What's Possible for First-Grade At-Risk Literacy Learners Receiving Early Intervention Services

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ABSTRACT

This paper summarizes a study that was conducted on data from children who received a one-on-one intervention called Reading Recovery® during the first half of their first-grade year in school. The purpose was to investigate the relationship between accelerated progress children made during and after receiving a Reading Recovery intervention, and to determine if a prediction could be made of children's progress following a series of Reading Recovery lessons. The measure used to assess progress in literacy development was Text Reading Level (TRL), a subtask of *An Observation Survey of Early Literacy Achievement* (Clay, 2006). The findings show a moderate relationship between students' progress following a series of Reading Recovery lessons to the end of first grade, suggesting the sustained effect of the intervention. Additionally, intervention length was noted to be a significant predictor of year-end TRL. Students who had progressed through their series of lessons at a quick rate and had the same TRL at mid-year were shown to have higher TRL scores at year-end. Plotting odds of success (defined as reaching a year-end TRL >18 or 20) for length of intervention and mid-year TRL revealed that students who accelerated through the intervention quickly did not need to reach as high a TRL by the end of the intervention compared to students who did not progress as fast. Although mid-year TRL was known to be important in predicting success after an intervention, no empirical determination of which level was predictive existed prior to this study.

Some children, at the beginning of their school career, discover that learning literacy skills is difficult. These children frequently progress on a path of development which puts them behind their classmates. Educators have implemented a multitude of approaches, many of which have been shown to be ineffective. However, as Walberg and Tsai (1983) concluded, an approach based on the principles of early intervention has been shown to be successful. Walberg and Tsai also found that without an intervention early in their educational careers, students finding literacy learning difficult languished behind their more-fortunate peers.

TRADITIONAL APPROACHES

Since the 1960s, most schools have supported struggling literacy learners with Title I funding. Typically, Title I instruction support involves a reading specialist providing 90 minutes per week of small-group instruction. However, Neuharth-Pritchett (2005) concluded that elementary school students enrolled in Title I programs were more likely to remain struggling students in Grade 9 and receive poorer grades in mathematics and reading.

Another approach used extensively in schools is referral and placement in special education programs. Research findings about special education services were mixed (Lennon & Slesinski, 1999). A 6-year longitudinal study of a program provided to Grades 1–7 students identified with learning disabilities failed to find any significant improvement in either reading comprehension or word recognition skills (Bentum & Aaron, 2003).

EARLY INTERVENTION — A PREVENTATIVE APPROACH

Early intervention, on the other hand, has been shown to be an effective approach to supporting at-risk literacy learners. D'Agostino and Murphy (2004) pointed out that

> Compensatory-education programs have helped disadvantaged students keep pace with their peers, but have not helped them close the achievement gap … [as a result] educators have turned to interventions that follow a preventative approach. (p. 23)

A preventative approach entails providing services to children early in their educational career before literacy challenges become internalized.

Many studies have shown the power of early intervention programs. A 3-year longitudinal study involving children in Grades 1–3 noted significant increase in reading comprehension skills of suburban students who received an early intervention (Ryder, Burton, & Silberg, 2006). Furthermore, a 4-year longitudinal study involving children in Grades K–3 revealed that the majority of children identified as "at risk" (lower socioeconomic status) in the beginning

of kindergarten responded early and positively to a supplemental intervention (Simmons et al., 2008). These children not only moved out of risk but also stayed out of risk during the kindergarten to third-grade period. In a study of the comparison of long-term outcomes of early interventions, Hurry and Sylva (2007) noticed that Reading Recovery was a powerful method of improving children's reading and spelling over a broad spectrum of literacy skills.

READING RECOVERY AS AN EARLY INTERVENTION

Reading Recovery, an early reading intervention that is delivered one-on-one, has been shown to be successful in breaking the trajectory of low progress often characterized as the *Matthew Effect* (Pinnell, Lyons, DeFord, Bryk, & Seltzer, 1994; Stanovich, 1986). The students in this first-grade intervention are those not acquiring the complex set of concepts including, but not limited to, alphabetic principle, sight word recognition, and phonological awareness that support successful reading and writing skills. Clay's (1991) research regarding Reading Recovery confirmed that text progression begins with books that support familiar, predictable, repetitive, rhythmic language patterns, and highly supportive pictures. Clay further explained that progressions in text levels helped students integrate meaning, structure, and print cues specified to develop essential word-solving and meaning-construction strategies that empowered them to enhance their own reading skills.

Wilson and Daviss (1994) confirmed the positive outcomes for struggling first-grade readers involved in a Reading Recovery intervention: Since the start of Reading Recovery in 1984, approximately 75% of students who completed the full 12- to 20-week intervention met grade-level benchmarks in reading and writing. Also, continuing studies indicated that most struggling readers who successfully completed the Reading Recovery intervention have met school district average benchmark on standardized tests and maintained individual gains in continuing years (Briggs & Young, 2003; Schmitt & Gregory, 2005).

Leveled Texts

In each Reading Recovery lesson, a highly trained teacher works one-on-one with a student who has fallen behind his/her peers in literacy development. The teacher tailors reading and writing activities to address the needs of each student. Children read from a set of leveled books individualized for each student based on their particular strengths and needs. The North American Trainers Group (NATG) determines the levels of the book used in Reading Recovery lessons. All leveled books are field tested through a rigorous research-based process. The process includes the collection of data from field testing by Reading Recovery teachers, teacher leaders, and trainers who consider the instructional accuracy rates of Reading Recovery students reading the books

to confirm or disconfirm a target level. Brabham and Villaume's (2002) study regarding the good and bad news of leveled texts stated that, "struggling readers must have opportunities to read comfortable texts rather than experience constant frustrations with texts that are too difficult" (p. 438). As a child progresses in literacy development, the difficulty level of the books the child is reading increases and supports more-effective literacy development. The leveled books used by each teacher are one critical part of each child's program, and contribute to the fast acceleration provided by a Reading Recovery intervention.

Just as successful aspects of the use of leveled books are praised, concerns should be considered as to the books children are reading in their classrooms. Researchers (Gourley, 1984; Peterson, 1991; Rhodes, 1979) are concerned about first-grade books that are available to struggling readers in their classrooms. Cunningham et al. (2005) reported that reading materials typically used in first-grade classrooms were either vocabulary or phonetic controlled. According to Brabham and Villaume (2002), controlled vocabulary limits children's opportunities to develop word-solving and meaning-constructing strategies and is difficult for struggling readers to understand. In contrast to the vocabulary and phonetic controlled aspect of some first-grade books, the leveled books used in Reading Recovery lessons build on a complex theory of reading (Clay, 2005).

Cunningham et al. (2005) noted that many teachers and publishers have become committed to the principle of gradually increasing text difficulty. The leveled books used in Reading Recovery lessons are essential to the development of strategies that successful readers use, and they help struggling readers continue to implement the strategies developed. It must also be noted, however, that the scaffolding that a highly trained teacher provides is another integral part of a child's success (Vygotsky, 1978).

Is There a Book Level that Indicates Effective Processing?

An important question is whether there is a specific book level below which students face a high risk of not maintaining average progress after a Reading Recovery intervention. There is disagreement regarding the instructional reading level that indicates children are strong enough to continue learning on their own. Recent studies by Rodgers (2004/2005) and Dantas (2003) identified level 14 as the benchmark goal for the end of first grade. Peterson (1991) stated that children at the end of first grade should be working at level 20. Clay (2005) agreed that some children must be able to read well above level 20 to fully participate in classroom activities, but argued that level 16 may be sufficient for most children.

Presently when a Reading Recovery teacher determines that a student has developed an efficient processing system that will enable the child to perform

literacy tasks successfully in the classroom without further intervention, the series of Reading Recovery lessons is discontinued. The teacher also looks at the instructional reading level in the student's classroom at that time and consults with the child's classroom teacher to ensure that the student will be able to keep up with classroom instruction. While the instructional reading level is a strong guide for teachers, the literacy processing strategies that the child exhibits at levels 14, 16, 18, or 20 is the most-important determination. So while a set level is desirable, Reading Recovery teachers must look beyond the level itself to make determinations regarding an appropriate ending point for the intervention for each individual child.

Nevertheless, the question remains: Is there an instructional reading level which can be used as a determiner? Normative U.S. data indicate the mean for a representative sample of first graders is level 20 at year-end; level 18 is the 46th percentile, while the low end of stanine 4 (31st percentile) is level 16 (Gómez-Bellengé & Thompson, 2005). Therefore, the national data reveals that levels 18 and 20 at year-end are reasonable criteria for establishing whether the progress of children served in the first semester is maintained during the second semester.

Acceleration — What Is It?

Reading Recovery lessons are discontinued when the student demonstrates that he/she is an average-progress child. Clay (2005) stated, "In order to become an average-progress child, a child will have to progress faster than his classmates for a time if that child is to catch up to their peers" (p. 22).

This quick progress that struggling readers display in the implementation of Reading Recovery is called *acceleration* (Clay, 2005), and the concept is key to Reading Recovery. The teacher cannot produce or induce acceleration. It is the learner who accelerates the learning. Children who are able to accelerate their learning while being scaffolded by a highly trained teacher will be able to continue their literacy learning independently without an intervention.

Wood, Bruner, and Ross (1976) defined scaffolding as a process "that enables a child or novice to solve a task or achieve a goal that would be beyond his unassisted efforts" (p.90). Rodgers (2004/05) explained how the concept of scaffolding was applied in the work of intervention teachers. The highly complex tasks are mediated by a teacher within a child's *zone of proximal development* (ZPD) (Vygotsky, 1978). The more skilled the teacher is at determining the child's cutting edge of development, the more able the child will be in "taking on" the learning which becomes integrated into the child's zone of actual development. As the child's literacy processing improves, strategic behaviors in reading and writing become more noticeable.

RESEARCH QUESTIONS

This study addressed three research questions:

1. Is there a significant relationship between mid-year text reading level (TRL) and year-end TRL?

2. How much is exit TRL and intervention length associated with year-end literacy success?

3. Is the rate of acceleration during the Reading Recovery lessons itself predictive of progress on TRL after the Reading Recovery lessons were discontinued?

METHOD

Data for this study were gathered as part of the yearly national evaluation of Reading Recovery. A standard part of the national evaluation of Reading Recovery is the collection of Observation Survey data for all students served at the beginning and end of the intervention, as well as fall and spring. To complete this process, about 15,000 teachers entered evaluation data for 115,000 students on a website operated by the National Data Evaluation Center (now International Data Evaluation Center) at The Ohio State University. Of the 115,000 students who received the Reading Recovery intervention during the 2004–2005 academic year, 30,826 successfully discontinued their series of Reading Recovery lessons and exited the intervention in the first half of the year (Gómez-Bellengé & Rodgers, 2006). Those students (first round) were used as the sample for this study; purposefully chosen so that the sustained effect of the intervention could be examined at year-end. Students in the second/third round were not included in the sample.

Participants

The sample consisted of 18,861 (61.2%) boys and 11,965 (38.8%) girls; 63.3% White, 17.6% African Americans, 16.5% Hispanics, 2.1% Asians, and 1.5% Native American or Hawaiian students. Of the 20,722 students for whom school lunch costs were available, 11,336 (54.71%) received free or reduced-price school lunches because of low family income. The children in this study began their series of lessons in fall of first grade and ended successfully around mid-year.

Measures

Text Reading Level, a subtask of *An Observation Survey of Early Literacy Achievement* (Clay, 2006), was used to measure students' reading achievement. This measure is used to determine an instructional level (90–94%) of text accuracy and to record, by using a running record, what the child says when

reading continuous text. In this task, the child reads texts that increase in gradient of difficulty until the highest text level with 90% accuracy or better is reached. The texts were drawn from established basal systems and have, over the years, proved to be a stable measure of reading performance. Scores range from 0 to 30. The Rasch (Wright, Linacre, & Schulz, 1989) item separation reliability (equivalent to Cronbach's Alpha) was .99 (Clay, 2006), based on data from 96 urban children in fall 1990.

Procedures

Students in this study began Reading Recovery interventions in fall and ended about mid-year. To participate in the intervention, students were identified by their classroom teachers as being within the lowest 20th percentile in reading and were recommended for one-on-one tutoring with a specially trained Reading Recovery teacher for half an hour each day for a period of 12 to 20 weeks. As soon as students read within the average range of their classmates and demonstrated that they could continue to read successfully without the need of an intervention, their series of Reading Recovery lessons were discontinued and they exited from the Reading Recovery intervention.

In this process, the Observation Survey was used to assess student performance on different literacy tasks. Data were collected across time. Three data points were examined: fall/entry, end-of-treatment/exit about mid-year, and follow up at year-end. Data were also collected on the length of the intervention for each child, measured in weeks.

Data Analyses

The first area addressed in the study, the relationship between exit TRL and year-end TRL, was examined with Pearson correlation coefficients. Analysis of covariance (ANCOVA), using exit TRL as the covariate and intervention lengths as the independent variable, was employed to investigate the second research question. Partial eta squared (η^2) was reported as effect size for each main effect. Odds of success for each group with various exit TRL was also used to answer the second research question. Odds are the ratio of probability of success and the probability of failure. Odds of success can be interpreted as the number of students expected to be successful with one student expected to fail. When an odds of success of 2 is applied to a particular group, for instance, it means two students are expected to be successful with one student expected to fail. In other words, the probability of success for this particular group is approximately 67% (2 out of 3). Two levels of TRL (18 and 20) were used as the criteria for success at year-end. To analyze the third research question, a hierarchical linear regression analysis was employed to determine the relative weight of mean weekly gains of students on the TRL measure (an indicator of accelerated progress) during the Reading Recovery intervention compared to exit TRL in predicting year-end TRL.

RESULTS

Descriptive statistics of the TRL for the complete sample (all students who had complete data for exit TRL and year-end TRL) and students who discontinued after 15 to 22 weeks are presented in Table 1. The relationship between exit TRL and year-end TRL for the complete sample was found to be statistically significant, $r = .50$, $p < .001$.

The ANCOVA results (Table 2) indicated that intervention length was a significant predictor of year-end TRL when exit TRL scores were controlled, $F(7, 26272) = 394.84$, $p < .001$, partial $\eta^2 = .10$. This result suggested that for

Table 1. Means and Standard Deviations for Each Group of Students

Weeks[a]	Measure	M	SD
15 (*n* = 1,407)	Exit TRL	13.13	2.98
	Year-End TRL	21.73	4.53
16 (*n* = 1,657)	Exit TRL	13.32	2.96
	Year-End TRL	21.23	4.32
17 (*n* = 1,933)	Exit TRL	13.43	2.95
	Year-End TRL	20.79	4.44
18 (*n* = 2,190)	Exit TRL	13.49	2.75
	Year-End TRL	20.03	4.10
19 (*n* = 2,961)	Exit TRL	13.56	2.61
	Year-End TRL	19.59	4.08
20 (*n* = 12,324)	Exit TRL	13.13	2.74
	Year-End TRL	18.05	4.17
21 (*n* = 2,151)	Exit TRL	13.19	2.64
	Year-End TRL	17.54	3.85
22 (*n* = 1,658)	Exit TRL	13.24	2.43
	Year-End TRL	17.09	3.67
Complete Sample (*N* = 29,604)	Exit TRL	13.32	2.82
	Year-End TRL	19.52	4.51
	Mean Weekly Gains	0.36	0.28

Notes: a = Number of intervention weeks the students were served before exiting the Reading Recovery intervention

Table 2. Analysis of Covariance for Year-End TRL by Weeks with Exit TRL

Source	df	Mean Square	F	p	Partial η^2
Exit TRL	1	112727.67	8721.65	< .001	.25
Weeks[a]	7	5103.30	394.84	< .001	.10
Error	26272	12.93			
Total	26281				

Notes: a = Number of intervention weeks the students were served before exiting the Reading
Recovery intervention

students who exited the Reading Recovery intervention at the same TRL level, the fewer weeks it took them to reach that level, the higher scores they gained at year-end.

The odds of success for each group of students classified by the number of weeks they received the intervention (15–22 weeks) and various exit TRL scores (Table 3) indicated that the faster the students moved to the exit TRL, the larger the chance of success in literacy at year-end. Students who accelerated through the intervention more quickly did not need to reach as high a TRL by the end of the intervention in order to achieve a year-end text level of 18 or 20. For example, a student who reaches a TRL of 14 with an intervention of 15–17 weeks will have had approximately the same chance to succeed at year-end as a student who reached a TRL of 16 with an intervention of 18–20 weeks as well as a student who reached a TRL of 18 with 21 or 22 weeks. Please keep in mind that students who exited the intervention early had more time for full participation in classroom literacy instruction. When the length of the intervention is the same (e.g., 15 weeks), a student who reached a TRL of 16 had nearly five times the odds of success (10.29) at year-end in comparison to a student who reached a TRL of 14 (2.70).

When graphing these odds of success, we found that the students' odds of success increased in a nonlinear fashion, with an exit TRL of 14 related to odds of 2 or better for the shorter interventions, and an exit TRL of 16 related to the longer interventions (Figure 1). That is to say, if a student reached a TRL of 14 within 15 or 16 weeks of intervention, then the child was very likely to be successful at year-end. On the contrary, if it took a student more than 20 weeks to reach a TRL of 16, then the chance that the student was able to fully participate in classroom activities at year-end was low.

Table 3. Odds of Success at Year-End for Students with Various Exit TRL and Various Length of Intervention Measured in Weeks
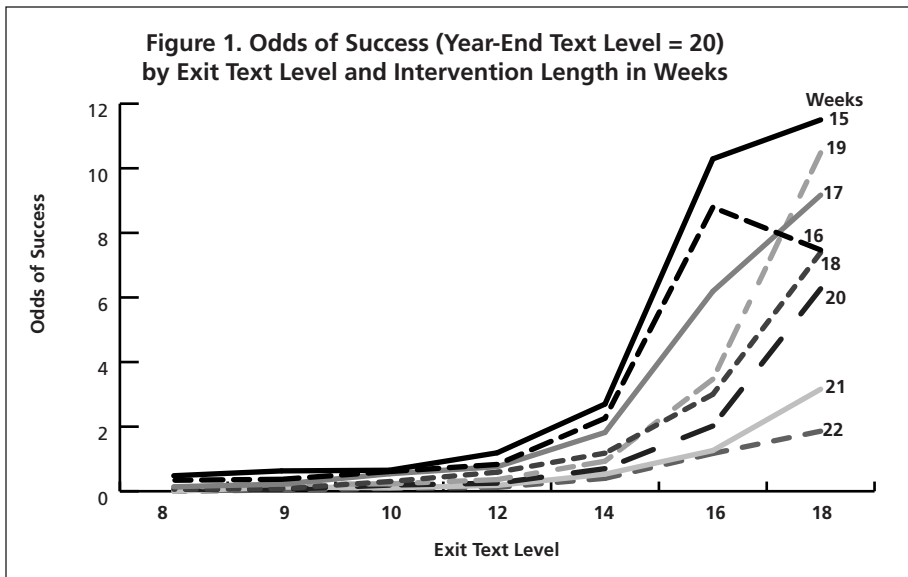
	Number of Weeks							
Exit TRL	15	16	17	18	19	20	21	22
When Year-End TRL = 20 Considered As Success								
8	0.48	0.34	0.14	0.06	0.12	0.06	0.00	0.00
9	0.63	0.37	0.22	0.08	0.21	0.06	0.13	0.04
10	0.75	0.61	0.54	0.30	0.23	0.19	0.11	0.09
12	1.19	0.83	0.76	0.59	0.36	0.25	0.18	0.12
14	2.70	2.26	1.82	1.18	0.93	0.70	0.53	0.40
16	10.29	8.79	6.19	3.00	3.47	2.02	1.26	1.17
18	11.50	7.47	9.17	7.39	10.48	6.27	3.16	1.86
When Year-End TRL = 18 Considered As Success								
8	2.09	0.81	0.71	0.43	0.65	0.32	0.00	0.71
9	2.38	1.08	1.25	0.74	0.90	0.41	0.13	0.18
10	3.11	2.23	2.08	1.25	0.56	0.83	0.11	0.53
12	5.12	4.25	2.32	1.96	1.61	1.10	0.18	0.69
14	11.93	15.17	7.41	6.52	4.38	3.39	0.53	2.30
16	157.00	46.00	28.56	17.50	16.30	9.70	1.26	4.43
18	124.00	160.00	NA	NA	131.00	344.50	3.16	82.00

Notes: Shaded cells represent odds of success close to or higher than 2.

Table 4. Summary of Hierarchical Regression Analysis for Variables Predicting Year-End TRL

Variable	B	SE B	β
Step 1			
Exit TRL	0.79	.01	.50*
Step 2			
Exit TRL	.96	.003	.60*
Mean Weekly Gain Prior to Discontinuing	12.78	.04	.79*

Notes: R^2 = .25 for Step 1; ΔR^2 = .62 for Step 2 (*ps* < .001); *p* < .001

Figure 1. Odds of Success (Year-End Text Level = 20) by Exit Text Level and Intervention Length in Weeks

Exit TRL was entered into a hierarchical linear regression model first because we already knew that it was significantly related to year-end TRL, but we wanted to know how much additional variance could be accounted for by mean weekly gains. Both exit TRL (t = 278.58, p < .001) and mean weekly gains in TRL (t = 366.63, p < .001) significantly impacted year-end TRL. The change of R-squared for Model 2 over Model 1 was .62, suggesting that mean weekly gains in TRL explained additional 62% of the variance in year-end TRL when 25% of the variance had already been explained by exit TRL (Table 4). This means that the speed of children's progress in reaching exit TRL is a very important predictor of year-end TRL when the exit TRL is held constant.

DISCUSSION

Reading Recovery is a series of lessons delivered to first-grade students one-on-one to intervene early in a child's literacy career. To date (1984–present), nearly two million children have received Reading Recovery services (Ortega & McGee, 2010). One key factor in the success of these children is the support that Reading Recovery teachers give to each student during daily lessons. As Clay stated,

> When the teacher designs each part of every lesson to target the cutting edge of an individual's learning, the teacher can select crucial next learning. (Clay, 2005, pp. 21-22)

This support or scaffolding allows a teacher to work on the cutting edge of each student's zone of proximal development, resulting in accelerated learning:

> Acceleration is achieved as the child takes over the learning process and works independently, discovering new things for himself inside and outside the lessons. (Clay, 2005, p. 23)

As mentioned earlier, it is the learner who accelerates, with the teacher creating learning situations that support this growth.

This study looked at the acceleration that children made by comparing the instructional level book that children read when intervention was no longer needed, and those they read at the end of the school year. In addition, we looked at the speed at which the children reached different levels and tried to determine if there was a relationship between that speed and the progress children made to the end of the year.

In previous publications, the text level that a child reaches at the end of the intervention was asserted to be important in predicting success after the intervention (Clay, 2005; Dantas, 2003; Rodgers, 2004/2005). No empirical determination of which level was predictive, however, existed prior to this study. In other words, the relationship between time in the intervention and subsequent progress had not been described previously, nor had the speed that a child makes in text reading been researched. Clearly shown in these results is the fact that acceleration is a key to a child's continued progress beyond the intervention. A teacher who has supported a child, which in turn has resulted in the child moving quickly through the text levels, can be fairly certain that this child will continue to make progress on his/her own.

This study suggested that if a child can reach a text level of 14 within 15–16 weeks, then that child is very likely to be successful at year-end. If it takes a child 20 weeks to reach the text level of 16, then the child is still likely to be successful at year-end. However, if it takes more than 20 weeks for a child to reach the text level of 16, then it is unlikely that the child will be successful at year-end without additional intervention. These findings suggest that the rate of acceleration allows the children to return to on-level classroom instruction more quickly. The results are helpful for Reading Recovery teachers when they need to decide whether or not to continue the intervention for individual students. Reading Recovery teachers, however, are cautioned against attributing success to speed and text levels only. As we know from the Matthew Effect, most children follow a steady path of development as they progress in literacy learning. This study shows that if an at-risk literacy learner's path of development is dramatically altered by quickly moving through text levels with the support of a highly trained teacher, then that path will continue to develop

effectively. The key to the pace of each child's progress is the good teaching that Reading Recovery teachers provide. For students who are able to reach a designated book level in a short time period with the support of a Reading Recovery teacher, the teacher might be certain that the series of lessons can be discontinued and be confident of student's subsequent progress. Teacher resources can then be directed to a new student.

Limitations

This study used the existing data routinely collected by the National Data Evaluation Center (now International Data Evaluation Center) at The Ohio State University, which affected the research design. For example, writing is also an important component of each Reading Recovery lesson. This study, however, focused on reading only. Future studies focusing on writing would give Reading Recovery teachers more data to use when making decisions about completing a child's series of lessons. We also want to caution readers that we did not control for length of on-level instruction following the intervention. In our study, the students who exited the intervention early had a longer time of after-intervention, on-level instruction than students who exited the intervention later. Therefore, this study cannot attribute success to acceleration and text reading level only. The length of on-level instruction (full classroom participation) following the intervention could be a confounding variable to consider in future research designs.

CONCLUSION

The results of this study illustrate the power behind the expert scaffolding that occurs in Reading Recovery lessons. At-risk learners who were progressing on an altered path of literacy development were found to overcome individual obstacles and continue to learn in the classroom literacy program after completion of the Reading Recovery intervention. Accelerated progress leads to further growth after the intervention.

The results of this study could dramatically impact the number of children who become more-efficient readers. As Ortega and McGee (2010) noted, 60% of students who received a full series of Reading Recovery lessons developed an effective processing system, and their lessons were discontinued. It is not the text reading level alone that demonstrates each child's readiness to exit from the intervention, but the effective and efficient literacy processing that a child is able to demonstrate at the threshold levels researched in this study. Reading Recovery teachers' close attention to each individual student's development of literacy processing and accelerated progress supports students' high literacy achievement levels both during and beyond Reading Recovery intervention.

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