Cut Scores to Illinois Standards Achievement Test
Based on 2010 Scores

Ben Ditkowsky, Ph.D.

Curriculum Based Measures (CBMs) have been around for more than thirty years. For at least the last decade schools around the country have been using Cut Scores derived from CBM to predict which students are likely to struggle in school, or meet standards on a high stakes test. In Illinois, Measured Effects Inc. has provided Cut Scores to ISAT for the past seven years. This document provides Cut Scores for Key Tests of Early Literacy and Reading Curriculum - Based Measurement predictive of success on the Illinois Standards Achievement Test. The first table, Table 1 provides Cut Scores that predict success upon entry of third grade based on an R-CBM score of 75 to 80 Words Read Correctly. The second table, Table 2, provides Cut Scores that were directly linked to the ISAT for the same year, 2010.

There are many valid ways in which Cut Scores may be used. In general, the Cut Scores function very well. They were derived from data from thousands of individually administered measures, furnished from school districts across the state of Illinois, including data from rural, suburban and urban school districts. The Cut Scores **do not provide** a perfect prediction. When we think about it, it is remarkable to think that a one minute sample of oral reading in September, January or May would be able to predict the results of a test lasting more than two hours administered over two to three days in March, but it does. The benefits of CBM are far more widespread than the simple use of Cut Scores, In the document below, I have summarized some of the ways in which Cut Scores can be used.

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Table 1. Cut Scores for Measures of Early Literacy Grades K - 2

Grade	Measure	*Fall*		*Winter*		*Spring*	
		Below Basic	Proficient	Below Basic	Proficient	Below Basic	Proficient
K	LNF*	*2*	*8*	*15*	*27*	*29*	*40*
	LSF**	3**	13**	15	30	25	40
	NWF	-	-	*5*	*20*	*15*	*25*
1	*LSF*	20	35	-	-	-	-
	NWF	*15*	*25*	*30*	*50*	-	-
	R-CBM	*0*	*20*	*20*	*40*	*40*	*60*
2	R-CBM	*30*	*45*	*55*	*65*	*70*	*90*

Note. LNF = Letter Naming Fluency; LSF = Letter Sound Fluency;
NWF = Nonsense Word Fluency; R-CBM = Reading Curriculum-Based Measurement;
*LNF based on DIBELS Cut Scores
**LSF in Fall of K is typically measured in late October or early November

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Use of Cut Scores: The Cut Scores presented in Table 1 are intended to be used primarily for Program Evaluation purposes (for example making triangles). Scores that fall at or below the cut score for **Below Basic** are an indication that the student has not sufficiently mastered basic skills for the grade level. Scores at or above ***the* Proficient** level indicate a high probability that students have mastered basic skills for that grade level. Scores that fall *between the Below Basic and Proficient* range indicate a degree of uncertainty regarding mastery of basic skills.

How I shouldn't use these Scores?

Don't Use for Resource allocation. Although some schools have decided to use these scores to determine who needs assistance based on the attainment of the cut Scores, I do not recommend this application for practical reasons. If many students in a school do not meet the expectations, using these scores for placement into tiers 2 and 3 could result in having more students who require "extra" service, than there is space available. Instead the focus should be addressed at the core instructional level. That is, intensify the Core Instructional Program for all students. On the other hand if a school is high performing, use of these cut scores to determine placement would result in very few students receiving extra service. In this case, a student who is performing significantly below peers, but still above the Cut Score (i.e., someone who can't keep up with his/her peers) would not receive service that is needed. In both cases, the wrong proportion of students would be identified for service, and the result would be frustration. **For this reason, local normative data should be used for resource allocation.**

How I should use these Scores?

The Cut Scores are useful as a guide to determine if groups of students are on-track at a given point in the school year. In figure 2 below examples of how to use Cut Scores to ISAT are listed.

Season	Compare current students to Previous cohort	Determine if there is sufficient Growth	Goal Setting for Tier 2 intervention	Identify students for acceleration	Readiness for Core Program	
					Intensify the Core	Enhance the Core
Fall	x		x	x	x	x
Winter	x	x	x	x	x	X
Spring	x	x	x	x	x	X

Figure 2. Examples Of How To Use Cut Scores To ISAT

In the fall, the Cut Scores are useful for predictive purposes. For example, one might use Cut Scores to determine if incoming students are ready for the standard curriculum, as is, without modification or if the core program may need to be intensified. Along the same lines, calculation of the proportion of students who fall within a band (i.e., below basic, proficient) will provide teachers with a general idea, whether the class this year is higher or lower performing than classes in previous years.

In Table 2 an additional category, *Confidently Proficient* has been added. Students who score in this range may also need something different from the Core Instructional Program, but instead of remedial assistance, these students are typically ready to move ahead at a faster rate, delving deeper into the curriculum

than is typically done within the core. The ***Confidently Proficient*** student is likely to exceed standards on state tests like ISAT, and should be challenged. As an example, roughly 68% of grade 6 students who scored in the confidently proficient range in the September 2009, (490 of 723) exceeded standards on ISAT, while only 1% (8 of 723) scored in the below standards range. In short, most of the students in the confidently proficient range, not only meet, but exceed standards.

In addition, Cut Scores are useful to set progress monitoring goals for students in Tier 2 and or Tier 3 intervention. In Winter and Spring, Cut Scores are helpful to determine if there has been sufficient growth within the standard program as part of a comprehensive program evaluation.

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Table 2. Cut Scores to the Illinois Standards Achievement Test (ISAT)

		Fall			Winter			Spring		
Grade	Measure	Below Basic	Proficient	Confidently Proficient	Below Basic	Proficient	Confidently Proficient	Below Basic	Proficient	Confidently Proficient
3	R-CBM	48	75	118	73	100	140	92	119	158
4	R-CBM	69	94	134	89	113	153	102	127	169
5	R-CBM	80	107	148	97	125	165	113	141	181
6	R-CBM	89	118	170	105	133	185	111	143	198
7	R-CBM	103	131	187	114	142	199	123	152	213
8	R-CBM	94	120	207	105	132	219	114	140	228

Note R-CBM = Reading Curriculum-Based Measurement;
Based on N paired CBM and ISAT scores; Grade **3,N~3400; Grade 4, N ~3300; Grade 5, N ~3400; Grade 6, N~2600; Grade 7, N ~ 2300; Grade 8, N ~ 2300.**

Cut Scores for the ISAT presented in Table 2 were derived using data from the 2009-10 school year and ISAT in March 2010. Scores at-or below values of below basic indicate justification for concern. Scores at or above the **Confidently Proficient** level indicate we can be confident that the student has mastered basic skills, and in most cases have exceeded expectations for the grade level (i.e., likely to exceed standards on ISAT). Scores ***above the* Proficient *level but below the* Confidently Proficient** level indicate a high probability that students have mastered basic skills for that grade level. Scores that fall between the Below Basic and Proficient range indicate a degree of uncertainty regarding mastery of basic skills. Scores that fall at or below the cut score for **Below Basic** are an indication that the student has not sufficiently mastered basic skills for the grade level.

Stability of Validity Coefficients: Performance of cut scores across years and districts has been stable +/- 10% including revised ISAT 05-06, 06-07, 07-08, 09-10 for grade 3. Cut-scores are approximated with a combination of logistic regression and discriminant function analysis with the criterion measure being the state test for Illinois (ISAT). Bootstrap resampling of repeated logistic regressions of third grade data revealed asymmetric 95% empirical confidence intervals within 4 WRC. Specifically, the 2007-08 Fall cut score for Below Basic of 51 ranged from 51 to 54 WRC; The Fall Proficient Cut Score of 77 ranged from 76 to 80.

Receive Operator Characteristic Curve (ROC) and the Area Under the Curve

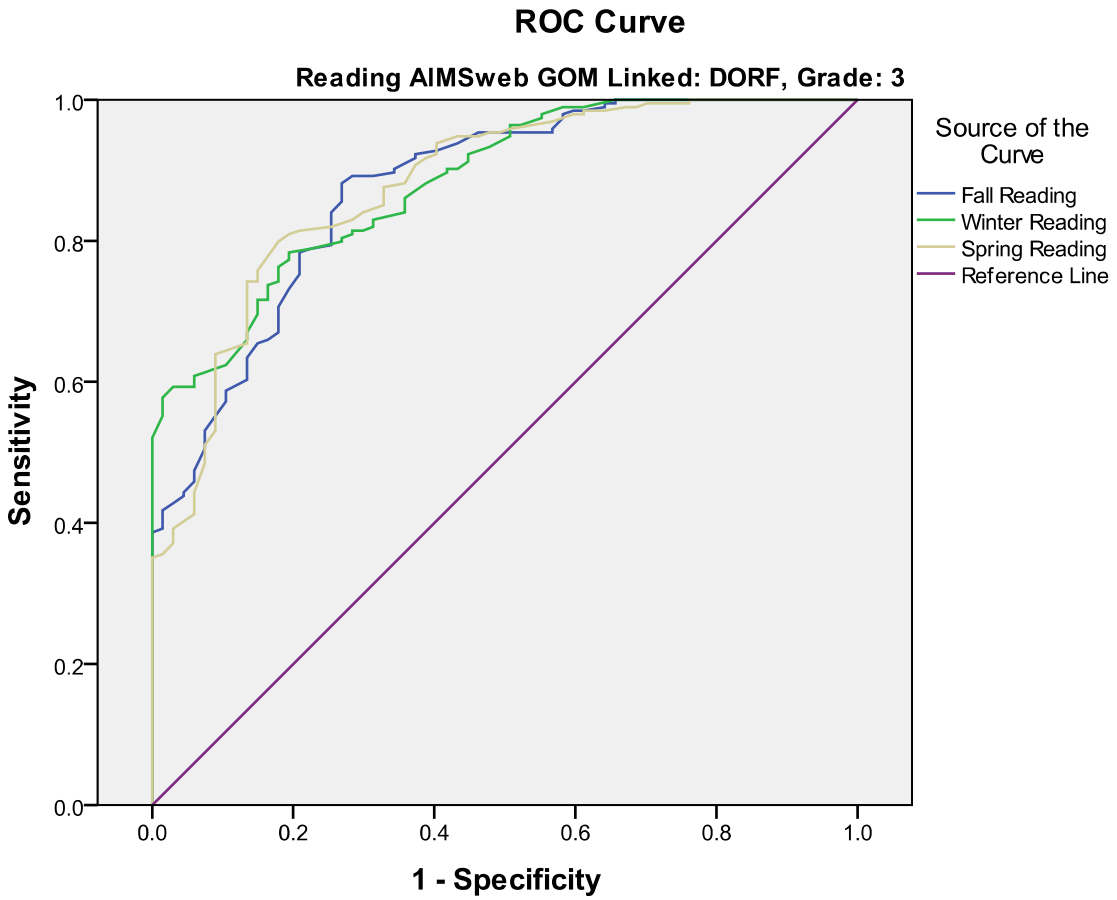
A Receive Operator Characteristic Curve (ROC) describes the performance of a prediction model across the entire range of classification thresholds, plotting the true positive identification rate against the false positive rate (1-Specificity) for various cut scores. In addition to a ROC plot, the area under the curve (AUC) is calculated to produce an effect size indicator of the ROC analysis. The AUC is an aggregation of test performance over the range of pairings of sensitivity and specificity, with the maximum value for the AUC equal to 1.0, a theoretically perfect test, while an AUC value of 0.5 denotes no discriminative value, equivalent to a chance occurrence.

Table 3. Area Under the Curve For DIBELS and Aimsweb R-CBM Predicting ISAT

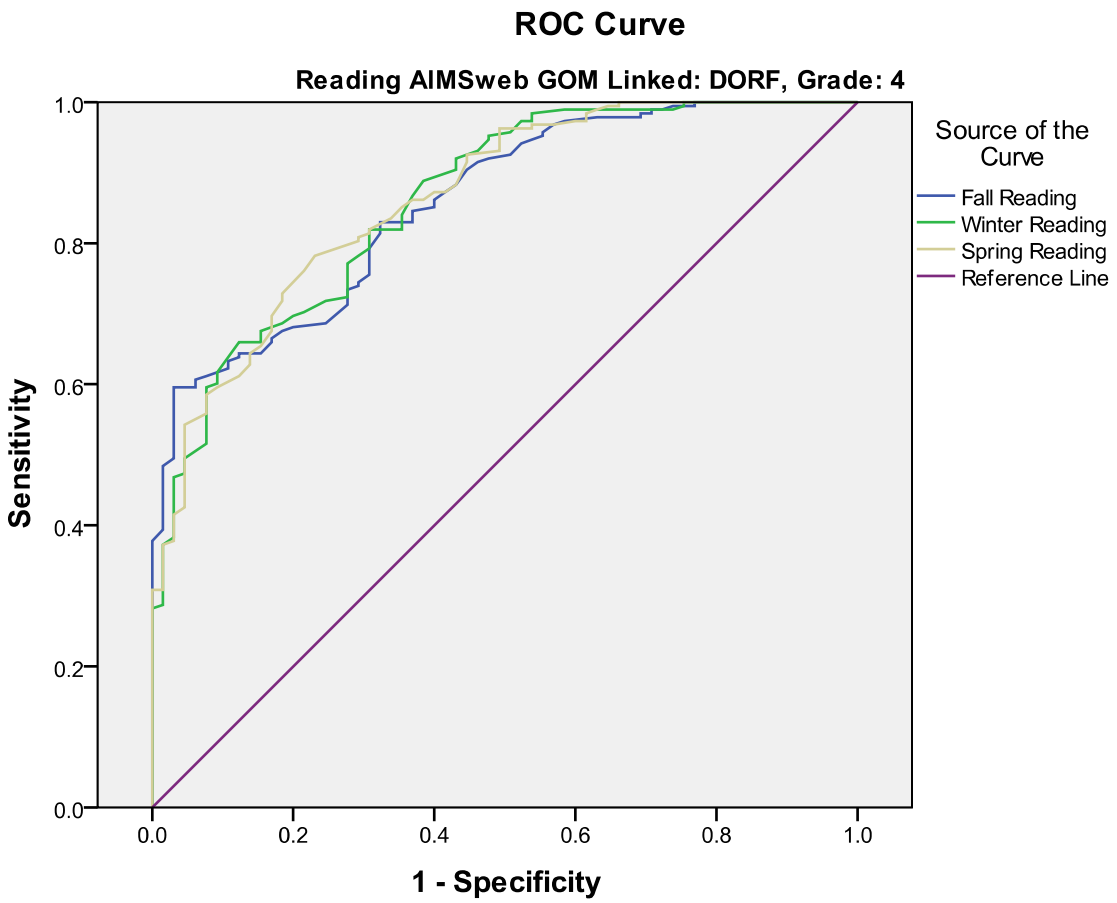
Grade	Season	DORF	AW R-CBM		Grade	Season	DORF	AW R-CBM
3	Fall	.874	.864		6	Fall		.871
3	Winter	.883	.875		6	Winter		.872
3	Spring	.878	.872		6	Spring		.860
3	**N**	**261**	**3435**			**N**		**2649**
4	Fall	.856	.867		7	Fall		.872
4	Winter	.860	.878		7	Winter		.875
4	Spring	.863	.877		7	Spring		.870
4	**N**	**253**	**3317**			**N**		**2347**
5	Fall	.835	.867		8	Fall		.890
5	Winter	.827	.878		8	Winter		.890
5	Spring	.816	.877		8	Spring		.889
	N	**211**	**3447**			**N**		**2332**

In the figures that follow, ROC plots for DIBELS and Aimsweb R-CBM are provided. The National Center on Response to Intervention lists AUC Values of .9 and greater as convincing evidence, and values between .80 and .90 as partially convincing evidence for accurately classifying students as at - risk. In Table 3 AUC values for DIBELS (grades 3-5) and Aimsweb (grades 3 - 8) are presented. Although at each level the AUC values approach the convincing mark designated by the center, overall, the values for each time

period and at every grade level provide partially convincing evidence.



Diagonal segments are produced by ties.



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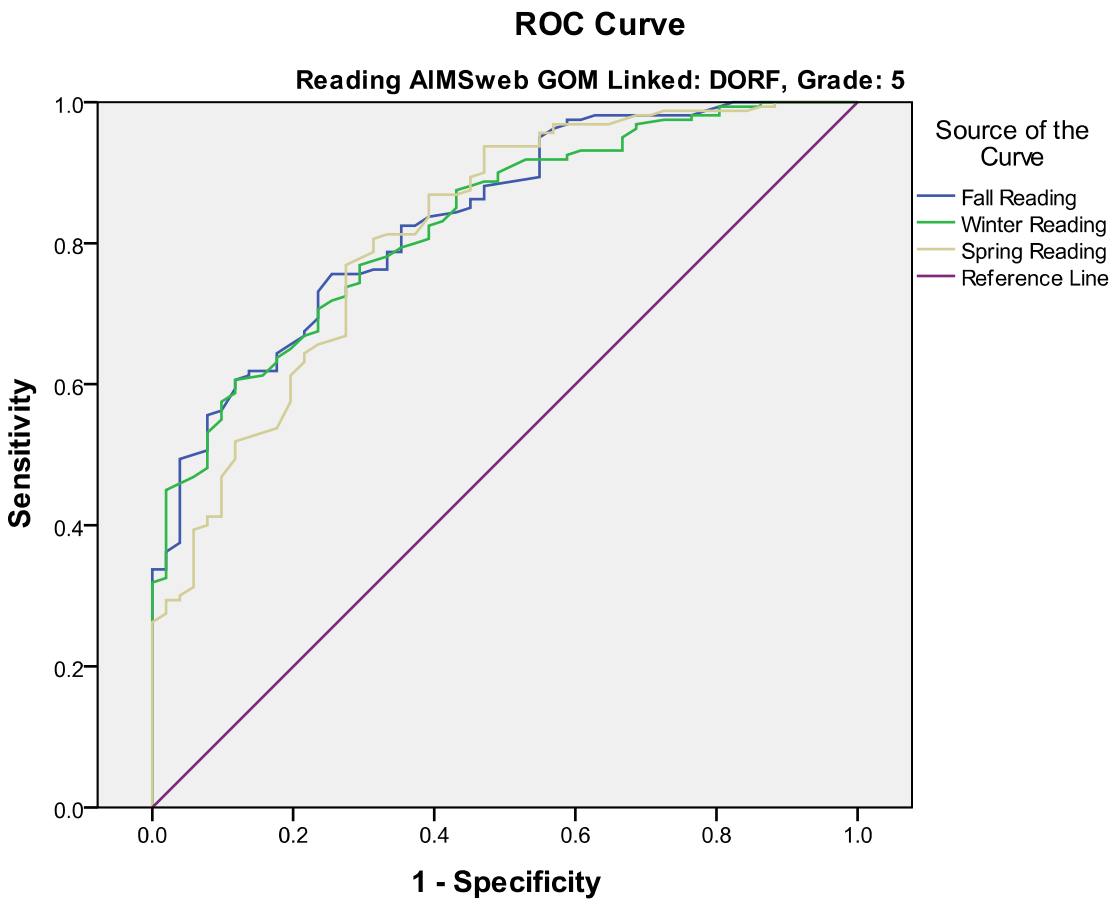

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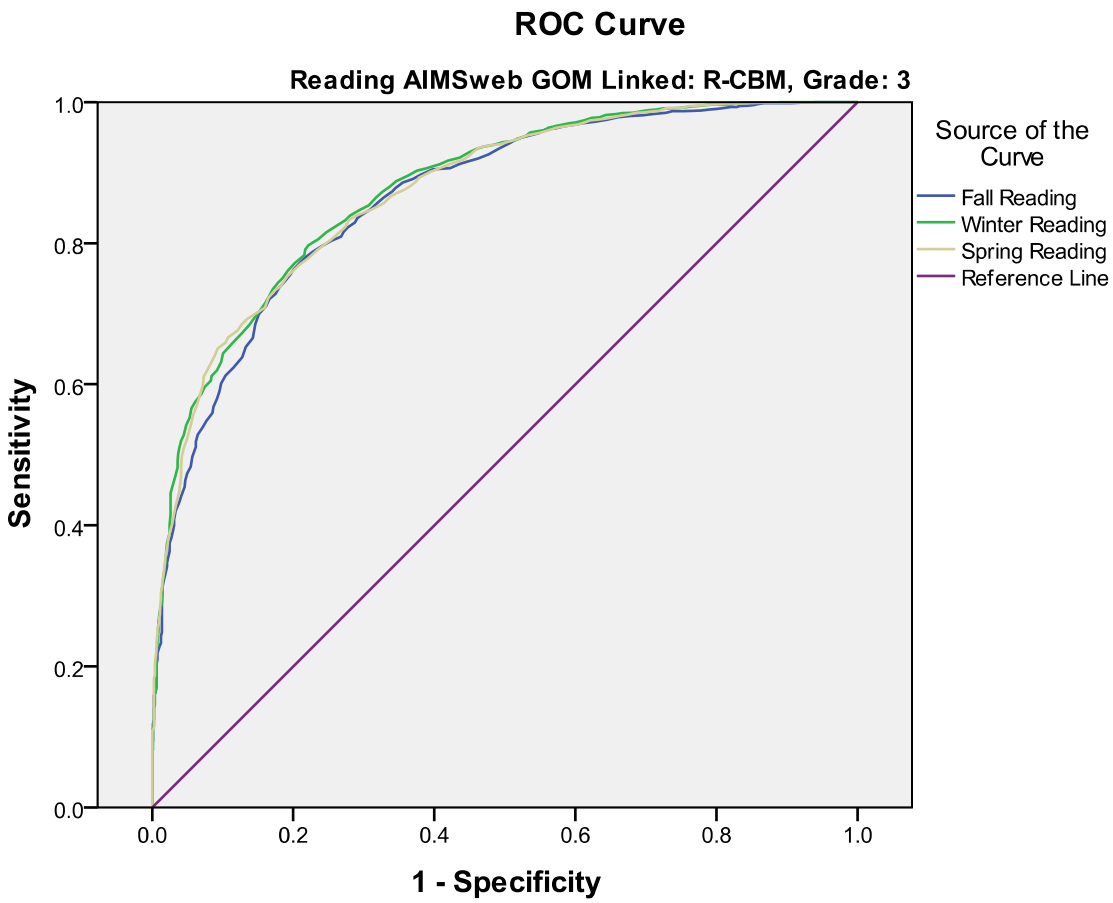

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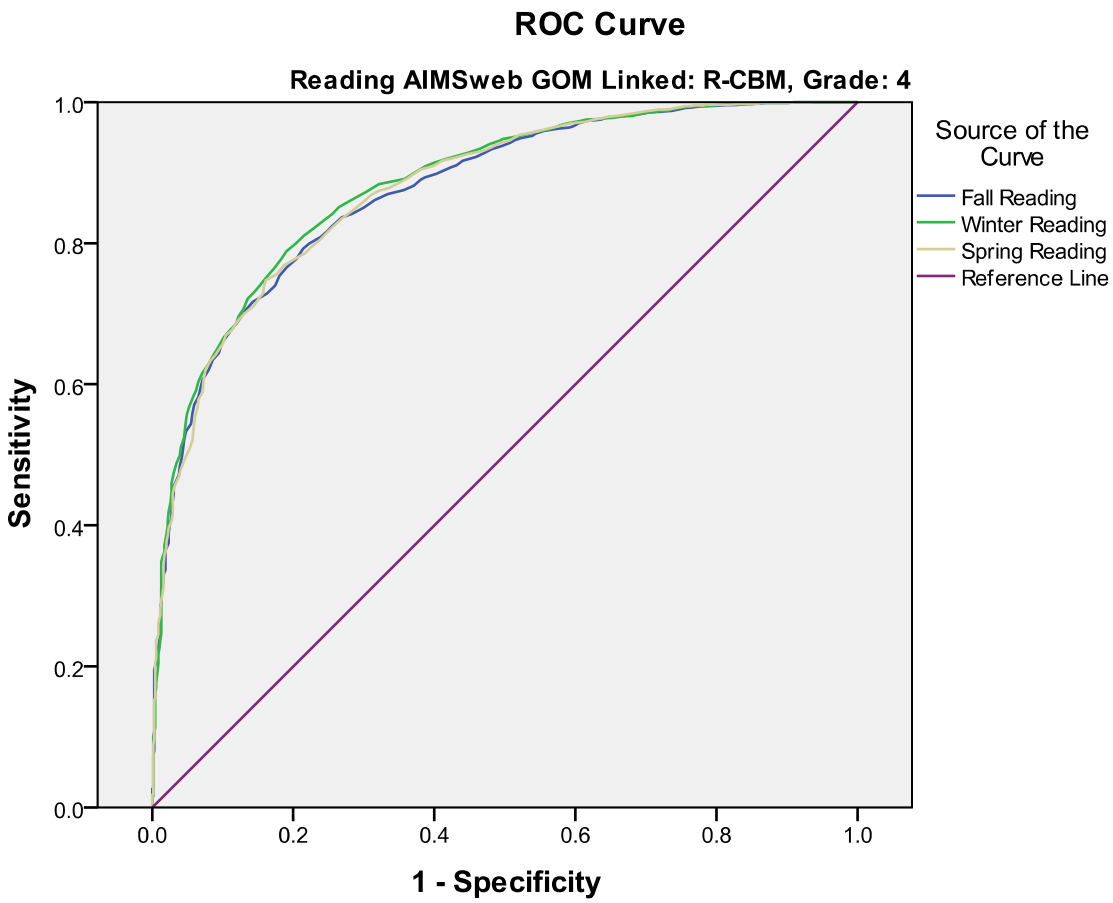

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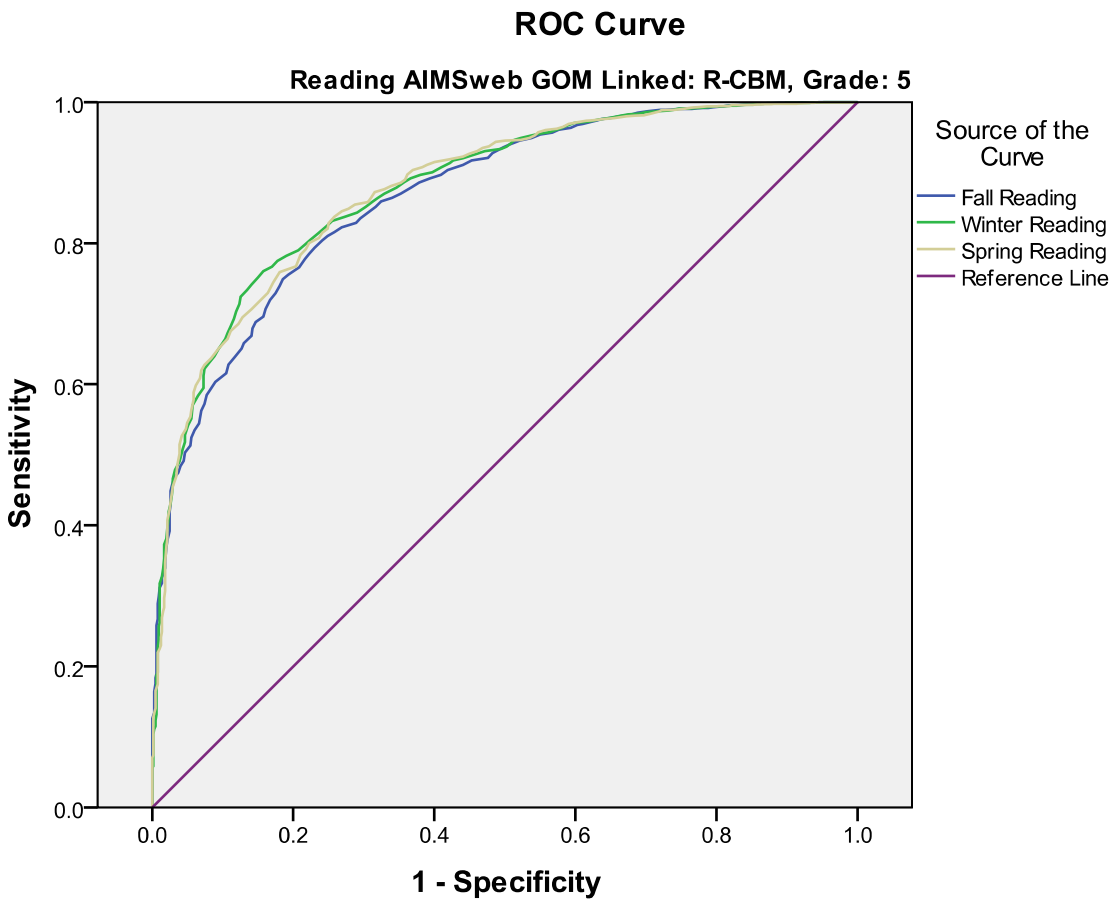

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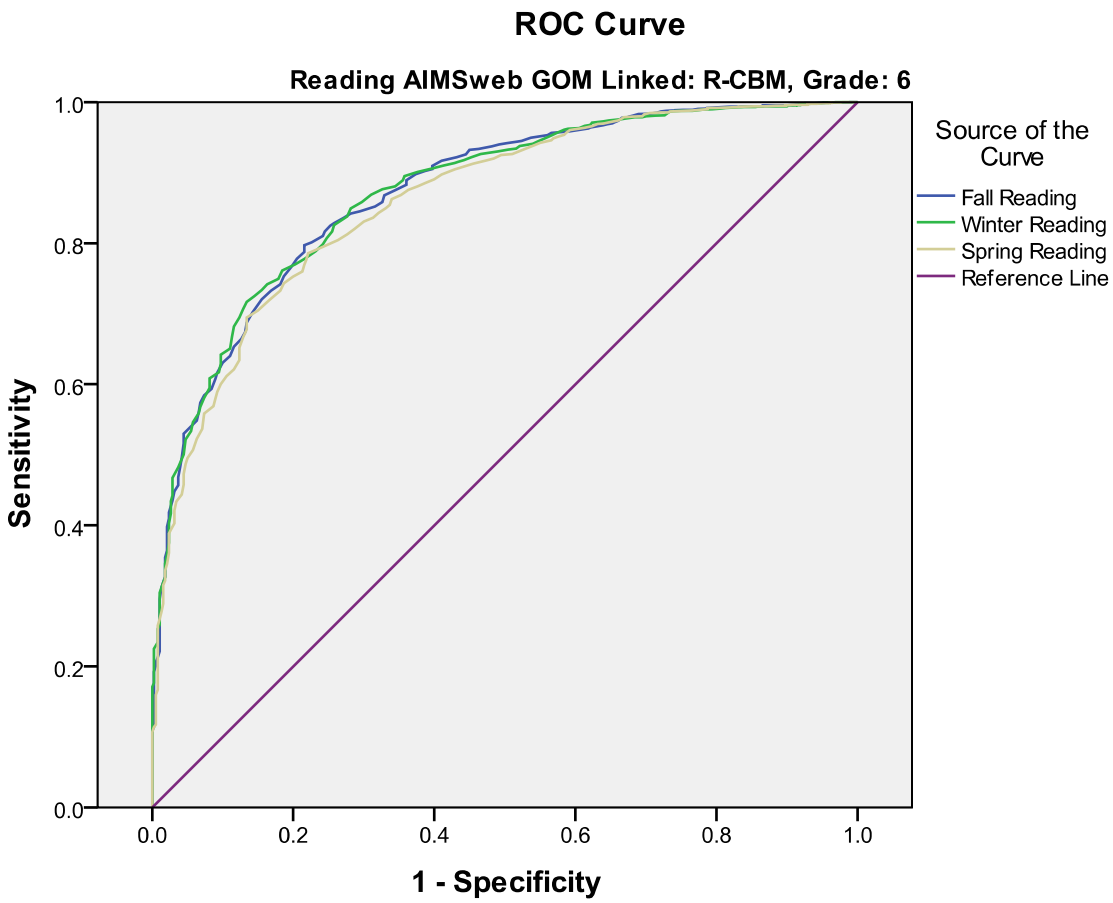

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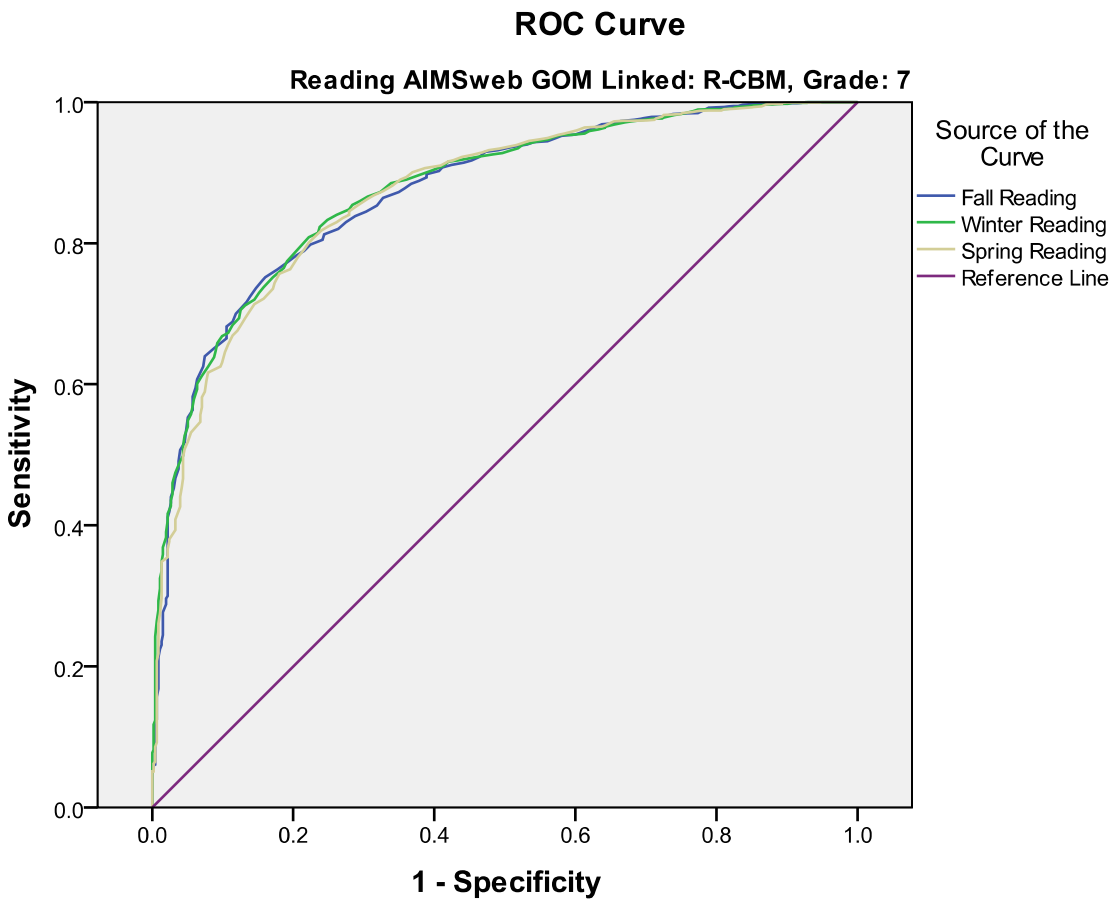

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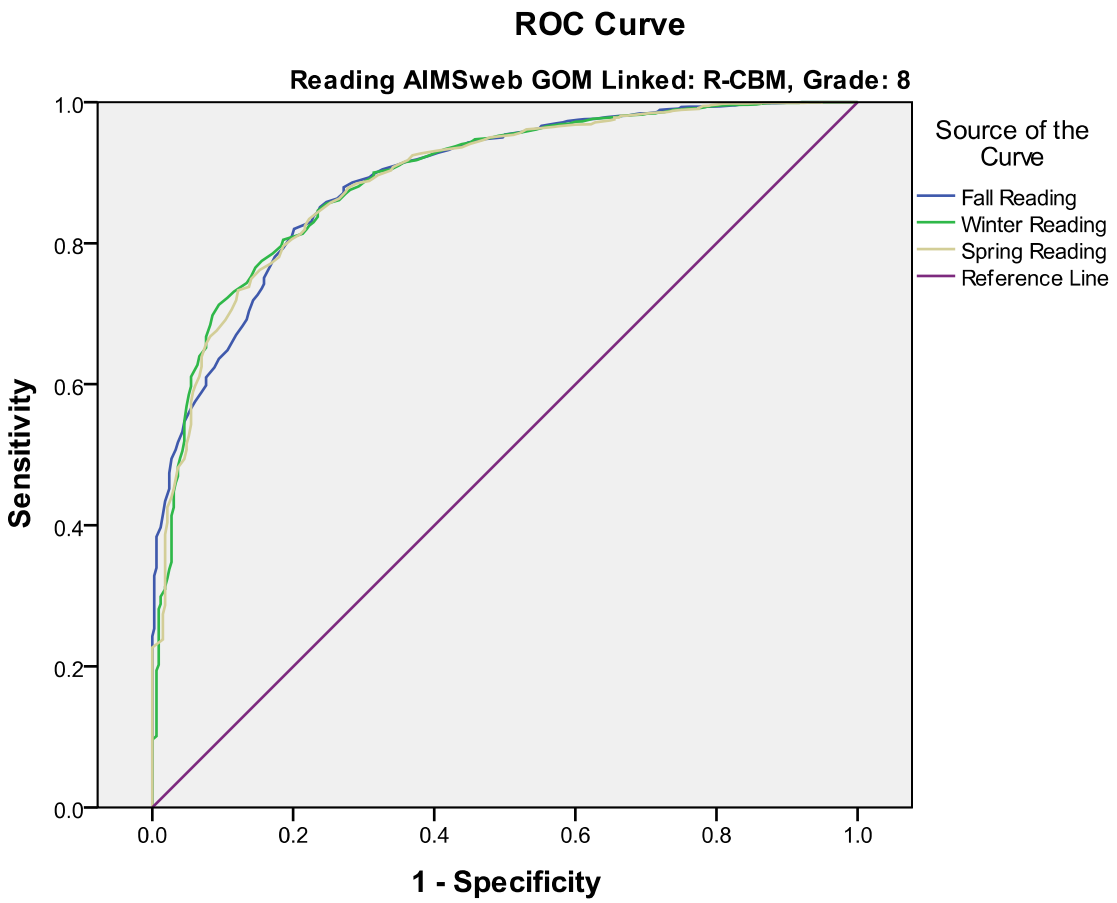

Diagonal segments are produced by ties.

Predictive Validity. Fall, Winter and Spring Reading Curriculum-Based Measurement scores for students from grades 3 - 8 were compared to scores from the Illinois Standards Achievement Test. For each grade and time period the number of scores varied, however for each grade level and time period no fewer than 2500 pairs of scores were considered (for grades 3 - 8 the approximate number of paired scores was 4300, 4200, 4400, 3300, 3000, 3000 respectively. Concurrent, Criterion - Related Validity was computed for each Fall, Winter and Spring Session with R-CBM as the predictor variable and the Illinois Standards Achievement Test as the Criterion measure.) were consistently though larger than predictive coefficients.

Table 4. Criterion - related Validity of R-CBM and ISAT

		R-CBM		
Grade	**Source**	**Fall**	**Winter**	**Spring**
3		.70	.72	.72
4	ISAT	.70	.71	.70
5	Reading	.70	.71	.70
6	Scale	.69	.69	.66
7	Score	.67	.67	.64
8		.67	.67	.64

Obtained validity coefficients reveal that between 41 and 52% of the variance in ISAT scores is explained by CBM. Not too bad when we consider that we are saying that 50% of the variance in scores on a two hour test is predicted by a one minute sample of oral reading!