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A Stacked Approach to Reading Intervention: Increasing 2nd- and 3rd-Graders’ Independent Reading Levels With an Intervention Program

Chase Young, Patricia Durham, and Crystal Rosenbaum-Martinez

ABSTRACT
Fifty 2nd- and 3rd-grade students identified as experiencing difficulty reading were randomly assigned to experimental and control groups. In the experimental group, students received a reading intervention called Read Two Impress for a total of 360 min. Students in the control continued to receive regular instruction from their teacher. A 2 × 3 repeated measure analysis of variance revealed significant main effects, and a post hoc analysis of mean difference effects size showed that students who received the intervention experienced a medium effect (d = .71) on their independent reading levels, whereas the control group experienced a small effect (d = .40). Both groups showed a slight decrease 2 months after the completion of the study. Implications for instruction are also discussed.

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Elementary education; reading fluency; reading instruction; reading intervention

Many students in the United States are still struggling to read by the 4th grade (Institute for Educational Sciences, 2015). It is imperative that literacy educators do everything we can to ensure their success. As we know from Stanovich (1986), the Matthew Effects in Reading equate reading success to an old saying, “The rich get richer and the poor get poorer.” To combat this phenomenon, we need research-based interventions that can potentially close the gap in reading achievement. Vellutino et al. (1996) would recommend that we target early childhood and primary classrooms and provide much-needed support and intervention for students who struggle. If every kindergartner left on grade level, we should see their success transfer into subsequent grades. However, the reality is that some kindergartners and 1st-graders move on to the middle grades continuing to read below grade level, which is very unfortunate because the stakes get higher in these grades (Afflerbach, 2016; Johnson, Johnson, Farenga, & Ness, 2008).

When we look at research about struggling readers in 2nd and 3rd grades, we find a variety of recommendations, most of which are dependent on the diagnostic results from student assessments. As we look deeper into these diagnostic assessments, we find that many students who struggle with overall reading achievement often struggle with accuracy in word recognition and fluency (Valencia & Buly, 2004). Of course, students also struggle with many aspects of the reading process, including comprehension, which is the main goal of reading. Indeed, some reading interventions that target fluency have also been found to positively affect reading comprehension (Wilfong, 2008). Fluency is often regarded as the bridge to reading comprehension (Rasinski & Young, 2014).

Fluency is typically defined by its constituents: word recognition automaticity and reading prosody. Word recognition automaticity is the ability to accurately and effortlessly read words at an appropriate pace (Young, Valadez, & Gandara, 2016). This component of fluency is often assessed with timed readings of grade level passages that are used to calculate words read correctly per minute (Hasbrouck
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& Tindal, 2006). Reading prosody refers to the expressiveness of a student’s oral reading. We assess several dimensions of reading prosody, including volume, expression, phrasing, smoothness, and pace (Zutell & Rasinski, 1991). Some definitions of reading fluency, however, include comprehension as a necessary component (Pikulski & Chard, 2005).

Early developmental theories of reading place 2nd- and 3rd-grade students in or near what (Chall, 1996) called the fluency stage. That is, students in this stage move away from word-by-word decoding and work toward rapid word recognition—often referred to as reading automaticity. LaBerge and Samuels (1974) elaborated on this transitional stage and offered the Automactity Theory, which states that swift and effortless word reading can free cognitive resources for comprehension. So, it is plausible that we might find effective reading interventions from fluency research.

Fluency instruction ranges from reading aloud (Farrell, 1966) to performance-related activities, such as readers’ theater (Young & Rasinski, 2009) and poetry recitations (Wilfong, 2008). Although reading aloud demonstrates proficient oral reading for students, the latter methods allow students to repeatedly practice their oral reading for performances. Extensive research on repeated readings suggests it is an effective method for increasing students’ reading fluency (Mathes & Fuchs, 1993; Mercer, Campbell, Miller, Mercer, & Lane, 2000; Vadas & Sanders, 2008; Vaughn, Chard, Bryant, Coleman, & Kouzekanani, 2000). Samuels (1979) reported on how reading a text multiple times can increase reading accuracy and rate, and the success is transferred to subsequent readings. Confirmed by the National Reading Panel (National Institute of Child Health and Human Development, 2000), the method continues to positively affect students who find reading difficult.

The Neurological Impress Method (NIM) is another intervention designed to support readers who struggle. As Heckelman (1966) first described, a tutor sits side-by-side with a student and both begin reading aloud. The tutor then reads slightly ahead of the student while he or she tries to keep pace. Heckelman (1969) reported that NIM aided in the rapid increase of an adolescent’s ability to read. Subsequent studies also reported positive effects of NIM on students’ reading proficiency (Arnold, 1972; Cook, Nolan, & Zanotti, 1980; Eldredge, 1990; Eldredge & Butterfield, 1986; Eldredge & Quinn, 1988; Henk, 1981; Hollingsworth, 1970, 1978).

Research on a relatively new intervention, Read Two Impress (R2I; previously called Reading Together; Young, Mohr, & Rasinski, 2015; Young, Rasinski, & Mohr, 2016), suggests it is a viable option for students who struggle with reading. The method stacks NIM (Heckelman, 1969) and repeated readings (Samuels, 1979). First, NIM is conducted for sections of text and each section is then reread aloud by the student. In a multiple case study on R2I (Mohr, Dixon, & Young, 2012), students received 10 weeks of tutoring and made remarkable gains. Two 3rd-grade students who had been reading at 1st-grade levels were exited from tutoring after the intervention because of their proficient reading abilities in both reading fluency and comprehension.

In light of the improvements observed in the 2012 case study, a larger quasi-experimental study was designed (n = 52), and the R2I treatment group significantly outperformed the control group on several measures. Results revealed large positive effects on reading fluency measures, including word recognition automaticity (d = 1.08) and prosody (1.44), and moderate effects on 3rd- through 5th-grade students’ overall reading achievement based on norm referenced data (d = .56; Young et al., 2015). Although the intervention was derived from research that is typically associated with fluency, the 2015 study revealed that the method has the potential to affect reading processes beyond fluency. For instance, the repeated reading component of R2I is likely responsible for the increased word recognition automaticity, as it is a practice-based intervention that targets accurate word reading and increasing rate (Samuels, 1979). The NIM component likely affects word recognition automaticity as well to some degree, but it also affects prosody. It is an assisted reading strategy wherein proficient readers demonstrate accurate reading, at a decent pace, and with appropriate expression. Thus, R2I targets both components of reading fluency in hopes of providing a strong foundation so that students can focus on reading comprehension (LaBerge & Samuels, 1974). Though repeated readings and NIM are effective separately, combining the strategies may create a synergistic effect that more completely develops reading fluency.
In this study, we further investigate the utility of the R2I. Several modifications were made to the present study, most notably that independent reading level (IRL) served as the dependent variable and we used an experimental design. We’ve previously measured R2I’s effect on reading fluency, but this study will focus solely on IRL, which was derived from the reading comprehension and vocabulary subtests of iStation. We endeavored to answer the following question: What are the effects of R2I on 2nd- and 3rd-graders’ independent reading levels as measured by iStation?

Method

Participants and recruitment

Participants were 50 students (2nd- and 3rd-graders) from a Title I elementary school in the coastal bend region of South Texas. Experimental and control groups contained 25 students each (13 in 2nd grade and 12 in 3rd grade). The experimental group was 68% Hispanic, 28% White, and 4% Indian. In addition, this group was 64% male and 36% female. In the control group, 72% were Hispanic, 24% were White, and 4% were Persian. Gender consisted of 60% male and 40% female.

When recruiting the students, we limited the pool of students to those who were reading at least 6 months below grade level. We asked teachers to list students’ names and corresponding independent reading levels as measured by iStation, the district’s adopted reading assessment. The initial list was compiled and consisted of 71 students who could potentially benefit from the R2I intervention. Because the success of the intervention depends solely on the number of volunteers willing to participate in the training and frequent tutoring of the students, we had to limit the intervention to 25 students. The 71 students in the pool were separated into grade levels (Grades 2 and 3), and then randomly assigned to experimental and control groups until each group had 25 students. During recruitment, we provided consent forms for the teachers to send home with potential participants. The consent forms also included a date for parents to attend an optional information meeting regarding the intervention.

For volunteers, we recruited students from the university and parents from the participating school. We sent emails to classes at the local university and sent letters home with the students explaining the expectations and timeline. In the end, we recruited five undergraduates, one graduate student, and five parents. After interested volunteers completed a background check, they committed to tutor various numbers of students, which ranged from one to nine students. The one graduate student also served as a research assistant who helped provide the training, maintained documentation, and helped keep the tutors on schedule and/or reschedule if the tutor was not able to meet with the student for the day.

Once the volunteers committed, we trained all of the volunteers. We explained the method, demonstrated it, and had the attendees practice R2I with each other. To ensure fidelity, we observed the tutoring sessions for the entire first week and then checked in once per week for the remainder of the study.

Students were taken from their classrooms during their language arts block to receive R2I tutoring. Thus, students did not receive additional time in language arts, but they did receive different instruction.

R2I

R2I is an assisted reading activity that is derived from both the NIM (Heckelman, 1969) and the method of repeated readings (Samuels, 1979). The method requires a proficient reader, one student, 20 min, and a challenging text. To execute the method, obtain two copies of a text at the outer limits of a student’s instructional level, typically 6 months or a year above the student’s independent level. If possible, the text should reflect the student’s interest.
First, we engage the student in NIM. That is, we sit with the student and begin reading together out loud. The proficient reader or tutor reads, staying slightly ahead of the student, with appropriate expression. In other words, the proficient reader adjusts his/her reading rate to be a little bit faster while the student attempts to keep pace and read with accuracy. According to NIM, the reading aloud would continue throughout the text. With R2I, we chunk the text into manageable sections. When the section is complete, we ask that the student reread the section aloud. We then move to the next section, read it with NIM, and then students reread—we continue this cycle for the entire 20-min session. The students received R2I 3 days per week for 6 weeks. Thus, each student participated in approximately 360 min of R2I tutoring. The steps for each session are summarized below:

1. Choose a challenging text
2. Read a page or paragraph aloud together
3. Read slightly ahead of the student
4. Read with good expression that matches the meaning of the text
5. Have the student reread the page/paragraph aloud
6. Continue with subsequent page/paragraphs for 20 min
7. Complete the intervention log.

**Data collection and analysis**

The study began in December, with recruitment, and ended in May, with the follow-up data collection. Data were collected using the existing district reading assessment, iStation, which is an online reading assessment that renders IRLs for each student. The IRL is based on two subtests that measure students’ abilities in silent reading comprehension and vocabulary knowledge. Reliability and validity studies reveal high levels of internal consistency for the subtests and overall IRL. The test-retest reliability is strong for IRL, and ranges from 0.927 to 0.970 (N = 416), suggesting the scores remain very stable across time (Mathes, 2007). For the study, the students were assessed at three different times, which served as the IRL pretest, posttest, and follow-up test. For the purpose of data analysis, we employed a 2 × 3 repeated measures analysis of variance (ANOVA). A complete timeline of the study can be found in Table 1.

**Results**

The experimental study examined the effects of R2I on students’ independent reading levels. The 50 subjects were pre- and posttested to analyze the immediate effects of the R2I intervention. As a follow up, participants were tested 2 months later to examine delayed effects. Levene’s test indicated equal variances (F = .745, p = .372), so no adjustments were made to the degrees of freedom. Box’s Test of Equality of Covariance Matrices was also insignificant (F = .326, p = .924), and thus the assumptions were met. The pretest, posttest, and follow-up means and standard deviations for the IRL measure are summarized in Table 2.

A 2 × 3 ANOVA revealed main effects on IRL, F(2, 47) = 8.06, p = .001, ηp² = .255 (Table 3). These main effects were not qualified by an interaction between treatment and Treatment × Time, F(2,
47) = 0.87, \( p = .43 \), \( \eta^2 = .036 \). Group differences at pretest were not statistically significant, \( F(1,48) = 2.13, p = .15 \). Posttest group differences were not statistically significant, \( F(1,48) = .08, p = .78 \). Finally, there were no significant differences among groups’ follow-up test, \( F(1,48) = .15, p = .70 \). Pairwise comparisons indicated that groups from Time 1 to Time 2 improved significantly (\( p = .001 \)) as well as from Time 1 to Time 3 (\( p < .05 \)); however, the comparison indicated that groups did not perform significantly better from Time 2 to Time 3 (\( p = 1.00 \)). Comparisons and growth are illustrated further in Figure 1.

The lack of significant interaction effects may have been due to the small sample size. However, because there was a significant main effect, a post analysis was performed to further investigate the

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**Table 2.** Means and standard deviations for independent reading level.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretest</th>
<th></th>
<th>Posttest</th>
<th></th>
<th>Follow Up</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Experimental group, ( n = 25 )</td>
<td>1.59</td>
<td>.64</td>
<td>2.02</td>
<td>.88</td>
<td>1.97</td>
<td>.88</td>
</tr>
<tr>
<td>Comparison group, ( n = 25 )</td>
<td>1.88</td>
<td>.73</td>
<td>2.09</td>
<td>.92</td>
<td>2.07</td>
<td>1.06</td>
</tr>
</tbody>
</table>

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**Table 3.** Repeated measure analysis of variance summary table for Treatment × Time interaction effect on independent reading level.

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>( F )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>3.052</td>
<td>2</td>
<td>1.53</td>
<td>6.71</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Treatment × Time</td>
<td>.32</td>
<td>2</td>
<td>.16</td>
<td>.70</td>
<td>.50</td>
</tr>
<tr>
<td>Error</td>
<td>21.83</td>
<td>96</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* SS = sum of squares; MS = mean squared.

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47) = 0.87, \( p = .43 \), \( \eta^2 = .036 \). Group differences at pretest were not statistically significant, \( F(1,48) = 2.13, p = .15 \). Posttest group differences were not statistically significant, \( F(1,48) = .08, p = .78 \). Finally, there were no significant differences among groups’ follow-up test, \( F(1,48) = .15, p = .70 \). Pairwise comparisons indicated that groups from Time 1 to Time 2 improved significantly (\( p = .001 \)) as well as from Time 1 to Time 3 (\( p < .05 \)); however, the comparison indicated that groups did not perform significantly better from Time 2 to Time 3 (\( p = 1.00 \)). Comparisons and growth are illustrated further in Figure 1.

The lack of significant interaction effects may have been due to the small sample size. However, because there was a significant main effect, a post analysis was performed to further investigate the

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**Figure 1.** Estimated marginal means of independent reading level (IRL).
effect. For practical significance, an analysis of simple effects was performed to compare within-group mean difference effect sizes. The simple effects reveal the magnitude of the effect. In other words, these effects can clarify which condition had a greater positive effect on IRL. According to Table 4, R2I had a larger effect on students’ IRL.

**Discussion**

According to the results, the 6 weeks of R2I tutoring had a moderate effect on students’ independent reading levels. And, as we like to see, the students in the control group also benefited from their regular classroom instruction, even though it had a smaller effect. This study adds to the extant research that reports gains in reading fluency (Young et al., 2015) and that the combination of NIM (Heckelman, 1969) and repeated readings (Samuels, 1979) can also increase students’ IRLs.

We made several modifications to the current study. First, we limited the study to 2nd- and 3rd-graders, because, according to Chall (1996), the fluency stage occurs between 1st and 3rd grades, a postulation we hoped would increase the effect of the treatment. In the previous study (Young et al., 2015), the sample consisted of 3rd- through 5th-graders, and we observed a mean difference effect size of .56 in the treatment group. In this study, the treatment showed an effect size of .71. Thus, one might conclude that R2I is likely more suitable for students in lower grades, such as 2nd and 3rd.

Of course, the research design and other student differences might have influenced the current results. However, we intentionally conducted the study in a different district with a different population to explore transferability. The results indicated moderate effects similar to the previous study, which suggests that R2I can have positive effects in various contexts.

There are several reasons why we believe R2I typically produces positive results. Firstly, it is a practice-based intervention and aligns with the theory of automaticity in that students who become more fluent or automatic also become more proficient in other aspects of reading (LaBerge & Samuels, 1974). Although historically, the effect on fluency is much greater, which is by design, we also observe growth in their overall reading abilities (Young et al., 2015). In the current study, we observed an increase in IRL, suggesting that the increases in fluent reading boosts students’ reading comprehension as well.

Another compelling reason for the effects of R2I is the research that it is built upon—the stacked approach uses two timeless and often successful methods for increasing reading fluency and proficiency, repeated readings, and NIM. Perhaps it is not surprising this method is effective for many struggling readers.

Another possible reason for R2I’s utility is that it is similar to the gradual release model (Pearson & Gallagher, 1983). During NIM, the teacher provides a high level of support by reading slightly ahead with accuracy, at an appropriate pace, and with good expression—essentially modeling what proficient oral reading sounds like. Subsequently, teachers remove their support and ask the student to read independently. With the assisted reading fresh in the students’ minds, their rereadings are often successful. Of course, we might expect that, as seen in the results, the success would transfer to other readings, namely, the posttest.

**Practical implications**

With the proper training, nearly anyone can deliver the R2I intervention. In the current study, the initial training lasted for an hour. We also gave feedback during observations throughout the first week and as needed for the remaining six weeks. Although it would take some time to train the
volunteers and observe them, it is a relatively easy process and requires only 1 full hour and sporadic observations during the first week of implementation.

Sometimes, parents or guardians want to volunteer in the schools but feel like they are not qualified, especially when working with students. This intervention program provides specific steps to follow and is accompanied by a schedule of tutoring sessions. Thus, parents might feel more confident about volunteering to work with young readers. Although teachers do need copies, volunteers may have a greater effect on the school by dedicating their time to students who need additional support.

The study reported moderate effects; larger effects might be seen when working with a volunteer throughout the year. Of course, teachers and/or specialists would be in charge of assessing a student’s progress. Although many of the participants in the study made remarkable progress, some did not. Thus, it is the school’s responsibility to assess whether the intervention is working or if it should be changed.

**Limitations**

Though we can say that the effects were mostly maintained from our treatment and the general instruction, we did not observe further growth from March to the end of the year. This phenomenon warrants some speculation. We realize that the limited duration of the intervention likely influenced the slight decrease in the treatment group. However, possible reasons for a simultaneous decrease in the control group requires even further speculation. In an effort to further understand the decrease in both groups, we searched the literature for studies describing a similar phenomenon. However, we found no research base for this speculation in previous education research.

As this is relatively new territory, we admit this is pure speculation as we reflect the time of year and the school context as possible explanations for the results of the follow-up assessment. Spring break immediately followed the intervention, leaving 2 more weeks in March before entering the state testing month of April for elementary students. Following the April testing, the students entered the last month of the school year. Although there is little or no research base that concludes students do poorly on assessments at the end of the year, there is research that suggests school context matters (Dooley & Assaf, 2009).

Dooley and Assaf (2009) surveyed two 4th-grade teachers regarding their instructional beliefs and found that both believed in best practices, such as guided reading and discussion-based literacy activities. One teacher served a more affluent community, and one served a low-income community. Although the teachers shared similar beliefs about effective literacy instruction, the researchers observed remarkable differences in their actual practices in the classroom. The teacher in the more affluent community engaged her students in the social construction of knowledge and required discussions regarding literary themes and topics, whereas the teacher in the low-income community spent more time teaching discrete skills that are often tested on high-stakes exams.

In the current study, we conducted the research in a low-income community and the quantitative data may reveal something similar to what Dooley and Assaf observed in 2009. Had the effects dropped only in the treatment, we could have concluded that the students in this study reverted to their previous developmental trajectory. However, because both groups experienced a very slight decrease in the 2 months following the intervention, we have to speculate on the cause of this and if high-stakes pressures and testing environment culture affected the nature of the instruction students received (Johnson et al., 2008).

**Further research**

It seems bold, but as presented above, we first state that the pressures of high-stakes testing might be a limitation in this study. A similar study could be conducted during the fall to avoid the increased
pressures of the spring to collect more reliable follow-up data. Or, the study could be conducted in context that lacks high-stakes pressure.

In addition, a closer look could be taken into the correlation of the participants’ IRLs and on-grade level reading status. Do participants who are still below grade-level reading expectations at the end of the intervention, but showed growth with the R2I intervention approach, need additional sessions to maintain growth on the follow-up assessment? Could there not have been enough intervention to withstand regression? If so, how many sessions would a participant need to complete for sustained growth to be measured? Extending the current research to address some of these areas would deepen the understanding of the advantages the R2I model has to offer.

Conclusion

In the words of Afflerbach’s (2016) assessment credo, “Assessment should produce information that is useful in helping students become better readers, and assessment should do no harm” (p. 414). For reading assessments to “do no harm,” they must become more useful so teachers can assist readers with their journey of efficiently moving through the stages of reading. For reading assessments to become “useful,” teachers need access to well-designed intervention approaches so they can guide students toward becoming independent, successful readers. These approaches must complement regular classroom instruction seamlessly. In addition, with the dwindling time teachers have to devote to individual students’ needs, well-designed intervention approaches need to be multifaceted to be more time efficient. The uniqueness of the R2I intervention approach can potentially deliver on these demands.

As stated previously, students who struggle with overall reading achievement, often struggle with accuracy in word recognition and fluency. In this study, we further explored the effects R2I has on these aspects of reading, specifically on 2nd- and 3rd-graders’ independent reading levels as measured by iStation. Thus, R2I is a viable fluency intervention that consequently increases reading comprehension and vocabulary, enabling students to more rapidly ascend reading levels.

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References


