

Current Practice **ALERTS**

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A focus on:

**Data-Based
Individualization**

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Special Note. Unlike an intervention program, data-based individualization (DBI) is the *process* of making decisions on when and how to adjust instruction for individual students on an ongoing basis. This Research Alert provides a “use caution” rating due to the lack of multiple experimental studies investigating the combined process of DBI; however, we highlight the importance that practitioners use progress monitoring and systematic, data-based decision rules to inform instructional decision making and intervention intensification.



& Mirkin, 1984; Fuchs, Fuchs, & Hamlett, 1989). DBI can be viewed as a process for guiding instructional decisions, in which CBM plays an essential role.

For Whom Is It Intended?

DBI is for students who have minimal response to standardized and validated supplemental interventions. Analysis of student response data from controlled studies suggests that approximately 3-5% of students do not respond to such intervention programs (Fuchs et al., 2012; Wanzek & Vaughn, 2009) and may be good candidates for DBI. While this group often includes students with disabilities, it is defined by inadequate response to supplemental intervention programs delivered with fidelity. Students with persistent difficulties may require more intensive use of data and individual customization of instruction. It has been suggested that ongoing collection and use of student data to monitor progress and customize interventions ensures maximally effective interventions (Fuchs, Fuchs, & Compton, 2012). Thus, DBI guides intensification of an intervention through customization aligned with a student's unique needs.

How Does It Work?

The DBI process involves five steps, as outlined by the National Center on Intensive Intervention (NCII, 2013) as represented in **Figure 1** (on page 2). The teacher engages in an iterative process of adjusting an intervention based on students' progress data collected over time.

1. The teacher delivers a supplemental intervention program that targets the students' needs.
 - In addition to selecting a validated supplemental intervention, the teacher may customize the program for greater intensity than intended by the developers. This may include adjusting

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What Is it?

Supplemental interventions for struggling students (e.g., Tier 2 or 3) are intended to be implemented with greater frequency and duration than typical services. To do this, teachers must have adequate knowledge and skills to (a) implement a range of evidence-based interventions to address significant learning needs, and (b) use ongoing progress monitoring data to estimate students' response to intervention programs and to determine when adjustments are needed (Fuchs, Fuchs, & Vaughn, 2014; Fuchs & Fuchs, 2016). Data-based individualization (DBI) is a systematic approach to using student data to determine *when* and *how* to modify interventions for students with persistent academic difficulties (Danielson & Rosenquist, 2014; Fuchs, Fuchs, & Vaughn, 2014). This approach was developed by special education researchers, working closely with special education teachers, and led to a process of intensive intervention known at the time as data-based program modification (Deno & Mirkin, 1977). This work led to the development of curriculum-based measurement (CBM; Deno, 1985), a framework for frequently monitoring progress and using the data to adjust instruction (Fuchs, Deno,

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group size, frequency, duration, component-specific dosage, or opportunities to respond. Fidelity of implementation is monitored to ensure that the intervention is being delivered as intended.

2. Student progress is monitored on an ongoing basis.

- An appropriate tool must be selected to monitor student progress, such as CBM. Teachers determine the frequency of data collection, set an outcome goal, and engage in analysis of data to make decisions about student response (Filderman & Toste, 2018; Fuchs & Fuchs, 2007; Stecker & Lembke, 2011).

3. When data indicate the student is not making desired progress, the teacher conducts a diagnostic assessment to determine the student's specific needs and whether the intervention is meeting those needs.

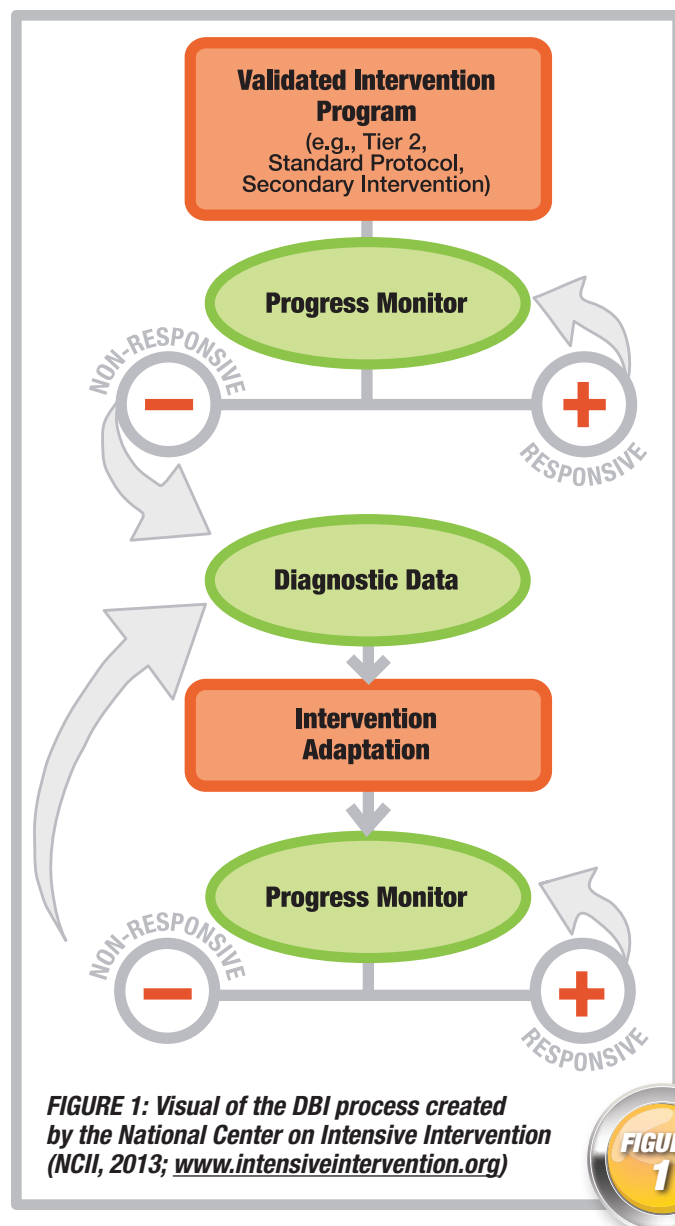
- Diagnostic assessments provide additional information about specific skills with which a student might be struggling (Coyne & Harn, 2006), as well as skills that are relatively stronger for the student. This information is used to more specifically tailor an intervention to address the students' needs. In other words, these data help teachers determine *how* an intervention should be changed. For example, diagnostic assessments might reveal the word types or spelling patterns in which a student has difficulty reading compared to those they read more accurately, or the aspects of solving a word-problem that are more problematic for a student. Diagnostic tools include error analysis of progress monitoring or work samples, skill inventories (e.g., phonics inventory), or a published tool (e.g., GMADE for mathematics or DAR for reading). Teacher-made probes may also be appropriate for gathering diagnostic information.

4. The intervention is then adapted accordingly.

- The progress monitoring data and results of the diagnostic assessment are used to determine how the intervention should be adapted to better address the students' needs. To adapt the intervention, the structure or content of the intervention may be adjusted (NCII, 2013). Structural changes include further increasing the frequency, length, duration, and teacher-student ratio of sessions; adding more time for guided practice; or slowing down or speeding up the pace of treatment based on student response (Fuchs & Fuchs, 2015). Content adjustments include increasing explicit instruction and opportunities for student response, reviewing previously taught skills, and targeting individual student needs as determined by diagnostic assessment (NCII, 2013; Vaughn et al., 2012). The taxonomy of intensive intervention can be used to guide decision making related to instructional adjustments (Fuchs, Fuchs, & Malone, 2017)

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5. The adjusted intervention is implemented, progress monitoring continues, and the process repeats.



How Adequate Is the Knowledge Base?

Recent systematic reviews have focused on the process of DBI. Jung, McMaster, Kunkel, Shin, and Stecker (2018) conducted a meta-analysis on the effects of DBI on K-12 students' academic outcomes. The researchers examined the effects of two forms of DBI in comparison to business-as-usual (BAU) instruction: DBI-only, wherein teachers used CBM data to make instructional decisions, and DBI plus, wherein teachers used CBM along with other data sources. The researchers reported significant moderate positive effects for the 14 studies in the DBI Only vs. BAU comparisons ($g = .37$), and for the 6 studies in the DBI Plus vs. BAU comparison ($g = .38$). These findings did not differ across interventions for reading, math, or spelling/writing. There were larger effects noted for studies that used teacher-development CBM (as compared to researcher-developed) and for studies that included more frequent teacher support, such as consultation. Interpretation of these findings are somewhat limited as studies provided little detail about the instructional adjustments that were undertaken in response to students' progress monitoring data.

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Filderman, Toste, Didion, Peng, and Clemens (2018) conducted a meta-analysis and synthesis of studies that used DBI within the context of reading intervention for K-12 students. Unlike Jung et al. (2019), studies were included if they used viable sources of student assessment data (including not not limited to CBM). Across 15 studies that used DBI, the researchers reported a significant weighted average effect ($g = .24$). They further isolated studies that compared the same reading intervention delivered with and without DBI to better isolate these effects. For this subset of 6 studies, a small significant positive average effect was reported ($g = .27$). A synthesis of intervention characteristics revealed that most studies reported code-focused interventions (e.g., word reading, fluency), and only 3 studies used standardized progress monitoring measures. Similar to Jung et al. (2018), the studies lacked details on how teachers used data or the nature of the instructional adjustments made within the interventions.

While the literature provides support for the systematic use of data to inform instruction, there are gaps in the evidence base related to specific steps in the DBI process. For instance, Ardoin and colleagues (2013) found that despite the wealth of literature recommending a preferred amount of data points and decision-making rules, there was a lack of empirical evidence supporting how best to make decisions within the context of DBI. Point rules (i.e., three consecutive data points above or below a goal line) and slope rules (i.e., comparing the student's rate of growth relative to the goal line) have both been recommended for decision-making, although evidence suggests slope rules may result in better decisions (e.g., Van Norman et al., 2018). It is not yet clear how many data points are necessary before making a decision (Christ, Zopluoglu, Monaghan, & Van Norman, 2013; Jenkins & Terjeson, 2011). Most recently, researchers have noted several practical considerations to promote more accurate decision making, particularly over shorter periods of time, including considering multiple sources of data (i.e., CBM and mastery measurement; VanDerHeyden & Burns, 2018), comparing the median of the three most recent CBM administrations to a goal line, and standardizing the data collection process (e.g., following scripted protocol, administering at the same time and place each day; Klingbeil, Bradley, & McComas, 2016). There is a need for further empirical evidence to inform the decision making involved in the DBI process.

How Practical Is It?

DBI is an accessible way for teachers to improve outcomes for their students with the most intensive academic needs. However, intensive intervention is resource-intensive. Successful implementation of DBI requires a substantial time investment, including time for teachers to learn how to conduct the steps for DBI and time within the school day to plan and implement the process. As a result of these time constraints, many teachers report that although they have access to a wealth of data collected on their students (Gallagher et al., 2008), they have difficulty interpreting and using these to inform their instructional decision making (Datnow & Hubbard, 2016; Means et al., 2011). Using data to make timely, informed decisions is a way to ensure that resources dedicated to interventions are being used to their maximum benefit. If teachers are provided with the time and training to support implementation, DBI presents an effective process to intensify interventions with which teachers are already familiar.

How Effective Is It?

DBI shows promise for improving student outcomes. While the effects across academic areas may seem modest, they are important because they represent improvements for students with persistent learning difficulties. For some students, many research-based supplemental interventions are simply not intensive enough to meet their academic needs. DBI provides a systematic process of intensifying interventions to ensure that instruction is responsive to student needs.

While there is a lack of experimental evidence for the DBI process as a whole, there is a wealth of evidence that supports the foundational principles of the DBI process. That is, there is evidence that aligning intervention with students' needs improves outcomes; that using CBM data to evaluate student response and following decision-making rules improves instruction; and that adapting instruction according to student response promotes improvement for students who struggle the most. Therefore, this "use caution" rating is not because this practice lacks empirical support. Rather, it is because there is a lack of experimental studies that have clearly established that DBI *causes* stronger student outcomes compared to intervention without a data-driven decision process.

What Questions Remain?

There are questions that remain about DBI as a whole, as well as the decision making involved in each step of the DBI process. First, as previously noted, there is a need for more experimentally controlled research testing the value-added effects of DBI. Studies that compare a similar researcher-controlled intervention with and without DBI would provide the opportunity for more robust causal inferences of its effects on student achievement (Filderman et al., 2018).

When considering the steps in the DBI process, there are questions related to the selection, administration, and interpretation of student progress monitoring data. Under which conditions should teachers monitor progress with CBM, mastery measures, or both? Does certain data align better with specific intervention or student characteristics? What are the best methods for setting progress monitoring goals? When making decisions about adequate versus inadequate response, how many data points are required to make a sound decision? Are decisions best made based on students' slope of improvement or most recent data points, and are there systematic decision rules that better support this process? Furthermore, considering the practicalities of DBI as a fairly time-intensive process, there is a need to better understand how to train and supports teachers in intensifying academic interventions.

How Do I Learn More?

The National Center for Intensive Intervention offers a set of professional learning modules on DBI: <https://intensiveintervention.org/implementation-support/dbi-training-series>

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These additional sources provide useful information to support implementation of DBI:

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Each *Alerts* issue focuses on a single practice or family of practices that is widely used or discussed in the LD field. The *Alert* describes the target practice and provides a critical overview of the existing data regarding its effectiveness for individuals with learning disabilities. Practices judged by the Alerts Editorial Committee to be well validated and reliably used are featured under the rubric of **Go For It**. Those practices judged to have insufficient evidence of effectiveness are featured as **Use Caution**.

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