effectiveness of the two reading strategies.

Participant

The same student who participated in the second study, Al, was selected for this third study. Al had a more severe oral reading fluency problem with his baseline of cwpm at 14. Also, his oral fluency score (early 1st grade level) was over a year lower than his word identification score (2nd grade level) which indicated an area of need.

Procedure

The setting for this study was the same as the previous studies. Reading passages were placed on a slant board directly in front of the student. The DIBELS oral fluency passages that had been used with Bella in the first study were selected for this study. Al had never been exposed to these passages. As in the first study, Al read for one minute.

The student was told which intervention would occur and was provided with a brief description of the steps which that intervention would entail. At the end of the session, the teacher provided verbal praise for completion of the tasks and informed the student how had performed. The correct words per minute (cwpm) were calculated for each of Al's readings.

Repeated Reading with Error Feedback. In the repeated reading with error feedback condition (Condition A), the student engaged in three 1-minute timed readings of the same passage. At the end of each passage reading, the teacher reviewed the errors that the student made by pointing to the word, telling the student that it was missed, and then telling the student the correct word and having the student repeat the correct word. The session ended after the student had completed three readings.

Unison Reading. Condition B consisted of individual readings and unison readings with the teacher and student reading together. The procedure was the same as the previous study. This condition began with the student doing a one-minute reading. After the student completed the timed reading, the teacher provided error correction in the same manner as in Condition A. Then the teacher reminded the student that the next reading would be done with both of them reading. The teacher read faster than Al's preceding reading and she varied her reading speed based on the student's pace. The student and teacher read to the end of the sentence in which the student stopped during the first one-minute reading and then read one additional sentence. After unison reading, the student performed a one-minute timed reading alone. This was followed by error correction and another unison reading using the same procedures as the first. After this second unison reading, the student had a final timed reading.

Design

An alternating treatments design (Barlow & Herson, 1992; Alberto & Troutman, 2006) was selected for the third study because it allows the comparison of two independent variables on a single dependent variable. The two independent variables were: a) the repeated reading with corrective feedback, and b) the unison reading procedure with corrective feedback. The dependent variable was the correct words per minute (cwpm).

The repeated reading with corrective feedback served as Condition A. The repeated reading with unison reading was designed as Condition B. Conditions were randomly alternated. The study ended when a clear bifurcation in the data was present or after three weeks of data were obtained.

Treatment integrity data and reliability data were taken on at least 65% of the sessions.

Treatment integrity was taken by an observer marking whether the teacher followed each step of a task analysis of the instructional procedure for each condition. Treatment integrity was determined to be at 100% . Interobserver reliability was measured during 75% of the sessions by comparing the number of correct and incorrect student responses that was recorded by the teacher and second observer. Agreement ranged from 98.59% to 100% with an overall mean agreement of 99.74%.

Results

Al's oral reading rate improved between the first and last reading in each session under both conditions (i.e., positive nontransfer results). He consistently had a higher fluency rate under the final reading of the unison reading condition (Condition B) as compared with the final reading of the repeated readings condition (Condition A). (See Figure 3).

To take into account that the repeated reading with correction had three repetitions and the final unison reading had a total five repetitions (including reading alone and reading in unison), the data were also examined between the third repetition of repeated readings with correction (which was the final reading) and the third repetition of the unison reading condition (which was after one independent reading, one unison reading, and one independent reading). The unison reading condition after the third repeated reading has a higher cwpm than the third repeated reading condition, although there is not a clear bifurcation of the data. However, over half (6 out of 10) of the data points in the unison reading condition are higher than the highest data point in the repeated readings condition.

The data was also examined for the mean gains across the conditions. Under the repeated readings with correction (Condition A) the first readings

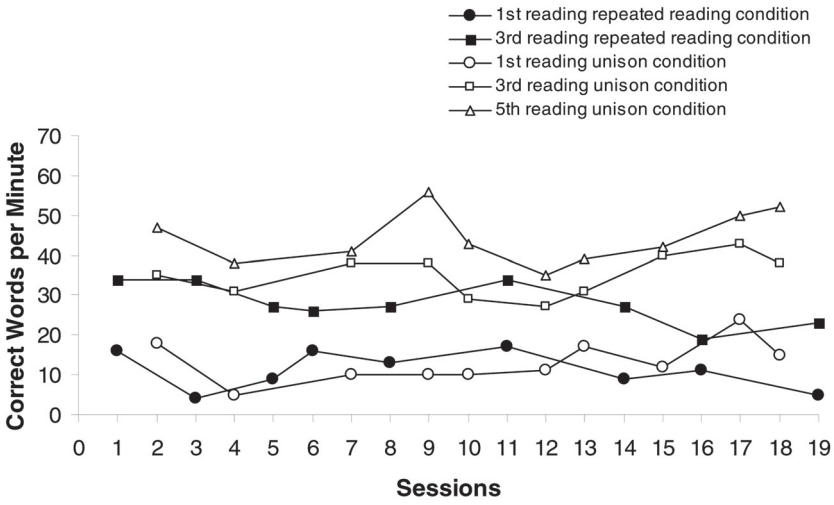

Figure 3.

Correct words per minute for Al during alternating treatments of repeated reading with correction and unison reading with corrections.

had a mean of 11.11 cwpm which increased to 27.88 cwpm by the third reading, a gain of 16.77 words between the first and third reading. Under the unison reading with error correction (Condition B), the first reading mean was 13.2 cwpm, the third reading mean increased to 35 cwpm, and the fifth reading mean was 44.3 cwpm. This was a mean increase of 21.8 cwpm between the first and third reading and a mean increase of 31.1 cwpm between the first and fifth reading.

The investigators also examined if the student increased his reading across the first sessions (i.e., transfer results). The quarter-intersect method (Alberto & Troutman, 2006) was used to evaluate the presence of a positive trend in the data which would indicate that than increase in reading rate was occurring. A very slight positive trend was present.

Under both conditions, Al made fewer errors between the first reading and subsequent readings. However, there was not a difference in the number of errors between the two conditions. The types of errors he made were similar to the second study in which he substituted logical words, as well as mispronunciations that had no particular pattern.

DISCUSSION

The purpose of these case studies was to examine the effect of repeated readings with error correction and unison reading with error correction on oral reading fluency with two students with physical disabilities. In all three case studies, the students were able to increase their oral reading rate on the practiced passage, and in some cases, on unpracticed passages.

The number of repetitions appeared to influence the reading rate for both students. When using the repeated reading strategy with error correction, fluency rates increased between the first and second reading and between the second and third reading for both Bella (in the first case study) and Al (in the third case study). In the unison reading strategy, reading rates increased between the first and third reading and between the third and fifth reading for Al in both the second and third case studies. In case study three, Al's highest fluency rate between the two strategies was by far the fifth reading of a passage under the unison reading condition (with mean increase of 31.1 cwpm from the first to fifth reading) as compared to first and third readings under the unison condition (with mean increase of 21.8 cwpm), or between the first and third repetition under the repeated reading condition (with a mean increase of 16.77 cwpm). Having five reading repetitions of the same passage resulting in the highest fluency rate is consistent in the literature where more repetitions resulted in higher fluency rates (O'Shea, et al., 1987, Therrien, 2004). Although more studies are needed, teachers may want to initially determine if their students benefit from more than three reading repetitions of a passage by examining their students' fluency rates with four or five repetitions, as opposed to three.

Although the repeated reading and the unison reading strategies were able to increase fluency rates on the practiced passages in the third case study, questions arise as to whether one strategy was more effective than the other. There is an obvious higher fluency rate under the unison condition, but this may be attributed to having more repetitions of the same passage. One way to make the two strategies more comparable is to examine the third reading of the repeated reading strategy to the third reading of the unison reading strategy (which allowed only 1 reading in unison). This comparison did not show a clear bifurcation of the graphed data, but the majority of the unison reading sessions had higher fluency rates. Also, there was a mean gain of 21.8 cwpm between the first and third readings of the unison condition, as apposed to a mean gain of 16.77 cwpm in the repeated reading with correction condition. This data indicate that the unison reading was more effective for this student in increasing reading fluency.

Fluency changes across unpracticed passages (transfer results) were also examined in this study by determining if there was an increase in reading rate across the first reading in each session (which was the initial reading of unknown passages). Although there were no transfer results in the first study, transfer results were clearly evident in the second study. This is consistent in the literature in studies that found increases in fluency across unpracticed passages (Layton & Koenig, 1998; Patillo, Heller, and Smith, 2004; Therrien, 2004). The differences between the first and second study consisted of different types of fluency instruction, different reading material, more reading repetition on each passage (five each) in the second study, and reading for longer periods of time in the second study. Having a teacher model more fluent reading with proper intonation and cadence in the second study may have had an effect, but having more repetitions and a longer time reading may have been important factors in increasing fluency to unpracticed passages.

Unlike the second study, the third study only showed minimal transfer effects. Al used the unison approach in the second study and used both the unison and repeated readings approach in the third study. There was not only a difference in methodology, but Al had more repetitions of the material in the second study (five repetitions) as opposed to the third study (in which three repetitions were used in the repeated reading condition). Other differences that may have contributed to the minimal transfer effects include the differences in reading time (in which Al read for 11/2 to 31/2 minutes in the second study as opposed to 1 minute in the third study). There was also a difference in the reading material with the third study having more difficult material as noted by the slower cwpm. This may indicate that the level of difficulty of the passages, in addition to the length of time allotted for passage reading, number of repetitions, and type of fluency instruction, may be important considerations in increasing fluency of unpracticed passages. Further research is needed to differentiate which factors are most salient.

The number of errors made by the students between the first and final readings of each passage during each session decreased. This would be expected due to the error correction that was given after the student completed reading a passage. There was no decrease in errors across session (from the beginning of the study to the end of the study). This was to be expected since the students were not receiving vocabulary instruction to increase familiarity with the words. When errors were made, they were not typically the same errors that the student had made in previous sessions. In fluency instruction, it is important to use passages in which few errors are anticipated and that are at the student's reading level. Passages were selected based on this premise,

but Bella appeared to be nervous about being timed and her error rate was attributed to this nervousness. Given more time, Bella may have become more relaxed about being timed and hence had a higher fluency rate with fewer errors.

Individualized adaptations were made for both students in these studies. Although Bella's adaptations primarily dealt with positioning and having an accessible table, Al required additional modifications for book placement (use of a slant board), print size (to allow for easy tracking), and breaks for fatigue. Future studies should investigate fluency instruction with students who require other types of adaptations. Of particular interest would be fluency instruction and assessment of students who have severe speech and physical impairments.

These three case studies serve as an initial examination of fluency instruction with students with physical disabilities. Both methods were found to increase oral reading fluency. However, further research is needed to determine which method is more effective since the third case study that compared the two methods was only with one student. Of particular interest is the impact of these fluency methods on unpracticed passages. There was an increase in fluency to unpracticed passages when union reading (with five repetitions) was used in addition to allowing the student to read the entire passage of text at an independent to instructional reading level. Future studies need to examine each of these factors that made the second study unique, to determine if certain variables are more relevant than others.

In summary, this article provided three case studies that examined the use of the repeated reading with error correction and the unison reading method with students who have physical disabilities. Both methods were successful in increasing oral reading rate on the practiced passages. Only in the second study, where the student engaged in only unison reading, was there a clear increase in fluency across passages that had not received intervention. This suggests that fluency training may also increase the student's fluency on unpracticed passages. In the third study, a comparison of the two methods indicated that the unison method, with all its repetitions, was the most successful with the highest fluency rate. As teachers are providing literacy instruction to their students who have physical disabilities, they should consider providing fluency instruction which can increase their student's reading rate and lead to more effective reading.

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