National Center on
INTENSIVE INTERVENTION
at American Institutes for Research

Data-Based Individualization:

A Framework for Intensive Intervention

SUBMITTED TO:
Division of Research to Practice
Office of Special Education Programs
U.S. Department of Education

PREPARED BY:
National Center on Intensive Intervention

March 2013

AIR® American Institutes for Research®
IDEAs that Work U.S. Office of Special Education Programs

This document was produced under U.S. Department of Education, Office of Special Education (OSE) Grant No. H326Q110005. Celia Rosenquist is the OSE project officer. The views expressed herein do not necessarily represent the positions or policies of the U.S. Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service, or enterprise mentioned in this publication is intended or should be inferred. This product is public domain. Authorization to reproduce it in whole or in part is granted. Although permission to reprint this publication is not necessary, the citation should be: National Center on Intensive Intervention. (2013). *Data-based individualization: A framework for intensive intervention.* Washington, DC: Office of Special Education Programs, U.S. Department of Education.

Contents

Introduction 1

Who Needs Intensive Intervention? 1

What Is NCII's Approach to Intensive Intervention? 3

What Is Data-Based Individualization (DBI)? Some Key Points to Remember 4

How Is Intensive Intervention Delivered? 5

Secondary intervention program, delivered with greater intensity 7

Progress monitoring 8

Diagnostic assessment 9

Adaptation 10

Continued progress monitoring, analysis, and adaptation. 11

I've Got the Basics; Where Should I Go From Here? 12

References 13

Introduction

The mission of the National Center on Intensive Intervention (NCII) is to build district and school capacity to support the implementation of intensive intervention for K–12 students who require it. The term *intensive intervention* is not commonly understood, and variations abound in the literature regarding both its definition and implementation. This document introduces and describes the data-based individualization (DBI) process, a framework for addressing the needs of students who require intensive intervention in academics and/or behavior. DBI involves a dynamic, continuous interplay between assessment and intervention. It is a research-based method for individualizing validated intervention programs to improve outcomes for students with the most severe and persistent learning and/or behavior needs.

Although the intended audience for this document includes anyone interested in learning about intensive intervention and DBI, it assumes a basic understanding of multi-tiered systems of support, such as Response to Intervention (RTI) and Positive Behavioral Interventions and Supports (PBIS), which form the foundation upon which intensive intervention is typically implemented.[1] The information in this document is organized according to these three key questions:

- Who needs intensive intervention?
- What is NCII's approach to intensive intervention?
- How is intensive intervention delivered?

Who Needs Intensive Intervention?

Intensive intervention is intended to meet the needs of the subgroup of students in Grades K–12 who have the most persistent and severe learning and behavioral problems. They may be described as:

- Students in a tiered intervention program who have not responded to evidence-based secondary intervention or other standardized remediation programs.
- Students with very low academic achievement and/or severe behavior problems who are not making adequate progress in their current intervention program.
- Students with disabilities who are consistently not making adequate progress in meeting their IEP goals.

[1] For more information on multi-tiered systems of supports, see Center on Positive Behavioral Interventions and Supports (2009) and National Center on Response to Intervention (2010).

In terms of multi-tiered intervention frameworks, students with disabilities and other students referred for intensive intervention have been insufficiently responsive to the core instruction afforded all students (Agodini et al., 2009) and have also responded inadequately to secondary interventions (e.g., Al Otaiba & Fuchs, 2006; McMaster, Fuchs, Fuchs, & Compton, 2005; Vaughn et al., 2010; Wanzek & Vaughn, 2009) designed to address their needs in reading, mathematics, or behavior. There is no consensus on the number of students with disabilities nationwide who demonstrate learning and behavioral problems despite participation in core and secondary programs. However, based on analysis of student responsiveness data from multi-level studies (e.g., Al Otaiba & Fuchs, 2006; Conduct Prevention Problems Research Group, 2002; Fuchs et al., 2008; McMaster, Fuchs, Fuchs, & Compton, 2005; Wanzek & Vaughn, 2009), we estimate that a minimum of 2.5 million students (5 percent of the general K–12 school population) require intensive academic interventions and that approximately 1.5 million students (3 percent of the general school population) require intensive behavioral interventions.

WHAT IS A MULTI-TIERED INTERVENTION FRAMEWORK?

A multi-tiered intervention framework is a seamless, integrated system of academic and/or behavioral interventions that vary in intensity, are matched to students according to need, and whose implementation is driven by team- and data-based decisionmaking.

Nationally, there is a critical need to improve outcomes for students with the most severe and persistent learning and behavioral needs—particularly those with disabilities. In 2011, the National Assessment of Educational Progress (NAEP) reported that 68 percent of fourth graders with disabilities and 64 percent of eighth graders with disabilities lacked basic reading skills. The percentages for students with disabilities who lacked basic mathematics skills were similarly high: 45 percent of fourth graders and 65 percent of eighth graders (National Center for Education Statistics, 2011). Also, the National Longitudinal Transition Study (NLTS-2) reported that one of every three students with disabilities has had a disciplinary problem at school (Wagner et al., 2003), one of four dropped out of high school without graduating, and four of five were either unemployed or working in low-paying (minimum wage) jobs as young adults (Wagner et al., 2005). The data are especially troubling for students labeled with emotional disturbance (ED); the NLTS-2 showed that almost two-thirds of students with ED have been subject to disciplinary actions at school; approximately 35 percent have been arrested (Wagner et al., 2003), and only 56 percent completed high school (Wagner et al., 2005).

These nationally representative data make an incontrovertible point: Millions of students with disabilities are demonstrating unacceptably poor academic performance or school behavior. What makes this situation all the more discouraging is that intervention studies in reading, mathematics, and behavior have shown that outcomes can be significantly improved (e.g., Fuchs, Fuchs, & Stecker, 2010; Gresham, 2004; Wanzek & Vaughn, 2009; Wanzek et al., in press). NCII's approach to intensive intervention draws from what has been learned from this work to improve academic and behavioral outcomes.

What Is NCII's Approach to Intensive Intervention?

NCII's approach to intensive intervention is grounded in the concept of *data-based individualization* (DBI), a systematic method for using assessment data to determine when and how to intensify intervention in reading, mathematics, and behavior. Its origins are in a program of research conducted at the University of Minnesota in the 1970s (Deno & Mirkin, 1977), funded by the Office of Special Education Programs in the U.S. Department of Education, and expanded upon by others (Fuchs, Deno, & Mirkin, 1984; Fuchs, Fuchs, & Hamlett, 1989; Capizzi & Fuchs, 2005). DBI relies on the systematic and frequent collection and analysis of student-level data, modification of intervention components when those data indicate inadequate response, and use of teachers' clinical experience and judgment to individualize intervention.

DBI is typically implemented within the context of a multi-tiered intervention framework, such as RTI or PBIS. The DBI process can be used to support those students who truly need intensive and individualized support, and for whom core and supplemental instruction have not been sufficient to meet their needs. The DBI process does not occur in isolation, but rather in addition to the interventions that a student is receiving at the universal and secondary levels. For example, DBI involves adapting and individualizing interventions that are implemented at the secondary level. Additionally, DBI may be used for students requiring intensive intervention in one skill area (e.g., math problem solving) but receiving core instruction or secondary intervention in other areas (e.g., numeracy, computational fluency). In this way, DBI is intimately connected to the full continuum of intervention supports that make up the multi-tiered framework.

The quality and fidelity with which universal and secondary intervention levels are implemented are critical, and set the foundation for successful implementation of DBI. At the universal level, this means that all students are taught the same core, research-based curriculum, and that the school implements a school-wide behavior plan that includes a common set of expectations, rewards, and consequences. At the secondary level, this means that teachers use standardized, evidence-based, academic and/or behavioral intervention programs that are delivered with fidelity. In other words, the program is delivered exactly as it was intended by the developer: all elements of content are covered, and the session frequency, duration, and group size are consistent with what is recommended.

WHAT IS FIDELITY?

Delivering an intervention with fidelity means delivering it exactly the way it was designed, and in the way it was implemented during research studies that have validated its effectiveness. Important components of fidelity include: content, dosage/schedule, and group size.

The DBI process begins when an intervention team decides that a student needs a more intensive and individualized version of the standardized secondary intervention program that he or she has been receiving. This intervention program serves as a "platform" (or starting point) that the interventionist will change to meet the student's unique needs. Interventionists use ongoing progress monitoring data (e.g., curriculum-based measurement or direct behavior ratings) and diagnostic assessment data (error analysis or functional behavioral assessment) both to assess the student's response to the secondary intervention and to determine when adjustments to that intervention are needed. In academics and behavior, interventionists use these data to individualize instruction on a student-by-student basis. In this way, instructors align intensive intervention to the student's unique learning and behavior needs (Bambara & Kern, 2005; Fuchs, Fuchs, & Vaughn, 2008).

What Is Data-Based Individualization (DBI)? Some Key Points to Remember

- DBI is a validated *process*, and ***not*** a single intervention program or strategy.
- DBI is an *ongoing* process in which intervention and assessment are linked and used to adjust a student's academic or behavior program over time. DBI is ***not*** a one-time fix. It is not a single static intervention program.
- DBI is often *domain-specific*, meaning that a student may receive DBI in one domain (e.g., reading, behavior) or even on one component of that domain (reading comprehension, social interactions), while receiving core or supplemental instruction in other domains (e.g., word-level reading, school-wide expectations). DBI can be implemented in multiple domains at the same time, responding to the learning and behavioral needs of the student.
- For students with the most intensive needs, it is likely that they will require DBI over a sustained period of time. Decisions about if and when to reduce the intensity and individualization of the intervention must take into account the student's responsiveness, as well as the breadth and nature of skill deficits to be addressed.

While DBI can be used for students who have the most severe and persistent learning and behavioral needs, successful implementation of DBI may also be a mechanism for schools to make improvements to their broader tiered intervention system that serves all students. For example, schools that implement DBI successfully may be better able to make distinctions between interventions used at the universal, secondary, and tertiary levels, helping teams to plan and allocate resources and staff more efficiently.

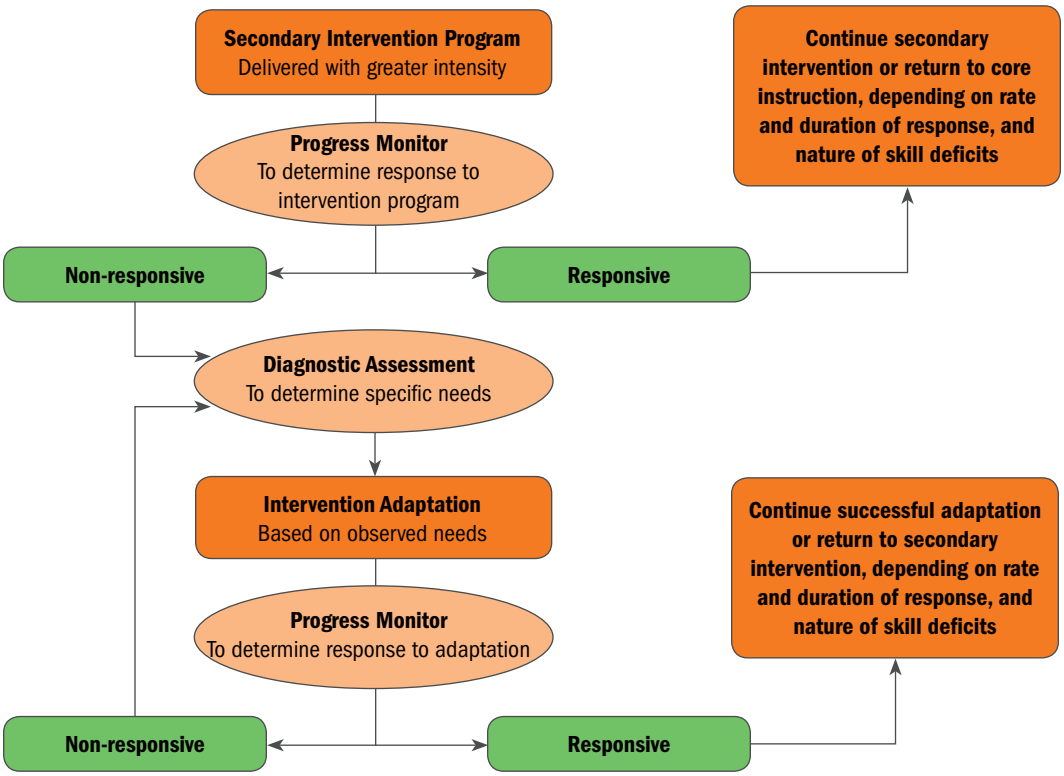
Additionally, interventionists using DBI need to have expertise in how to use data for instructional decision-making at *both* the individual and group levels. NCII's approach to intensive intervention recognizes this intimate connection between DBI and the larger tiered support initiatives within which it is often situated. Strong implementation of the full multi-tiered system of support is the factor most likely to support implementation of DBI that is effective and sustainable. The remainder of this paper provides more detail on how intensive intervention is delivered, focusing on the five major steps of the DBI process. Throughout, we assume that a solid foundation of universal and secondary supports is in place.

How Is Intensive Intervention Delivered?

DBI is an iterative, multi-step process that involves the analysis of progress-monitoring and diagnostic assessment data, followed by individualization of a validated academic or behavioral intervention program. Figure 1 illustrates the typical DBI process. As stated in the previous section, the DBI process begins when data show that a student is making insufficient progress in response to a secondary intervention program that is evidence based and delivered with fidelity.[2] The first step is to implement the program with *greater intensity* (e.g., smaller group size, more time), and to collect frequent progress monitoring data. If the student continues to be unresponsive, diagnostic data are collected and analyzed to identify the specific skill deficits that need to be targeted. The results of the diagnostic assessment, in combination with the teacher's analysis of what features of the intervention need to be modified to better support the student, help staff determine how to individualize the secondary intervention program to meet the individual student's unique needs. Upon implementing the change, the teacher continues to collect progress monitoring data at regular intervals to help determine whether additional changes to the individualized intervention are required to support adequate student response. The DBI process provides a systematic way for interventionists to gradually intensify their instruction and support, based on data.

[2] A small number of students may present with very significant academic or behavioral difficulties where a standardized secondary intervention alone is unlikely to be effective. Intervention teams may choose to move directly to intensive intervention in these instances, rather than follow the typical protocol for the secondary intervention program. However, such decisions are rare and should be made on an individual, case-by-case basis.

Figure 1. The DBI Process[3]



As illustrated in Figure 1, the DBI process comprises the following steps:

1. Secondary intervention program, delivered with greater intensity
2. Progress monitoring
3. Diagnostic assessment
4. Adaptation
5. Continued progress monitoring, with adaptations occurring whenever needed to ensure adequate progress

[3] This graphic assumes that secondary interventions have been delivered with fidelity and the student has been non-responsive before beginning the DBI process.

Below we describe what each of these steps looks like in practice, for a fictional student with intensive academic needs and a fictional student with intensive behavioral needs.

1. SECONDARY INTERVENTION PROGRAM, DELIVERED WITH GREATER INTENSITY

The first step in intensive intervention is to start with a strong, validated, evidence-based secondary intervention program, implemented with greater intensity (e.g., smaller group size, more instructional time) than prescribed by the developers. These types of intensification strategies are often referred to as *quantitative* changes to an intervention. Examples of quantitative changes may include increasing the frequency or duration of the intervention; decreasing the group size; decreasing the heterogeneity of participants in the intervention group; or increasing prompting for desirable behavior.

Kelsey's story

Kelsey expressed serious reading problems, reading at an early 2nd grade level at the beginning of 4th grade. Kelsey's teacher discussed her concerns about Kelsey with the school's intervention team, and together the team selected a research-validated program that addressed phonological awareness, word study, and fluency skills, to be delivered by a skilled reading specialist, Ms. Hayes. This program was designed to be administered with a group comprising two to six students, for 20–40 minutes per session, three to four times per week for seven weeks. After seven weeks, progress monitoring data showed that Kelsey was not responding to this intervention program at an adequate rate. Ms. Hayes then made the decision to intensify her implementation of this program by adding an additional 15 minutes per session.

Ryan's story

Ryan was identified as having externalizing behavior problems in January of his 4th grade year. Ryan had an excessive number of office discipline referrals (ODRs), and frequently instigated fights with other students. Because of Ryan's excessive ODRs, the school intervention team decided to implement a Check In Check Out system that corresponded to the goals on the school-wide positive behavior support system and included a three-point rating scale. Ryan's teacher, Mr. Jones, checked in with Ryan at the beginning of each school day to review expectations and goals. After each class period, he checked in with Ryan again to assign behavioral ratings and provide feedback. At the end of the day, Ryan again met with Mr. Jones and checked out by reviewing ratings and feedback for the entire day. A daily report card then went home with Ryan for parent signature. Although Mr. Jones implemented this intervention with fidelity every day for seven weeks, Ryan continued to have excessive ODRs. Mr. Jones then scheduled a meeting with the intervention team. The team believed that Ryan would benefit from additional adult contact, and decided to implement an intensified version of the daily report card by pairing Ryan with a mentor who could check in frequently with Ryan throughout the day and encouraging Ryan to initiate contact with the mentor whenever he had an issue he wanted to discuss.

2. PROGRESS MONITORING

While the intensified secondary intervention is being implemented, the teacher gathers frequent progress monitoring data and evaluates these data against a student's individualized instructional or behavioral goal to determine whether progress is occurring at a sufficient rate. If the student's progress is deemed sufficient, the teacher continues to implement the intensified intervention program, evaluate progress, and adjust instructional or behavioral goals as appropriate. On the other hand, if the student's progress is not deemed sufficient, the teacher will consult with a team about further intensifying the intervention.

Kelsey's story

Ms. Hayes set a reading fluency goal for Kelsey, and then implemented formal progress monitoring using a Passage Reading Fluency (PRF) assessment. This progress monitoring tool was able to detect changes in Kelsey's reading skill level. After several weeks, Ms. Hayes looked carefully at Kelsey's scores to see if she was making adequate progress. Based on Kelsey's progress monitoring graph, she was not progressing at the rate needed to meet her goal, and Ms. Hayes knew that she would likely need more intensive supports.

Ryan's story

Ryan's teacher used his Check In Check Out monitoring system to track the extent to which Ryan was meeting the three school-wide behavioral expectations: Be Safe, Be Respectful, and Work Hard. ODR data were also collected when ODRs occurred. Although some progress was evident, Ryan continued to have an unacceptable number of ODRs based on school cut points, and met his daily report card goals only 40 percent of the time. Mr. Jones and the intervention team decided that more intensive supports would be needed.

3. DIAGNOSTIC ASSESSMENT

Although progress monitoring assessments help teams to determine *when* an intervention change is needed, diagnostic assessments help teams determine the *nature* of the intervention change that is needed.

After receiving the intensified version of the secondary intervention program, if the student's progress is deemed insufficient, the team uses the progress monitoring data, in combination with diagnostic assessment information and analysis of the instructional design or intervention features, to determine further intervention changes that are likely to be effective for the student. Diagnostic assessment tools can include standardized measures, error analysis of progress monitoring data and work samples, or functional behavioral assessment (FBA). These tools and processes allow teachers to identify a student's specific area(s) of difficulty when lack of progress is evident, and can inform decisions about how to adapt the intervention.

Kelsey's story

Ms. Hayes knew she had to make a change to ensure that Kelsey could make adequate progress and meet her goal, but she wasn't sure how to best individualize her instruction. To determine the nature of the instructional change needed, Ms. Hayes conducted an error analysis of Kelsey's most recent passage reading fluency data. The error analysis provided more detailed information about the types of errors Kelsey was making and helped Ms. Hayes gain insight into productive directions for supplementing the reading intervention and for building Kelsey's individualized program. Ms. Hayes also administered a phonics survey to determine Kelsey's decoding strengths and weaknesses. She then brought the results of these assessments to the intervention team to discuss potential strategies for intensifying the intervention.

Ryan's story

Mr. Jones knew that Ryan was making insufficient progress, and that some kind of change was needed to his intervention. To determine the nature of the change needed, Mr. Jones, with the help of the school's intervention team, took a closer look at Ryan's Check In Check Out data, and found that he had difficulty earning points for the goal "Be Respectful." Ryan's teachers noted that he often disrupts class with both verbal (yelling out) and physical (throwing pencils, touching peers) outbursts. At this time, Ryan's teacher and intervention team decided that Ryan needed an even more intensive intervention, and they began by conducting an FBA to identify antecedent(s) and potential functions of the challenging behavior. FBA results indicated that Ryan's problem behavior functioned as a way to gain attention from adults and to avoid difficult academic tasks.

4. ADAPTATION

Using multiple data sources, the teacher or team makes a decision to adapt the intervention program to target a very specific need. Strategies for intensifying an intervention often occur along several dimensions, some of which can be considered *quantitative* changes and some of which can be considered *qualitative* adaptations. Quantitative changes, which were described earlier (e.g., smaller group size, more time, more prompts), may be necessary, and often serve as a first step in the intensification process. However, they are often not sufficient to facilitate progress for students with the most intensive needs.

Qualitative adaptations may also be made to the intervention program that alter the way the content is delivered (e.g., more carefully selecting instructional foci aligned with students' needs), how a student responds (e.g., providing more opportunities to practice orally and in writing), arrangement of environmental variables (e.g., arranging for instruction in a setting that allows students to focus without distractions), or the type of adult feedback and error correction a student receives. Often, a qualitative adaptation in combination with a quantitative change is necessary to meet a student's unique needs. In some cases, the diagnostic data may indicate that the student requires a different intervention program or approach.

Kelsey's story

Despite the increase in intervention length, Kelsey continued to make insufficient progress. Ms. Hayes decided that qualitative changes were also needed. Diagnostic assessment data suggested that Kelsey had difficulty applying decoding strategies to vowel teams. So, Ms. Hayes intensified her decoding instruction by (a) incorporating fluency practice of newly taught teams, with specified mastery criteria; (b) providing explicit instruction and error correction; and (c) frequently checking for retention, with reteaching as needed.

Ryan's story

Ryan's behavior team developed an intensified multi-component intervention program. This program included having teachers provide him with periodic positive attention throughout each class period. In addition, task difficulty was reduced so that Ryan was successfully completing assigned work with 95 percent or higher accuracy. Simultaneously, intensive skill instruction was provided in specific areas of deficit. Ryan also was explicitly taught strategies for appropriately initiating contact with adults and appropriately requesting help with difficult assignments. Check-ins and mentoring were continued, to provide frequent, positive interactions with adults as well as reinforcement for appropriate behavior. Ryan also began participating in a social skills group to work on goals of showing respect with appropriate language. When this intensive functional assessment-based intervention was initiated, a 10-point direct behavior rating scale was used to monitor responsiveness to intervention.

5. CONTINUED PROGRESS MONITORING, ANALYSIS, AND ADAPTATION

After revising the student's instructional program, the teacher collects additional and ongoing progress monitoring data to determine whether the student is making adequate progress toward his or her instructional or behavioral goals. The teacher continues to use these data to evaluate progress, conduct further diagnostic assessment, and adapt the intervention as needed—in iterative fashion, allowing interventionists to align intensive interventions to the student's unique learning needs.

Kelsey's story

Ms. Hayes again studied Kelsey's progress. She had improved substantially with this revised program, but her most recent four progress monitoring scores still fell below her goal line. Given this insufficient rate of progress, Ms. Hayes determined that Kelsey was not likely to achieve her goal, and another instructional change was needed. She collected additional diagnostic data to inform the instructional change and determined that Kelsey did not appear to retain skills once they were no longer the instructional focus. Thus, Ms. Hayes modified her instruction to incorporate (a) more frequent checks for retention of previously taught skills; (b) distributed practice of these skills; and (c) immediate and explicit error correction and reteaching when mistakes were observed. Ms. Hayes continued to collect progress monitoring data and found that after implementing these instructional changes for several weeks, Kelsey's performance improved enough to put her on track to meet her goal. Encouraged by Kelsey's positive response, Ms. Hayes will maintain this instructional program and continue to monitor Kelsey's progress to determine if and when additional changes are warranted.

Ryan's story

A review of Ryan's ODR and direct behavior rating data after six weeks indicated that his behavior plan was working. His ODRs decreased to an acceptable level, and he reached his goals on his direct behavior rating 90 percent of the time. Mr. Jones reported that he was making progress in his social interactions, and that he appropriately asked for help with a task at least five times daily. The intervention team determined that Ryan continued to need this level of support to be successful, so they decided to continue to implement the plan, and regularly collect and analyze progress monitoring and ODR data.

In summary, it is important to keep several points in mind when implementing or planning to implement intensive intervention with DBI:

1. DBI can require significant resources to implement successfully. If more than 3 to 5 percent of students in a school appear to need intensive intervention and DBI, this may be an indication that the core curriculum, school-wide behavior plan, or secondary interventions in place need to be improved.
2. Academic and behavioral supports do not exist in isolation, and they are most often successful when combined to meet students' needs.
3. When adapting an intervention, it is important to start small and try only one or a small number of changes or adaptations at a time. This makes it easier to be systematic in understanding the types of changes that improve the student's learning and behavior, and is more sustainable for staff.
4. Every student requiring DBI will have individual needs. The examples provided in this document are merely illustrative. In reality, the needs of each student are significant and varied, and so the DBI process that each student experiences will vary as well.

NCII's goal is to support schools and districts in building their capacity to implement DBI to improve outcomes for students with the most intensive academic and behavioral needs. Schools that are able to implement DBI effectively and sustain that implementation have the opportunity to strengthen their full tiered intervention system, benefitting not only students with the most intensive needs, but ultimately all students. We encourage you to view our website at www.intensiveintervention.org for more information, or email us at ncii@air.org with questions you may have regarding effective implementation of intensive intervention.

I've Got the Basics; Where Should I Go From Here?

The NCII library (available at http://www.intensiveintervention.org/) provides more information on DBI. In particular, we suggest that you take a look at the following resources:

- NCII's webinar series
- NCII's Intervention and Progress Monitoring Tools charts
- NCII's Ask the Expert series

References

Agodini, R., Harris, B., Atkins-Burnett, S., Heaviside, S., Novak, T., & Murphy, R. (2009). *Achievement effects of four early elementary school math curricula: Findings from first graders in 39 schools* (NCEE 2009-4052). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Al Otaiba, S., & Fuchs, D. (2006). Who are the young children for whom best practices in reading are ineffective? An experimental and longitudinal study. *Journal of Learning Disabilities, 39*(5), 414–431.

Bambara, L. M. & Kern, L. (2005). *Designing positive behavior supports for students*. New York: Guilford Press.

Capizzi, A. M., & Fuchs, L. S. (2005). Effects of curriculum-based measurement with and without diagnostic feedback on teacher planning. *Remedial and Special Education*, *26* (3), 159–174.

Center on Positive Behavioral Interventions & Supports. (2009). *What is school-wide positive behavioral interventions and supports?* Washington, DC: U.S. Department of Education, Office of Special Education Programs, Center on Positive Behavioral Intervention and Support. Retrieved from: http://www.pbis.org/common/cms/documents/WhatIsPBIS/WhatIsSWPBS.pdf

Conduct Prevention Problems Research Group. (2002). Evaluation of the first 3 years of the Fast Track prevention trail with children at high risk for adolescent conduct problems. *Journal of Abnormal Child Psychology, 30*(1), 19–35.

Deno, S. L., & Mirkin, P. K. (1977). *Data-based program modification: A manual.* Minneapolis, MN: Leadership Training Institute for Special Education.

Fuchs, L. S., Deno, S. L.& Mirkin, P. K. (1984). The effects of curriculum-based measurement evaluation on pedagogy, student achievement, and student awareness of learning. *American Educational Research Journal, 21*(2), 449–460.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research & Practice, 13,* 204–219.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1989). Effects of instrumental use of curriculum-based measurement to enhance instructional programs. *Remedial and Special Education, 10*, 43–52.

Fuchs, L. S., Fuchs, D., Craddock, C., Hollenbeck, K. N., Hamlett, C. L., & Schatschneider, C. (2008). Effects of small-group tutoring with and without validated classroom instruction on at-risk students' math problem solving: Are two tiers of prevention better than one? *Journal of Educational Psychology, 100*, 491–509.

Fuchs, L. S., Fuchs, D., Powell, S. R., Seethaler, P. M., Cirino, P. S., & Fletcher, J. M. (2008). Intensive intervention for students with mathematics disabilities: Seven principles of effective practice. *Learning Disability Quarterly, 31*(2), 79–92.

Fuchs, D., Fuchs, L. S., & Stecker, P. (2010). The "blurring" of special education in a new continuum of general education placements and services. *Exceptional Children, 76*(3), 301–323.

Fuchs, D., Fuchs, L. S., & Vaughn, S. (2008). *Response to intervention: A framework for reading educators*. Newark, DE: International Reading Associations.

Gresham, F. (2004). Current status and future directions of school-based behavioral interventions. *School Psychology Review, 33*, 326–343.

McMaster, K. L., Fuchs, D., Fuchs, L. S., & Compton, D. L. (2005). Responding to nonresponders: An experimental field trial of identification and intervention methods. *Exceptional Children, 71*(4), 445–463.

National Center for Education Statistics. (2011). The nation's report card: Reading 2011 (NCES 2012–457). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

National Center for Education Statistics (2011). *The nation's report card: Mathematics 2011* (NCES 2012–458). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

National Center on Response to Intervention. (2010). *Essential components of RTI—A closer look at response to intervention*. Washington, DC: U.S. Department of Education, Office of Special Education Programs, National Center on Response to Intervention. Retrieved from: http://www.rti4success.org/pdf/rtiessentialcomponents_042710.pdf

Stecker, P. M., Fuchs, L. S., & Fuchs, D. (2005). Using curriculum-based measurement to improve student achievement: Review of research. *Psychology in the Schools, 42*, 795–819.

Vellutino, F. R., Scanlon, D. M., Sipay, E. R., Small, S., Chen, R., Pratt, A., Denckla, M. B. (1996). Cognitive profiles of difficult-to-remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability. *Journal of Educational Psychology, 88,* 601–638.

Vaughn, S., Wanzek, J., Murray, C. S., Roberts, G. (2012). *Intensive interventions for students struggling in reading and mathematics: A practice guide*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.

Wagner, M., Marder, C., Blackorby, J., Cameto, R., Newman, L., & Levine, P., et al. (2003). *The achievements of youth with disabilities during secondary school. A report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International. Retrieved from: www.nlts2.org/reports/2003_11/nlts2_report_2003_11_complete.pdf

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International. Retrieved from: www.nlts2.org/reports/2005_04/nlts2_report_2005_04_complete.pdf

Wanzek, J. & Vaughn, S. (2009). Students demonstrating persistent low response to reading intervention: Three case studies. *Learning Disabilities Research & Practice, 24*(3), 151–163.

Wanzek, J., & Vaughn, S. (2010). Tier 3 interventions for students with significant reading problems. *Theory and Practice, 49*(4), 305–315.

Wanzek, J., Vaughn. S, Scammacca, N., Metz, K., Murray, C., & Roberts, G. (in press). *Extensive reading intervention for older struggling readers: Implications from research*.

National Center on
INTENSIVE INTERVENTION
at American Institutes for Research

1000 Thomas Jefferson Street, NW
Washington, DC 20007
Phone: 877.784.4255
Fax: 202.403.6844

This document was produced under U.S. Department of Education, Office of Special Education (OSE) Grant No. H326Q110005. Celia Rosenquist is the OSE project officer. The views expressed herein do not necessarily represent the positions or policies of the U.S. Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service, or enterprise mentioned in this publication is intended or should be inferred. This product is public domain. Authorization to reproduce it in whole or in part is granted. Although permission to reprint this publication is not necessary, the citation should be: National Center on Intensive Intervention. (2013). *Data-based individualization: A framework for intensive intervention*. Washington, DC: Office of Special Education Programs, U.S. Department of Education.

13 1450 09/18

AIR® American Institutes for Research®

IDEAs that Work U.S. Office of Special Education Programs