MINNESOTA
LINKING STUDY

A Study of the Alignment of the NWEA RIT Scale
with the Minnesota Comprehensive Assessments (MCA) Testing Program

April 2014

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NWEA
Northwest Evaluation Association
Partnering to help all kids learn

A STUDY OF THE ALIGNMENT OF THE NWEA RIT SCALE WITH THE MINNESOTA STATE COMPREHENSIVE ASSESSMENTS (MCA) TESTING PROGRAM

APRIL 2014

Recently, NWEA completed a study to connect the scale of the Minnesota Comprehensive Assessments (MCA) Testing Program used for Minnesota's mathematics and reading assessments with NWEA's RIT scale. Information from the state assessments was used in a study to establish performance-level scores on the RIT scale that would indicate a good chance of success on these tests.

To perform the analysis, we linked together state test and NWEA test results for a sample of 49,160 Minnesota students who completed both exams in the spring of 2013, the term in which the MCA is administered. For the spring season (labeled "current season"), an Equipercentile method was used to estimate the RIT score equivalent to each state performance level. Under this method, we determined the percentage of the population within the selected study group that performed at each level on the state test and found the equivalent percentile ranges within the NWEA dataset to estimate the cut scores. For example, if 40% of the study group population in grade 3 mathematics performed below the proficient level on the state test, we would find the RIT score that would be equivalent to the 40th percentile for the study population (this would not be the same as the 40th percentile in the NWEA norms). This RIT score would be the estimated point on the NWEA RIT scale that would be equivalent to the minimum score for proficiency on the state test. For the prior (fall) season, cut scores were estimated by identifying the RIT score associated with the same normative percentile ranking as the cut score from the same season. For example, if the cut score for Level 3 in third grade reading was found to fall at the 44th percentile on NWEA's status norms, the RIT score associated with the 44th percentile for third graders in the fall was assigned as the "prior season" cut score associated with that grade and performance level. Documentation about this method can be found on our website.

Table Sets 1 and 2 show the best estimate of the minimum RIT equivalent to each state performance level for same-season (spring) and prior-season (fall) RIT scores. These tables can be used to identify students who may need additional help to perform well on these tests.

Table Sets 3 and 4 show the estimated probability of a student receiving a proficient score (Level 3) on the state assessment, based on that student's RIT score. These tables can be used to assist in identifying students who are not likely to pass these assessments, thereby increasing the probability that intervention strategies will be planned and implemented. These tables can also be useful for identifying target RIT-score objectives likely to correspond to successful or "proficient" performance on the state test.

Table 5 shows the correlation coefficients between MAP and the state test in each grade. These statistics show the degree to which MAP and the state test are linearly related, with values at or near 1.0 suggesting a perfect linear relationship, and values near 0.0 indicating no linear relationship. Table 6 shows the percentages of students at each grade and within each subject whose status on the state test (i.e., whether or not the student "met standards") was accurately predicted by their MAP performance and using the estimated cut scores within the current study. This table can be used to understand the predictive validity of MAP with respect to the MCA.

TABLE SET 1 – MINIMUM ESTIMATED SAME-SEASON (SPRING) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS

MATH - Spring Season							
Cut Scores and %tiles for each State Performance Level							
Grade	Does Not Meet the Standards	Partially Meets the Standards		Meets the Standards		Exceeds the Standards	
	Cut Score	Cut Score	%tile	Cut Score	%tile	Cut Score	%tile
2	<182	182	24	191	50	204	84
3	<194	194	24	203	50	216	84
4	<205	205	30	213	51	227	85
5	<216	216	37	228	68	244	94
6	<220	220	36	232	66	246	90
7	<222	222	31	237	64	251	88
8	<225	225	30	237	56	251	82
READING - Spring Season							
Cut Scores and %tiles for each State Performance Level							
Grade	Does Not Meet the Standards	Partially Meets the Standards		Meets the Standards		Exceeds the Standards	
	Cut Score	Cut Score	%tile	Cut Score	%tile	Cut Score	%tile
2	<185	185	39	192	58	209	90
3	<195	195	39	202	58	218	90
4	<202	202	37	211	62	225	90
5	<204	204	28	214	55	229	88
6	<212	212	38	219	57	231	84
7	<217	217	43	224	62	236	87
8	<220	220	44	227	62	240	88

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Table Set 3 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data. Level 3 has been designated by the State as demonstrating "sufficient command of grade level knowledge", but "are not yet on track for college-and-career readiness without additional academic support".

TABLE SET 2 – MINIMUM ESTIMATED PRIOR-SEASON (FALL) RIT CUT SCORES CORRESPONDING TO STATE PERFORMANCE LEVELS

MATH - Fall Season							
Cut Scores and %tiles for each State Performance Level							
Grade	Does Not Meet the Standards	Partially Meets the Standards		Meets the Standards		Exceeds the Standards	
	Cut Score	Cut Score	%tile	Cut Score	%tile	Cut Score	%tile
2	<169	169	24	178	49	191	84
3	<183	183	23	192	50	204	83
4	<197	197	30	204	51	217	84
5	<208	208	36	219	67	235	94
6	<214	214	36	226	66	239	90
7	<217	217	30	231	63	245	88
8	<221	221	29	232	54	246	82
READING - Fall Season							
Cut Scores and %tiles for each State Performance Level							
Grade	Does Not Meet the Standards	Partially Meets the Standards		Meets the Standards		Exceeds the Standards	
	Cut Score	Cut Score	%tile	Cut Score	%tile	Cut Score	%tile
2	<171	171	38	179	58	196	90
3	<185	185	37	193	58	209	90
4	<195	195	37	204	62	218	90
5	<199	199	28	209	55	224	88
6	<208	208	38	215	57	226	83
7	<213	213	41	220	60	232	87
8	<217	217	44	224	62	237	88

*Note: the cut scores shown in this table are the **minimum** estimated scores. Meeting the minimum MAP cut score corresponds to a 50% probability of achieving that performance level. Use the probabilities in Table Set 4 to determine the appropriate 'target' scores for a desired level of certainty. Italics represent extrapolated data. Level 3 has been designated by the State as demonstrating "sufficient command of grade level knowledge", but "are not yet on track for college-and-career readiness without additional academic support".

TABLE SET 3 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE TEST IN SAME SEASON (SPRING), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP ASSESSMENT

MATH - Spring Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***0%***	0%	0%	0%	0%	0%	0%
135	***0%***	0%	0%	0%	0%	0%	0%
140	***1%***	0%	0%	0%	0%	0%	0%
145	***1%***	0%	0%	0%	0%	0%	0%
150	***2%***	0%	0%	0%	0%	0%	0%
155	***3%***	1%	0%	0%	0%	0%	0%
160	***4%***	1%	0%	0%	0%	0%	0%
165	***7%***	2%	1%	0%	0%	0%	0%
170	***11%***	4%	1%	0%	0%	0%	0%
175	***17%***	6%	2%	0%	0%	0%	0%
180	***25%***	9%	4%	1%	1%	0%	0%
185	***35%***	14%	6%	1%	1%	1%	1%
190	***48%***	21%	9%	2%	1%	1%	1%
195	***60%***	31%	14%	4%	2%	1%	1%
200	***71%***	43%	21%	6%	4%	2%	2%
205	***80%***	55%	31%	9%	6%	4%	4%
210	***87%***	67%	43%	14%	10%	6%	6%
215	***92%***	77%	55%	21%	15%	10%	10%
220	***95%***	85%	67%	31%	23%	15%	15%
225	***97%***	90%	77%	43%	33%	23%	23%
230	***98%***	94%	85%	55%	45%	33%	33%
235	***99%***	96%	90%	67%	57%	45%	45%
240	***99%***	98%	94%	77%	69%	57%	57%
245	***100%***	99%	96%	85%	79%	69%	69%
250	***100%***	99%	98%	90%	86%	79%	79%
255	***100%***	99%	99%	94%	91%	86%	86%
260	***100%***	100%	99%	96%	94%	91%	91%
265	***100%***	100%	99%	98%	96%	94%	94%
270	***100%***	100%	100%	99%	98%	96%	96%
275	***100%***	100%	100%	99%	99%	98%	98%
280	***100%***	100%	100%	99%	99%	99%	99%
285	***100%***	100%	100%	100%	100%	99%	99%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of performing at Level 3 or higher on the state test based on a MAP test score taken during that same (spring) season. Example: if a fifth grade student scored 200 on a MAP test taken during the spring season, her/his estimated probability of performing at Level 3 or higher on the state test is 6%.

Italics represent extrapolated data.

READING - Spring Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	*2*	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***0%***	0%	0%	0%	0%	0%	0%
135	***0%***	0%	0%	0%	0%	0%	0%
140	***1%***	0%	0%	0%	0%	0%	0%
145	***1%***	0%	0%	0%	0%	0%	0%
150	***1%***	1%	0%	0%	0%	0%	0%
155	***2%***	1%	0%	0%	0%	0%	0%
160	***4%***	1%	1%	0%	0%	0%	0%
165	***6%***	2%	1%	1%	0%	0%	0%
170	***10%***	4%	2%	1%	1%	0%	0%
175	***15%***	6%	3%	2%	1%	1%	1%
180	***23%***	10%	4%	3%	2%	1%	1%
185	***33%***	15%	7%	5%	3%	2%	1%
190	***45%***	23%	11%	8%	5%	3%	2%
195	***57%***	33%	17%	13%	8%	5%	4%
200	***69%***	45%	25%	20%	13%	8%	6%
205	***79%***	57%	35%	29%	20%	13%	10%
210	***86%***	69%	48%	40%	29%	20%	15%
215	***91%***	79%	60%	52%	40%	29%	23%
220	***94%***	86%	71%	65%	52%	40%	33%
225	***96%***	91%	80%	75%	65%	52%	45%
230	***98%***	94%	87%	83%	75%	65%	57%
235	***99%***	96%	92%	89%	83%	75%	69%
240	***99%***	98%	95%	93%	89%	83%	79%
245	***100%***	99%	97%	96%	93%	89%	86%
250	***100%***	99%	98%	97%	96%	93%	91%
255	***100%***	100%	99%	98%	97%	96%	94%
260	***100%***	100%	99%	99%	98%	97%	96%
265	***100%***	100%	100%	99%	99%	98%	98%
270	***100%***	100%	100%	100%	99%	99%	99%
275	***100%***	100%	100%	100%	100%	99%	99%
280	***100%***	100%	100%	100%	100%	100%	100%
285	***100%***	100%	100%	100%	100%	100%	100%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of performing at Level 3 or higher on the state test based on a MAP test score taken during that same (spring) season. Example: if a fifth grade student scored 200 on a MAP test taken during the spring season, her/his estimated probability of performing at Level 3 or higher on the state test is 20%.

Italics represent extrapolated data.

TABLE SET 4 –ESTIMATED PROBABILITY OF SCORING AS PROFICIENT OR HIGHER ON THE STATE TEST IN PRIOR SEASON (FALL), BY STUDENT GRADE AND RIT SCORE RANGE ON MAP

MATH - Fall Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***1%***	0%	0%	0%	0%	0%	0%
135	***1%***	0%	0%	0%	0%	0%	0%
140	***2%***	1%	0%	0%	0%	0%	0%
145	***4%***	1%	0%	0%	0%	0%	0%
150	***6%***	1%	0%	0%	0%	0%	0%
155	***9%***	2%	1%	0%	0%	0%	0%
160	***14%***	4%	1%	0%	0%	0%	0%
165	***21%***	6%	2%	0%	0%	0%	0%
170	***31%***	10%	3%	1%	0%	0%	0%
175	***43%***	15%	5%	1%	1%	0%	0%
180	***55%***	23%	8%	2%	1%	1%	1%
185	***67%***	33%	13%	3%	2%	1%	1%
190	***77%***	45%	20%	5%	3%	2%	1%
195	***85%***	57%	29%	8%	4%	3%	2%
200	***90%***	69%	40%	13%	7%	4%	4%
205	***94%***	79%	52%	20%	11%	7%	6%
210	***96%***	86%	65%	29%	17%	11%	10%
215	***98%***	91%	75%	40%	25%	17%	15%
220	***99%***	94%	83%	52%	35%	25%	23%
225	***99%***	96%	89%	65%	48%	35%	33%
230	***99%***	98%	93%	75%	60%	48%	45%
235	***100%***	99%	96%	83%	71%	60%	57%
240	***100%***	99%	97%	89%	80%	71%	69%
245	***100%***	100%	98%	93%	87%	80%	79%
250	***100%***	100%	99%	96%	92%	87%	86%
255	***100%***	100%	99%	97%	95%	92%	91%
260	***100%***	100%	100%	98%	97%	95%	94%
265	***100%***	100%	100%	99%	98%	97%	96%
270	***100%***	100%	100%	99%	99%	98%	98%
275	***100%***	100%	100%	100%	99%	99%	99%
280	***100%***	100%	100%	100%	100%	99%	99%
285	***100%***	100%	100%	100%	100%	100%	100%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of performing at Level 3 or higher on the state test based on a MAP test score taken during that prior (fall) season. Example: if a fifth grade student scored 200 on a MAP test taken during the fall season, her/his estimated probability of performing at Level 3 or higher on the state test is 13%.

Italics represent extrapolated data.

READING - Fall Season							
Estimated Probability of Passing State Test Based on Observed MAP Score							
RIT Range	2	3	4	5	6	7	8
120	***0%***	0%	0%	0%	0%	0%	0%
125	***0%***	0%	0%	0%	0%	0%	0%
130	***1%***	0%	0%	0%	0%	0%	0%
135	***1%***	0%	0%	0%	0%	0%	0%
140	***2%***	0%	0%	0%	0%	0%	0%
145	***3%***	1%	0%	0%	0%	0%	0%
150	***5%***	1%	0%	0%	0%	0%	0%
155	***8%***	2%	1%	0%	0%	0%	0%
160	***13%***	4%	1%	1%	0%	0%	0%
165	***20%***	6%	2%	1%	1%	0%	0%
170	***29%***	9%	3%	2%	1%	1%	0%
175	***40%***	14%	5%	3%	2%	1%	1%
180	***52%***	21%	8%	5%	3%	2%	1%
185	***65%***	31%	13%	8%	5%	3%	2%
190	***75%***	43%	20%	13%	8%	5%	3%
195	***83%***	55%	29%	20%	12%	8%	5%
200	***89%***	67%	40%	29%	18%	12%	8%
205	***93%***	77%	52%	40%	27%	18%	13%
210	***96%***	85%	65%	52%	38%	27%	20%
215	***97%***	90%	75%	65%	50%	38%	29%
220	***98%***	94%	83%	75%	62%	50%	40%
225	***99%***	96%	89%	83%	73%	62%	52%
230	***99%***	98%	93%	89%	82%	73%	65%
235	***100%***	99%	96%	93%	88%	82%	75%
240	***100%***	99%	97%	96%	92%	88%	83%
245	***100%***	99%	98%	97%	95%	92%	89%
250	***100%***	100%	99%	98%	97%	95%	93%
255	***100%***	100%	99%	99%	98%	97%	96%
260	***100%***	100%	100%	99%	99%	98%	97%
265	***100%***	100%	100%	100%	99%	99%	98%
270	***100%***	100%	100%	100%	100%	99%	99%
275	***100%***	100%	100%	100%	100%	100%	99%
280	***100%***	100%	100%	100%	100%	100%	100%
285	***100%***	100%	100%	100%	100%	100%	100%
290	***100%***	100%	100%	100%	100%	100%	100%
295	***100%***	100%	100%	100%	100%	100%	100%
300	***100%***	100%	100%	100%	100%	100%	100%

*Note: This table provides the estimated probability of performing at Level 3 or higher on the state test based on a MAP test score taken during that prior (fall) season. Example: if a fifth grade student scored 200 on a MAP test taken during the fall season, her/his estimated probability of performing at Level 3 or higher on the state test is 29%.

Italics represent extrapolated data.

TABLE 5 – CORRELATION COEFFICIENTS BETWEEN MAP AND STATE TEST FOR EACH GRADE AND TEST SUBJECT

Grade	Math Correlation Pearson's r	Reading Correlation Pearson's r
3	0.890	0.857
4	0.899	0.837
5	0.905	0.819
6	0.907	0.832
7	0.906	0.833
8	0.880	0.831

* Note: Correlations range from 0 (indicating no correlation between the state test score and the NWEA test score) to 1 (indicating complete correlation between the state test score and the NWEA test score).

TABLE 6 – PERCENTAGE OF STUDENTS WHOSE PASS STATUS WAS ACCURATELY PREDICTED BY THEIR MAP PERFORMANCE USING REPORTED CUT SCORES

Grade	Sample Size	MAP Accurately Predicted State Performance	MAP Underestimated State Performance	MAP Overestimated State Performance
Mathematics				
3	10064	89.1%	6.2%	4.7%
4	9656	89.5%	5.4%	5.1%
5	9342	88.7%	5.7%	5.6%
6	6294	88.8%	5.7%	5.5%
7	6172	89.2%	5.9%	4.9%
8	4986	87.0%	6.1%	6.9%
Reading				
3	10107	84.3%	8.3%	7.5%
4	9751	83.4%	8.9%	7.6%
5	9368	84.7%	8.1%	7.3%
6	6556	84.7%	7.0%	8.3%
7	6475	83.8%	7.7%	8.5%
8	4844	85.2%	6.6%	8.2%

*Note: The third column of this table shows the percentage of students whose Pass/NotPass status was predicted accurately when their state test score was linked to their MAP score based on this linking study. The fourth column shows the percentage of students whose MAP score predicted they would not pass the state benchmark but they did pass. The last column shows the percentage of students whose MAP score predicted they would pass the state benchmark but they did not pass. Due to rounding, percentages may not add to 100%.