

Technical Report # 1805

**Supplementary Report on easyCBM
Grade K – 2 Literacy Measures: Classification
Accuracy and Predictive Validity, a Follow-Up to
Technical Report 1403**

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Published by

Behavioral Research and Teaching
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<http://brt.uoregon.edu>

Note: Funds for this dataset were provided by the U.S. Department of Education: Office of Special Education Programs (OSEP) #H327S150007.

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Abstract

This technical report is an addendum to a study we initially reported on in 2014 (Wray, Lai, Saez, Alonzo, & Tindal, 2014). In response to a request for additional analyses, in particular reporting confidence intervals around the results, we re-analyzed the data from the Wray et al study. This supplementary report presents the results of the additional analyses. Results varied by measure and grade but were generally within *good* or *acceptable* ranges for all measures and grade levels analyzed.

Supplementary Report on easyCBM Grade K – 2 Literacy Measures:

Classification Accuracy and Predictive Validity, a Follow-Up to Technical Report 1403

We initially conducted a year-long study of the easyCBM (Alonzo, Tindal, Ulmer, & Glasgow) early reading measures in school year 2012-2013, reporting the results in Wray, Lai, Saez, Alonzo, and Tindal (2014). In response to a request for additional analyses, in particular reporting confidence intervals around the results, we re-analyzed the data from the Wray et al study. This supplementary report presents the results of the additional analyses.

Methods

As reported in Wray et al. (2014), the sample included 222 kindergarten and 204 first-grade students from a convenience sample of three (K-5) schools within the same semi-rural Pacific Northwest school district. Students came from six kindergarten and eight first-grade classrooms. All students in attendance on the days that the research team collected data were included in the study. Of the kindergarten sample, 83.3% were White, 9.5% were reported as two or more races, 2.3% were Black 2.3% were American Indian/Alaskan Native, and two were Asian; 20.3% were identified as Hispanic, and 48.6% as female. For grade 1 students, 83.8% were White, 6.4% were American Indian/Alaskan Native, 4.4% were reported as two or more races, 3.4% were Black, and one student each was of Asian and Pacific Islander descent. Of the grade 1 students in our sample, 23.5% were Hispanic, and 44.1% were female. We used data from the easyCBM® measures administered in the fall of 2012 and the SAT-10 measures administered in the spring of 2013 for this supplementary report.

Measures

We administered alternate forms of four easyCBM® measures (Letter Names (LN), Letter Sounds (LS), Phoneme Segmenting (PS), and Word Reading Fluency (WRF)) to all

kindergarten and first-grade students in the sample. Each of these measures is administered for 60 seconds, one-on-one by a trained assessor. We also administered two sub-tests from the SAT-10 to students in each grade. Kindergarten students were administered the Sounds and Letters measure (SL) and the Word Reading measure (WR) from the SESAT 2 (spring seasonal measure). First grade students took the Word Reading measure and the Word Study Skills measure (WWS) found in the spring SAT-10. Second-grade students took the Word Reading measure and the Vocabulary measure found in the spring SAT-10. The SAT-10 Sounds and Letters measure is administered orally. An assessor reads direction while the students follow along in a workbook. This subtest assesses matching words that begin or end with the same sound, recognizing letters, and matching letters to sounds. Like the sounds and letters measure, the SAT-10 word reading measure was administered orally. Similarly, directions were read orally while students followed along in a workbook. This subtest requires students to identify a printed word that matches either a work presented orally or an illustration. More information about test administration can be found in the original technical report describing this study (Wray et al, 2014).

The SAT-10 is a nationally recognized standardized assessment published by Pearson. The Reading section of the SAT-10 has a reported reliability rating of .87, the Math section .80-.87, and the language section .78-.84 (Stanford Achievement Test 10 (SAT-10)). We selected the SAT-10 as the external criterion measure for this study due to its technical adequacy and relevant constructs assessed.

Results

We present complete results for all analyses conducted in table format at the end of this supplementary report. They are summarized in text here as well.

Classification Accuracy Results

Table 1 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 10 different forms of the kindergarten *easyCBM® Letter Names Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .69 - .85 across all 10 forms of the LN measures, with an average AUC of .77.

Table 2 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 10 different forms of the kindergarten *easyCBM® Letter Sounds Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .71 - .78 across all 10 forms of the LS measures, with an average AUC of .76.

Table 3 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 10 different forms of the kindergarten *easyCBM® Phoneme Segmenting Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at*

risk. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .62 - .71 across all 10 forms of the Phoneme Segmenting measures, with an average AUC of .66.

Table 4 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 9 different forms of the kindergarten *easyCBM® Phoneme Segmenting Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Word Reading* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .60 - .72 across all 10 forms of the Phoneme Segmenting measures, with an average AUC of .66.

Table 5 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 10 different forms of the kindergarten *easyCBM® Word Reading Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .71 - .78 across all 10 forms of the WRF measures, with an average AUC of .76.

Table 6 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 5 different forms of the Grade 1 *easyCBM® Phoneme Segmenting Fluency*

measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* and Word Reading sub-tests. We used the SAT-10 *Sounds and Letters* and *Word Reading* sub-tests as the criterion measures, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .57 - .70 across all 5 forms of the *Phoneme Segmenting* measure using the *SAT-10 Sounds and Letters* sub-test as the criterion, with an average AUC of .61, and from .47 - .63 across all 5 forms of the *Phoneme Segmenting* measure using the *SAT-10 Word Reading* sub-test at the criterion, with an average AUC of .55.

Table 7 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 2 different forms of the Grade 1 *easyCBM*® *Word Reading Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Sounds and Letters* sub-test. We used the SAT-10 *Sounds and Letters* sub-test as the criterion, selecting 50th percentile performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .60 - .77 across the 2 forms of the WRF measures, with an average AUC of .68.

Table 8 presents the results of classification accuracy analyses using data gathered in the fall of 2012 for 5 different forms of the Grade 2 *easyCBM*® *Passage Reading Fluency* measure and the spring of 2013 for the Stanford Early School Achievement Test/Stanford Achievement Test, 10th edition (SESAT/SAT-10) *Vocabulary* sub-test. We used the SAT-10 *Vocabulary* sub-test as the criterion, selecting 40th percentile performance as the cut point. 50th percentile

performance as the cut point for SAT-10 and 25th percentile on the easyCBM measures to identify students as *at risk*. These cut points were selected to correspond with students needing intensive intervention. AUC ranged from .83 - .86 across the 5 forms of the PRF measures, with an average AUC of .85.

Predictive Validity Results

We used Pearson's correlations to analyze the relation between the easyCBM literacy and SAT-10 literacy measures.

Table 9 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 10 alternate forms of the Kindergarten easyCBM® Letter Names Fluency measure and the SAT-10 Sounds and Letters sub-test. Correlations ranged from .73 - .79, with an average correlation of .77.

Table 10 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 10 alternate forms of the Kindergarten easyCBM® Letter Sounds Fluency measure and the SAT-10 Sounds and Letters sub-test. Correlations ranged from .71 - .78, with an average correlation of .76.

Table 11 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 6 alternate forms of the Kindergarten easyCBM® Phoneme Segmenting measure and the SAT-10 *Sounds and Letters* and *Word Reading* sub-tests. Correlations ranged from .62 - .71, with an average correlation of .66 for the *Sounds and Letters* sub-test and from .60 - .72, with an average correlation of .66 for the *Word Reading* sub-test.

Table 12 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 10 alternate forms of the Kindergarten easyCBM® Word Reading

Fluency measure and the SAT-10 *Sounds and Letters* sub-test. Correlations ranged from .71 - .78, with an average correlation of .76.

Table 13 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 10 alternate forms of the Grade 1 easyCBM® Letter Names Fluency measure and the SAT-10 *Sounds and Letters* sub-test. Correlations ranged from .47 - .73, with an average correlation of .59.

Table 14 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 5 alternate forms of the first grade easyCBM® Letter Sounds Fluency measure and the SAT-10 Sounds and Letters sub-test. Correlations ranged from .40 - .77, with an average correlation of .61.

Table 15 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 5 alternate forms of the first grade easyCBM® Phoneme Segmenting Fluency measure and the SAT-10 *Sounds and Letters* and *Word Reading* sub-tests. Correlations ranged from .57 - .70, with an average correlation of .61 for the *Sounds and Letters* sub-test and from .47 - .59, with an average correlation of .52 for the *Word Reading* sub-test.

Table 16 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 5 alternate forms of the first grade easyCBM® Word Reading Fluency measure and the SAT-10 Sounds and Letters sub-test. Correlations ranged from .40 - .77, with an average correlation of .61.

Table 17 presents the Correlation coefficient as well as the 95th Confidence Interval (both lower and upper bounds) for 5 alternate forms of the second grade easyCBM® Word Reading Fluency measure and the SAT-10 Vocabulary sub-test. Correlations ranged from .85 - .99, with an average correlation of .93.

Discussion

Results varied by measure and grade but were generally within *good* or *acceptable* ranges for all measures and grade levels analyzed.

References

- Alonzo, J., Ulmer, K., Tindal, G., & Glasgow, A. (2006). *easyCBM online assessment system*. <http://easycbm.com>. Eugene, OR: Behavioral Research and Teaching, University of Oregon.
- Stanford Achievement Test 10 (SAT-10). Retrieved from <https://www.statisticssolutions.com/stanford-achievement-test-10-sat-10/>
- Wray, K., Lai, C. F., Sáez, L., Alonzo, J., Tindal, G. (2014). *easyCBM beginning reading measures: Grades K-1 alternate form reliability and criterion validity with the SAT-10* (Technical Report No. 1403). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

Table 1
 Kindergarten Letter Names → SAT-10 Sounds & Letters

Test Form	8	9	10	11	12	13	14	15	16	17
Criterion	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.35	.53	.54	.45	.42	.45	.65	.56	.51	.41
False Negative Rate	.28	.15	.14	.18	.14	.28	.15	.13	.16	.14
Sensitivity	.74	.80	.80	.80	.84	.71	.76	.82	.79	.84
Specificity	.63	.56	.56	.59	.61	.57	.50	.55	.57	.61
Positive Predictive Power	.65	.47	.46	.55	.58	.55	.35	.44	.49	.59
Negative Predictive Power	.72	.85	.86	.82	.86	.72	.85	.87	.84	.86
Overall Classification Rate	.68	.64	.64	.67	.70	.63	.57	.63	.64	.70
Area Under the Curve (AUC)	.77	.69	.85	.77	.69	.85	.77	.69	.85	.77
AUC Estimate's 95% Confidence Interval: Lower Bound	.77	.79	.76	.78	.79	.73	.78	.77	.76	.77
AUC Estimate's 95% Confidence Interval: Upper Bound	.69	.71	.69	.71	.72	.64	.70	.70	.68	.69
Specificity Value at 90% Sensitivity	.49	.47	.42	.51	.48	.42	.51	.34	.45	.45
Specificity Value at 80% Sensitivity	.59	.63	.65	.61	.59	.51	.66	.63	.56	.51
Specificity Value at 70% Sensitivity	.69	.74	.70	.75	.71	.62	.74	.71	.65	.68

Table 2
Kindergarten Letter Sounds → SAT-10 Sounds & Letters

Test Form	8	9	10	11	12	13	14	15	16	17
Criterion	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters
Cut points	40 th percentile	40 th percentil e	40 th percentil e	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentil e	40 th percentile	40 th percentile
False Positive Rate	.31	.76	.65	.49	.61	.35	.69	.66	.48	.52
False Negative Rate	.27	.06	.10	.18	.13	.34	.09	.08	.22	.10
Sensitivity	.76	.84	.82	.78	.80	.69	.82	.84	.74	.86
Specificity	.66	.50	.52	.57	.53	.62	.51	.52	.57	.57
Positive Predictive Power	.69	.24	.35	.51	.39	.65	.31	.34	.52	.48
Negative Predictive Power	.73	.94	.90	.82	.88	.66	.91	.92	.78	.90
Overall Classification Rate	.71	.55	.59	.65	.60	.66	.57	.60	.64	.66
Area Under the Curve (AUC)	.76	.78	.75	.77	.76	.71	.75	.77	.74	.76
AUC Estimate's 95% Confidence Interval: Lower Bound	.68	.71	.68	.69	.68	.62	.68	.70	.66	.69
AUC Estimate's 95% Confidence Interval: Upper Bound	.84	.86	.83	.84	.83	.80	.83	.84	.82	.84
Specificity Value at 90% Sensitivity	.33	.41	.39	.40	.44	.37	.35	.46	.43	.41
Specificity Value at 80% Sensitivity	.57	.64	.62	.57	.54	.49	.57	.59	.58	.55
Specificity Value at 70% Sensitivity	.70	.67	.66	.65	.65	.63	.69	.66	.63	.66

Table 3
Kindergarten Phoneme Segmenting → SAT-10 Sounds & Letters

Test Form	5	7	7	8	10	11	12	13	14	15
Criterion	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.50	.82	.78	.71	.74	.56	.88	.76	.64	.75
False Negative Rate	.27	.07	.06	.13	.10	.23	.04	.04	.11	.11
Sensitivity	.67	.76	.83	.74	.77	.65	.77	.88	.81	.74
Specificity	.57	.47	.48	.50	.49	.59	.47	.50	.52	.48
Positive Predictive Power	.50	.18	.22	.29	.26	.44	.12	.24	.36	.25
Negative Predictive Power	.73	.93	.94	.88	.90	.77	.96	.96	.89	.89
Overall Classification Rate	.61	.51	.53	.56	.54	.61	.49	.56	.59	.53
Area Under the Curve (AUC)	.70	.64	.69	.65	.65	.64	.62	.71	.67	.66
AUC Estimate's 95% Confidence Interval: Lower Bound	.61	.55	.60	.56	.56	.55	.53	.63	.58	.57
AUC Estimate's 95% Confidence Interval: Upper Bound	.79	.72	.77	.75	.73	.74	.71	.79	.76	.74
Specificity Value at 90% Sensitivity	.18	.40	.33	.18	.18	.13	.32	.32	.19	
Specificity Value at 80% Sensitivity	.34	.45	.44	.36	.35	.25	.45	.37	.33	
Specificity Value at 70% Sensitivity	.54	.51	.49	.53	.50	.53	.58	.52	.53	

Table 4
Kindergarten Phoneme Segmenting → SAT-10 Word Reading

Test Form	5	7	8	10	11	12	13	14	15
Criterion	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading	SAT-10 Word Reading
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.52	.86	.76	.82	.56	.90	.80	.71	.80
False Negative Rate	.19	.07	.18	.11	.10	.02	.02	.16	.15
Sensitivity	.85	.83	.74	.81	.90	.92	.96	.80	.77
Specificity	.43	.31	.33	.31	.44	.32	.33	.36	.30
Positive Predictive Power	.48	.14	.24	.18	.44	.10	.20	.29	.20
Negative Predictive Power	.81	.93	.82	.89	.90	.98	.98	.84	.85
Overall Classification Rate	.59	.38	.42	.39	.59	.37	.43	.47	.39
Area Under the Curve (AUC)	.71	.60	.66	.66	.60	.72	.64	.68	.66
AUC Estimate's 95% Confidence Interval: Lower Bound	.62	.50	.57	.55	.50	.62	.55	.59	.56
AUC Estimate's 95% Confidence Interval: Upper Bound	.80	.70	.75	.76	.70	.81	.74	.77	.76
Specificity Value at 90% Sensitivity	.30	.27	.25	.20	.24	.22	.36	.38	.21
Specificity Value at 80% Sensitivity	.45	.39	.45	.30	.40	.31	.47	.44	.37
Specificity Value at 70% Sensitivity	.53	.43	.55	.45	.64	.44	.49	.53	.49

Table 5
Kindergarten easyCBM Word Reading Fluency → SAT-10 Sounds & Letters

Test Form	8	9	10	11	12	13	14	15	16	17
Criterion	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.52	.86	.76	.82	.56	.90	.80	.71	.80	.56
False Negative Rate	.19	.07	.18	.11	.10	.02	.02	.16	.15	.14
Sensitivity	.85	.83	.74	.81	.90	.92	.96	.80	.77	.77
Specificity	.43	.31	.33	.31	.44	.32	.33	.36	.30	.58
Positive Predictive Power	.48	.14	.24	.18	.44	.10	.20	.29	.20	.44
Negative Predictive Power	.81	.93	.82	.89	.90	.98	.98	.84	.85	.86
Overall Classification Rate	.59	.38	.42	.39	.59	.37	.43	.47	.39	.64
Area Under the Curve (AUC)	.76	.78	.75	.77	.76	.71	.75	.77	.74	.76
AUC Estimate's 95% Confidence Interval: Lower Bound	.68	.71	.68	.69	.68	.62	.68	.70	.66	.69
AUC Estimate's 95% Confidence Interval: Upper Bound	.84	.86	.83	.84	.83	.80	.83	.84	.82	.84
Specificity Value at 90% Sensitivity	.35	.41	.41	.40	.44	.37	.37	.46	.43	.41
Specificity Value at 80% Sensitivity	.57	.64	.62	.57	.54	.49	.57	.59	.57	.55
Specificity Value at 70% Sensitivity	.69	.67	.66	.65	.65	.63	.67	.67	.63	.66

Table 6
Grade 1 Phoneme Segmenting → SAT-10 Sounds & Letters and Word Reading

Test Form	5	5	12	12	15	15	16	16	17	17
Criterion	SAT-10 Sounds & Letters	SAT-10 Word Reading	SAT-10 Sounds & Letters	SAT-10 Word Reading	SAT-10 Sounds & Letters	SAT-10 Word Reading	SAT-10 Sounds & Letters	SAT-10 Word Reading	SAT-10 Sounds & Letters	SAT-10 Word Reading
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.40	.58	.20	.81	.90	.81	.40	.79	.81	.79
False Negative Rate	.67	.24	.33	.10	.18	.18	.33	.19	.18	.19
Sensitivity	.60	.65	.80	.65	.38	.53	.75	.53	.53	.53
Specificity	.33	.56	.67	.51	.46	.49	.50	.49	.49	.49
Positive Predictive Power	.60	.43	.80	.19	.10	.19	.60	.21	.19	.21
Negative Predictive Power	.33	.76	.67	.90	.82	.82	.67	.81	.82	.81
Overall Classification Rate	.50	.59	.75	.54	.45	.50	.63	.50	.50	.50
Area Under the Curve (AUC)	.57	.59	.60	.47	.57	.54	.63	.53	.70	.63
AUC Estimate's 95% Confidence Interval: Lower Bound	.12	.51	.16	.38	.03	.45	.20	.44	.18	.13
AUC Estimate's 95% Confidence Interval: Upper Bound	1.00	.68	1.00	.56	1.00	.63	1.00	.62	1.00	1.00
Specificity Value at 90% Sensitivity	NA	.22	NA	.04	NA	.18	NA	.08	.33	.08
Specificity Value at 80% Sensitivity	.33	.29	.33	.12	.67	.28	.33	.22	.67	.18
Specificity Value at 70% Sensitivity	.33	.35	.50	.19	.67	.38	.33	.38	.67	.28

Table 7
Grade 1 Word Reading Fluency → SAT-10 Sounds & Letters

Test Form	10	16
Criterion	SAT-10 Sounds & Letters	SAT-10 Sounds & Letters
Cut points	40 th percentile	40 th percentile
False Positive Rate	.20	.40
False Negative Rate	.33	.33
Sensitivity	.80	.75
Specificity	.67	.50
Positive Predictive Power	.80	.60
Negative Predictive Power	.67	.67
Overall Classification Rate	.75	.63
Area Under the Curve (AUC)	.60	.77
AUC Estimate's 95% Confidence Interval: Lower Bound	.16	.41
AUC Estimate's 95% Confidence Interval: Upper Bound	1.00	1.00
Specificity Value at 90% Sensitivity	NA	NA
Specificity Value at 80% Sensitivity	.33	.67
Specificity Value at 70% Sensitivity	.33	.67

Table 8
Grade 2 Passage Reading Fluency → SAT-10 Vocabulary

Test Form	5	9	10	15	17
Criterion	SAT-10 Vocabulary	SAT-10 Vocabulary	SAT-10 Vocabulary	SAT-10 Vocabulary	SAT-10 Vocabulary
Cut points	40 th percentile	40 th percentile	40 th percentile	40 th percentile	40 th percentile
False Positive Rate	.46	.61	.64	.76	.56
False Negative Rate	.13	.04	.04	.04	.04
Sensitivity	.92	.96	.96	.94	.97
Specificity	.43	.37	.38	.33	.39
Positive Predictive Power	.54	.39	.36	.24	.44
Negative Predictive Power	.88	.96	.96	.96	.96
Overall Classification Rate	.64	.54	.53	.44	.58
Area Under the Curve (AUC)	.83	.86	.86	.85	.86
AUC Estimate's 95% Confidence Interval: Lower Bound	.73	.77	.77	.76	.78
AUC Estimate's 95% Confidence Interval: Upper Bound	.93	.94	.95	.93	.95
Specificity Value at 90% Sensitivity	.54	.62	.64	.54	.63
Specificity Value at 80% Sensitivity	.71	.65	.71	.68	.71
Specificity Value at 70% Sensitivity	.79	.81	.82	.79	.79

Table 9
Correlation between Kindergarten – Letter Names & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	145	.77	.69	.85
Predictive	9	SAT-10, Sounds & Letters	155	.79	.71	.86
Predictive	10	SAT-10, Sounds & Letters	162	.76	.69	.84
Predictive	11	SAT-10, Sounds & Letters	152	.78	.71	.86
Predictive	12	SAT-10, Sounds & Letters	160	.79	.72	.86
Predictive	13	SAT-10, Sounds & Letters	145	.73	.64	.81
Predictive	14	SAT-10, Sounds & Letters	157	.78	.70	.85
Predictive	15	SAT-10, Sounds & Letters	162	.77	.70	.84
Predictive	16	SAT-10, Sounds & Letters	151	.76	.68	.83
Predictive	17	SAT-10, Sounds & Letters	161	.77	.69	.84

Table 10
Correlation between Kindergarten – Letter Sounds & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	140	.76	.68	.84
Predictive	9	SAT-10, Sounds & Letters	154	.78	.71	.86
Predictive	10	SAT-10, Sounds & Letters	163	.75	.68	.83
Predictive	11	SAT-10, Sounds & Letters	151	.77	.69	.84
Predictive	12	SAT-10, Sounds & Letters	165	.76	.68	.83
Predictive	13	SAT-10, Sounds & Letters	134	.71	.62	.80
Predictive	14	SAT-10, Sounds & Letters	155	0.75	0.68	0.83
Predictive	15	SAT-10, Sounds & Letters	163	0.77	0.70	0.84
Predictive	16	SAT-10, Sounds & Letters	149	0.74	0.66	0.82
Predictive	17	SAT-10, Sounds & Letters	163	0.76	0.69	0.84

Table 11
Correlation between Kindergarten – Phoneme Segmenting & SAT-10 Sounds & Letters & Word Reading

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	5	SAT-10, Sounds & Letters	134	0.70	0.61	0.79
Predictive	5	SAT-10, Word Reading	134	0.71	0.62	0.80
Predictive	6	SAT-10, Sounds & Letters	154	0.64	0.55	0.72
Predictive	6	SAT-10, Word Reading	152	0.60	0.50	0.70
Predictive	7	SAT-10, Sounds & Letters	163	0.69	0.60	0.77
Predictive	7	SAT-10, Word Reading	161	0.66	0.57	0.75
Predictive	8	SAT-10, Sounds & Letters	142	0.65	0.56	0.75
Predictive	8	SAT-10, Word Reading	139	0.66	0.55	0.76

Table 11

Correlation between Kindergarten – Phoneme Segmenting & SAT-10 Sounds & Letters & Word Reading

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	10	SAT-10, Sounds & Letters	165	0.65	0.56	0.73
Predictive	10	SAT-10, Word Reading	162	0.60	0.50	0.70
Predictive	11	SAT-10, Sounds & Letters	130	0.64	0.55	0.74
Predictive	11	SAT-10, Word Reading	128	0.72	0.62	0.81
Predictive	12	SAT-10, Sounds & Letters	150	0.62	0.53	0.71
Predictive	12	SAT-10, Word Reading	150	0.64	0.55	0.74
Predictive	13	SAT-10, Sounds & Letters	163	0.71	0.63	0.79
Predictive	13	SAT-10, Word Reading	162	0.68	0.59	0.77
Predictive	14	SAT-10, Sounds & Letters	144	0.67	0.58	0.76
Predictive	14	SAT-10, Word Reading	141	0.66	0.56	0.76
Predictive	15	SAT-10, Sounds & Letters	164	0.66	0.57	0.74
Predictive	15	SAT-10, Word Reading	162	0.63	0.53	0.73

Table 12
Correlation between Kindergarten – Word Reading & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	140	.76	.68	.84
Predictive	9	SAT-10, Sounds & Letters	154	.78	.71	.86
Predictive	10	SAT-10, Sounds & Letters	163	.75	.68	.83
Predictive	11	SAT-10, Sounds & Letters	151	.77	.69	.84
Predictive	12	SAT-10, Sounds & Letters	165	.76	.68	.83
Predictive	13	SAT-10, Sounds & Letters	134	.71	.62	.80
Predictive	14	SAT-10, Sounds & Letters	155	.75	.68	.83
Predictive	15	SAT-10, Sounds & Letters	163	.77	.70	.84
Predictive	16	SAT-10, Sounds & Letters	149	.74	.66	.82
Predictive	17	SAT-10, Sounds & Letters	163	.76	.69	.84

Table 13
Correlation between Grade 1 – Letter Names & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	8	.47	.00	.94
Predictive	9	SAT-10, Sounds & Letters	8	.60	.09	1.00
Predictive	10	SAT-10, Sounds & Letters	8	.63	.20	1.00
Predictive	11	SAT-10, Sounds & Letters	8	.47	.00	.95
Predictive	12	SAT-10, Sounds & Letters	8	.73	.33	1.00
Predictive	13	SAT-10, Sounds & Letters	8	.57	.08	1.00
Predictive	14	SAT-10, Sounds & Letters	8	.63	.19	1.00
Predictive	15	SAT-10, Sounds & Letters	8	.70	.27	1.00
Predictive	16	SAT-10, Sounds & Letters	8	.60	.00	1.00
Predictive	17	SAT-10, Sounds & Letters	8	.53	.05	1.00

Table 14
Correlation between Grade 1 – Letter Sounds & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval: Lower Bound	95% Confidence Interval: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	8	.40	.00	.91
Predictive	10	SAT-10, Sounds & Letters	8	.60	.16	1.00
Predictive	12	SAT-10, Sounds & Letters	8	.77	.41	1.00
Predictive	15	SAT-10, Sounds & Letters	8	.67	.23	1.00
Predictive	17	SAT-10, Sounds & Letters	8	.63	.13	1.00

Table 15
Correlation between Grade 1 – Phoneme Segmenting & SAT-10 Sounds & Letters & Word Reading

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Predictive	5	SAT-10, Sounds & Letters	8	0.57	0.12	1.00
Predictive	5	SAT-10, Word Reading	156	0.59	0.51	0.68
Predictive	12	SAT-10, Sounds & Letters	8	0.60	0.16	1.00
Predictive	12	SAT-10, Word Reading	157	0.47	0.38	0.56
Predictive	15	SAT-10, Sounds & Letters	8	0.57	0.03	1.00
Predictive	15	SAT-10, Word Reading	171	0.54	0.45	0.63
Predictive	16	SAT-10, Sounds & Letters	8	0.63	0.20	1.00
Predictive	16	SAT-10, Word Reading	161	0.53	0.44	0.62
Predictive	17	SAT-10, Sounds & Letters	8	0.70	0.18	1.00
Predictive	17	SAT-10, Word Reading	170	0.48	0.39	0.57

Table 16

Correlation between Grade 1 – Word Reading Fluency & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Predictive	8	SAT-10, Sounds & Letters	8	0.40	0.00	0.91
Predictive	10	SAT-10, Sounds & Letters	8	0.60	0.16	1.00
Predictive	12	SAT-10, Sounds & Letters	8	0.77	0.41	1.00
Predictive	15	SAT-10, Sounds & Letters	8	0.67	0.23	1.00
Predictive	17	SAT-10, Sounds & Letters	8	0.63	0.13	1.00

Table 17

Correlation between Grade 2 – Word Reading Fluency & SAT-10 Sounds & Letters

Type of Validity	Test Form	Criterion	n	Coefficient	95% Confidence Interval*: Lower Bound	95% Confidence Interval*: Upper Bound
Predictive	5	SAT-10, Vocabulary	8	.85	0.83	0.73
Predictive	9	SAT-10, Vocabulary	8	.96	0.86	0.77
Predictive	10	SAT-10, Vocabulary	8	.98	0.86	0.77
Predictive	15	SAT-10, Vocabulary	8	.99	0.85	0.76
Predictive	17	SAT-10, Vocabulary	8	.88	0.86	0.78