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**Supplementary Report on easyCBM
MCRC Measures: A Follow-Up
to Previous Technical Report**

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Abstract

In response to a request for additional analyses, in particular reporting confidence intervals around the results, we re-analyzed the data from prior studies. This supplementary report presents the results of the additional analyses addressing classification accuracy, reliability, and criterion-related validity evidence. For ease of reference, we organize this technical report into sections based on the type of evidence being presented.

Supplementary Report on easyCBM MCRC Measures: A Follow-Up to Previous Technical Reports

This technical report is an addendum to previous technical reports. In response to a request for additional analyses, in particular reporting confidence intervals around the results, we re-analyzed the data from prior studies. This supplementary report presents the results of the additional analyses addressing classification accuracy, reliability, and criterion-related validity evidence. For ease of reference, we organize this technical report into sections based on the type of evidence being presented.

Classification Accuracy Methods

We used the Smarter Balanced English Language Arts Assessment as our criterion measure. This measure is completely independent from the screening measure. SBAS is a large-scale assessment in wide use across the United States as a state accountability measure. We used R statistical package to perform the classification analyses. The cut point of the score associated with the 40th percentile from the easyCBM National Norms was selected, as prior studies and wide-spread district policy suggests this is an appropriate cut-point for identifying students with intensive need. Although the 40th percentile might, initially, seem too high a cut-point for intensive need, the higher expectations for student performance aligns with the higher expectations for which schools are being held accountable in the past five years. (Prior to SBAS and the CCSS adoption, performance expectations in the states from which this sample was drawn were substantially lower – the 20th percentile was previously used for identifying students with intensive need. Expectations have increased, however, and thus our cut-point also had to raise.

Students who scored below the cut-point 40th percentile were assigned a variety of interventions, depending on specific pattern of need (performance on other parts of the literacy benchmark assessment such as vocabulary and reading comprehension, success of prior years' interventions, whether they also had identified mathematics needs) and resources available at the schools. Interventions ranged from one-on-one daily instruction on phonics to small group (2-6 students) twice-weekly supplemental fluency instruction, to after-school mentoring with a focus on oral reading fluency. A number of students concurrently received several of these interventions (typically only those students whose mathematics performance did not indicate a need for mathematics intervention as well because those students who also needed mathematics intervention simply did not have sufficient time in the school day to receive all the instructional interventions they needed). Interventions were delivered by a variety of personnel (depending on school/district resources): Special Education teachers, general education teachers during their "intervention block", instructional assistants, and student mentors (some adult, some older children). Sample demographics are reported in Table 1.

Table 1
Sample Demographics, Classification Accuracy Analyses

Grade	3	4	5	6	7	8
Criterion	SBAS ELA	SBAS ELA	SBAS ELA	SBAS ELA	SBAS ELA	SBAS ELA
National/Local Representation ¹	Pacific Northwest, OR and WA	Pacific Northwest, OR and WA	Pacific Northwest, OR and WA	Pacific Northwest, OR and WA	Pacific Northwest, OR and WA	Pacific Northwest, OR and WA
Date	SY2014-15	SY2014-15	SY2014-15	SY2014-15	SY2014-15	SY2014-15
Sample Size	26250	30567	30483	29800	29267	34250
Male	12667	12100	12517	12117	11817	13783
Female	11467	11800	11667	11417	11133	13317
Gender Unknown	2117	6667	6300	6267	6317	7150
Free or Reduced-price Lunch Eligible	8133	8233	7933	8300	7433	7717
White, Non-Hispanic	5617	4883	5617	4567	5283	7283
Other	20633	25683	24867	25233	23983	26967
Disability Classification	2683	2767	2550	2567	2283	2750
Language Proficiency Status (ELL)	2700	2467	2267	1783	1900	1667

Classification Accuracy Results

Results of our classification accuracy analyses are presented for fall (Table 2), Winter (Table 3), and Spring (Table 4).

Table 2
Classification Accuracy: Fall easyCBM MCRC Predicting SBAS ELA Performance

Grade	3 rd	4 th	5 th	6 th	7 th	8 th
Criterion	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	0.19	0.14	0.18	0.16	0.21	0.24
False Negative Rate	0.34	0.34	0.30	0.37	0.31	0.26
Sensitivity	0.62	0.55	0.62	0.55	0.57	0.62
Specificity	0.83	0.91	0.87	0.88	0.86	0.85
Positive Predictive Power	0.81	0.86	0.82	0.84	0.79	0.76
Negative Predictive Power	0.66	0.66	0.70	0.63	0.69	0.74
Overall Classification Rate	0.72	0.72	0.75	0.70	0.72	0.75
Area Under the Curve (AUC)	0.81	0.84	0.83	0.79	0.80	0.80
AUC Estimate's 95% Confidence Interval: Lower Bound	0.79	0.82	0.81	0.76	0.78	0.78
AUC Estimate's 95% Confidence Interval: Upper Bound	0.83	0.86	0.85	0.81	0.82	0.82
Specificity Value at 90% Sensitivity	0.57	0.61	0.50	0.37	0.48	0.36
Specificity Value at 80% Sensitivity	0.69	0.72	0.68	0.58	0.64	0.57
Specificity Value at 70% Sensitivity	0.77	0.80	0.80	0.77	0.77	0.73

Table 3
Classification Accuracy: Winter easyCBM MCRC Predicting SBAS ELA Performance

Grade	3 rd	4 th	5 th	6 th	7 th	8 th
Criterion	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	0.16	0.17	0.19	0.18	0.22	0.30

False Negative Rate	0.34	0.34	0.25	0.44	0.34	0.28
Sensitivity	0.61	0.57	0.72	0.40	0.53	0.63
Specificity	0.87	0.88	0.84	0.90	0.86	0.78
Positive Predictive Power	0.84	0.83	0.81	0.82	0.78	0.70
Negative Predictive Power	0.66	0.66	0.75	0.56	0.66	0.72
Overall Classification Rate	0.73	0.72	0.78	0.63	0.70	0.71
Area Under the Curve (AUC)	0.83	0.82	0.84	0.75	0.78	0.76
AUC Estimate's 95% Confidence Interval: Lower Bound	0.81	0.79	0.82	0.72	0.75	0.74
AUC Estimate's 95% Confidence Interval: Upper Bound	0.85	0.84	0.86	0.77	0.80	0.79
Specificity Value at 90% Sensitivity	0.45	0.57	0.53	0.36	0.37	0.34
Specificity Value at 80% Sensitivity	0.77	0.69	0.72	0.55	0.59	0.50
Specificity Value at 70% Sensitivity	0.77	0.78	0.84	0.71	0.75	0.64

Table 4

Classification Accuracy: Spring easyCBM MCRC Predicting SBAS ELA Performance

Grade	3 rd	4 th	5 th	6 th	7 th	8 th
Criterion	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts	SBAS English Language Arts
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	0.10	0.19	0.26	0.14	0.26	0.28
False Negative Rate	0.36	0.33	0.24	0.36	0.25	0.24
Sensitivity	0.55	0.56	0.67	0.49	0.70	0.69
Specificity	0.93	0.87	0.81	0.92	0.78	0.79
Positive Predictive Power	0.90	0.81	0.74	0.86	0.74	0.72
Negative Predictive Power	0.64	0.67	0.76	0.64	0.75	0.76
Overall Classification Rate	0.73	0.72	0.75	0.70	0.74	0.74
Area Under the Curve (AUC)	0.85	0.80	0.82	0.80	0.81	0.80
AUC Estimate's 95% Confidence Interval: Lower Bound	0.83	0.77	0.79	0.78	0.79	0.78

AUC Estimate's 95% Confidence Interval: Upper Bound	0.87	0.82	0.84	0.82	0.83	0.83
Specificity Value at 90% Sensitivity	0.10	0.19	0.26	0.14	0.26	0.28
Specificity Value at 80% Sensitivity	0.36	0.33	0.24	0.36	0.25	0.24
Specificity Value at 70% Sensitivity	0.55	0.56	0.67	0.49	0.70	0.69

Reliability Methods

Split-half reliability and Cronbach's Alpha are both estimates of the internal consistency of the MCRC measures. Because the easyCBM MCRC measures are often administered for a set period of time (typically 30-45 minutes), not all students will complete all items. Having an internally-consistent measure, where scores on two split halves of the assessment are correlated with one another, provides some reassurance that scores obtained when students complete only some of the items (for instance, when they "time out" after responding to only half of the possible items on the assessment) reflect the distribution of scores that would be obtained were the entire test completed. Prior to analysis, students who had not responded to any items on a particular MCRC measure were removed from the dataset. The measures were analyzed for internal consistency using Cronbach's Alpha and Split-half reliability (first half/second half). For the split-half reliability, the measures were analyzed using the first half to the median compared to the second half.

Sample and Setting: Reliability Analyses

Demographic information for the convenience sample used for both the Split-half and Cronbach's Alpha analyses are presented below. The study was conducted using values from the fall and winter 2013-2014 Vocabulary benchmark assessments. The fall benchmark was taken by

20,252 grade 2 students; 23,694 grade 3 students; 17,850 grade 4 students; 26,978 grade 5 students; 17,222 grade 6 students; 12,798 grade 7 students; and 8,965 grade 8 students. The winter benchmark was taken by 19,158 grade 2 students; 21,807 grade 3 students; 15,031 grade 4 students; 23,146 grade 5 students; 15,575 grade 6 students; 11,506 grade 7 students; and 9,464 grade 8 students. Students of American Indian or Alaskan Native descent comprised 1-4% of the sample, and Asian students made up 2-3% of the sample across all grades. Black or African American students made up 10-19% of the sample in grade 2 and 3-5% of the sample in grade 3-8. Native Hawaiian or other Pacific Islander students made up 0-1% and students identified as Two or more Races constituted 1-2% of the sample across all grades. Lastly, White students made up 44-55% of the sample, and those classified as Unknown ethnicity made up 29-47% of the sample across all grades. Similarly, students identified as Hispanic/Latino made up 8-16% of the sample and students identified as Not Hispanic/Latino made up 48-70% of the sample, varying by grade level. The percentage of ELL students in the sample had a range of 16-33%. Students identified by their districts as disabled constituted 17-31% of the sample. Males made up 49-53% of the sample.

Reliability Results

Table 5
Reliability Results

Type of Reliability	Grade	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Cronbach's	2	23461	0.75	0.75	0.75
Cronbach's	3	25074	0.73	0.73	0.74
Cronbach's	4	20681	0.79	0.79	0.79
Cronbach's	5	30663	0.78	0.78	0.79
Cronbach's	6	18135	0.71	0.70	0.71
Cronbach's	7	15297	0.73	0.73	0.74

Table 5
Reliability Results

Type of Reliability	Grade	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Cronbach's	8	17639	0.66	0.66	0.66
Split-half	2	23461	0.72	0.75	0.77
Split-half	3	25074	0.67	0.74	0.76
Split-half	4	20681	0.76	0.79	0.81
Split-half	5	30663	0.76	0.80	0.82
Split-half	6	18135	0.65	0.72	0.74
Split-half	7	15297	0.69	0.75	0.77
Split-half	8	17639	0.60	0.68	0.71

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Cronbach's alpha	GenEd	2	15829	0.85	0.85	0.86
Cronbach's alpha	SPED	2	1766	0.81	0.8	0.82
Cronbach's alpha	GenEd	3	18797	0.83	0.83	0.84
Cronbach's alpha	SPED	3	1918	0.87	0.86	0.88
Cronbach's alpha	GenEd	4	13330	0.82	0.81	0.82
Cronbach's alpha	SPED	4	1988	0.85	0.84	0.86
Cronbach's alpha	GenEd	5	19859	0.77	0.77	0.77
Cronbach's alpha	SPED	5	3440	0.84	0.83	0.84
Cronbach's alpha	GenEd	6	13086	0.77	0.77	0.78
Cronbach's alpha	SPED	6	2487	0.87	0.86	0.87
Cronbach's alpha	GenEd	7	9600	0.77	0.76	0.77
Cronbach's alpha	SPED	7	1955	0.82	0.81	0.83
Cronbach's alpha	GenEd	8	7534	0.73	0.73	0.74
Cronbach's alpha	SPED	8	1931	0.84	0.83	0.84
Split-half	GenEd	2	1829	0.84	0.85	0.86
Split-half	SPED	2	1766	0.79	0.81	0.83
Split-half	GenEd	3	1797	0.83	0.85	0.86
Split-half	SPED	3	1918	0.86	0.87	0.88
Split-half	GenEd	4	1330	0.81	0.84	0.85
Split-half	SPED	4	1988	0.83	0.86	0.87
Split-half	GenEd	5	1859	0.78	0.8	0.81
Split-half	SPED	5	3440	0.82	0.84	0.85

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Split-half	GenEd	6	1086	0.78	0.81	0.82
Split-half	SPED	6	2487	0.85	0.87	0.89
Split-half	GenEd	7	9600	0.77	0.79	0.81
Split-half	SPED	7	1955	0.79	0.82	0.84
Split-half	GenEd	8	7534	0.74	0.77	0.78
Split-half	SPED	8	10931	0.82	0.85	0.86
Cronbach's alpha	F	2	9689	0.85	0.85	0.86
Cronbach's alpha	M	2	10176	0.85	0.85	0.86
Cronbach's alpha	M	3	11293	0.84	0.83	0.84
Cronbach's alpha	F	3	11958	0.85	0.84	0.85
Cronbach's alpha	M	4	8465	0.83	0.82	0.83
Cronbach's alpha	F	4	8975	0.84	0.84	0.85
Cronbach's alpha	M	5	12958	0.79	0.78	0.79
Cronbach's alpha	F	5	13550	0.81	0.8	0.81
Cronbach's alpha	F	6	7967	0.79	0.78	0.8
Cronbach's alpha	M	6	8826	0.83	0.82	0.83
Cronbach's alpha	M	7	5819	0.79	0.79	0.8
Cronbach's alpha	F	7	6658	0.82	0.81	0.83
Cronbach's alpha	F	8	4969	0.75	0.74	0.75
Cronbach's alpha	M	8	4193	0.81	0.8	0.81
Split-half	F	2	9689	0.84	0.85	0.86
Split-half	M	2	10176	0.84	0.85	0.86
Split-half	M	3	11293	0.83	0.85	0.86
Split-half	F	3	11958	0.84	0.86	0.87
Split-half	M	4	8465	0.82	0.84	0.85
Split-half	F	4	8975	0.83	0.86	0.87
Split-half	M	5	12958	0.79	0.81	0.82
Split-half	F	5	13550	0.81	0.83	0.84
Split-half	F	6	7967	0.8	0.83	0.84
Split-half	M	6	8826	0.82	0.85	0.86
Split-half	M	7	5819	0.79	0.81	0.83
Split-half	F	7	6658	0.81	0.84	0.85
Split-half	F	8	4969	0.75	0.78	0.79
Split-half	M	8	4193	0.81	0.83	0.84
Cronbach's alpha	White	2	10999	0.85	0.85	0.86
Cronbach's alpha	Two or more races	2	1434	0.86	0.85	0.87

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Cronbach's alpha	Asian	2	631	0.86	0.84	0.87
Cronbach's alpha	Black or African American	2	2254	0.82	0.80	0.83
Cronbach's alpha	American Indian or Alaskan Native	2	826	0.83	0.81	0.85
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	2	115	0.82	0.77	0.87
Cronbach's alpha	White	3	13963	0.83	0.83	0.84
Cronbach's alpha	Black or African American	3	2409	0.85	0.84	0.86
Cronbach's alpha	Asian	3	636	0.83	0.82	0.85
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	3	127	0.83	0.78	0.87
Cronbach's alpha	Two or more races	3	1521	0.84	0.83	0.85
Cronbach's alpha	American Indian or Alaskan Native	3	1138	0.83	0.82	0.85
Cronbach's alpha	White	4	9351	0.83	0.82	0.83
Cronbach's alpha	Black or African American	4	2334	0.81	0.80	0.82
Cronbach's alpha	Asian	4	590	0.83	0.81	0.85
Cronbach's alpha	American Indian or Alaskan Native	4	533	0.80	0.78	0.83
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	4	115	0.83	0.79	0.88
Cronbach's alpha	Two or more races	4	1394	0.82	0.81	0.84
Cronbach's alpha	White	5	13551	0.78	0.78	0.79
Cronbach's alpha	Black or African American	5	4901	0.79	0.78	0.80
Cronbach's alpha	Asian	5	713	0.83	0.81	0.85
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	5	160	0.72	0.66	0.79

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Cronbach's alpha	Two or more races	5	1858	0.75	0.74	0.77
Cronbach's alpha	American Indian or Alaskan Native	5	544	0.78	0.75	0.81
Cronbach's alpha	White	6	8556	0.80	0.80	0.81
Cronbach's alpha	Asian	6	521	0.84	0.82	0.86
Cronbach's alpha	Two or more races	6	1217	0.78	0.76	0.80
Cronbach's alpha	Black or African American	6	2571	0.81	0.80	0.82
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	6	130	0.78	0.73	0.84
Cronbach's alpha	American Indian or Alaskan Native	6	350	0.78	0.74	0.81
Cronbach's alpha	White	7	5961	0.80	0.79	0.81
Cronbach's alpha	Two or more races	7	980	0.78	0.76	0.80
Cronbach's alpha	Black or African American	7	2556	0.80	0.79	0.82
Cronbach's alpha	Asian	7	281	0.78	0.75	0.82
Cronbach's alpha	American Indian or Alaskan Native	7	327	0.76	0.73	0.80
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	7	43	0.81	0.73	0.89
Cronbach's alpha	Black or African American	8	9764	0.79	0.79	0.80
Cronbach's alpha	White	8	54052	0.77	0.77	0.77
Cronbach's alpha	Two or more races	8	7326	0.77	0.76	0.78
Cronbach's alpha	Asian	8	3720	0.79	0.78	0.80
Cronbach's alpha	Native Hawaiian or Other Pacific Islander	8	544	0.75	0.72	0.78

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Cronbach's alpha	American Indian or Alaskan Native	8	2296	0.79	0.77	0.80
Split-half	White	2	10999	0.84	0.85	0.86
Split-half	Two or more races	2	1434	0.84	0.86	0.87
Split-half	Asian	2	631	0.83	0.86	0.88
Split-half	Black or African American	2	2254	0.80	0.82	0.83
Split-half	American Indian or Alaskan Native	2	826	0.81	0.83	0.85
Split-half	Native Hawaiian or Other Pacific Islander	2	115	0.76	0.82	0.87
Split-half	White	3	13963	0.83	0.85	0.86
Split-half	Black or African American	3	2409	0.83	0.85	0.86
Split-half	Asian	3	636	0.83	0.85	0.87
Split-half	Native Hawaiian or Other Pacific Islander	3	127	0.78	0.85	0.89
Split-half	Two or more races	3	1521	0.83	0.85	0.87
Split-half	American Indian or Alaskan Native	3	1138	0.82	0.84	0.86
Split-half	White	4	9351	0.82	0.85	0.86
Split-half	Black or African American	4	2334	0.79	0.82	0.83
Split-half	Asian	4	590	0.82	0.84	0.87
Split-half	American Indian or Alaskan Native	4	533	0.78	0.82	0.84
Split-half	Native Hawaiian or Other Pacific Islander	4	115	0.78	0.84	0.89
Split-half	Two or more races	4	1394	0.81	0.84	0.86
Split-half	White	5	13551	0.79	0.81	0.83

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Split-half	Black or African American	5	4901	0.77	0.80	0.82
Split-half	Asian	5	713	0.82	0.85	0.88
Split-half	Native Hawaiian or Other Pacific Islander	5	160	0.67	0.74	0.80
Split-half	Two or more races	5	1858	0.76	0.79	0.81
Split-half	American Indian or Alaskan Native	5	544	0.76	0.80	0.83
Split-half	White	6	8556	0.81	0.84	0.85
Split-half	Asian	6	521	0.83	0.87	0.89
Split-half	Two or more races	6	1217	0.78	0.82	0.84
Split-half	Black or African American	6	2571	0.80	0.83	0.85
Split-half	Native Hawaiian or Other Pacific Islander	6	130	0.74	0.81	0.86
Split-half	American Indian or Alaskan Native	6	350	0.76	0.81	0.84
Split-half	White	7	5961	0.79	0.82	0.83
Split-half	Two or more races	7	980	0.78	0.81	0.83
Split-half	Black or African American	7	2556	0.79	0.82	0.83
Split-half	Asian	7	281	0.75	0.80	0.84
Split-half	American Indian or Alaskan Native	7	327	0.73	0.78	0.82
Split-half	Native Hawaiian or Other Pacific Islander	7	43	0.72	0.82	0.89
Split-half	Black or African American	8	964	0.78	0.81	0.83
Split-half	White	8	5052	0.78	0.80	0.81
Split-half	Two or more races	8	7326	0.78	0.80	0.81

Table 6
Reliability Results, by Subgroup

Type of Reliability	Subgroup	Grade	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Split-half	Asian	8	3720	0.79	0.82	0.83
Split-half	Native Hawaiian or Other Pacific Islander	8	544	0.74	0.78	0.81
Split-half	American Indian or Alaskan Native	8	2296	0.78	0.81	0.82

Discussion: Reliability

The results of the test-retest and alternate-form reliability analyses suggested acceptable form equivalence.

Validity Methods

We used the Smarter Balanced English Language Arts Assessment as our criterion measure. This measure is completely independent from the screening measure. SBAS is a large-scale assessment in wide use across the United States as a state accountability measure. Because it is used by so many states for their accountability measure, school districts are quite interested in the relation between SBAS and easyCBM MCRC.

Setting and Sample: Validity Study

Data for this study came from a convenience sample provided by two school districts in the Pacific Northwest. All students enrolled in school and present during the three-week easyCBM Benchmark Assessment windows in the fall (September 2014), winter (January 2015) and spring (May 2015) were administered the easyCBM assessments. All enrolled students were likewise administered the Smarter Balanced assessments during the testing window provided by

the state in the spring of 2015. The data set provided by the districts included easyCBM CCSS Math, Passage Reading Fluency, Vocabulary, and Multiple Choice Reading Comprehension (MCRC) as well as Smarter Balanced Math and English Language Arts total scores for students enrolled in grades 3-8. District 1 provided data for Grades 3-8, while District 2 provided data for Grades 4-8. In addition, District 1 provided demographic information, while District 2 (approximately $\frac{1}{4}$ the size of the first district) did not. Known demographics of the sample are provided in Table 7. Because of the missing demographics from a large proportion of the sample, the percentages for each of the demographic variables are calculated based on the students in the sample whose data included full-resolution demographic information.

Table 7

Sample Demographics

Grade	Missing Demographic Data		Female		Hispanic		SpEd		ELL	
	#	%	#	%	#	%	#	%	#	%
3	33	3	492	48	187	18	87	8	67	7
4	328	24	523	50	217	21	100	10	62	6
5	295	23	483	48	159	16	89	9	39	4
6	291	22	505	49	180	17	95	9	27	3
7	280	23	456	48	185	19	78	8	29	3
8	266	20	526	50	192	18	83	8	22	2

During data cleaning, data from students who were administered the Alternate Assessment rather than the General Education assessment were removed from the dataset prior to further analyses. In all, six students each from Grades 4, 6, and 7 and three students from Grade 5 were removed from the dataset in this step. Data from all additional students were retained.

Validity Analyses

We analyzed the data using bivariate correlations and linear regression using SPSS

software.

Table 8
Criterion-Related Validity Evidence

Type of Validity	Grade	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Predictive (Fall easyCBM MCRC → Spring SBAS)	3	Smarter Balanced Assessment	3	1239	0.62	0.58
Predictive (Win. easyCBM MCRC → Spring SBAS)	3	Smarter Balanced Assessment	3	1285	0.63	0.59
Concurrent (Spr easyCBM MCRC → Spring SBAS)	3	Smarter Balanced Assessment	3	1288	0.68	0.64
Concurrent (Spr easyCBM MCRC → Spring SBAS)	4	Smarter Balanced Assessment	4	1443	0.68	0.65
Concurrent (Spr easyCBM MCRC → Spring SBAS)	4	Smarter Balanced Assessment	4	1483	0.64	0.60
Concurrent (Spr easyCBM MCRC → Spring SBAS)	4	Smarter Balanced Assessment	4	1307	0.62	0.58
Concurrent (Spr easyCBM MCRC → Spring SBAS)	5	Smarter Balanced Assessment	5	1531	0.67	0.63
Concurrent (Spr easyCBM MCRC → Spring SBAS)	5	Smarter Balanced Assessment	5	1570	0.68	0.64
Concurrent (Spr easyCBM MCRC → Spring SBAS)	5	Smarter Balanced Assessment	5	1333	0.64	0.60
Concurrent (Spr easyCBM MCRC → Spring SBAS)	6	Smarter Balanced Assessment	6	1505	0.60	0.55
Concurrent (Spr easyCBM MCRC → Spring SBAS)	6	Smarter Balanced Assessment	6	1554	0.54	0.50
Concurrent (Spr easyCBM MCRC → Spring SBAS)	6	Smarter Balanced Assessment	6	1297	0.65	0.61
Concurrent (Spr easyCBM MCRC → Spring SBAS)	7	Smarter Balanced Assessment	7	1433	0.65	0.61

Table 8
Criterion-Related Validity Evidence

Type of Validity	Grade	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Concurrent (Spr easyCBM MCRC → Spring SBAS)	7	Smarter Balanced Assessment	7	1476	0.59	0.55
Concurrent (Spr easyCBM MCRC → Spring SBAS)	7	Smarter Balanced Assessment	7	1200	0.62	0.58
Concurrent (Spr easyCBM MCRC → Spring SBAS)	8	Smarter Balanced Assessment	8	1475	0.63	0.59
Concurrent (Spr easyCBM MCRC → Spring SBAS)	8	Smarter Balanced Assessment	8	1535	0.58	0.54
Concurrent (Spr easyCBM MCRC → Spring SBAS)	8	Smarter Balanced Assessment	8	1250	0.64	0.60

Discussion: Validity Evidence

Data from these validity studies support the concurrent and predictive validity of the tool. Correlations between the easyCBM MCRC measures and an external measure of English Language Arts that includes reading comprehension as a tested construct suggest that the easyCBM MCRC assessments are, indeed, capturing important information about students' ability to make sense of what they are reading. The easyCBM MCRC measures consistently predict student performance on other measures of English Language Arts.