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Special Education Research Advances Knowledge in Education

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Abstract

Research in special education has yielded beneficial outcomes for students with disabilities as well as typical achieving students. The authors provide examples of the valuable knowledge special education research has generated, including the elements of response to intervention (e.g., screening and progress monitoring), instructional practices such as systematic instruction and feedback, and intensive interventions designed to meet the specific learning needs of students with disabilities. They present the importance of maintaining an appropriate funding stream for research in special education to ensure that robust research findings continue to be available to the educational community to improve outcomes for students with disabilities as well as typical learners.

Special education research has contributed significantly to knowledge and practice not just related to individuals with disabilities but for all learners. Special educators have had the dual responsibility of (a) designing interventions that meet the feasibility criteria for general education classrooms aimed at enhancing outcomes for a range of learners and (b) developing intensive interventions for special educators to meet the individual learning and behavior needs of students with disabilities. This dual responsibility is significant and challenging. The first section of this article explores special education research as the intellectual engine that has significantly influenced progress in improving outcomes for all learners. We describe several examples of this influence, focusing on the components of response to intervention (RTI; e.g., progress monitoring, intervention, accelerating instruction based on students' needs) and features of effective instruction that are derived largely from research on special education (e.g., strategy instruction and feedback). In the second section of this article, we discuss the fact that there remains much work to do in improving outcomes for students with disabilities. We provide guidelines for future special education research, highlighting the importance of developing and evaluating intensive treatments for students who have inadequately responded to treatment protocols that are effective for the majority of students. In the third part of this article, we make suggestions for future research and supports necessary to continue the influential research to practice necessary to improve innovations in general and special education.

Educational Practice Influenced by Special Education Research

Over the past 20 years, considerable emphasis in special education has been placed on designing and implementing effective practices for enhancing outcomes for all learners, including those

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with disabilities, served in the general education classroom. This emphasis is a result of initiatives (e.g., regular education initiative, inclusive schools movement) that entitled students with disabilities to be included in the general education setting aimed at promoting interaction between general and special education as a unified system. With this shift toward the expectation that all educators have responsibility for serving students with disabilities (Harkins, 2012; Will, 1986) came greater need for instructional techniques effective for a wide range of learners that could be feasibly implemented in the general education setting. As a result, instructional methods effective for students with disabilities were adopted and tested for efficacy in general education settings.

Perhaps one of the most successful examples of special education research influencing general education organization, instruction, and practice has been RTI (L. S. Fuchs & Vaughn, 2012). It was included in the most recent reauthorization of the Individuals with Disabilities Education Improvement Act in 2004 as an approved method for identifying learning disabilities and has laid the groundwork for enhancing the performance of all students—with and without disabilities—through a common system where classroom teachers, special education teachers, and other specialists work together (D. Fuchs, Fuchs, & Compton, 2012; D. Fuchs, Fuchs, & Vaughn, 2014). RTI has yielded a network of changes in screening, assessment, and intervention that relate to both prevention and remediation of students at risk for academic and behavioral difficulties.

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Effective RTI frameworks provide increasingly intensive tiers of interventions for students as a function of their response to research-based instruction. Several elements are essential to the effective implementation of a multitiered approach. One is that students are provided with research-based instruction in the general education classroom as part of Tier 1, assuring that they have had an adequate opportunity to learn. A second is that progress monitoring informs decision making throughout the multitiered approach to ensure that students are provided with adequately intensive interventions in a timely manner. A third element is that students need not move through each tier of instruction before being referred for a special education evaluation, but rather that students with special education needs receive the services they require in the most timely manner. The idea, much like medicine, is that very aggressive and expensive treatments are not provided if milder, less aggressive, and less expensive treatments are effective; however, one must also move quickly to provide more aggressive and intensive interventions as soon as it becomes clear they are required. For a more complete description of this process, see the special *TEACHING Exceptional Children* issue on data-based individualization (March/April 2014).

In summary, RTI—largely derived from research and practice in special education—has established a set of practices that are increasingly adopted in general education settings and provide screening, progress monitoring, data-based instructional decision making, and increasingly intensive interventions to students with academic and behavioral difficulties. Ideally, these practices will bolster the effectiveness of general education and reduce the number of students with academic and behavioral difficulties.

High-Quality, Research-Based Classroom Instruction

A key feature of RTI is the existence of high-quality, research-based classroom instruction that ensures every child, regardless of ability, has access to the best instruction possible, eliminating the assumption that difficulties are due to inadequate instruction. It is here, within the general education context, where

special education research has exercised considerable influence on features of instruction that affect outcomes for a range of learners. Although there are countless examples, evidence of this influence is demonstrated when considering just two classroom strategies: mnemonics and instructional feedback.

Over more than a decade, Mastropieri and Scruggs conducted research on the effective use of mnemonic strategies for enhancing learning and recall of key ideas (Mastropieri & Scruggs, 1989, 1991; Mastropieri, Scruggs, & Fulk, 1990; Scruggs & Mastropieri, 1992). Mnemonic strategies are clever picture-associations, key words, or letter strategies that help students remember or retrieve information by forming associations that do not exist naturally in the content. For example, in a social studies class, the target word *archipelago* could be represented by an "arch" connecting a series of islands. For students with disabilities, mnemonic strategies have been proven effective (see Gajiria Jitendra, Sood, & Sacks 2007; Uberti, Scruggs, & Mastropieri, 2003; Swanson et al., 2012) with effect sizes of studies ranging from 0.79 to 1.68 (Swanson et al., 2012). These effect sizes are considered large, meaning that the students who participated in the treatment surpassed those getting typical instruction in the number of concepts learned and retained. At the low end, the effect size of 0.79 suggests more than three-quarters of a standard deviation of separation between the two groups. At the high end, the effect size of 1.68 suggests more than one and a half of a standard deviation of separation. Swanson and colleagues' (2012) meta-analysis of reading interventions delivered within social studies tested mnemonic strategy for moderating effects. Although not statistically significant (probably due to the small number of studies), the use of mnemonics added 0.07 to the 1.00 mean effect for studies using other types of interventions. Both general and special educators can readily implement this relatively facile instructional practice in math, science, and social studies, enabling improved learning and greater access for all students, including those with disabilities.

Another feature of instruction benefitting all learners is systematic and explicit instruction with feedback allowing for differentiation of instruction (e.g., Hattie & Timperley, 2007). *Feedback* refers to the type and manner of providing information to learners regarding their performance or understanding (Hattie & Timperley, 2007) and is one of the top five effective instructional methods—more powerful than students' prior ability, socioeconomic status, and homework (Center on Instruction, 2008). Feedback can be differentially effective based on how it is provided and is particularly powerful for individuals with disabilities; it has consistently been associated with moderate to large effect sizes (Hattie & Timperley, 2007). Feedback is most effective when cues or reinforcement are provided to close the gap between a student's current level of achievement and the desired level of achievement (Center on Instruction, 2008). This type of task-level feedback is often led by three questions: (a) Where am I going? (goal setting), (b) How am I going? (progress toward goal), and (c) Where to next? (what needs to be done to progress even further). This type of feedback is particularly effective for students who struggle with classroom learning tasks and, when coupled with effective instructional practices that facilitate students meeting these goals, outcomes from feedback are even more enhanced.

Of the countless examples of ways in which special education research has influenced high-quality, research-based classroom instruction, mnemonics provides an example of a discrete strategy that is effective and widely applicable in classrooms whereas feedback provides an example of a more diffuse practice that can be applied in any subject area, at any time.

Student Screening and Progress Monitoring

One of the beneficial outcomes of implementing RTI approaches is screening students for risk and then providing them with early treatment. The use of screening is a universal idea in health (e.g., cancer screenings) and in RTI

applications increasingly used in education. One of the challenges of screening is that it typically has high numbers of false positives (students identified as demonstrating problems who will not demonstrate difficulty in the near future). This high rate of false positives is necessary to ensure that individuals with problems do not go unidentified, yet these false positives can be costly if they result in unneeded treatment (L. S. Fuchs & Vaughn, 2012). However, one of the benefits is preventing academic difficulties that, if they remain untreated, become difficult to remediate in later schooling (e.g., Vaughn et al. 2011; Vaughn & Fletcher, 2010, 2012) and are very costly to influence (e.g., Catterall, 2011; Vaughn et al., 2014).

Progress monitoring serves as a bridge between screening and intervention. Progress monitoring alone does not produce benefits to students (e.g., King, Deno, Mirkin, & Wesson, 1983; Skiba, Wesson, & Deno, 1982; Tindal, Fuchs, Christenson, Mirkin, & Deno, 1981). Instead, the power of progress monitoring lies in its use as a tool for instructional decision making. Once students are identified as demonstrating risk and provided a treatment, progress monitoring can guide future instructional decisions. The idea is to use simple and efficient but technically adequate measures to track students' academic growth and modify instruction as needed (Deno, 1985). Within the RTI framework, if students improve and reach levels similar to those of students in the general education classroom as a result of an intervention, they can be dismissed from intervention services. Alternatively, if students make limited gains or continue to struggle, they may stay in the intervention group or receive even more intensive intervention.

A line of research examining data-based decision making to inform teachers of students' progress based on the slope of their scores using progress monitoring measures (e.g., Stecker, Fuchs, & Fuchs, 2005) holds promise for both monitoring students' progress and using the data to inform instructional decision making (D. Fuchs, Fuchs, & Stecker, 2010). However, it requires measures with alternate forms that are comparable in difficulty and concept. It also requires teacher training in not only assessment administration but also charting and interpreting scores so that teachers use the data to both determine when a goal is met and also consider the data slope in a predictive fashion to estimate whether students are on target toward meeting longer term goals (Stecker et al., 2005). It also seems that training is necessary to influence teacher facility in making instructional decisions (e.g., changing teaching techniques or deciding when to seek more intensive intervention) when a student's data slope is flat or declining (Stecker et al., 2005).

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Thus, both screening and progress monitoring benefit all learners. Appropriate use of screening identifies students "just in time" to ensure that their difficulties are recognized and thus the opportunity for additional treatment is available. Progress monitoring provides a mechanism for determining students' response to these treatments so that instruction can be altered in way to improve outcomes.

Increasingly Intensive Tiers of Intervention

In a well-established school-based RTI model, students are provided with research-based instruction in the general education classroom, preventing difficulties due to lack of opportunity to learn. This is coupled with an efficient screening process to identify struggling learners early. Students who struggle with instruction within the general classroom then have access to increasingly intensive tiers of intervention designed to address the areas in which students are deficient. Within

these tiers of instruction, progress is systematically monitored to allow for timely instructional decision making. Carefully delineated tiers of instruction facilitate these decisions. When students struggle in high-quality Tier 1 settings, some time spent in Tier 2 interventions, where instruction is targeted to meet student need, may be necessary. These services are provided in small group settings and are relatively brief in duration (i.e., 6–10 weeks; e.g., Denton et al., 2011). Students who continue to exhibit minimal progress are provided access to Tier 3, intensive instruction that is individualized and even more highly targeted to students' needs (e.g., Denton et al., 2013).

Of course, the movement between tiers of instruction is predicated on the notion that early interventions are likely to benefit the majority of students and that educators can quickly and readily determine students who require a more intensive intervention. In academic areas, this assumption is accurate in the primary grades (kindergarten through second grade), but less is known about interventions and progress monitoring with students in Grade 4 and up. It is likely unnecessary to use the same approach to RTI in upper elementary and secondary grades as is used in the primary grades. This is because students in upper elementary and middle school have already demonstrated a pattern of response to treatments based on grades, local assessments, and state standardized tests. It can be determined, based on their current standing in key academic and behavioral areas, whether more intensive interventions may be appropriate without necessarily requiring students to proceed through a series of less intensive interventions. This is important because it provides students with the ready access to the more intensive interventions needed rather than waiting for their lack of progress to be documented through less intensive interventions. For example, L. S. Fuchs, Fuchs, and Compton (2010) as well as Vaughn and Fletcher (2010) argue that middle school students with very low academic scores benefit from more intensive interventions immediately, without necessitating Tier 2-type interventions first. In essence, for students with significant learning difficulties, identifying who needs more intensive interventions can be based on current performance.

We have highlighted several research areas influenced by special education that are associated with improved outcomes for the majority of learners. These successes in research and practice are noteworthy and emphasize the importance of special education research influencing educational practice broadly. There are also ways in which special education researchers have focused (and should continue to focus) on services for students with disabilities. Several studies have investigated the effects of extensive or interventions for students with disabilities.

Special Education's Focus on Intensive Interventions

Despite the many successes in educational practice for students with disabilities, there are many areas of special education where additional research is needed, especially as they relate to individuals with autism spectrum disorder and students with significant learning and behavioral disabilities. These students require more intensive interventions that are delivered in smaller groups over a longer period of time (D. Fuchs et al., 2014; Pyle & Vaughn, 2012). A systematic review of the research investigating the effects of intensive reading treatments for students with learning disabilities reveals not only progress in this area but also the urgency in the need for additional research into the effects of intensive treatments in all academic areas.

Two recent syntheses reported on effects from intensive interventions in reading. One is a synthesis of 18 studies investigating the effects of reading interventions that were delivered over the course of 100 or more sessions for students with reading difficulty in kindergarten through third grade (Wanzek & Vaughn, 2007). The second is a similar review of 19 studies investigating the effects of reading interventions delivered across 75 or more sessions for at-risk students in Grades 4 through 12 (Wanzek et al., 2013). Results for students in kindergarten through third grade indicated that there were larger effects for

interventions delivered in the smallest group sizes and for those delivered in kindergarten or first grade. Results for students in Grade 4 and above yielded overall effect sizes that were considerably smaller than those for students in kindergarten through third grade for word reading, comprehension, word reading fluency, reading fluency, and spelling outcomes. There are several interpretations to the findings of higher effects at earlier grades. One is that these reading components may be more malleable prior to fourth grade. A second interpretation, and one that we think may be a stronger explanation, is that the focus of reading instruction in the early grades is on basic skills that are more readily remediated, such as phonological awareness and letter-sound knowledge. As the text demands increase in third grade and above, more advanced knowledge of vocabulary and background knowledge are needed, and advancing students in these areas is more challenging.

For this article, we examined the studies from both of these syntheses (Wanzek et al., 2013; Wanzek & Vaughn, 2007) that disaggregated findings for students with disabilities. Findings for individuals with disabilities were not previously reported in these syntheses. Because both prior syntheses employed extensive search techniques (i.e., database search coupled with hand searches), we relied on the technical adequacy of those searches for this investigation. Of the 37 studies included in the two syntheses, 12 included samples with a majority of students identified with a disability (primarily learning disability). Four of the studies were conducted with kindergarten through third graders, and eight studies were conducted with fourth through 12th graders. A total of 632 students were included in the samples. Interventions were implemented for a minimum of 75 sessions with durations spanning 6 months to 3 years, with a majority of interventions delivered for one school year (n = 7). Group sizes of eight or smaller were used in all but one middle school study where students were taught in groups of 10 to 15. Teachers and professionals implemented most interventions (n = 10), with fewer researcher-implemented interventions (n = 2).

Intervention components were reflected to varying degrees across the corpus of studies (see Table 1). Although phonics or word reading was included in nine studies, fluency in seven, and comprehension in seven, vocabulary was included in only four studies, all for students in fourth grade and above. Among the seven studies that included comprehension in the intervention, students were asked to answer questions in three studies (Rankhorn, England, Collins, Lockavitch, & Algozzine, 1998; Torgesen et al., 2001; Wanzek, Vaughn, Roberts, & Fletcher, 2011), summarize in two studies (Calhoon, 2005; Wanzek et al., 2011), and identify main idea in two studies (Calhoon, 2005; Wanzek et al., 2011). Phonological awareness was identified as an intervention component in one older reader study (Torgesen, 2001) and in no younger reader studies

Outcomes measured in the studies focusing on individuals with disabilities are displayed in Table 2. Phonics or word reading outcomes were most often investigated (nine studies) and included measures of letter-word identification, word attack, non-word reading fluency, and sight-word reading fluency. Fluency was measured in eight studies and included oral reading fluency, non-word reading fluency, and sight-word reading fluency. Comprehension outcomes were included in six studies, and phonological awareness measures were included in two younger reader studies. Only one vocabulary outcome—the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981)—was included in a single study.

Effect sizes are a succinct way to present findings from studies and provide an indication of differences between two groups. Effect sizes that are positive indicate that the treatment group as a whole outperformed the comparison group. Effect sizes that are negative indicate that the comparison group outperformed the treatment group. Effect sizes that are not discernable from 0 indicate that both groups performed about the same. Even small positive effects are worth considering as they suggest that students in the treatment condition made small gains on the outcome measures; these small gains continued over time

Table 1. Intervention Components.

	Phonological awareness	Phonics		Oral reading fluency					Vocabulary	Comprehension		
Study	Phonological awareness	Phonics	Encoding	Sound fluency	Word reading fluency	Phrase reading fluency	Connected text fluency[a]	Oral reading connected text[b]	Vocabulary	Com-prehension[c]	Preview text	Discussion
Grades 4–12												
Calhoon (2005)		X					X	X	X	X		
England, Collins, and Algozzine (2002)			X		X	X	X	X	X		X	
Mercer, Campbell, Miller, Mercer, and Lane (2000)				X	X		X	X				
Rankhorn, England, Collins, Lockavitch, and Algozzine (1998)							X	X		X	X	
Snider (1997)		X					X	X				
Spencer and Manis (2010)				X	X	X	X	X				
Torgesen et al. (2001)	X	X	X		X			X	X	X		
Wanzek, Vaughn, Roberts, and Fletcher (2011)		X	X		X		X	X	X	X	X	X
Grades K–3												
Foorman et al. (1997)		X	X					X				
O'Connor, Notari-Syverson, and Vadasy (1996)		X	X					X				X
Englert, Mariage, Garmon, and Tarrant (1998)			X		X	X		X				X
Snider (1997)		X					X	X				

[a]Authors reported oral reading fluency of connected text as part of the intervention. If a cell does not contain an X, the specific purpose of the oral reading was not detailed in the report.
[b]Authors reported connected text reading that was not identified as specifically for fluency development.
[c]Includes summary, main idea, answering questions.

Table 2. Outcomes Measured.

Study	Reading comprehension	Oral reading fluency	Phonics/ word reading	Sight word reading fluency	Dictation	Spelling	Phonological awareness	Peabody Picture Vocabulary Test-Revised	Rapid letter naming	Sound repetition
Grades 4–12										
Calhoon (2005)	X	X	X							
England, Collins, and Algozzine (2002)	X		X		X					
Mercer, Campbell, Miller, Mercer, and Lane (2000)		X								
Rankhorn, England, Collins, Lockavitch, and Algozzine (1998)	X		X		X					
Snider (1997)		X								
Spencer and Manis (2010)	X	X	X	X						
Torgesen et al. (2001)	X	X	X	X		X				
Wanzek, Vaughn, Roberts, and Fletcher (2011)	X		X	X						
Grades K–3										
Foorman et al. (1997)			X			X	X			
O'Connor, Notari-Syverson, and Vadasy (1996)			X		X		X	X	X	X
Englert, Mariage, Garmon, and Tarrant (1998)		X		X						
Snider (1997)		X								

Note. Snider (1997) included students in Grades 2, 3, and 4, so it is listed with both age groups.

can yield very meaningful change. Although there are many considerations when interpreting the size of an effect from a study, small effects are typically considered about 0.10, with more moderate effects starting at around 0.30 and large effects at 0.50—particularly when interpreting findings from standardized measures.

Effects on Reading Comprehension

Six studies reported findings for reading comprehension outcomes. Spencer and Manis (2010) reported no statistically significant effect on reading comprehension for a fluency only intervention, whereas for the two intervention studies that combined phonics, fluency, vocabulary, and comprehension instruction, a small effect (Wanzek et al., 2011) and large effect (Calhoon, 2005) were reported. However, it should be noted that these effects were on standardized measures (e.g., Gates MacGinitie). Therefore, small effects should not be interpreted as inconsequential, particularly among older readers. The remaining three studies (England, Collins, & Algozzine, 2002; Rankhorn et al., 1998; Torgesen et al., 2001) that included reading comprehension outcomes were studies that reported significant differences between pretest and posttest on standardized measures of reading comprehension.

Effects on Fluency

Seven studies reported findings for fluency outcomes, with two studies providing adequate data for effect size calculation. In one study (Snider, 1997) investigating the effects of a single-component oral reading fluency intervention, the effect size was medium (g = .45) on a curriculum-based measure, whereas in the other study (Calhoon, 2005) that included phonics/word reading, oral reading fluency, vocabulary, and comprehension instruction, effects were small (g = .08) on a standardized measure. In the remaining five studies, authors reported gains in oral reading fluency from pre- to posttest.

Word level fluency outcomes were reported in four studies. In Spencer and Manis's (2010) fluency study, the effect size for sight-word fluency on a standardized measure was small (g = .14), whereas the authors of a multicomponent intervention study (Wanzek et al., 2011) with phonics/word reading, oral reading fluency, vocabulary, and comprehension instruction reported a medium size effect (g = .48) on a standardized measure. The two other studies reported gains from pre- to posttest. O'Connor, Notari-Syverson, and Vadasy (1996) implemented a phonics/word reading and comprehension intervention that resulted in an effect size of g = .23 on the PPVT-R.

Effects on Phonics/Word Reading

Three studies included phonics/word reading outcomes (letter-word identification, word attack, and non-word reading) with adequate information to calculate effect sizes. Several studies investigated the effects of multicomponent interventions that included phonics or word reading, oral reading fluency, vocabulary, and comprehension instruction. One (Calhoon, 2005) reported large effect sizes on letter-word identification (g = .96) and word attack (g = 1.02) on standardized measures, whereas another (Wanzek et al., 2011) reported no effects on letter-word identification (g = .05) and word attack (g = –.02) and medium effects on non-word reading fluency (g = .36) on a standardized measure. A fluency-focused study (Spencer & Manis, 2010) reported small to medium effect sizes on letter-word identification (g = .33), word attack (g = .49), and non-word reading fluency (g = .36) on standardized measures. In a study that combined fluency with phonics intervention (Foorman et al., 1997), authors reported small effect sizes on word attack (g = .17 and .19) on a standardized measure. The remaining three studies with insufficient information for calculating effect sizes (England et al., 2002; Rankhorn et al., 1998; Torgesen et al., 2001) implemented multicomponent interventions and reported increases from pre- to posttesting on measures of letter-word identification, word attack, and non-word reading fluency.

In sum, within the area of intensive reading interventions designed for students with disabilities, relatively few studies have been conducted, particularly when considering that studies may have specific focuses, disability groups, and age groups. For example, the small number of reading comprehension studies may give the impression of mixed results. However, we may also argue that six studies—only three of which contained information for effect size calculation—does not provide an adequate corpus from which to draw conclusions. Reading comprehension intensive intervention research is not alone. This trend is evident in reading fluency, phonics or word reading, and vocabulary interventions as well. Interventions implemented over a long period of time may be particularly necessary among older readers. Among these students, it seems that multicomponent interventions that highlight vocabulary and background knowledge as well as text-based comprehension may be needed to impact reading comprehension gains.

Beyond the scope of reading, mathematics researchers investigating the effects of intensive interventions have lamented the lack of research studying the effects of intensive interventions (e.g., Bryant et al., 2011). Consider a recent synthesis of schema based word problem solving interventions (Powell, 2011). Among the 12 studies included in the synthesis, none included interventions implemented beyond 36 lessons. It seems that intensive interventions should become a greater focus of research for students with disabilities who require longer, more intensively delivered instruction that is targeted to specific needs. For example, Bottge and colleagues (2014) completed a study examining the effects of a long-term math intervention that combined explicit and anchored instruction during five instructional units on fractions and problem solving for students with disabilities served in resource rooms. Findings indicated that students assigned to the treatment condition outperformed students in the "business as usual" condition on standardized measures of computation (i.e., Iowa Tests of Basic Skills [Hoover, Dunbar, & Frisbie, 2001]) and researcher-developed measures of problem solving. Although additional research is needed, it is possible that multicomponent mathematics interventions implemented with greater intensity (i.e., over a longer period of time) are key to mathematics gains among students with disabilities as well.

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As we shift to the final focus of this article, we describe a research agenda that addresses the needs of students served in the general education setting with a wide range of abilities and the academic needs specific to students with disabilities. Finally, we will discuss the types of supports necessary to continue these impactful lines of research.

Future Work and Necessary Support

Work to Influence General Education

RTI, informed largely by special education research, has influenced the way all students are educated, particularly students who struggle academically and behaviorally. There are many opportunities for extending understanding of RTI procedures, classroom practices, and student outcomes. Related to screening, critical research questions might address improving brief screening approaches that can accurately place students in interventions (e.g., Speece, Case, & Molloy, 2003). Research addressing the development of reliable and valid measures to monitor student progress in academic treatments is needed (L. S. Fuchs, 2003). Progress monitoring measures that address discrete skills (e.g., letter and sound naming, number recognition) have been effective in discriminating progress in those target areas, but more complex tasks

such as reading comprehension and math problem-solving have not been adequately addressed with progress monitoring measures. In addition, professional development studies investigating the effects of different teacher training methods on collecting and using progress monitoring data within an RTI framework are warranted.

Although elementary school level RTI models have received considerable research attention in the past decade, investigating RTI models at the middle and high school level is necessary (L. S. Fuchs & Vaughn, 2012). In particular, questions remain related to the time necessary to remediate academic difficulties for middle and high school students. In a recent study (Vaughn et al., 2011), middle school students who did not make adequate progress in a reading intervention were retained in the intervention for up to 3 years. Those students who participated for 3 years outperformed the comparison students with a large effect size in reading comprehension on a standardized measure (ES = 1.20; Vaughn et al., 2011). Moderate effects on reading comprehension were also reported from a 2-year intervention for students in high school with significant reading problems (Vaughn et al., 2014). These findings suggest that the complex knowledge and skills needed for proficiency in reading and math take extensive time within a systematic and explicit instructional approach. This extensive time and intensity of treatment require additional investigation as well as application in practice.

Work Focused on Special Education

Previous research related to special education has had a positive effect on students with disabilities served in special education and general education settings. Because educational outcomes are one of the essential goals for students with disabilities, better understanding of effective intensive treatments for these students is needed. Although the number of intensive treatment studies with students with disabilities is not adequate, they provide initial guidance for educators and future research. A strong research base in special education is even more necessary than in general education because students with disabilities cannot make up for lost time resulting from inadequate practices. Although many typically achieving students learn well independently, special education students cannot. The influence of research and evidence on educational decision making has even greater value for those students with disabilities who most require precision in their instructional (Vaughn & Dammann, 2001). The successes and opportunities for students with disabilities will occur only if we can maintain a rigorous pace of conducting high-quality research providing evidence to support decisions about academic and behavioral interventions for youngsters with disabilities.

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Necessary Support

Since its creation in 2004, the National Center for Special Education Research has supported more than 260 research projects totaling more than $440 million. However, we believe that there is evidence for serious concern that the vigorous pace of findings related to individuals with disabilities will be jeopardized by the shortsighted cuts in funding for research in special education over the past 2 years and potentially continuing in future years. In fiscal year 2005, $83 million was allocated for research in special education. The numbers declined to $42.27 million in 2013, and 75% fewer grants were funded due to these cuts (Council for Exceptional Children, 2014). In fiscal year 2014, no funds were awarded through the Institute of Education Sciences' National Center for Special Education Research. Although some funds have been reallocated for 2015, they certainly do not reach

levels seen in 2005. These cuts will certainly reduce the quantity of information and likely even the quality of knowledge available to educators. Considering the significant impacts of special education research, including several of the findings highlighted in this article, it would be most unfortunate for all learners to slow this progress.

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