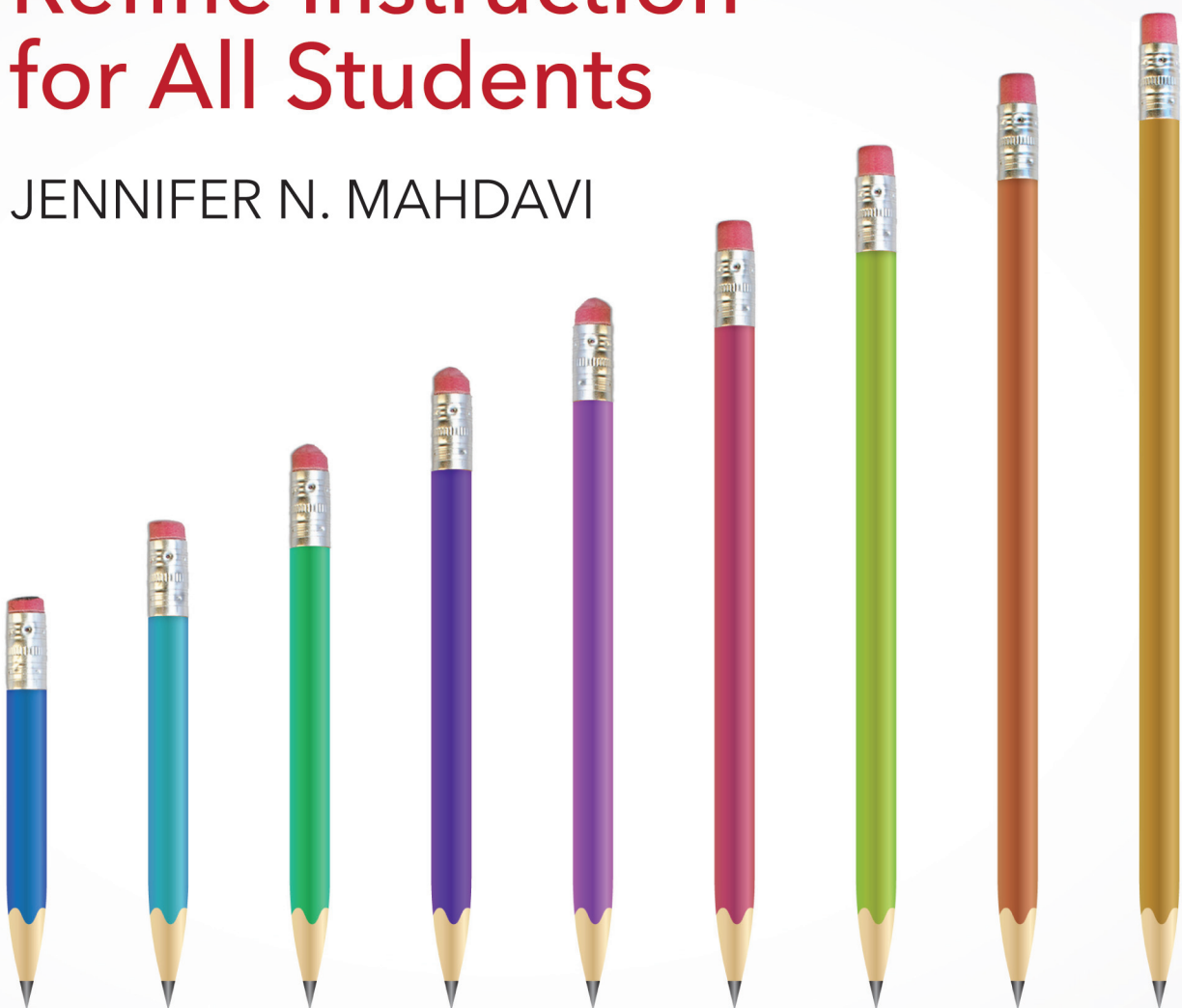
A TEACHER'S GUIDE TO

Progress Monitoring

Track Goals to Refine Instruction for All Students

JENNIFER N. MAHDAVI



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by

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with invited contributors

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Preface

Individuals with disabilities require careful approaches conducted by skilled professionals to ensure that they are learning and growing to meet their potential. Data-based decision making is a current buzzword that describes the way that teachers and specialists use assessment data to inform instructional decisions. Progress monitoring (PM) is perfectly suited to be used for data-based decision making.

This book provides a broad discussion of PM. It incorporates both academic and social or functional skills. Most texts about PM only address academic skills for students with mild disabilities; yet, it is a flexible tool that can be used for the youngest children and the oldest adults. PM can be used at all ages and for just about any skill, goal, or plan individuals wish to track. Teachers can monitor the reading fluency of very young children; speech-language pathologists can monitor the language development of children with communication disorders; specialists can monitor the street-crossing strategy of teens with cognitive disabilities; and coaches can even track the weight-loss goals of adults. PM is a tool that teachers and education-related specialists can use across many subjects and skill areas to understand student growth better and thereby teach more effectively.

PM has many applications:

- Tracking individualized education program (IEP) goals and student growth can be difficult. PM is an inexpensive and effective tool in providing evidence that IEP goals are being met, whether the goals are academic, functional, communicative, or social-emotional. All specialists on the IEP team, including special educators, school psychologists, speech pathologists, and adapted physical education specialists, may find utility in PM as a way to track whether students are meeting IEP goals set for later in the year.
- Charts and graphs generated through PM can be presented at IEP meetings and parent conferences to substantiate the growth a student has made over time.
- PM supplements the formal and normally referenced assessments that are required in special education. It is quick and ongoing, so it gives teachers and specialists week-by-week information on student progress. This formative assessment is superior to the trimester, semester, and end-of-year summative assessments that are typical and required in schools. Formative assessment is predictive of where the student will be at the end of the year and has been demonstrated to predict results of summative or end-of-year tests.

- The formative nature of PM makes service providers aware of whether progress is being made appropriately and alerts them when an instructional change needs to be made to facilitate student growth.

The tools and strategies shared in this book will make your teaching more effective by

- Teaching you the procedures for PM
- Assisting with your data-based decision making about future instruction
- Demonstrating how to use PM for functional/life skills
- Helping you find inexpensive assessment tools—or guiding you to create your own

ORGANIZATION OF THIS BOOK

Section I of this book includes the first four chapters, which provide the research foundation for using PM. They discuss how to use PM in both academic and functional settings. Task analysis is described as a method to track growth in functional, social, and advanced academic skills.

With the foundation set, the next four chapters (Section II) provide detailed instructions on how to implement PM, including how to graph results and how to use the charts to make decisions about intervention needs. As well, one chapter focuses on how to include individuals with disabilities in their own goal setting and PM. A final instructional chapter describes methods of making the entire PM process feasible for a working professional.

The next five chapters of the book (Section III) were written by special education teachers. Each one conducted a case study aligned with this book's recommendations for PM. The teachers worked with a variety of students, from an elementary-age child with intellectual disability, to a high school student with aspirations to attend an elite college, to a young man in an 18- to 22-year-old transition program. In each case, the teacher worked to help his or her student learn a necessary skill: regrouping in subtraction, reading fluency, self-regulation, delaying gratification, and choice making. These teachers not only wrote about the PM plans they implemented but also about what they learned in the process. A final chapter addresses real-world challenges of PM.

CHAPTER 1

Introduction to Progress Monitoring

LEARNING GOALS

After reading this chapter, you will be able to

- Define the term *progress monitoring* in the context of teaching and learning.
- Summarize the research-based foundations of progress monitoring.
- Identify practical applications of progress monitoring.
- Recall research that supports using progress monitoring in reading, mathematics, writing, and functional or social skills.
- Compare progress monitoring to single-subject research designs.

People who teach, coach, or provide therapy to students or clients may wonder whether their charges are making progress at an appropriate rate. To what extent is the selected instruction or intervention effective in helping an individual meet his or her goals? In special education, with annual individualized education program (IEP) reports and goals looming, the teacher or specialist needs to determine whether the student's learning trajectory will meet or exceed the goal. General educators also need to keep track of whether students will meet end-of-year learning goals, ensuring that their instruction is preparing the children for the next grade. On the one hand, if the learning curve is too flat, indicating that learning is occurring at a slow rate, as in Figure 1.1, the professional needs to change instruction in some way so that the student gets back on track. On the other hand, a steep learning slope, also illustrated in Figure 1.1, shows that the student is learning rapidly, which may mean that goals will more readily be met and that instructional methods are adequate. Relying solely on summative assessments, such as final evaluations or end-of-chapter tests, may result in failure to meet goals because these assessments do not provide clues that trouble is brewing until it is too late to remedy the problem. Formative assessments, those that are conducted on an ongoing basis, will reveal the slope of the child's learning curve. Progress monitoring (PM) is a well-developed and extensively researched method of formative assessment.

This book considers PM from three perspectives: 1) improving students' fluency in basic academic skills, 2) tracking and changing students' behaviors to be more prosocial, and 3) helping students make progress toward complex academic and functional goals via a process called task analysis. Fluency, or quick and accurate perfor-

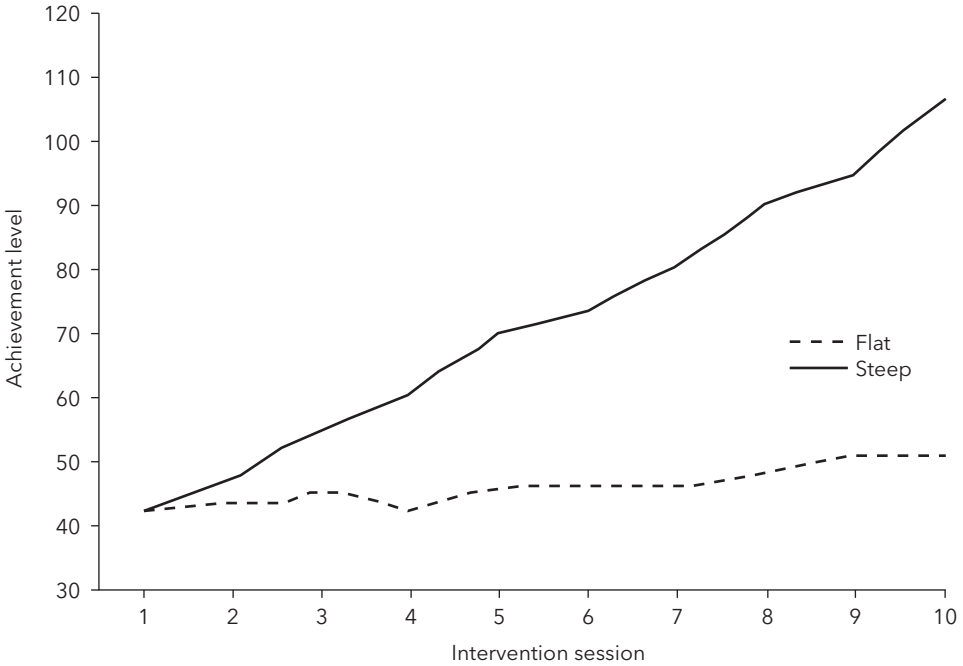

Figure 1.1. Examples of flat and steep growth lines.

mance in certain focused academic skills, is the foundation of performance on more complex academic work and thinking (Deno, 2014). Examples include orally reading text with accuracy and with appropriate rate and expression, solving basic math facts, or free writing sentences with ease. Teachers wishing to build the basic academic ability of their students will appreciate PM for its ability to assess and inform classroom instructional methods. Many kinds of disruptive or harmful behaviors can be tracked and analyzed with the goal of decreasing student engagement with those behaviors and increasing the use of prosocial ones. Functional skills, such as hand washing or using public transit, as well as complex academic strategies, such as approaches to building reading comprehension or tactics for writing a persuasive essay, can be progress-monitored through task analysis. (This process, which involves breaking down complex goals or tasks into a series of discrete steps, is discussed in depth in Chapter 4.)

Because PM can measure both fluent performance on academic skills and advancement along complex steps of a task or strategy, it is an incredibly flexible and useful tool for special educators, related services professionals (e.g., speech-language pathologists, occupational therapists), and general education classroom teachers. We can use PM procedures to benefit individuals of all ages, whether we are observing a baby making the transition from crawling to standing to walking, or tracking the weight maintenance goals of an older adult in an assisted living environment. We can monitor the level of independence with which a teenager with intellectual disability can prepare her own breakfast or the quick, accurate reading performance of a 6-year-old who is just developing literacy skills. We can observe and progress-monitor the

gains made by a young adult with autism in initiating a social interaction as well as the persistence of a social 12-year-old in keeping his attention on his work rather than playing with his friends.

Once you have mastered the essential components of PM, you will be able to keep track of nearly any conceivable skill, behavior, or accomplishment your students or clients are pursuing. You will be able to select your lessons more precisely and align them with the needs of your students, which will yield more effective instruction that leads to mastery more quickly. PM is not a miracle, but it is a powerful tool for teachers and specialists who are working with a diverse array of individuals.

PROGRESS MONITORING IN CONTEXT: OVERVIEW OF ASSESSMENT TYPES

To understand how PM developed and the purposes for which it can be used, it is helpful to examine PM in the context of other types of assessment. This section briefly reviews different ways assessment is used in educational and therapeutic settings and how PM has evolved since the 1980s.

Educators and professionals in related services use several types of assessments for different purposes, as summarized in Table 1.1. As discussed previously, assessments can be summative (measuring what has been learned) or formative (measuring ongoing learning or progress for the purpose of making changes to increase success). They can be formal standardized tests, such as state high school proficiency exams, or less formal, nonstandardized measures, such as chapter tests in social science classes or final exams in algebra. Informal assessment also includes observations of student behavior or performance, interviews with families to learn more about a student's preferences, portfolios of student work, and video capture of a student engaged in a functional task.

Some assessments are mandated by the federal or state government, such as high-stakes end-of-year tests designed to determine whether students met grade-level standards. Teachers spend significant time preparing students for these tests, the results of which are used to evaluate whether schools are effective. As well, the Individuals with Disabilities Education Act (IDEA, 2004), the federal special education law, requires that students with disabilities be assessed annually, to ascertain whether they are achieving their IEP goals, as well as triennially, to determine whether they continue to qualify for special education services.

There are other assessments that school districts and school sites insist on. School administrators may insist on a battery of benchmark testing each trimester to evaluate whether students are at grade level or struggling to learn. These assessments are often used to place students into groups in which they can receive interventions that will help them catch up to their peers.

Beyond this, there are assessments that teachers use to assign grades to students. Teachers may use grade books to track whether students turn in homework, to record the grades students earn on essays, and to monitor students' scores on group projects. These grades are entered on report cards that are then sent to families, students, and even colleges.

Perhaps the most important assessments teachers and specialists use are the informal ones that help them understand what their students' strengths are and the

Table 1.1. Assessment types and schedules

Assessment type	Definition	Examples	Schedule of use
Formal, norm-referenced assessments	Standardized tests that are administered the same way each time and compare people to their same-age peers	Woodcock-Johnson (WJ; Schrank, Mather, & McGrew, 2014) Wechsler Individualized Achievement Test (WIAT; Weschler, 2009) Vineland Adaptive Behavior Scales (Sparrow, Cicchetti, & Saulnier, 2016)	Initial individualized education program Every 3 years
End-of-year tests	High-stakes tests given at the end of the year to establish whether students are meeting grade-level standards	Summative assessments aligned with state academic standards and mandated by federal law	Annually
Screening measures (benchmark tests)	Assessments given to determine whether students require additional supports to meet grade-level standards; used to predict whether students will succeed on end-of-year tests	Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002) Renaissance Star Reading and Math (Renaissance Learning, 2015a, b)	Three times per year
Diagnostic measures	Assessments that identify areas of challenge that prevent students from learning	Brigance (French & Glascoe, 2010) Basic Phonics Skills Test (BPST; Shefelbine, 2008) Student Annual Needs Determination Inventory (SANDI; Riverside County Office of Education, Special Education Unit, 2008)	As needed At least three times per year
Informal assessments	Measures that teachers and specialists use regularly to understand student growth	Observations Interviews Checklists Portfolios Work samples	As needed Weekly Daily
Progress-monitoring probes	Assessment tools that are designed to be given quickly, that are easy to score, and that provide a basis for data-based decision making	DIBELS Renaissance Star Reading and Math (Renaissance Learning, 2015a, b) aimswebPLUS (Shinn & Shinn, 2002).	Weekly for students who need them

areas where students need more strategic intervention. Phonics screeners, math facts tests, checklists of social skills, language samples, and work products are just of few of the multitude of tools that teachers regularly use with their students. These measures are used to evaluate whether students are learning as well as what skills need to be taught next. PM is one kind of informal assessment that teachers might choose.

FOUNDATIONS: PROGRESS MONITORING AND CURRICULUM-BASED MEASUREMENT

PM is a particular kind of informal assessment. It was designed to be easy to use, and it is a powerful tool in refining instruction for struggling learners. To better understand PM, let's examine its roots in curriculum-based measurement (CBM).

PM draws from work in CBM that dates back to the late 1970s. Researchers, concerned that teachers were making instructional decisions based on unreliable or infrequent tests, which made their instruction less effective, sought methods to institute more focused data-based decision making. The earliest forays into CBM were in reading fluency, although researchers also explored spelling and writing (Deno, 1985). These tests, created by teachers and drawn directly from the curriculum in use in the classroom, were an informal method of assessment designed to be administered, scored, and analyzed simply and quickly (Deno, 2014). The results of CBM assessments were graphed and used to plan instruction for individual students, with positive results for student learning (Marston & Magnusson, 1985; Marston, Mirkin, & Deno, 1984). In short, CBM has three primary goals: 1) measuring the effects of instruction on a particular child's learning, 2) permitting teachers to make data-based decisions on whether instructional changes are needed, and 3) creating more robust educational programs for each child (Fuchs, 2017).

From the beginning, CBM was bound with the idea of PM. With multiple short probes designed to be equally difficult (Fuchs, 2017), CBM tools were meant to be administered frequently; their results were supposed to be tracked over time and used to evaluate the effectiveness of instruction (Deno, 1985; Marston & Magnusson, 1985). Evidence-based practices (EBP) are statistically effective instructional strategies for most students, but an individual practice may not be useful for the child who is sitting in front of you right now. CBM (or PM) is a way to test instructional hypotheses about whether an EBP is right for a particular person; it can be used to ensure that the instruction a teacher provides is reaching each student (Espin, Wayman, Deno, McMaster, & Rooij, 2017).

Over time, researchers began to develop more general measures of skills and abilities that were unrelated to any specific classroom curriculum. In this way, school district personnel were able to adopt assessments that would cover expected grade-level skills, regardless of whether particular instructional passages were used. The Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002) was an early commercially available measure that was designed to be easy to use, efficient, and cost effective as well as reliable and valid for measuring what it purported to measure (University of Oregon, Center on Teaching and Learning, 2020). A measure is *reliable* when it obtains consistent, stable results and *valid* when it truly assesses what it is intended to assess. The concepts of reliability and validity are discussed further in Chapter 2.) Math measures such as Accelerated Math were developed by the early 2000s, at which time researchers referred to CBM and PM interchangeably (Ysseldyke & Tardrew, 2007). These measures alleviated issues that teachers and districts faced when they attempted the difficult work of developing their own sets of tools (Deno, 2014). These measures include such tools as DIBELS (2002) or aimsweb 2006), along with others described in Chapter 2.

Academic PM is conducted with quick, short measures, many of which can be administered in 5 minutes or less (Deno, 1985; Kaminski & Good, 1996). An oral

reading fluency measure administered to an individual student for 1 minute, a math facts assessment in which students get 5 minutes to solve addition and subtraction problems, or a writing prompt in which students are given 3 minutes to write as many words as they can, are the sorts of academic PM tools that are widely available. Because these PM tools measure fluency, or how quickly students can complete the task, they are best suited to measure concrete or foundational skills; other measures are better for more complex thinking, such as reading comprehension (Fuchs & Fuchs, 1992). PM measures have great appeal and utility for teachers who are anxious to help their students reach their learning goals.

PROGRESS MONITORING APPLICATIONS

PM is perfectly suited for many applications. This book primarily discusses PM used in school or rehabilitative settings: 1) implementation of multi-tiered systems of support (MTSS), 2) determination of eligibility for special education, and 3) data-based decision making in the general-education classroom.

Multi-Tiered Systems of Support

For almost as long as there have been federally mandated special education services, researchers and policy makers have been concerned that students were being placed in restrictive settings before interventions had properly been attempted. The idea of *prereferral intervention* emerged in the middle 1980s, just 10 years after the passage of the Education for All Handicapped Children Act of 1975 (PL 94-142). Prereferral intervention activities involved a teacher or parent noticing that a student was struggling to learn and calling for a meeting with a panel of teachers and specialists. At this meeting, known by names such as a *child study team* or *student study team,* a child's teacher and his or her parents would meet with other general educators, a special education teacher, a school psychologist or other specialist, and an administrator to discuss the child's strengths and areas of struggle. The team then recommended interventions that had proved helpful for other children in the past (Chalfant & Pysh, 1989). The team would typically meet again 6–8 weeks later to evaluate whether the interventions were successful; if they were not, they would recommend new interventions and repeat the process. If, after two or three attempts to resolve issues through this process, the student was still failing to learn, the team would refer the student to the special education assessment team. This process unfortunately tended to drag on for too long and did not present any data to substantiate that interventions had been tried and failed (Mahdavi, 2000).

The reauthorization of IDEA in 2004 brought a requirement of "early-intervening services" as a means to determine whether a student needed special education services or if his or her needs could be best met in the general education classroom with additional support. This change also allowed states to provide funding for early-intervening services. Response-to-intervention (RTI) was an attempt to add accountability to prereferral intervention with a focus on screening and PM. RTI established a tiered model of support, as illustrated in Figure 1.2. The first tier is universal or core, "first and best," instruction in the general education classroom that provides benefit to most students. Students are assessed with a CBM probe three times each year as a benchmark measure; those who fail to meet established benchmarks are identified as "at risk" and provided with strategic intervention at Tier 2 (Fuchs, 2017). Further PM indicates whether Tier 2 instruction is enough to support student

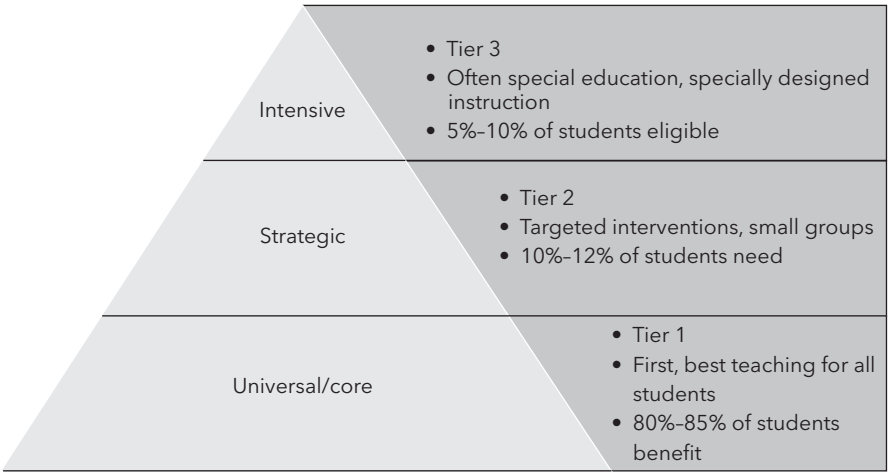

Figure 1.2. Multi-tiered systems of support (MTSS): Three tiers.

growth; students who do not respond to intervention may need more intensive and specially designed instruction, such as special education or Tier 3 services (Sugai & Horner, 2009).

Over time, the RTI model, with its focus on academic skills, expanded to include behavioral and social skills. School-wide Positive Behavior Supports (SWPBS) were developed to support the prosocial behavior of children in school settings and also followed a model of least-to-most intense interventions based in classrooms. Under SWPBS, all students in all grades receive Tier 1 typical social and behavior skills instruction about ideas such as waiting politely, raising a hand to talk, and resolving conflict with peers. Students who continue to exhibit antisocial behaviors, as evidenced by behavior referrals or other data, are then pulled aside into small groups for Tier 2 interventions to help the children learn better behavior strategies. The children who cannot successfully implement the social and behavioral skills expected pass to Tier 3 intensive behavior intervention, possibly in a special education setting (Sugai & Horner, 2009). With both RTI and SWPBS grounded in research about universal screening of students, data-based decision making using PM, and evidence-based intervention practices—all in the service of supporting student growth—it is logical to bring the academic and behavioral/social/emotional models together under the title "multi-tiered systems of support" (MTSS; Sugai & Horner, 2009). PM is a critical component of MTSS, whether the primary concern is the student's academic, social, functional, or behavioral needs.

Special Education Eligibility Determination

An early-intervening service as described in the federal Individuals with Disabilities Education Act (IDEA), RTI/MTSS employs methods that may allow educators to identify whether a student has a specific learning disability (SLD). That is to say, when ongoing PM data indicate that evidence-based interventions are not effective in producing student achievement at an expected rate, this evidence can replace or supplement other methods of determining SLD eligibility, such as discrepancy formulas (Fuchs, 2003). Under this paradigm, both effective instruction and ongoing PM are crucial not only for attempting to teach students outside of restrictive special

education services, but also for making certain that only students who truly need it are placed in a special education setting (Stecker, Fuchs, & Fuchs, 2008).

Data-Based Decision Making

The previous sections describe how PM can be used within RTI/MTSS with students who have been or may be identified as having a disability and needing special education services. PM has also trickled into use in general education classrooms as an evidence-based method of evaluating the progress of students who do not have disabilities. Teachers can and do use PM to track their students' learning and change instruction for small groups as required, without any expectation that special education may be necessary (Vaughn & Swanson, 2015). PM may be an indicator of whether the instruction the teacher is providing is effective; when the student fails to make progress, it may be as much a mismatch between the instruction and the student's needs as it is evidence that the student is not learning. For example, many children can rapidly learn sight words in reading that propel them to excellent reading fluency; some children, however, do not readily learn sight words and require instruction in phonics instead. Ongoing PM has been used successfully to inform instruction in general and special education classrooms (Fuchs, 2003; Stecker et al., 2008; Tindal, Nese, Stevens, & Alonzo, 2016; Ysseldyke & Tardrew, 2007).

PROGRESS MONITORING AS EVIDENCE-BASED PRACTICE

With a growing emphasis on selecting and using *evidence-based practices* in classrooms and educational settings, it is important to consider whether PM has an adequate evidence base to recommend it. In the past, everyone discussed what research supports, but "research" refers to the findings of one study at a time. Perhaps you have noticed media reports about research findings; one day, the reporting is that chocolate will help you live a longer, happier life, but the next you hear about another study that warns that eating chocolate causes heart disease and diabetes. Each of these studies supports its position as a "research-based practice."

A *promising practice* is one that has preliminary studies to support it. In such a case, a practice or intervention has been tested, and early results indicate that this practice could be very effective. Additional research is necessary to raise a practice from promising to evidence based.

An EBP takes a research-based or promising practice several steps further. An EBP is established when a preponderance of research findings, conducted by multiple research teams, point in the same direction. The research designs may be single case or group and must compare a control condition to an experimental one so that researchers can logically conclude that the intervention under study actually causes the change in performance. As well, a large number of high-quality, peer-reviewed studies—conducted in different areas of the country by different research teams—must yield similar results. The effects of the intervention, when compared across many studies, must also demonstrate statistical significance (Cook & Cook, 2013).

A practice is not recommended when only one study found it to be effective; many studies, all adhering to exacting experimental procedures, must have been peer reviewed and published to create an evidence base. It is a high standard to meet. The following sections provide support for PM as an EBP in a variety of academic, behavioral, and functional areas.

RESEARCH ABOUT PROGRESS MONITORING IN ACADEMIC AREAS

Research about PM in academic areas is being conducted on an ongoing basis. This research is the most advanced in reading, with mathematics and writing gaining attention. There is also emerging literature about using PM in content areas such as science and social science. Basic reading and math skills for young children are among the most commonly studied areas of PM, but applications of PM for middle and high school students are in development. English language learners (ELLs) and students with disabilities are of particular interest to researchers, too. This section explains how PM has been used to measure students' academic skills.

Reading

Research on the uses of PM of basic reading skills is more advanced than research on other content areas. This research has been conducted across many grade levels with many kinds of students. Overall, it reveals that children with or without disabilities, as well as ELLs, generally make greater progress in reading when teachers implement ongoing PM.

The DIBELS Phoneme-Segmentation Fluency (PSF) and Nonsense Word Fluency (NWF) measures have excellent predictive validity for the reading ability of kindergarten students, according to one study, that supports the notion that PM tools are useful for planning instruction (Oslund et al., 2012). A review of the literature revealed that PM in reading was also helpful to differentiate instruction effectively for ELLs; the researchers strongly recommended using the procedures with these individuals (Fien et al., 2011).

In another study of reading under the RTI model, researchers used PM to place students in Tier 2 or 3 intervention but found that they were unable to bring the students to grade level or prevent future struggles in reading (Gilbert et al., 2013). Of note, in this study PM was only conducted every 7 weeks, which did not allow researchers to quickly detect continuing struggles or change the interventions being used. However, in a study of fourth-grade students in which students were offered instruction that was differentiated according to their needs, the students showed growth on PM measures and growth in their reading ability overall (Jaeger, 2016). Indeed, in another study, third- through fifth-grade teachers who used PM frequently to diagnose and intervene with specific reading difficulties saw their students make more progress than those who used PM less consistently (Tindal et al., 2016).

Mathematics

Although mathematics has gotten less attention from researchers than reading has, PM in mathematics is cited as a critical element of the MTSS process (Lembke, Hampton, & Beyers, 2012), as it is in reading. Similar to research in other areas of basic academic skills, more studies have focused on the earlier grades than later ones.

One such study found that 10 elementary-age students were able to raise their standardized math test results approximately two grade levels (from fourth to sixth) due to their teacher's use of daily and weekly PM in basic computation skills, along with data-based decision making about what they needed to learn next (Weisenburgh-Snyder, Malmquist, Robbins, & Lipshin, 2015). Another found that third- through sixth-grade teachers who used PM regularly were more likely to differentiate instruction for their students; in turn, their students made better

progress than other students and expressed more confidence about math as a result (Ysseldyke & Tardew, 2007).

Higher grade mathematics classes have also been studied. General education eighth-grade math teachers were able to use PM data provided to them as part of their implementation of a particular math curriculum to determine which students needed greater support in solving problems, with the result being increased progress for those students (Montague, Enders, & Dietz, 2011). In developing a PM tool for algebra, Foegen, Olson, and Impecoven-Lind (2008) considered the need for items that assessed basic algebra skills as a predictor of more complex ones, as well as items measuring the skills that are the foundations of algebra, such as solving expressions, graphing, and using exponents. Teachers who participated in developing the tool called for immediate access to scores and PM graphs so they could be used to plan further instruction (Foegen et al., 2008). Years later, teachers who received professional development in how to administer and analyze PM in algebra were able to identify and intervene with students who were not keeping pace with their peers (Lyons et al., 2019).

Writing

Because written expression encompasses a complex set of skills, from penmanship and spelling to grammar and mechanics, along with cohesiveness and creativity, research about PM in writing has lagged behind other areas. A meta-analysis of high-quality studies that used CBM to monitor progress in writing revealed limited success as a result of the practice (Graham, Hebert, & Harris, 2015). Researchers who used CBM to track writing performance in terms of variables such as total words written, correct word sequences, and words spelled correctly found that the students in their study demonstrated variable performance over time as well as less progress than anticipated in their writing ability. They concluded that CBM as a measure of writing ability is complicated by a variety of factors, such as the choices of writing prompts, the subjectivity of evaluation, and the limited opportunities to collect data (Costa, Hooper, McBee, Anderson, & Yerby, 2012). However, even though PM in writing is a complicated issue, researchers have successfully established the reliability and validity of some such measures, including their ability to predict the writing skills growth of first-grade students (Hampton & Lembke, 2016).

Despite the evolving state of PM in writing, studies show that the tools are promising. In one study (Pyung-Gang, McMaster, & delMas, 2017), CBM was used to track writing progress in variables similar to those selected by Costa and colleagues (2012), but the data collected were also used to inform and change instructional choices. This study revealed that students in the intervention condition did better than those who did not receive data-based instruction. In another study (McMaster et al., 2019), elementary teachers were given professional development in the use of CBM to make data-based instructional decisions as well as support in developing their use of EBPs for writing. Extensive analyses concluded that these teachers were more adept at collecting and using data to guide their writing instruction than their peers who did not participate in professional development. Also, their students with significant deficits in writing ability made greater gains in their skills than did their peers whose teachers did not receive professional development.

In the area of PM for writing skills, research is still evolving. Nevertheless, researchers recommend that teachers use error analysis along with an evaluation of the numeric results of CBM in writing to decide which instructional strategies to try

as well as to monitor whether students, even those in kindergarten or first grade, are making progress (Dombek & Al Otaiba, 2016).

BEYOND ACADEMICS: PROGRESS MONITORING FOR FUNCTIONAL AND SOCIAL SKILLS

As noted, much of the research conducted to date about PM has been in the arena of academic skills, predominantly in reading but increasingly also in writing and mathematics. One web site that reviews assessment tools included only 17 behavioral-social instruments, compared to hundreds measuring academic skills (Miller & Fabiano, 2017). Where does this leave teachers of students who are developing behavioral or functional life skills? Educators and related services professionals who are seeking research about behavioral and functional interventions may not find results when they search the term *progress monitoring.* However, the concept of PM is nevertheless relevant to these interventions.

Interventions to address functional, behavioral, and social skills emerged from the field of applied behavior analysis (ABA). ABA is a branch of behavioral psychology focusing on the study of environmental circumstances and reinforcing conditions around behavior so that interventions can be undertaken to improve the social situations of individuals and organizations. This field has a long history of taking data about functional and social skills and using it to inform future interventions (Cooper, Heron, & Heward, 2020). When the ABA field was in its infancy, Baer, Wolf, and Risley (1968) asserted that it was an effective method of selecting and implementing interventions to change behaviors because it carefully measures the effect that each intervention has on the behavior of interest. Single-case (or subject) research designs are most commonly used in ABA. In a single-case research design, each subject or individual serves as both the intervention group and the control group. The procedures used and graphs created are similar to those generated through PM.

Teachers and specialists collect PM data to evaluate whether students are developing functional or behavioral skills and then analyze patterns in those data to determine whether the progress is acceptable or whether instructional strategies need to be changed (Browder, Wood, Thompson, & Ribuffo, 2014). Examining research in ABA and related fields reveals parallels between the academic and functional interventions described; each is a form of PM.

Research Designs

Most people are familiar with group research designs. In research conducted with groups, one group of individuals typically is given an intervention, the effect of which is compared with results from a similar group of individuals who did not receive that intervention. In other words, if members of one group received an experimental treatment and members of another group did not, comparing the two groups allows researchers to determine if the intervention had a statistically significant effect.

This sort of research is often seen in medical studies, in which one group of patients takes a drug that theoretically has the potential to cure their illness, while another group of patients who are similarly ill receives a placebo. A few years ago, many people were delighted to read studies that showed that people who ate chocolate (intervention group) were less likely than those who did not (control group) to develop diabetes (Matsumoto, Sesso, Gaziano, & Djousse, 2013), have a stroke (Larsson,

Virtamo, & Wolk, 2011), or suffer heart failure (Petrone, Gaziano, & Djoussé, 2014). Reaching these conclusions required studying hundreds, if not thousands, of people. The results of these studies are based on statistics and provide broad recommendations only; there are always some people who receive a research-based intervention without experiencing the average effects enjoyed by the larger group. Group research results may reliably predict the outcome for most people, but they will never apply to everyone; there will be a number of people who eat lots of chocolate but still develop diabetes, have strokes, or experience heart failure. Furthermore, group research is difficult to conduct among individuals with severe disabilities because the prevalence of such individuals in the population is so low that it is difficult to find enough participants to form a group. Thus, research conducted using group designs is useful but has some intrinsic limitations.

Single-case (or subject) research design is not as widely understood as group-designed research, but the individual design has great applicability when a teacher or specialist wishes to find the right intervention strategy for a particular individual. It is also the most common research design when studying interventions for individuals with severe disabilities. In single-case research, each subject or individual serves as both the intervention "group" and his or her own control. We assess the individual to ascertain his or her baseline or current performance level, and then we apply an intervention to see if we can change that level (Cooper et al., 2020). In a theoretical chocolate example, we might compare one person's blood pressure during a period of chocolate eating to the same person's blood pressure during a similarly long period not eating any chocolate in order to determine how that person's blood pressure is affected by eating chocolate. Single-case research measures one behavior or skill exhibited by one individual, repeatedly and over time, to examine the effects of intervention; the baseline (or preintervention) ability is compared to the results after the intervention has been implemented (Cook & Cook, 2016).

As a hypothetical example of single-case research, suppose a specialist working with a 16-year-old with intellectual disability wishes to help the client become more independent by helping him maintain his attention to his work for a longer period of time. Before implementing any sort of intervention, the specialist records the length of time that the client maintains attention to a task for several work sessions. (This is the baseline, or control, measure of ability.) When it seems that a consistent baseline of attention to the task has been determined, the specialist teaches the client to ask himself, "Am I doing what I am supposed to be doing?" as a way of reminding himself to return to the task. At that point, the specialist spends several sessions reviewing the strategy and recording the client's time on task to see if it has lengthened. (This is the intervention measure of ability.)

In this case, it is irrelevant whether the self-reminding strategy effectively helps a majority of the population to increase their attention to a task; the client is the only person whose performance matters. If the specialist's intervention works for most people but not for this person, then the experiment failed and a new strategy must be tried. Likewise, even if the intervention does not work for everyone, it is still worth using if it happens to be effective for this particular person.

Single-Subject Research and Evidence-Based Practices

Single-subject research is becoming more widely used in special education and related professions because of its focus on the individual needs of students and cli-

ents (Courtade, Test, & Cook, 2014; Horner et al., 2005). Examining how theoretical interventions can be applied scientifically for the benefit of individuals is a strength of single-subject research that is not as readily found in group designs (Kourea & Lo, 2016). Indeed, in reviewing studies to determine EBPs for teaching academic skills to individuals with significant disabilities, a group of researchers only considered single-case–designed studies (Spooner, Knight, Browder, & Smith, 2012). Professional organizations such as the National Reading Panel and What Works Clearinghouse have established guidelines for what constitutes EBP when it is studied via single-subject research, with up to nine studies conducted by at least two different teams of researchers being touted as evidence (Lanovaz & Rapp, 2016). The fact that such organizations are willing to consider single-case studies as a way to establish the evidence base for a practice highlights the legitimacy of this research method.

Changing Behavior With Progress Monitoring

A plethora of studies has been conducted that highlights the ways in which single-case research has been used to improve the behavior of teachers and students alike. It is the perfect research method for formative assessment and curriculum development (Kourea & Lo, 2016). One study involved researchers coaching a teacher of children with emotional/behavior disorders to provide more opportunities to respond as well as to give more praise. Not only did the teacher in this study give students more chances to respond and more praise, but the students also demonstrated more on-task behavior (Sutherland, Alder, & Gunter, 2003). In another, four mothers of children with autism were taught how to best intervene in their own child's behavior. In each case, the child's problem behaviors decreased after the interventions tailored to their needs were implemented (Crone & Mehta, 2016).

Developing Functional or Life Skills With Progress Monitoring

Single-case–designed studies are prevalent in the research literature describing how to teach individuals with disabilities to more independently use functional or life skills. Preschool-age children with autism and intellectual disabilities were taught to use social skills such as responding to their names and delaying gratification. Researchers collected PM data to track the children's ability to successfully engage in the behaviors being taught, leading to increases in the desirable behavior (Falligant, & Pence, 2017).

In one study, cooking skills were taught to two teens with intellectual disabilities. Researchers compared the impact of two different instructional strategies, video prompting and video self-modeling, on each student's independence in following a recipe. By charting the level of independence each teen displayed under each condition, researchers were able to ascertain the better method of instruction for each individual (Taber-Doughty et al., 2011).

In another study, two young men with intellectual disabilities were taught to independently find items in the grocery store. Researchers tested the effectiveness of three kinds of prompts (picture, auditory, and video) with each young man to determine which kind of prompt would most effectively lead to the location and retrieval of the correct grocery items. With the proper prompt style identified, each man increased his independence in finding items while also decreasing the time required to do so (Bouck, Satsangi, & Bartlett, 2017).

In still another study, therapists worked with two different young children with autism to decrease their disruptive vocal or physically aggressive behaviors; the graphs generated during sessions were effectively used to determine when the communication intervention being implemented needed to be changed. By looking at the graphs, therapists were able to decide when it was time to put the next level of the intervention in place. As a result, each child demonstrated decreased inappropriate behavior, which helped increase the children's integration in the community (Rose & Beaulieu, 2019).

The research discussed here provides examples that illustrate how PM has been used to support the teaching and learning of a variety of daily living, social, or functional skills. Studies involving a wide variety of activities, instructional settings, ages, and ability levels clearly have demonstrated the efficacy of PM in shaping student success. There are many possibilities that a teacher or specialist can pursue in the arena of PM for functional, behavioral, or social skill development.

CONCLUSION: WHY USE PROGRESS MONITORING?

PM is an effective EBP for increasing student learning through the data-based selection of more efficacious instructional strategies. When teachers and specialists use this practice regularly and with fidelity, they are able to evaluate the instruction they delivered and determine whether the student is making expected progress (Espin et al., 2017). If the data depicted on a graph indicate that the student is not growing appropriately, the teacher knows it is time to change ineffective instruction immediately, rather than wait for the student to fail later (Alnahdi, 2015). This nimbleness is especially important when working with individuals who are performing far below expected levels; they do not have time to waste engaging with unproductive instruction. Every moment matters!

Not only can PM increase an individual's learning, but its sensitivity and frequency can also reveal subtle changes in student performance that are often difficult to detect using summative assessments. Many individuals with more severe disabilities make progress at rates that might seem glacial when compared with the progress made by others. The improvements they make can be nearly impossible to perceive based on observation alone. Properly conducted PM, in which outcomes are measured narrowly, can illuminate the tiniest advances in ability.

Given all of the research highlighting the utility of PM, maybe the real question is this: Why would you *not* use it?

CHAPTER 1 EXERCISE

Consider your own classroom or clinical setting. Based on what you learned in this chapter, which area of PM is most interesting to you? Why?

"An excellent resource and training tool for special educators . . . Dr. Mahdavi provides sound reasoning and pragmatic suggestions about how easily [data collection] can become part of a teacher's daily practice."

—Melinda Susan, M.A., NCSP, Director, South County Consortium, Adjunct Faculty, Sonoma State University

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- Monitor student progress toward academic, behavioral/social, and functional goals
- Create clear, easy-to-read graphs of your data
- Analyze data to make the best, most informed instructional decisions
- Select evidence-based practices to accelerate your students' progress
- Involve students with and without disabilities in monitoring their own progress
- Use PM to monitor progress toward IEP and 504 goals
- Manage your time and materials efficiently

Includes practical materials!

End-of-chapter exercises, visual examples, and handy downloadable forms give readers the tools they need to conduct effective progress monitoring in their own classrooms.

Ideal for educators in K–12 classrooms—but also applicable to preschool and transition programs—this urgently needed guide is your key to using PM to comply with federal mandates, refine your teaching, and help every learner achieve success.

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