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Research Based Interventions for Students Struggling with Oral Reading Fluency and Accuracy

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Running head: INTERVENTIONS FOR FLUENCY AND ACCURACY

RESEARCH BASED INTERVENTIONS FOR STUDENTS STRUGGLING WITH ORAL READING FLUENCY AND ACCURACY

An Undergraduate Thesis Presented

By

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in partial fulfillment of the requirements for a psychology degree with honors of Bachelor of Arts

University of Nebraska at Omaha

Advisor:
Dr. Brian McKeveit, Ph. D.
Being able to read proficiently is a key skill that students must learn to be successful in school as well as being able to function in society. Three of the main interventions to help students reach proficiency in reading are repeated reading, listening passage preview, and error correction. Each intervention has been shown to provide some benefit to students who struggle with reading when done independently or combined with repeated reading. However, the current literature on repeated reading, listening passage preview, and error correction is sparse when comparing the three against each other. The current study examined repeated reading, listening passage preview, and error correction by alternating the three interventions for a 5th grade student in a block rotation for 15 sessions. The main finding indicated that repeated reading was the most effective at improving the student’s fluency.

Keywords: oral reading fluency, repeated reading, error correction, listening passage preview, elementary students
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Research Based Interventions for Students Struggling with Oral Reading Fluency

Reading fluency is one of the five basic areas of literacy and a key academic skill that allows children to succeed in school and eventually in society (Ardoin, Eckert & Cole, 2008; Begeny, Krouse, Ross, & Mitchell, 2009; Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; Guzel-Ozmen, 2011; Hofstadter-Duke & Daly, 2011; Lo, Cooke & Starling, 2011; Soriano, Miranda, Soriano, Nievas, & Felix, 2011). Reading fluency is defined as how well a student can read with speed, accuracy, and proper expression (Begeny et al., 2009). In the last decade, there has been substantial amount of research on reading, but roughly 17% of children within the United States still have difficulties with reading in the first three years of entering school (Ardoin et al., 2008; Bengeny et al., 2009). Reading fluency also can influence other parts of reading, such as comprehension, which is another key skill students need to be successful (Lo et al., 2011).

Repeated Reading

There has been extensive research focusing on repeated reading interventions and how the intervention affects fluency and accuracy. Repeated reading intervention consist of rereading passages a set number of times until a desired fluency is reached (Hawkins, Marsican, Schmitt, McCallum, and Musti-Rao, 2015; Silber & Martens, 2010). Correct words read per minute are recorded each session and are utilized to see if there is improvement in fluency (Silber & Martens, 2010).

Therrien, Wickstrom, and Jones (2006), implemented a repeated reading intervention for students who had learning disabilities and were struggling with reading. The experimental group received the repeated reading intervention, while the control group did not receive the
intervention. The results indicated that students in the experimental group were able to improve reading fluency on passages that were reread (Therrien et al., 2006). Students in the experimental group also made significant gains in fluency on passages they had not read previously, showing that a repeated reading intervention can be effective (Therrien et al., 2006). Vadasy and Sanders (2008) found similar results working with students whose fluency ranged from the 10th-60th percentile before the repeated reading intervention. After completing the repeated reading intervention, the experimental group had significantly improved their fluency, from the pretest to the posttest, where the control group did not significantly improve their fluency (Vadasy & Sanders, 2008). Both of these studies elucidate how a repeated reading intervention can improve students’ fluency.

Chafouleas et al. (2004) examined a repeated reading intervention, along with feedback and a contingent reward. The students who participated in the study were identified as having difficulties with reading. Their results further demonstrate that repeated reading intervention can be effective, and that repeated reading paired with performance feedback can influence reading fluency. There were three separate groups; one group received just the repeated reading intervention, the second had the repeated reading intervention along with performance feedback, and the last group had the repeated reading intervention, performance feedback, and a contingent reward. Performance feedback consisted of telling the student how many words they read correctly after the passage. The student would choose a reward before reading a new passage and were told if they read one more correct word than the previous time they would receive the chosen prize. The results indicate that including the reward did not improve the student’s fluency. The results further showed that just the repeated reading intervention was best for
students who at baseline had high fluency and low error rate. Repeated reading plus performance feedback was best for students who at baseline had low fluency and high error rates.

Hawkins et al. (2015) focused on a repeated reading intervention, but also implemented a MP3 player in a second condition. In the MP3 player condition, students listened to an audio recording of a passage and read along with it. All four students in the study were considered “at risk” for reading failure. Each student participated in both the repeated reading intervention and MP3 intervention separately. Both interventions improved reading fluency for all the students, but differed on effectiveness based on the student’s preference. After completing both interventions students were asked which intervention they preferred. One student preferred the repeated reading intervention and his fluency improved more with the repeated reading intervention. The other three students preferred reading along with the MP3 player and their fluency improved more in this condition. Hawkins et al. (2015) provide evidence that having students participate in multiple interventions and then asking which intervention they prefer could further improve their fluency.

**Repeated Reading and Listening Passage Preview**

Silber and Martens (2010) examined a combined intervention of repeated reading and listening passage preview for students who were not classified as having reading difficulties. Listening passage preview consists of a student listening and following along on a passage, while a more advanced reader reads the passage. The student then reads the passage on their own, while the more advanced reader records the correct number of words read per minute. Students who were in the repeated reading and listening passage preview condition had higher gains than the control group, which did not receive any intervention (Silber & Martens, 2010).
Guzel-Ozmen (2011) found similar results, but also included performance feedback as a variable. The students in the study were identified as having reading difficulties. There were three different groups: listening passage preview and repeated reading, repeated reading and performance feedback, and listening passage preview, repeated reading, and performance feedback. All three interventions were effective, however, students improved the most in the listening passage preview and repeated reading than the other combinations (Guzel-Ozmen, 2011).

Begeny et al. (2009) compared repeated reading and listening passage preview among students who had low to average reading fluency. Students participated in both the repeated reading and listening passage preview interventions separately and the correct words read per minute served as the measurement for results. Begeny et al. (2009) found that repeated reading followed by listening passage preview was most effective for improving fluency.

**Repeated Reading and Error Correction**

A third intervention that can help students with fluency and accuracy is an error correction intervention. Begeny, Daly, and Valleley (2006) compared repeated reading to a phrase drill error correction intervention. The student in the study was classified as having reading difficulties. The student participated in both the repeated reading and error correction intervention separately. The phrase drill error correction intervention consisted of the student practicing a three to five-word phrase of the words that were read incorrectly. The student had to read the word phrase three times correctly, before moving on to the next words that were read incorrectly. Repeated reading and the phrase drill error correction improved the student’s fluency equally. However, the error correction was better for reducing errors and response levels during
analysis were more stable than the repeated reading. Begeny et al. (2006) suggest that error correction intervention targets words that the student is weak at, which could indicate the gains in reading fluency, whereas a repeated reading intervention does not specifically target each word the student read incorrectly. Herberg, McLaughlin, Derby, and Weber (2012) found similar results as Begeny et al. (2006). Herberg et al. (2012) included both repeated reading and error correction, but used flashcards to practice the words that were read incorrectly. The student in the study had a learning disability with reading and served as his own control. The intervention consisted of both repeated reading and error correction conducted concurrently. The results showed that the number of words read correctly increased and number of reading errors decreased. Herberg et al. (2012) were unable to identify if the repeated reading or the error correction intervention outweighed the other, as they used both interventions concurrently. However, both studies indicate an increase in reading fluency when implemented separately and combined.

Nelson, Alber, and Gordy (2004) found a functional relationship between repeated reading and error correction intervention. The students in the study had learning disabilities with reading and were receiving special education services. Nelson et al. (2004) first implemented an error word drill intervention and then added a repeated reading intervention concurrent with the error correction intervention. The error correction intervention was implemented and was found to decrease the number of errors, but did not increase the number of correct words read per minute. When the repeated reading intervention was implemented concurrent with error correction intervention, the number of errors decreased, and the number of words read per minute increased. Therefore, combining repeated reading with error correction can help students
improve their fluency.

**Current Study**

Even with all the previous literature on repeated reading, listening passage preview, and error correction, few studies compare all three of the interventions to each other. The current study seeks to examine each intervention by alternating the three interventions on an elementary age student who has difficulties with reading fluently. Based on previous research it is expected that each of the interventions will increase the student’s fluency, with repeated reading intervention increasing it the most. It was also hypothesized that the error correction intervention would be the most effective at decreasing the number of errors.

**Method**

**Participant and Setting**

An elementary-age female student who attends an after-school program in a large Midwestern city participated in the study. The student was in 5th grade and was 10 years old. The student had difficulties with reading fluency and accuracy, but was not receiving extra reading help during school. The student’s reading fluency fell below the 50th percentile according to national standards. The setting consisted of a room inside the program building where there were other children and loud noises.

**Materials**

For the repeated reading and listening passage preview intervention, materials included two copies of appropriate reading level passages, a stop watch, an instructional checklist, and a pen. The instructional checklist was used to record the number of correct words and errors made by the student for each session. The error correction intervention materials consisted of two
copies of the appropriate reading level passages, a highlighter, pens, and an instructional checklist. The instructional checklist was used again to record the number of correct words read and errors made by the student.

**Procedure**

The student participated in each intervention separately, starting with repeated reading, then listening passage preview, and error correction, then a block rotation was used. To start the repeated reading intervention, a room inside the afterschool program was chosen. The student and the researcher each had a reading level appropriate passage. The student started off by reading the passage aloud for one minute and the researcher kept track of the correct words read per minute and errors on her own text. Once the student had completed the one minute of reading, the researcher wrote in the number of words read correctly and errors made by the student on the instructional checklist. The student then re-read the same one to two paragraphs that was just completed two more times. This process continued until fifteen minutes of reading in total had been completed. Once reading time was completed the student read aloud for one minute from a different passage. The researcher again kept track of the number of correct words read and errors and recorded the data once the minute was completed. The student was told the correct number of words read and could compare her results for that day.

For the listening passage preview intervention the student and the researcher each had a copy of a reading level appropriate passage. The same room that was used in the previous intervention was chosen at the start of the intervention. To start the intervention the student read allowed for one minute from the level appropriate passage while the researcher kept track of the correct words read per minute and errors. The researcher then recorded the data on the
instructional checklist. The researcher explained to the student that they were going to read together, with the researcher reading one to two paragraphs from the passage first, while the student followed along silently. Once the researcher had completed reading the one to two paragraphs the student read the same paragraphs. The procedure was repeated until fifteen minutes of reading in total had occurred. Once fifteen minutes of reading had occurred the student read for one minute aloud from a different passage to test if fluency had improved. The researcher kept track of the number of correct words read per minute and errors made by the student. The data was record on the instructional checklist. The student was shown the results and could compare them for that day.

The last intervention was an error correction intervention. Before starting the intervention, the same room from the previous interventions was chosen. The student and the researcher each had a copy of a reading level appropriate passage. To start off the intervention the student read for one minute allowed while the research kept track on the number of correct words read per minute and the number of errors made. The researcher then recorded the data on the instructional checklist. The student read one to two paragraphs aloud. The researcher highlighted the errors on her copy that the student made while reading the paragraphs. Afterwards, the researcher read all the missed words to the student one at a time. After the researcher had read the missed words, the student read the missed words one at a time. Next, the student read the sentences with the missed words. After re-reading the sentences, the student re-read the paragraphs again and the researcher underlined the errors that the student made. Once the student was done reading, the researcher said the syllables for each word that was highlighted and underlined, and the student repeated the syllables after the researcher one at a time. The
student then said each word aloud and sounded out the syllables on their own. This procedure was repeated until a total of fifteen minutes of reading in total had occurred. After the fifteen minutes of reading had occurred, the student read from a different passage for one minute and the researcher recorded the correct words read per minute and errors.

**Research Design and Data Analysis**

This study used an alternating treatment design looking at one elementary student’s reading fluency. The interventions were conducted from September to November with two intervention sessions per week. During the first phase, baseline data were collected over three sessions. The second phase consisted of alternating each of the three interventions in a block rotation for fifteen sessions. One intervention was administered per session and the researcher made it clear to the student which intervention was being conducted before administering the intervention. The third phase consisted of repeating the most effective intervention for fluency and was conducted for three sessions. Each phase started immediately after the previous phase. A visual inspection was conducted to assess the data. The number of correct words read per minute and errors read per minute were graphed. The means were calculated, along with effect size (obtained by calculating the percent of non-overlapping data points). The effect size was calculated by finding the range of data points from the first phase, then counting the number of data points from the second phase. After calculating the range and the number of data points from phases one and two, the number of data points from the second phase that fell within the range of the first phase was counted. Next, the number of data points from the second phase that fell within the range of first phase was divided by the total number of data points from the second phase and was multiplied by one hundred. Finally, the resulting percentage was
subtracted from 100 to obtain the percent of data points that did not overlap across phases. Each intervention for phase one and two was calculated separately and compared to baseline.

**Hypotheses**

The current study aims to examine three interventions that improve fluency on an elementary age student who struggles to meet reading proficiency. The first hypothesis is that each of the interventions will increase the student’s fluency. The second hypothesis is repeated reading intervention will increase the student’s fluency the most. The third hypothesis is the error correction intervention will decrease the number of errors the most.

**Results**

**Correct Words Read Per Minute**

Figure 1 shows the data for each phase and the correct number of words read by the student. The repeated reading intervention increased the student’s fluency the most and was repeated as the most effective intervention in the third phase. Table 1 shows the means, standard deviations, and the effect size (percent of non-overlapping data points) for each condition for correct number of words read per minute. During baseline the student was reading an average of 112 correct words per minute. The repeated reading intervention had an average of 129 correct words per minute, listening passage preview had 118 and error correction had 115. At follow-up the most effective intervention, repeated reading, had an average of 139 correct words per minute. The repeated reading condition has the largest percentage of non-overlapping data points compared to baseline (80%) indicating the effectiveness of this intervention.

**Number of Errors**
Figure 2 shows the data for the number of errors made per minute for each condition by the student. Table 2 shows the means for the number of errors made per minute for each condition. The student made the most errors during baseline with an average of 1.67 per minute. The student made 1.40 number of errors during repeated reading, 1.20 during listening passage preview, and 1.00 for error correction. When repeated reading was done again at follow-up, the average number of errors per minute was 0.67.

**Intervention Acceptability**

To evaluate intervention acceptability, the student was asked what her favorite intervention was at the end of phase two. Her preferred intervention was error correction. Error correction did not improve her fluency the most, but did decrease the number of errors the most for phase two. Error correction decreased the number of errors to an average of 1.00 per minute from an average of 1.67 per minute during baseline.

**Discussion**

The purpose of the current study was to compare repeated reading, listening passage preview, and error correction, to each other based on the correct number of words read and number of errors made per minute. The first hypothesis of the study was each intervention would increase the student’s fluency from baseline. The second hypothesis was repeated reading intervention overall would improve the student’s fluency the most. Lastly, error correction would decrease the number of errors made by the student more over the other interventions.

The first hypothesis was supported by the results. Each intervention improved the student’s fluency from baseline. The results are supported by previous literature that repeated reading, listening passage preview, and error correction are effective interventions for improving
fluency (Begeny et al., 2009; Begeny et al., 2006; Nelson et al., 2004; Therrien et al., 2006; Vadas & Sanders, 2008; Silber & Martens, 2010).

The second hypothesis was that the repeated reading intervention would improve the student’s fluency the most and was supported by the results. During the intervention phase the student improved to an average of 129 correct words read per minute from 112 correct words per minute from baseline. Listening passage preview was second for improving the student’s fluency. It improved the student’s fluency by an average of 6 words. These results are similar to Begeny et al. (2009), as they found that repeated reading was the most effective for improving fluency followed by listening passage preview. Thirdly, error correction improved the student’s fluency by an average of 3 words, which is contrary to previous literature. Begeny et al. (2006) found that repeated reading and error correction improved the student’s fluency equally. One explanation for the difference in these findings could be Begeny et al. (2006) implemented the interventions on students who were classified as having reading difficulties and the student in the current study was not classified as having reading difficulties. A second explanation is Begeny et al. (2006) suggested that error correction intervention targets the words students are weak at and in the current study the student did not make many errors.

The third hypothesis was partially supported by the results. Error correction did decrease the number of error made by the student the most during the second phase. The student was making an average of 1.67 errors during baseline and made an average of 1.00 errors for error correction. This finding supports previous literature that error correction is effective at reducing the number of errors read per minute (Begeny et al., 2006; Nelson et al., 2004). However, during the third phase repeated reading decreased the number of errors made to 0.67 on average.
Therefore, repeated reading and error correction both decreased the number of errors made by the student.

Contrary to Hawkins et al. (2015) the most effective intervention for increasing fluency was not the favorite by the student. The student in the current study preferred the error correction intervention the best compared to the repeated reading and listening passage preview intervention. However, error correction was the most effective during the second phase for decreasing the amount of errors made. Thus, asking the student which intervention they preferred can still provide benefits and improve the students overall reading.

The student in the study was provided with performance feedback after each intervention. The performance feedback consisted of comparing the correct number of words read per minute and the number of errors made per minute for that intervention session for phases two and three. Since performance feedback was given in both phase two and phase three, comparisons about the effects of performance feedback on the student’s fluency and accuracy cannot accurately be drawn.

The current study has few limitations. One limitation is that the interventions were implemented in an afterschool program. The afterschool program consists of many children running around and yelling inside the building, as well as moving throughout the building. This caused distractions for the student while the interventions were being implemented. However, with the many distractions at the afterschool program the student’s fluency and accuracy still improved from baseline indicating that repeated reading, listening passage preview, and error correction are effective interventions. A second limitation was the limited sample size of one student. Despite the adequacy of the single subject alternating treatment design for addressing
the study’s hypotheses, future research could implement the current study with more participants, which would allow for more generalizability of the study. Lastly, another limitation is having the researcher implement the interventions and not being blind to which interventions are being implemented. To overcome this limitation, the researcher could have another person implement the interventions in the future.

Even with the limitations the results indicate that repeated reading, listening passage preview, and error correction are effective interventions for improving fluency and accuracy. The interventions are quick to implement and can be done in a loud setting, such as an afterschool program. The interventions could further improve fluency and accuracy if they are implemented in a quiet location with limited distraction. Implementing the interventions can help improve students’ fluency and accuracy effectively.

As stated above, being proficient in reading is a key skill that every student needs to be successful in to succeed in school and everyday life. Repeated reading, listening passage preview, and error correction are three interventions that can improve students’ fluency and accuracy in a short amount of time. Implementing these interventions for students who are behind in national standards for reading can increase their fluency and help them be successful in school.
References


Figure 1: Data for the number of correct words read per minute.
Figure 2: Data for the number of errors read per minute.
Table 1

Means, standard deviation, and effect size of non-overlapping data for each condition for correct number of words read

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Means</th>
<th>Standard Deviation</th>
<th>Effect Size (Percent of Non-Overlapping Data Points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>112</td>
<td>5.69</td>
<td></td>
</tr>
<tr>
<td>Repeated Reading</td>
<td>129</td>
<td>17.01</td>
<td>80%</td>
</tr>
<tr>
<td>Listening Passage</td>
<td>118</td>
<td>20.00</td>
<td>40%</td>
</tr>
<tr>
<td>Preview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error Correction</td>
<td>115</td>
<td>4.93</td>
<td>20%</td>
</tr>
<tr>
<td>Most Effective Intervention</td>
<td>139</td>
<td>15.59</td>
<td>100%</td>
</tr>
<tr>
<td>(Repeated Reading Follow-up)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2

*Means for each condition and standard deviation for the number of errors made*

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Means</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>1.67</td>
<td>0.58</td>
</tr>
<tr>
<td>Repeated Reading</td>
<td>1.40</td>
<td>0.89</td>
</tr>
<tr>
<td>Listening Passage</td>
<td>1.20</td>
<td>2.17</td>
</tr>
<tr>
<td>Preview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error Correction</td>
<td>1.00</td>
<td>0.71</td>
</tr>
<tr>
<td>Most Effective Intervention</td>
<td>0.67</td>
<td>0.58</td>
</tr>
</tbody>
</table>

(Repeated Reading)