



TECHNICAL REPORT #20:

Characteristics of Reading Aloud, Word Identification, and
Maze Selection as Growth Measures: Relationship
between Growth and Criterion Measures

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Note: Data set and data collection procedures are the same for Technical Reports #17, #18, #19, and #20.

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The purpose of this study was to compare the characteristics of reading aloud, word identification, and maze selection as growth measures with performance on criterion measures. The following research question was addressed: Which weekly progress monitoring measures in reading (reading aloud or maze selection) are related to other measures of reading?

Method

The participants, setting, CBM measures, and procedures are the same as found in Technical Reports #17, #18, #19, and #20. See Technical Report #17 for complete details on participants, setting, CBM measures, and procedures.

CBM Measures

The CBM measures used in the present study consisted of grade level reading aloud (1 min) and maze selection (2 min) passages. See Technical Report #17 for more details on the reading aloud and maze passages.

Criterion Measures

The criterion measures used in the present study consisted of the Comprehensive Reading Assessment Battery, the Minnesota Comprehensive Assessment II, the Gates McGinitie, and end of the year CBM reading performance.

Comprehensive Reading Assessment Battery. The Comprehensive Reading Assessment Battery (CRAB; Fuchs, Fuchs, & Maxwell, 1988) was administered to students in Grade 1. The CRAB requires students to read a folktale passage out loud for 3 min. and answer 10 open-ended comprehension questions immediately after reading the passage. The examiner stops administering the test after the student makes 5 consecutive errors. The number of correct responses was used in the analysis.

Minnesota Comprehensive Assessment II (MCA-II). The MCA-II (Minnesota Department of Education, 2006) is a statewide, criterion-referenced test given to all students in grades 3-8 and students in grade 10. The reading portion of the MCA-II requires students to read passages, answer multiple choice questions, and provide constructed responses. Students in Grade 3 are given 5 – 6 passages (degrees of reading power [DRP; Bormuth, 1966] ranging from 40 – 56) and are required to answer 38 multiple-choice questions and provide 2 constructed responses. Students in Grade 5 are given 5 – 7 passages (DRP ranging from 44 – 62) and are required to answer 41 multiple-choice questions and provide 2 constructed responses. The questions fall into four reading sub-strands: 1) reading and literature, 2) vocabulary expansion, 3) comprehension, and 4) literature. Three cognitive levels are used to categorize the questions: A) knowledge, B) understanding, and C) application, analysis, synthesis and evaluation. For students in Grades 3 and 5, 35 – 45% of the questions fall into Level A, 35 – 45% of the questions fall into Level B, and 10 – 20% of the questions fall into Level C. The raw scores were converted into scale scores for the analysis.

Gates-MacGinitie Reading Tests Fourth Edition (GMRT). Study participants in the ninth grade completed the Comprehension subtest of the Level 7/9 of the GMRT. The GMRT (MacGinitie, MacGinitie, Maria, & Dreyer, 2002) is series of standardized, paper-and-pencil, multiple choice tests of reading achievement. The proctor reads the standardized directions, which include sample questions for each test. For the Comprehension test, participants read passages and then answer multiple choice questions about the passages. Some questions ask students to recall information stated in the text, while other questions require that students make inferences from the text. The Comprehension test includes 11 narrative and expository passages and 48 questions, and participants are allowed 35 minutes to complete the test. Students read the

questions from a test booklet and mark their response on an answer sheet. The difficulty level of the questions on the GMRT progresses from easy in the beginning to very difficult at the end. Each level test of the GMRT is designed to accurately measure performance across a range of reading levels.

The GMRT was standardized in fall 1998 and spring 1999 using a stratified random sample with regard to geographic region, district enrollment, and district socioeconomic status (MacGinitie, MacGinitie, Maria, & Dreyer, 2002). Approximately 3,600 ninth-grade students taking level 7/9 of the GMRT participated in the standardization. Kuder-Richardson Formula 20 (K-R 20) internal reliability coefficients were .92 and .93 for the raw scores of ninth-grade students who took the Level 7/9 test in the fall and spring, respectively (Form S). Test-retest reliability coefficients were .90 for vocabulary, .74 for comprehension, and .88 for the total score, for 237 ninth-grade students who took level 7/9 in both the fall and spring (Form S).

Correlations between scores on the Third Edition of the GMRT and other reading tests were high; the relationship between scores on the Fourth Edition and other reading tests was not examined (MacGinitie et al., 2002). The standard scores on the GMRT was used for the analysis.

End of year CBM performance. During the 17th week, three grade level passages were administered to all students in both reading aloud and maze format. The Grade 1 passages were selected from the Edcheckup website (www.edcheckup.com; Children's Educational Services, 1987), Grade 3 and Grade 5 passages were selected from passages created at Vanderbilt University (Fuchs, Fuchs, & Hamlett, 2002), and Grade 9 passages were taken from the Star Tribune and modified with permission (Espin, Wallace, Lembke, Campbell, & Long, 2009). The passage length ranged from 207 – 214 words for Grade 1, 409 – 427 words for Grade 3, 394 – 470 words for Grade 5, and 571 – 1129 words for Grade 9. The Flesch-Kincaid Grade Level

readability for the end of the year CBM passages ranged from 0.3 - 0.8 for Grade 1 passages, 1.0 - 1.8 for Grade 3 passages, 2.0 – 4.3 for Grade 5 passages, and 5.3 – 6.4 for Grade 9 passages.

The mean and median score across the three passages was used for the analysis.

Procedure

CBM measures. (Taken from TR #17) CBM data were collected across 12 consecutive weeks starting in January, 2006. Half of the students at each elementary grade level were administered reading aloud at the beginning of the week and maze selection at the end of the week, and the other half of the students were administered maze selection at the beginning of the week and reading aloud at the end of the week. All high school students were administered maze selection at the beginning of the week and reading aloud at the end of the week due to scheduling issues. Students at each grade level received all reading passages in the same order across the 12 weeks. Ninth graders were not administered reading aloud during the 3rd week of the study due to scheduling difficulties.

Criterion measures. The end of the year CBM measures were administered to all students during the 17th and 18th week of the study. The reading aloud and word identification measures were administered by the same trained graduate students who administered the measures during the 12 consecutive weeks. The maze selection measures were administered by the classroom teachers. The CRAB was administered during Week 1 and Week 12 of the study by the same graduate students who administered the weekly CBM measures. The MCA-II was group administered to 3rd and 5th graders by the district during the spring. The GMRT was administered to 9th graders by two trained graduate students in the spring.

Analysis

For all analyses, students in Grade 2 ($n = 10$) were included in the same group as students in Grade 3 and students in Grade 4 ($n = 6$) were included in the same group as students in Grade 5. This decision was made based on the fact that there were two classrooms that combined grade levels (one Grade 2/3 split and one Grade 4/5 split) and the classroom teachers reported that there was no differentiation in reading instruction based on grade level within the classroom. Students in Grade 2 were receiving the same reading instruction as students in Grade 3 and students in Grade 4 were receiving the same reading instruction as students in Grade 5.

The ordinary least squares (OLS) based on each student's CBM score was used to calculate the slope and intercept for individual students from week 1 and week 12. The first step in analyzing data was to conduct a simple linear regression in order to calculate the intercept and slope for each student. The second step was to calculate the correlation coefficients between the slopes and intercepts and the criterion variables for both reading aloud and maze selection.

Results

Table 1 shows the correlations between the intercepts and slopes and criterion measures for maze selection and reading aloud. For Grade 1, CRAB pretest and posttest scores were used as criterion variable. For maze selection, the correlations between the CRAB pre- and post-test scores and intercept ranged from .82 to .83, whereas the correlations between the CRAB pre- and post-test scores and slope ranged from .31 to .34. For reading aloud, the correlations between the CRAB pre- and post-test scores and intercept ranged from .89 to .94, whereas the correlations between the CRAB pre- and post-test scores and slope ranged from .27 to .41.

For Grades 3 and 5, the MCA-II was used as a criterion variable (students in Grades 2 and 4 did not take the MCA-II), whereas for Grade 9, the Gates McGinitie standard score was used as a criterion variable. For students in Grade 3, the correlation between the maze selection

intercept and MCA-II was .49 and the correlation between the maze selection slope and the MCA-II was .01. For reading aloud, the correlation between the intercept and MCA-II was .54 and the correlation between the slope and the MCA-II was -.14. For students in Grade 5, the correlation between the maze selection intercept and MCA-II was .30 and the correlation between the maze selection slope and the MCA-II was .32. For reading aloud, the correlation between the intercept and MCA-II was .39 and the correlation between the slope and the MCA-II was .25. For students in Grade 9, the correlation between the maze selection intercept and MCA-II was .42 and the correlation between the maze selection slope and the MCA-II was .14. For reading aloud, the correlation between the intercept and MCA-II was .37 and the correlation between the slope and the MCA-II was .18.

Table 1. Correlation between CBM (slope and intercept) and MCA (Gates McGinitie)

CBM		Grade 1		Grade 3	Grade 5	Grade 9
		CRAB Pretest	CRAB Posttest	MCA-II	MCA-II	Gates McGinitie
MA	Intercept	.832	.822	.490	.299	.417
	Slope	.337	.311	.006	.324	.144
RA	Intercept	.937	.889	.538	.387	.366
	Slope	.270	.409	-.135	.249	.181

Table 2 shows correlations between the Week 17 mean CBM score, and intercept and slope for maze selection and reading aloud. According to Table 2, the correlation coefficients between the maze selection intercepts and the week 17 mean CBM scores were .75 or higher, meaning that there was a strong relationship between the two scores. The correlation coefficients between the maze selection slopes and the Week 17 mean CBM scores ranged from .21 to .63.

Similar to the maze selection results, correlation coefficients between the reading aloud intercept and the Week 17 mean CBM scores was very high (.70 - .93), whereas correlation coefficients between the reading aloud slope and the Week 17 mean CBM ranged from .16 to .48.

Table 2. Correlation between CBM (slope and intercept) and week 17 CBM score (Mean)

CBM		Grade 1	Grade 2/3	Grade 4/5	Grade 9
		Week 17 CBM	Week 17 CBM	Week 17 CBM	Week 17 CBM
MA	Intercept	.746	.782	.927	.791
	Slope	.633	.329	.209	.254
RA	Intercept	.932	.932	.697	.841
	Slope	.462	.162	.483	.402

Table 3 shows correlations between the Week 17 median CBM score, and the intercept and slope for maze selection and reading aloud. According to Table 3, the correlation coefficients between the maze selection intercepts and the Week 17 median CBM scores were .72 or greater, meaning that there was a strong relationship between two scores. The correlation coefficients between the maze selection slopes and the Week 17 median CBM scores ranged from .21 to .65 and the pattern of correlations decreased as grade level increased. Similar to the maze selection results, the correlation coefficients between the reading aloud intercepts and the Week 17 median CBM scores was very high (.70 to .92) and the pattern of correlations decreased as grade level increased. The correlation coefficients between the reading aloud slopes and the Week 17 median CBM scores ranged from .19 to .47, with the lowest correlation at Grade 2/3.

Table 3. Correlation between CBM (slope and intercept) and week 17 CBM score (Median)

CBM		Grade 1	Grade 2/3	Grade 4/5	Grade 9
		Week 17 CBM	Week 17 CBM	Week 17 CBM	Week 17 CBM
MA	Intercept	.719	.773	.910	.791
	Slope	.652	.345	.245	.210
RA	Intercept	.924	.923	.697	.820
	Slope	.470	.188	.467	.413

Examining the correlation coefficients between the slopes and intercepts and the criterion variables for both reading aloud and maze selection was a preliminary analysis. A better way to answer our research question, “Which weekly progress monitoring measures in reading (reading aloud or maze selection) are related to other measures of reading?”, might be to use Hierarchical Linear Modeling to examine differences in the growth rates for two groups of students (e.g., students who had passed or not passed the state standards test) or to examine differences in reading aloud and maze selection growth rates for 2 or 3 groups of students (e.g., low, medium, high) and how differences in growth rates relate to performance on other measures of reading.

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