Journal of School Psychology xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of School Psychology

journal homepage: www.elsevier.com/locate/jschpsyc

Comparison of progress monitoring data from general outcome measures and specific subskill mastery measures for reading☆

Ethan R. Van Norman[a,*], Kathrin E. Maki[b], Matthew K. Burns[c], Jennifer J. McComas[d], Lori Helman[d]

[a] Georgia State University, United States
[b] Ball State University, United States
[c] University of Missouri, United States
[d] University of Minnesota, United States

ARTICLE INFO

Action Editor: Laura Pendergast

Keywords:
Progress monitoring
Curriculum-based measurement
Specific subskill mastery measurement

ABSTRACT

Interventionists often monitor the progress of students receiving supplemental interventions with general outcome measures (GOMs) such as curriculum-based measurement of reading (CBM-R). However, some researchers have suggested that interventionists should collect data more closely related to instructional targets, specific subskill mastery measures (SSMMs) because outcomes from GOMs such as CBM-R may not be sufficiently sensitive to gauge intervention effects. In turn, interventionists may prematurely terminate an effective intervention or continue to deliver an ineffective intervention if they do not monitor student progress with the appropriate measure. However, such recommendations are based upon expert opinion or studies with serious methodological shortcomings. We used multi-variate multilevel modeling to compare pre-intervention intercepts and intervention slopes between GOM and SSMM data collected concurrently in a sample of 96 first, 44 second, and 53 third grade students receiving tier 2 phonics interventions. Statistically significant differences were observed between slopes from SSMM consonant-vowel-consonant words and CBM-R data. Statistically significant differences in slopes were not observed for consonant blend, digraph or consonant-vowel-consonant-silent e (CVCe) SSMMs. Results suggest that using word lists to monitor student response to instruction for early struggling readers is beneficial but as students are exposed to more complex phonetic patterns, the distinction between SSMMs and CBM-R become less meaningful.

1. Introduction

Interventionists often use curriculum-based measures (CBM; Deno, 1985) to monitor the progress of students receiving supplemental reading intervention. Oral reading fluency (ORF; often referred to as CBM-R) is one of the most commonly used CBM approaches to monitor student progress because the number of words a student reads correctly in one minute (WRCM) is strongly related to general reading proficiency (Fuchs, Fuchs, Hosp, & Jenkins, 2001) and this relationship is robust for students in first through sixth grades (Dynamic Measurement Group, 2010). Several characteristics of CBM-R have led to its popularity for monitoring student response to supplemental reading intervention within multitiered systems of support and response to intervention (Gersten et al., 2009). CBM-R is a useful tool because it is a robust indicator of performance on high-stakes reading measures (Reschly, Busch,

☆ Author Note: Data presented in this paper were collected as part of the Path to Reading Excellence in School Sites, which was funded by the Target Corporation.
* Corresponding author.
E-mail address: evannorman@gsu.edu (E.R. Van Norman).

https://doi.org/10.1016/j.jsp.2018.02.002
Received 1 March 2017; Received in revised form 10 November 2017; Accepted 19 February 2018

Betts, Deno, & Long, 2009; Wayman, Wallace, Wiley, Ticha, & Espin, 2007), but takes less time to administer and score than traditional reading measures, thereby limiting the amount of instructional time students miss because of assessment (Shinn, 2008). Multiple alternate forms are available so that progress can be measured continuously. Finally, data from CBM-R are easy to interpret and decision rules have been developed to help guide treatment decisions (Ardoin, Christ, Morena, Cormier, & Klingbeil, 2013; Deno, 1986).

Despite the strengths of CBM-R as a progress monitoring tool, researchers have noted limitations in its utility to inform appropriate reading interventions. CBM-R is often referred to as a general outcome measure (GOM) because it is thought to provide a global index of a student's current level and degree of improvement in reading proficiency. The process of reading connected text with sufficient accuracy and fluency requires the coordination and simultaneous execution of a number of lower order component skills (Fuchs et al., 2001). Therefore, CBM-R does not shed light on the specific subskill problems that may be preventing the student from reading grade level text with sufficient accuracy and speed. Investigations into the capacity of CBM-R passages to highlight specific student errors in order to provide relevant information as to the specific subskills a student is struggling to master are limited (Parker, Hasbrouck, & Tindal, 1992). Work has been done to determine whether students ought to receive fluency- or phonics interventions based upon their performance on CBM-R (Burns, Haegele, & Petersen-Brown, 2014; Fuchs, Fuchs, Hosp, & Hamlett, 2003). However, distinctions beyond that, such as which specific phonetic patterns students are struggling to master, have yielded inconsistent results (Hosp & Fuchs, 2005) or are not informative for monitoring response to instruction (Flynn, Hosp, Hosp, & Robbins, 2011).

Researchers have expressed concern about the degree to which CBM-R and other GOMs are sensitive to improvement in more narrow reading skills (Shapiro, 2010). To illustrate, consider a situation in which a student is receiving supplemental support for a targeted phonics skill such as decoding consonant blends. The student might very well be improving in their ability to blend consonants but still not show a large degree of improvement on the WRCM metric by virtue of having not mastered other phonetic patterns. Therefore, the interventionist may incorrectly conclude that the current intervention is not working when in reality the instrument is not sufficiently sensitive to the student's rate of improvement in the targeted skill. Moreover, decisions based upon limited CBM-R data (less than 12–14 observations across three months) often yields inaccurate decisions regarding student progress (Christ, Zopluoglu, Monaghen, & Van Norman, 2013). The precision of CBM-R growth estimates depends upon the number of datapoints collected, variability of observations, and duration of data collection (Christ, 2006). Thus, direct measurement of targeted intervention subskills may provide an indication of student responsiveness to intervention within a shorter amount of time than CBM-R data.

1.1. Specific subskill mastery measurement

In contrast to GOMs, interventionists and researchers may use specific subskill mastery measures (SSMMs) to monitor student improvement in more targeted skills. If a student was receiving an intervention targeting consonant blends, a measure may include a word list of all relevant blends the student is expected to master in their curriculum in a random order. The proportion of correct responses in one minute could be calculated as with CBM-R and the intervention may continue until a student achieves a predetermined accuracy or fluency criterion on the SSMM.

Deno and Fuchs (1991) detail key differences between SSMM and GOM approaches to monitoring student progress. SSMM is based on an established skill hierarchy. After a student masters one skill, they progresses to the next skill in the hierarchy and a measure directly aligned with the new targeted skill is used to monitor that student's progress. However, hierarchies and the measures directly tied to them often lack empirical support for the order that skills are introduced, and the psychometric properties of the instruments used to measure progress. In a similar vein, Deno and Fuchs (1991) argued that SSMMs, with continual shifts in measurement, cannot be used to assess generalization or retention of skills.

Conversely, GOMs such as CBM-R require the student to demonstrate the same behavior even as instructional targets shift. Thus, educators are able to continuously assess retention and generalization of previously learned skills and compare the effects of different instructional programs in an idiographic manner (Deno, 1986, 1990). Further, in contrast to SSMMs, GOMs have an established line of research documenting their psychometric characteristics. Similarly, the manner in which data from GOMs are collected, scored, and interpreted has been developed and refined based upon a long line of research (see Deno, 1985; Shinn, 1989).

1.2. Current recommendations

Presently, researchers recommend collecting data from both types of measures concurrently to monitor student progress (Ball & Christ, 2012; Shapiro, 2010). Doing so enables researchers to simultaneously gauge whether a given intervention is sufficiently remediating a targeted skill, determine whether the student is retaining skills from previous interventions, and whether they are making adequate progress toward a meaningful long-term goal. However, there is a startling paucity of research that has evaluated the degree to which the magnitude (i.e., slope) of growth estimates from each type of measure differs in the presence of a common intervention. It is unclear for instance whether the rate of improvement on a given SSMM within a given timeframe is significantly greater than or less than the rate of improvement based upon GOM data collected concurrently. In turn, one cannot be certain that different conclusions would be reached regarding whether an instructional change should be made depending on the metric used to evaluate progress.

The majority of recommendations and justifications for collecting both sources of information have been based on expert opinion (e.g., Ball & Christ, 2012; Shapiro, 2010). However, studies that serve as the basis for those opinions, examples of which we review in the next section, did not always evaluate or compare student growth. Further, as we briefly summarize, many of the studies that have