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The Read-Aloud Accommodation during Instruction: Exploring Effects on Student Self-Perceptions and Academic Growth

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The read-aloud accommodation (RA) is frequently provided to students with high-incidence disabilities to facilitate their access to learning opportunities during instruction and to allow them to demonstrate knowledge and skills during testing. Empirical support for this accommodation has been somewhat mixed, and has primarily focused on accommodations during testing rather than during instruction. Recent research does indicate positive effects of test accommodations on students' reports of self-efficacy. In the current study, an examination of the effects of the RA during instruction on growth in academic achievement among students with high-incidence disabilities was conducted, along with an examination of effects on locus of control (LOC) and self-concept, which were hypothesized to have mediating effects on the relationship between accommodation provision and academic growth. Results suggested a relationship between receiving an accommodation and LOC, but no subsequent effects on academic growth, apart from a marginally significant relationship between LOC and growth in passage comprehension.

Keywords: Reading Skills, Reading Problems, Read-Aloud Accommodation, High-Incidence Disabilities, Learning Disabilities, Testing, Self-Perceptions, Academic Growth, Locus of Control

Introduction

Reading skills substantially influence a student's ability to learn across subject areas, particularly in the later years of schooling when textbooks have high readability levels (Jitendra et al., 2001). Unfortunately, estimates within the United States suggest that nearly 90% of fourth-grade students with disabilities (SWDs) do not have proficient reading skills (National Center on Educational Statistics, 2013). In order to address the associated barriers to learning across subject areas, many SWDs are provided a read-aloud accommodation (RA) (i.e., written material is read aloud by an assistant or technological device). A substantial body of research now exists on the effects of RAs during testing (Rogers, Christian, & Thurlow, 2012). However, limited information exists on the extent to which students receive and benefit from these accommodations during instruction, which may ultimately influence whether they derive benefits from them during testing. Although the existing research on test accommodations provides some appropriate context for understanding accommodation effects more broadly, more information on the use and effects of these accom-

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modations during instruction is needed to understand the extent to which they are truly helpful to students' academic development.

Effects of the RA on Test Scores

Thus far, the effects of RAs have been primarily studied when provided during tests. Test accommodation studies often aim to determine the extent to which the accommodation results in greater performance improvements for SWD compared to improvements evident for students without disabilities. These studies have had mixed results. In the area of reading tests, one study found a positive effect of the accommodation on a reading test for third grade SWD, and no positive effect for the respective students without disabilities (Fletcher et al., 2006). However, another study of the effects of the RA on reading tests suggests that both groups benefit from the accommodation, with no differential boost evident (Fletcher et al., 2009). An additional study indicated no significant benefit of the accommodation for either group (McKevitt & Elliott, 2003), and others have suggested that both groups benefit, with SWD benefiting more than those without disabilities (Crawford & Tindal, 2004; Laitusis, 2010). Another study indicated that although both groups benefited, the extent of differential boost differed by grade level (Randall & Engelhard, 2010). In terms of RA effects on math tests, results have similarly been mixed, although slightly greater support for RA has been identified on these tests. One study did find a positive effect of the RA for SWD and a lack of effect for students without disabilities (Tindal, Heath, Hollenbeck, Almond, & Harniss, 1998), and others have identified a benefit among both groups, with SWD benefiting significantly more on the entire math test (Elbaum, 2007) or specifically on multiple choice items on the math test (Schulte, Elliott, & Kratochwill, 2001).

There are a variety of potential explanations for the different findings across studies, including the disability and age characteristics of the participants, the method by which the accommodation was provided, and the type of test. It is likely that accommodation effects will be more pronounced among those with specific reading disabilities, and particularly for those students with reading decoding challenges. Using certain methods, the RA may allow easy repetition of item content and reading aloud of material at a rate ideally suited to the user. These methods of providing the RA may facilitate better access for the student and correspond to greater score increases in those research studies that have used the given methods. Finally, the tests under investigation in the given research studies may ultimately measure different reading constructs (e.g., comprehension vs. reading decoding vs. math problem-solving), which may influence the extent to which the RA alters test scores.

The growing body of research on effects of the RA during testing has corresponded to the development of more specific accommodation policies that highlight the conditions under which such an accommodation should be provided, such as only on test sections designed to measure non-reading skills (Christensen, Braam, Scullin, & Thurlow, 2011). At the same time, policy guidelines continue to provide evidence of controversy. In the United States, accommodation guidelines recently put forth by the two major common core assessment consortia (Smarter Balanced and P.A.R.C.C.) represent two different approaches to addressing concerns with the RA on the literacy portions of these assessment programs for SWD (see Heiten, 2014);

however, these different policies both convey a general concern that highly liberal provision of the RA may undermine efforts to ensure that schools are held accountable for teaching students foundational skills in reading decoding.

Provision of RAs During Instruction

Inclusive accountability experts have argued that an accommodation that is deemed appropriate for an individual student on a particular test should also be provided during instruction (Bolt & Thurlow, 2007; Ysseldyke et al.,1999). Instructional accommodation is argued to be necessary in order to (a) ensure that students have the opportunity to learn the material on which they are being tested, and (b) ensure that students know how to make effective use of an accommodation during testing (Bolt & Thurlow, 2007; Ysseldyke et al., 1999). Although studies have indicated that the RA is frequently provided during testing (Bielinski, Ysseldyke, Bolt, Friedebach, & Friedebach, 2001), there is less information on the extent to which it is provided during instruction, and on the effects of accommodations provided during instruction.

Only two studies were identified that investigated RAs provided during instruction, and both were of students at advanced grade levels. One examined the effects of a computer-based RA provided during instruction on middle school students diagnosed with dyslexia (Elkind, Cohen, & Murray, 1993). Results suggested that the accommodation improved comprehension scores for the majority of students who received it, although some students did not improve or actually had lower comprehension scores when accommodated. The second study indicated that the RA produced some academic benefits to adults with disabilities (Elkind, Black, & Murray, 1996). The participants who received the read-aloud instructional accommodation reported that the accommodation allowed them to pay better attention to the text, increased their focus, made reading easier, decreased stress, and improved reading rate and comprehension. However, more objective measures of these variables suggested that only reading rate improved.

Technology is making it increasingly possible for accommodations, such as the RA, to be more easily provided to students during instruction. There are several unique benefits of providing an RA using computer technology, including access to a wider range of content, the ability to select desired rate and volume, and the potential to facilitate reading skills while providing the accommodation, given that text can be highlighted on the computer screen as it is being read aloud. However, it is important to note that although such technology is becoming increasingly available, ongoing concerns exist with the extent to which teachers effectively incorporate such technologies in practice (Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010), and whether students therefore have the opportunity to learn how to use and benefit from them. Currently, with the beginning implementation of the Smarter Balance and P.A.R.C.C. tests in the United States, options for having a proctor read aloud a paper-based test remain in place given that many schools do not have the technologies fully integrated into their instructional programming. Therefore, it is still important to gain a better understanding of the read-aloud accommodation as provided by an assistant.

Effects of Accommodations on Social Psychological Factors

Although a substantial body of literature has accumulated on the impact of the RA on academic achievement tests, there is a small but growing foundation of literature of effects on other variables, such as self-efficacy and self-concept (Elbaum, 2002; Feldman, Kim, & Elliott, 2011; Lang, Elliott, Bolt, & Kratochwill, 2008). It may be the case that accommodations, when provided over long periods of time during instruction, have an impact on these social psychological variables, which in turn may help foster higher achievement. Such effects could not be investigated using a simple point-in-time examination of differential boost on a test. When examining research on the RA specifically, its relationship with students' reports of self-efficacy, self-concept, locus of control (LOC), and similar psychological variables is very limited.

Over the past few decades, research has consistently found that students with learning disabilities demonstrate lower academic self-concept (ASC) than average- and low-achieving students without disabilities (Chapman, 1988; Zeleke, 2004). A more recent study suggests that over time, students with learning disabilities accumulate frustration from school failure, which may in turn further decrease their ASC (Wei & Marder, 2012). Based on the notion that accommodations help SWD access learning opportunities in regular education classrooms, it follows that students with learning disabilities in regular education classrooms who receive more support may develop a more positive ASC than students who receive limited support (Elbaum, 2002). Such an effect, in turn, may further enhance the academic growth of these students. Feldman and colleagues (2011) found that testing accommodations had a differential boost on self-efficacy and motivation for students with learning disabilities - positively affecting test performance; however, they did not study the effects such boosts might have on learning.

A construct related to self-efficacy and self-concept – locus of control (LOC) – has been largely neglected in the literature for the past few decades. LOC refers to the extent to which one thinks he or she is in control of events that influence them; an internal LOC suggests that the individual senses greater control, whereas an external LOC suggests that the individual senses limited control (Rotter, 1954). LOC has been found to be a significant predictor of the extent to which children with learning disabilities were successful in their academic programs (Rogers & Saklofski, 1985). Swanson (1981) found that those students with learning disabilities who reported a more internalized LOC experienced higher academic achievement. In a study that examined both ASC and LOC among SWDs, Hagborg (1996) found that students with higher ASC showed a more internalized LOC than those with lower ASC; moreover, students with a more internalized LOC and therefore higher ASC demonstrated a more favorable outlook - regardless of differences in SES, intelligence, and academic skill.

The Current Study

Altogether, limited research has examined longitudinal gains of SWD resulting from the provision of instructional accommodations. Recent research suggests that although accommodations may not always result in a substantial performance boost for student during testing situations, they may have an important effect on students' feelings of self-efficacy. It arguably follows that students who regularly receive support through accommodations during instruction, rather than solely during test-

ing, may develop a more internalized LOC - which in turn may accelerate their academic growth. However, it could be the case that those receiving the RA experience a more externalized LOC, given that their access to written material is based on the presence of additional supports (e.g., an external reader or computer program). Given these notions, it is important for research to more carefully explore the long-term effects of instructional accommodations on LOC, self-concept, and student learning. The corresponding research questions of the current study are:

1. To what extent does provision of an RA during instruction (as provided through a human assistant) correspond to greater growth in math and reading achievement among students with high-incidence disabilities?
2. To what extent does provision of an RA during instruction (as provided through a human assistant) correspond to differences in LOC and ASC among students with high-incidence disabilities?
3. Do LOC and ASC mediate the relationship between the provision of an RA during instruction (as provided through a human assistant) and growth in achievement among students with high-incidence disabilities?

Method

Participants

Data were selected for analysis from the Special Education Elementary Longitudinal Study (SEELS). SEELS was funded by the Office of Special Education Programs of the United States Department of Education in order to explore programming and outcomes for SWD at a national level. Several published studies indicate the purpose, sampling design, and measurement methods of SEELS (Wagner, Kutash, Duchnowski, & Epstein, 2005). We selected information on students from the SEELS sample who met the following criteria: (a) fourth grade or a higher grade level during the 2000-01 school year, corresponding to Wave 1, (b) identified as having a primary disability of one of the following during Wave 1: learning disability, cognitive impairment, emotional disability, or other health impaired, (c) reported to have a reading goal of improving reading skills or grade-level proficiency in reading (as opposed to a goal focused on development of pre-reading or functional literacy skills), (d) participated in the SEELS direct assessment across all three waves, and (e) had a teacher who participated in the teacher interview and a representative from their school who completed the school program interview during Wave 1. Analysis was limited to those in fourth grade and beyond given that this is the point at which students are likely expected to know how to read in order to complete many class activities. We also focused on students with mild disabilities who were at beginning reading stages (as opposed to those with more severe reading difficulties), given that they are more likely to receive instruction in general education environments in which accommodations may be particularly important for their success. 378 students met these criteria.

Measures

Items from the Teacher and School Program Surveys. As part of the SEELS project, the teacher who provided the majority of language arts instruction to the student included in the sample was asked to complete a survey (i.e., Teacher Survey)

during each wave of data collection. For the purposes of the current study, only a few items from this survey were selected for analysis. First, information about the student's goal in reading was obtained. In addition, teachers responded to several items about the supports that they provided to the given student, including whether the student received a "reader/interpreter" during instruction. A second similar survey was administered to a school representative who was deemed knowledgeable about the target student's overall program. The corresponding response to the "reader/interpreter" item from this survey was also used. If either the teacher or school representative indicated that the student received the "reader/interpreter" accommodation during instruction at Wave 1, the student was considered part of the accommodated group.

Scores from the Direct Assessment. A subset of students within the SEELS dataset participated in a direct assessment during all three waves of data collection (i.e., 2000-01, 2001-02, 2003-2004). The following variables from the direct assessment were included in the analysis:

Background characteristics. Information on student gender, ethnicity, grade, income level, and urbanicity was obtained from Wave 1. Also, the scores (in words correct per minute) from two oral reading fluency passages were averaged as the "oral reading fluency" score.

LOC. A composite of five items from the School Attitude Measure (Wick, 1990) administered during Wave 1 was used as an indicator of LOC. Each item required students to rate on a 4-point scale their level of agreement with several statements (e.g., "When I get bad grades it is because of bad luck," "I don't seem to have any control over the grades teachers give me"). For the composite score, item responses are coded and summed such that higher scores reflect a more internalized LOC.

Academic self-concept. A composite of 10 items from the Student Self-Concept Scale (Gresham, Elliott, & Evans-Fernandez, 1993) administered during Wave 1 was used as an indicator of ASC. Each item required students to rate on a 3-point scale their level of agreement with statements about their academic experiences (e.g., "I can do my homework on time," "I can finish my schoolwork easily"). Higher scores reflect a more positive ASC.

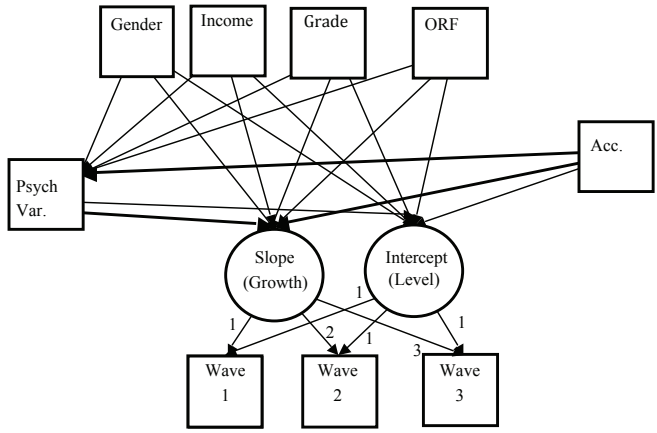
Calculation, Applied Problems, and Passage Comprehension. Scores from administrations of two math subtests (Calculation and Applied Problems) and one reading subtest (Passage Comprehension) included in the research edition of the Woodcock-Johnson Tests of Achievement-3 (WJ-Ach-3) from all three waves of data collection were included. It is important to note that the applied problems subtest items is read aloud to students; the passage comprehension subtest is not read aloud to students (apart from the subtest directions). Cronbach alpha reliabilities for these subtests are in the .80s across age and grade levels.

Data Analysis

An application of structural equation modeling, namely latent growth curve analysis, was used to examine the extent to which provision of the accommodation, LOC, and ASC during Wave 1 were associated with growth in math and reading achievement according to the model presented in Figure 1. The slope and intercept associated with growth models that were estimated separately for each subtest served

as endogenous latent variables, LOC and ASC served as observed endogenous variables, and the remaining demographic variables and accommodation status served as observed exogenous variables. Separate models were fit for LOC and ASC, and each analysis was run separately for each subtest. Covariates included in the model included student gender, grade, income level, and the oral reading fluency score. MPlus version 7.1 (Muthen & Muthen, 2013) was used for the analyses. Maximum likelihood estimation was used for model estimation, and the typical indexes were used to determine model fit, including the Chi-Square Test of Model Fit, Tucker-Lewis Index (TLI), comparative fit index (CLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). A Chi-Square Test of Model Fit should have a low, non-significant value, the TLI and CLI should be close to .95, and the RMSEA <.06 and SRMR <.08 for the model to be considered a good fit to the data (Hu and Bentler, 1999).

Figure 1. **Path Diagram for Approach to Model Development (bolded = parameters of interest)**



Results

Participating student demographic information according to accommodation group is provided in Table 1. Seventy students (19% of sample) were reported to have received the reader/interpreter accommodation. Males and students from non-urban environments were slightly more likely to receive an accommodation than females and those from urban environments. Descriptive information on student performance across waves by accommodation group is provided in Table 2. As expected, students receiving an accommodation tended to have lower oral reading fluency scores. They also tended to have slightly lower calculation, applied problems, and passage comprehension scores. Correlations between measured psychological variables and academic achievement are provided in Table 3. As expected, the academic subtests were all positively correlated, with those corresponding to similar basic skill areas correlating more strongly. Interestingly, ASC and LOC were negatively correlated, and LOC was negatively correlated with all academic subtests for all waves.

Table 1. ***Demographic Information***

	Accommodation		No Accommodation		Total Sample	
	Demographic Information					
	N	%	N	%	N	%
Female	21	30	107	35	128	34
Ethnic Minority	15	21	65	21	73	21
Income Level >$50K	19	28	93	31	112	31
Urban	13	19	83	27	88	25
Total N	70	19	308	82	378	100

Table 2. ***Descriptive Statistics for Total Sample and for Each Accommodation Group***

	Accomm.		No Accomm.		Total Sample	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
ORF	64	39	88	43	88	45
Locus of Control	10.2	0.8	10.0	0.6	10.0	0.6
Academic Self-Concept	12.8	2.0	13.0	1.8	12.9	1.9
W1 Calculation (w score)	494	21	502	19	500	19
W1 Calculation (SS)	82.7	16.5	88.6	15.3	87.4	15.7
W1 Applied Problems (w score)	487	25	493	27	492	27
W1 Applied Problems (SS)	83.7	13.8	87.2	16.0	86.6	15.7
W1 Passage Comprehension (w score)	481	21	489	19	488	19
W1 Passage Comprehension (SS)	77.3	17.3	83.6	15.5	82.4	16.0
W2 Calculation (w score)	500	20.8	508	19.4	506	19.9
W2 Calculation (SS)	82.7	17.7	89.2	16.7	88.0	17.0
W2 Applied Problems (w score)	494	26.6	499	27.0	498	27.0
W2 Applied Problems (SS)	84.0	15.9	86.7	16.2	86.2	16.1
W2 Passage Comprehension (w score)	485	17.5	492	18.3	491	18.4
W2 Passage Comprehension (SS)	77.1	15.2	82.8	16.3	81.8	16.2
W3 Calculation (w score)	508	22.5	514	20.7	513	21.2
W3 Calculation (SS)	82.7	20.2	87.5	18.6	86.6	19.0
W3 Applied Problems (w score)	500	26.8	507	26.9	505	27.0
W3 Applied Problems (SS)	80.9	16.6	85.0	16.8	84.2	16.8
W3 Passage Comprehension (w score)	491	18.8	498	15.6	497	16.4
W3 Passage Comprehension (SS)	76.5	17.3	82.9	14.5	81.7	15.3

Table 3. ***Correlations among Observed Variables.***

Measure	1	2	3	4	5	6	7	8	9	10	11
1. Oral Reading Fluency (ORF)	--										
2. Locus of Control (LOC)	-.10	--									
3. Academic Self-Concept (ASC)	.05	-.24**	--								
4. W1 Calculation (C)	.09	-.25**	.04	--							
5. W1 Applied Problems (AP)	.10	-.20**	-.07	.63**	--						
6. W1 Passage Comprehension (PC)	.14**	-.26**	.02	.44**	.50**	--					
7. W2 Calculation (C)	.07	-.20**	.00	.65**	.57**	.38**	--				
8. W2 Applied Problems (AP)	.11*	-.20**	-.01	.53**	.74**	.42**	.65**	--			
9. W2 Passage Comprehension (PC)	.20**	-.14*	-.02	.37**	.46**	.65**	.45**	.52**	--		
10. W3 Calculation (C)	-.08	-.16**	-.03	.59**	.59**	.39**	.71**	.64**	.46**	--	
11. W3 Applied Problems (AP)	.04	-.22**	-.01	.52**	.73**	.43**	.63**	.77**	.46**	.68**	--
12. W3 Passage Comprehension (PC)	.15**	-.13*	.03	.43**	.52**	.58**	.50**	.54**	.61**	.54**	.55**

Note. * = p<.05. ** = p < .01. All correlations with academic achievement variables include standard scores in the calculations.

Model Fit

Prior to examining each full model, the respective basic latent growth curve measurement models were examined by subtest to determine whether an intercept only, linear slope, or quadratic slope model fit each set of subtest data best. In all cases, the linear slope models provided the best model fit, with all indexes for the linear slope models meeting the expected thresholds. Table 4 provides information on model fit for the full models (i.e., those models including all exogenous and endogenous variables). Using thresholds suggested in prior research (e.g., Hu and Bentler, 1999), indexes indicated appropriate model fit across all models.

Table 4 . ***Indices of Fit for Hypothesized Models***

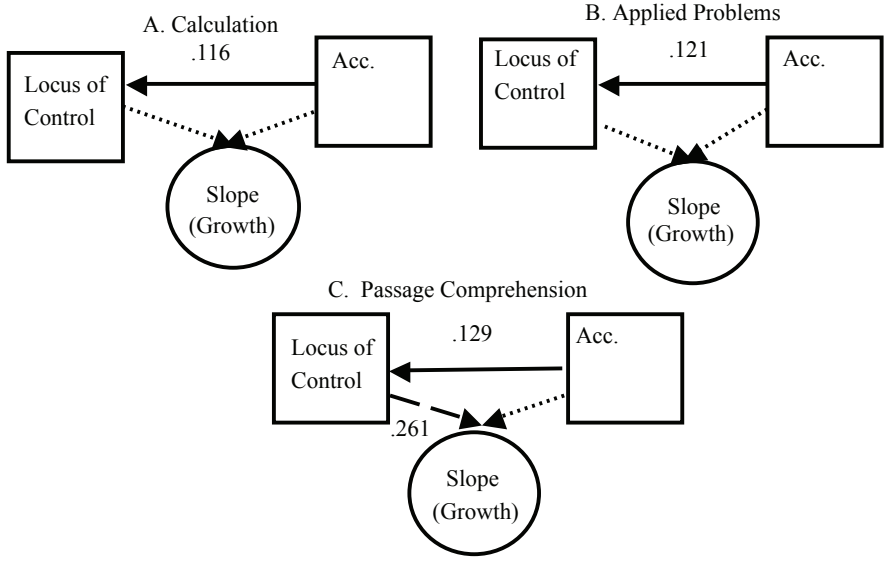
Model	x^2	*df*	*p*	*CFI*	*TLI*	*RMSEA*	*SRMR*
			Calculation				
Locus of Control	7.7	7	.36	.99	.99	.02	.04
Academic Self-Concept	6.9	7	.44	1.0	1.0	.00	.05
			Applied Problems				
Locus of Control	3.4	7	.84	1.0	1.0	.00	.01
Academic Self-Concept	4.1	7	.77	1.0	1.0	.00	.02
			Passage Comprehension				
Locus of Control	5.3	7	.62	1.0	1.0	.00	.05
Academic Self-Concept	6.2	7	.52	1.0	1.0	.00	.05

Model Parameters

Figure 2 provides information on the magnitude of the marginally significant and significant parameters corresponding to the relationships of interest. Within the models including ASC, none of the hypothesized relationships were found to be significant. However, within the models including LOC, several of the expected relationships were identified. Across all subtests, receiving the RA during instruction was associated with a more internalized LOC (Calculation: standardized beta = .116, $p < .05$; Applied Problems: standardized beta = .121, $p < .05$; Passage Comprehension: standardized beta = .129, $p < .05$). However, for none of the subtests was either LOC or provision of the accommodation significantly related to the latent slope factor. For the passage comprehension subtest, a marginally significant relationship was found between LOC and the slope factor (standardized beta = .261, $p = .09$), suggesting that a more internalized LOC was associated with greater growth in passage comprehension. However, because this was not a significant relationship, further analysis of potential mediating effects of LOC on the relationship between provision of the accommodation and growth was not examined. Overall, the amount of variance in LOC accounted for within the models (including covariates and accommo-

dation provision variable) was quite small (r-squared = .06 across all subtest models, $p < .05$). The amount of variance in slope accounted for within the models (including all predictor variables and covariates) was not significant for any of the subtests.

Figure 2. **Relationships identified. ➔ = significant, ⟶ = marginal, ⇢ = non-significant**



Discussion

In the current study, we examined the effects of providing the RA during instruction on students' longitudinal growth in math and reading achievement, anticipating that the RA would be associated with achievement growth, and that part of that effect might be due to increases in internalized LOC and ASC associated with accommodation provision. Provision of an RA was indeed found to be associated with a more internalized LOC, which aligns with prior research suggesting that testing accommodations do appear to influence various psychological variables such as self-efficacy. However, the accommodation was not found to be associated with growth for any of the subtests under investigation. Although for one of the subtests (i.e., passage comprehension) a more internalized LOC was marginally significantly related to growth, overall, the results do not indicate a substantial impact of the accommodation on academic achievement growth over time.

Providing supports merely to improve a student's feelings about him or herself when those supports do not translate into clear academic benefits is likely to be considered a questionable practice. In contrast to the limited information available to suggest that RAs facilitate growth in achievement over time, a wealth of information is available suggesting that certain reading instructional and intervention strategies provided in elementary and middle school can boost students' overall read-

ing competence, many of which are not fully implemented in schools at the current time (Duke & Block, 2013). Many students who are in need of an RA, particularly in elementary and middle school, will likely benefit from continued targeted reading interventions. Although ensuring access to instruction through effective accommodation is certainly a desirable feature of a student's educational program, the limited information to suggest that the accommodation directly corresponds to achievement growth may point to a more urgent need to promote their academic achievement in more direct ways through targeted intervention.

Although not central to the aims of the present study, which was focused on academic growth as opposed overall academic performance, a particularly unexpected finding was the negative relationship between LOC and overall academic performance. Based on the findings of prior work (Swanson, 1981), we anticipated that a more internalized LOC would be associated with higher achievement among SWD. However, in contrast to the Swanson (1981) study which included only boys who had been receiving segregated special education services since first grade, the current sample represented both boys and girls, and likely included students who received services in more integrated settings. Furthermore, the students in the current sample responded in ways that represented a range of levels of LOC; although all were SWD, they did not respond in ways suggesting that they had a particularly externalized LOC, as one might expect given that they all have experienced school challenges. It may be the case that changes in special education service delivery approaches over the past few decades have prevented students from developing a particularly externalized locus of control. Another unanticipated finding was that although the RA corresponded to a more internalized LOC, it did not correspond to a higher ASC. In fact, a negative correlation was identified between LOC and ASC (i.e., a more internalized LOC was associated with a lower self-concept), suggesting that those who feel in control of their academic success do not necessarily have a particularly positive view of their own academic competence. It is possible that this is again related to the varying degrees of integration within general education settings in the sample; perhaps those who are more integrated do feel like they have some control over their academic success, but feel less academically competent given that they are likely to compare themselves to others in their integrated classrooms who do not have disabilities.

Limitations

It is important to mention several limitations in the design and analysis of the current study. First, although teachers indicated providing students with the RA, it may not have been provided particularly frequently or with appropriate integrity, which may have influenced the failure to identify effects on academic growth. Next, it is important to point out that the predictor variables (apart from the measure of oral reading fluency) were based on student and teacher self-reports, which may not represent accurate measures of the given constructs. Accurate responses to items on the LOC scale used in this study may require a certain level of meta-cognitive skills that are beyond the level of many of the students, given that many students with disabilities struggle in this area (Sideridis, Morgan, Botsas, Padeliadu, & Fuchs, 2006). Additionally, it is important to note that there was somewhat limited variation in

the slope factor across participants. This may have limited our ability to detect the extent to which the predictor variables accounted for variation in growth. Finally, it is important to note that although we intentionally limited the analysis to students who had reading goals that suggested they were relatively high-functioning, students from multiple disability categories were included. Results may therefore have varied if there was a focus on one disability type; unfortunately, the sample sizes within the dataset were too small to run the respective analyses separately by disability type.

Implications for Research and Practice

Research on the effects of accommodations for SWDs continues to provide mixed evidence on their effectiveness. Although data from prior test accommodation studies indicate that RAs are effective for at least a portion of the population of SWDs, and for certain areas of academic achievement, there does not appear to be universal support across studies for their use among SWDs broadly. Although accommodations have demonstrated indirect benefits for students, such as improving student's self-efficacy, and in this study, were found to be associated with a more internalized LOC, questions remain about whether these effects go on to contribute to substantial student learning gains for most students.

As the methods by which RAs are provided to students advance with greater use of new technologies, it will be particularly important for research to investigate the impact that use of these supports have on both growth in reading achievement and growth in achievement across academic areas. Computerized RAs have certain potential advantages that may facilitate both access and learning of basic reading skills among students who are struggling, given that they can be programmed to allow for both visual and auditory support with written material. Furthermore, many programs include additional features that can support development of additional broad reading skills, such as hyperlinks to word definitions to support vocabulary development, and embedded comprehension supports. Research on aspects that facilitate student use of these supports, and that promote student achievement growth, will certainly be of great practical relevance to schools, teachers, and students.

There are a number of implications of this study for individuals who serve on school teams serving student with disabilities. As noted in prior research, it is important for school teams to engage in careful analysis and monitoring to determine whether a particular student needs and benefits from an accommodation (Fuchs et al., 2000). Given that limited research currently exists to support the effectiveness of RAs for promoting growth in academic achievement, schools should not rely solely on RAs to address the academic needs of struggling readers. Substantial research does exist to support the effectiveness of various reading interventions at the advanced elementary levels and beyond; therefore, it is important for schools to ensure that such interventions are incorporated in educational programs for SWD. The RA has been shown to be effective for certain students under certain circumstances. However, critical analysis among teachers regarding the conditions under which it may be helpful and appropriate is warranted, along with appropriate monitoring of its use and effectiveness for individual students, to ensure that it does indeed have the intended benefits.

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