Research Brief:

Predicting Success on the Minnesota Comprehensive Assessments – III Reading (MCA-III-R) using Measures of Academic Progress – Reading (MAP-R) and Oral Reading Fluency (ORF) Assessments:

Comparison of targets to 2014 and 2013 MCA-III-R

Benjamin Silberglitt, Ph.D.

Paul Muyskens, Ph.D.

Kerry Bollman

TIES

August, 2014

Predicting Success on the MCA-III-R using MAP-R and ORF:

Comparison of 2014 and 2013 targets

As a follow-up to our 2013 study, TIES completed several data analyses, exploring the relationship between two commonly used local assessments, the MAP-Reading and Oral Reading Fluency, and the 2014 MCA-III-R. While a similar study was completed looking at the 2013 MCA-III-R, 2013 was the first year of this new reading test, and it was felt that overall performance and target scores might change significantly in the second year of statewide administration. Additionally, the sample in 2014 included one district using the Oral Reading Fluency (ORF) passages from Children's Educational Services (CES), as well as several districts using the ORF passages from AIMSweb.

For the 2014 study, 205,540 students participated, across 48 school districts in Minnesota. The sample was 51% male / 49% female, with 12% identified as receiving Special Education services, 32% receiving Free or Reduced price lunch, 7% identified as English Language Learners, and students were identified with the following ethnicities: 2.2% American Indian or Alaskan Native / 7.7% Asian or Pacific Islander / 8.3% Hispanic / 12.3% Black / 80.9% White (note that percentages total more than 100%, as students may have been identified with more than one race/ethnicity).

Correlations between local assessments and the MCA-III-R

For the MAP-R, strong correlations were found with the MCA-III-R again in 2014. Correlations at spring of grades 3 through 8 and 10 are shown in Table 1, for both 2013 and 2014.

Table 1. Correlations between MAP-R Spring and MCA-III-R in 2013 and 2014.

		MAP Spring with MCA-III Assessment - 2014	MAP Spring with MCA-III Assessment - 2013
Grade 3	r	.852**	.849**
	N	10717	10935
Grade 4	r	.846**	.834**
	N	11064	10574
Grade 5	r	.832**	.815**
	N	10597	10164
Grade 6	r	.825**	.822**
	N	10179	9872
Grade 7	r	.824**	.821**
	N	9762	9366
Grade 8	r	.811**	.824**
	N	8064	7084
Grade 10	r	.785**	.796**
	N	2053	2084

** - p<.01

For the ORF (both AIMSweb and CES), correlations were also strong, as shown in Table 2. Correlations for CES are only available in grades 3 through 5 in 2014, as data were only available at these grade levels and in this school year.

Table 2. Correlations between ORF (CES and AIMSweb versions) and MCA-III-R in 2013 and 2014.

		CES 2014 ORF Spring Assessment	AIMSweb 2014 ORF Spring Assessment	AIMSweb 2013 ORF Spring Assessment
Grade 3	r	.732**	.675**	.718**
	N	251	5444	5093
Grade 4	r	.744**	.687**	.679**
	N	319	4540	4560
Grade 5	r	.720**	.621**	.612**
	N	288	3927	4100
Grade 6	r		.585**	.595**
	N		2905	3383
Grade 7	r		.631**	.581**
	N		1072	1736
Grade 8	r		.540**	.589**
	N		705	1281

** - p<.01

Descriptive statistics

Descriptive statistics are provided in Table 3, below, outlining information describing the distribution of performance across all measures in the 2014 sample.

Table 3. Descriptive statistics of MCA-III-R, MAP-R, and ORF (CES and AIMSweb versions), by grade level and season of administration.

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
MCA-III:							
3 Spring	15597	301	399	353.42	19.68	-0.29	-0.01
4 Spring	15980	411	490	451.59	14.90	-0.24	0.14
5 Spring	15449	517	591	556.35	13.67	-0.19	0.22
6 Spring	15198	606	699	655.21	16.70	-0.15	0.21
7 Spring	15695	703	798	753.09	16.91	-0.18	0.20
8 Spring	15682	802	898	852.42	16.56	-0.26	0.31
10 Spring	16006	1013	1094	1053.86	14.27	-0.23	0.22
MAP-R:							
K Fall	3183	112	261	152.03	22.79	2.10	4.68
K Spring	12395	1	269	160.43	17.38	-0.71	10.79
1 Fall	19936	109	217	162.75	13.36	0.17	0.33
1 Spring	27878	0	331	180.64	17.31	-2.45	19.60
2 Fall	69759	123	234	176.84	16.42	-0.04	-0.70
2 Spring	69457	124	245	192.16	14.65	-0.53	0.20
3 Fall	70185	133	250	191.57	15.14	-0.53	0.07
3 Spring	69926	124	251	202.84	14.02	-0.76	1.11
4 Fall	68849	117	257	201.85	14.32	-0.79	1.07
4 Spring	68310	136	259	210.38	13.68	-0.82	1.59
5 Fall	65657	134	253	209.50	13.67	-0.83	1.58
5 Spring	65365	125	261	216.52	13.41	-0.85	1.80
6 Fall	65478	125	260	215.42	13.48	-0.96	2.13
6 Spring	58472	112	265	220.15	13.49	-0.98	2.46
7 Fall	58122	139	264	219.74	13.66	-0.98	2.31
7 Spring	49974	135	271	223.20	13.91	-0.97	2.24
8 Fall	50629	122	270	223.63	13.65	-1.02	2.65
8 Spring	36647	114	269	225.54	14.41	-1.06	2.62
9 Fall	25336	130	279	224.44	15.03	-0.94	1.95
9 Spring	21056	133	269	225.80	14.96	-0.99	2.26
10 Fall	9003	124	271	223.51	15.83	-0.98	2.18
10 Spring	7320	113	274	224.51	16.65	-0.97	2.24
AIMSWeb ORF:							
1 Winter	34561	0	256	47.94	36.57	1.12	0.94
1 Spring	35442	0	266	73.58	39.78	0.59	0.18
2 Fall	34272	0	233	65.45	36.85	0.54	0.02
2 Winter	34361	0	262	91.99	38.27	0.10	-0.10
2 Spring	34673	0	270	108.12	38.88	0.00	0.13
3 Fall	32744	0	269	88.23	38.93	0.24	-0.13
3 Winter	32479	0	281	110.54	39.82	-0.04	0.01
3 Spring	32702	0	292	125.19	40.65	-0.11	0.24
4 Fall	28916	0	292	107.94	38.94	0.16	0.15
4 Winter	27229	0	331	127.36	39.85	0.05	0.31
4 Spring	27311	0	329	140.18	41.63	0.04	0.26
5 Fall	25409	0	341	124.76	40.31	0.04	-0.03

5 Winter	23504	0	350	140.93	41.00	-0.07	0.16
5 Spring	23109	0	349	154.29	42.05	-0.12	0.30
6 Fall	18829	0	320	142.65	39.51	-0.10	0.41
6 Winter	16650	0	352	155.90	41.97	-0.06	0.57
6 Spring	16190	0	350	169.03	43.66	-0.06	0.63
7 Fall	8229	1	314	150.89	39.81	-0.09	0.34
7 Winter	7580	2	359	163.77	40.97	-0.08	0.54
7 Spring	7521	8	380	176.03	41.77	-0.12	0.60
8 Fall	6194	0	285	152.37	36.42	-0.29	0.74
8 Winter	6018	0	327	162.47	36.54	-0.30	0.99
8 Spring	5139	5	295	169.74	36.83	-0.31	0.82
CES ORF:							
1 Winter	276	0	187	50.80	40.50	1.02	0.32
1 Spring	279	0	203	74.44	46.02	0.42	-0.62
2 Fall	287	1	199	66.08	39.52	0.62	0.03
2 Winter	280	9	199	95.43	39.83	0.17	-0.16
2 Spring	285	6	274	112.86	40.95	0.24	0.61
3 Fall	251	0	236	89.76	41.84	0.31	0.16
3 Winter	250	3	270	115.19	45.16	0.11	0.49
3 Spring	254	4	271	130.12	45.92	0.05	0.38
4 Fall	323	5	221	109.18	38.75	0.13	0.07
4 Winter	317	9	244	126.01	38.76	0.03	0.05
4 Spring	324	13	242	139.19	40.92	0.03	-0.09
5 Fall	287	8	283	129.59	46.05	0.06	0.03
5 Winter	294	18	258	147.15	45.96	-0.33	-0.14
5 Spring	298	25	264	163.37	47.62	-0.33	-0.05

Target scores

Logistic regression analysis was used to establish the relationship between local assessments (MAP-R and ORF) and whether or not the student reached grade-level proficiency on the outcome assessment (MCA-III-R). Further examination of the logistic response function of each relationship allowed for setting target scores on the local assessment, in order to provide meaningful prediction of performance on the MCA-III-R. Students above the Tier I target are highly likely (approx. 90% probability) to be successful on the upcoming MCA-III-R, students above the Tier II target but below the Tier I target have a moderate likelihood (approx. 50% probability), and students below the Tier II target have a low likelihood (approx. 10% probability). Logistic regression is well-suited to target setting when distributions of performance deviate from a normal distribution, as tends to be the case with ORF, especially at early grades. Logistic regression is then used across local assessments that are both normally and non-normally distributed, in order to achieve consistency of target scores across assessments. Target scores were established using the same methods as in the 2013 study, in order to establish comparability across the 2013 and 2014 MCA-III-R administrations.

Table 4 displays the target scores on the MAP-R, across both the 2013 and 2014 MCA-III-R administrations. The difference column identifies the level of discrepancy of target scores across years.

Table 4. Target scores on MAP-R, when established relative to the 2014 and 2013 MCA-III-R.

		2014 Targets	2013 Targets	Difference
K Fall	Tier 1	146		
	Tier 2	134		
K Spring	Tier 1	162		
	Tier 2	147		
1 Fall	Tier 1	164		
	Tier 2	150		
1 Spring	Tier 1	182		
	Tier 2	168		
2 Fall	Tier 1	179	180	-1
	Tier 2	160	160	0
2 Spring	Tier 1	194	195	-1
	Tier 2	181	181	0
3 Fall	Tier 1	194	194	0
	Tier 2	180	180	0
3 Spring	Tier 1	205	205	0
	Tier 2	196	197	-1
4 Fall	Tier 1	204	205	-1
	Tier 2	194	195	-1
4 Spring	Tier 1	213	214	-1
	Tier 2	206	206	0
5 Fall	Tier 1	211	211	0
	Tier 2	201	202	-1
5 Spring	Tier 1	218	217	1
	Tier 2	209	209	0
6 Fall	Tier 1	219	218	1
	Tier 2	210	209	1
6 Spring	Tier 1	224	223	1
	Tier 2	215	216	-1
7 Fall	Tier 1	224	224	0
	Tier 2	215	216	-1
7 Spring	Tier 1	228	228	0
	Tier 2	220	220	0
8 Fall	Tier 1	228	229	-1
	Tier 2	219	220	-1
8 Spring	Tier 1	231	231	0
	Tier 2	223	224	-1
9 Fall	Tier 1	229	228	1
	Tier 2	220	214	6
9 Spring	Tier 1	232	232	0
	Tier 2	222	218	4
10 Fall	Tier 1	232	232	0
	Tier 2	223	220	3
10 Spring	Tier 1	234	234	0
	Tier 2	225	222	3

As can be seen from the results, target scores are remarkably similar across the two years of administration, with the only differences greater than 1 or less than -1 coming from the Tier 2 targets in grades 9 and 10. Administration of MAP-R in grades 9 and 10 varies considerably by district, with some districts administering MAP-R to all students, and others only administering to a smaller sample of students already identified as at risk in these grades. Thus, grades 9 and 10 are likely to have a great deal of sample variation across years.

Table 5 displays the target scores on the ORF (AIMSweb version), also across both the 2013 and 2014 MCA-III-R administrations. The difference column again identifies the level of discrepancy of target scores across years. As with the MAP-R targets, the ORF targets show a relatively low degree of variation across the two years. Note that both the range and variability of ORF scores is much larger than for MAP-R, so difference scores should not be directly compared across the two assessments. For example, a difference of 4 on a target score across two years of ORF is much less significant than a difference of 4 on a target score across two years of MAP-R. In order to provide a more practical interpretation of the difference in target scores across years, a "standard difference" is calculated for each pair of target scores. The standard difference is akin to an effect size, providing the raw difference divided by the standard deviation at that grade level and season. As can be seen in the table, standard differences are almost universally low on the ORF, which is not surprising given the similar lack of difference in MAP-R targets across the two years.

Table 6 displays the target scores on the ORF (CES version), where data were only available in grade 3 through 5, and only relative to the 2014 MCA-III administration, as 2013-14 was the first year of use of the CES passages in TIES. Target scores are shown, with targets on the AIMSweb version in both 2014 and 2013 also provided at these grade levels, for comparison. Target scores on the CES version were very similar to target scores on the AIMSweb version in most cases, with the exception of grade 4 winter and spring.

Table 5. Target scores, differences, and standard differences on ORF (AIMSweb version), when established relative to the 2014 and 2013 MCA-III-R.

		2014 Target	2013 Target	Difference	Standard Difference
1 Winter	Tier 1	56	51	5	0.14
	Tier 2	6	7	-1	-0.03
1 Spring	Tier 1	83	80	3	0.08
	Tier 2	31	38	-7	-0.18
2 Fall	Tier 1	77	71	6	0.16
	Tier 2	29	31	-2	-0.05
2 Winter	Tier 1	104	100	4	0.10
	Tier 2	59	64	-5	-0.13
2 Spring	Tier 1	124	118	6	0.15
	Tier 2	66	82	-16	-0.41
3 Fall	Tier 1	100	100	0	0.00
	Tier 2	56	59	-3	-0.08
3 Winter	Tier 1	123	123	0	0.00
	Tier 2	80	88	-8	-0.20
3 Spring	Tier 1	142	138	4	0.10
	Tier 2	95	100	-5	-0.12
4 Fall	Tier 1	122	123	-1	-0.03
	Tier 2	81	81	0	0.00
4 Winter	Tier 1	146	148	-2	-0.05
	Tier 2	101	106	-5	-0.13
4 Spring	Tier 1	159	160	-1	-0.02
	Tier 2	114	118	-4	-0.10
5 Fall	Tier 1	128	126	2	0.05
	Tier 2	84	85	-1	-0.02
5 Winter	Tier 1	146	149	-3	-0.07
	Tier 2	100	106	-6	-0.15
5 Spring	Tier 1	163	161	2	0.05
	Tier 2	116	117	-1	-0.02
6 Fall	Tier 1	150	148	2	0.05
	Tier 2	103	106	-3	-0.08
6 Winter	Tier 1	168	168	0	0.00
	Tier 2	119	123	-4	-0.10
6 Spring	Tier 1	179	178	1	0.02
	Tier 2	130	131	-1	-0.02
7 Fall	Tier 1	178	177	1	0.03
	Tier 2	137	122	15	0.38
7 Winter	Tier 1	188	188	0	0.00
	Tier 2	140	136	4	0.10
7 Spring	Tier 1	199	198	1	0.02
	Tier 2	149	144	5	0.12
8 Fall	Tier 1	174	176	-2	-0.05
	Tier 2	130	132	-2	-0.05
8 Winter	Tier 1	189	184	5	0.14
	Tier 2	135	142	-7	-0.19
8 Spring	Tier 1	204	192	12	0.33
	Tier 2	156	150	6	0.16

Table 6. Target scores on ORF (CES version), when established relative to the 2014 MCA-III-R, compared to target scores on ORF (AIMSweb version) for both the 2014 and 2013 MCA-III-R administrations.

		CES MCA-III 2014 Targets	AIMSweb MCA-III 2014 Targets	AIMSweb MCA-III 2013 Targets
3F	Tier 1	96	100	100
	Tier 2	55	56	59
3W	Tier 1	122	123	123
	Tier 2	83	80	88
3S	Tier 1	137	142	138
	Tier 2	95	95	100
4F	Tier 1	118	122	123
	Tier 2	81	81	81
4W	Tier 1	133	146	148
	Tier 2	97	101	106
4S	Tier 1	147	159	160
	Tier 2	113	114	118
5F	Tier 1	118	128	126
	Tier 2	77	84	85
5W	Tier 1	141	146	149
	Tier 2	98	100	106
5S	Tier 1	158	163	161
	Tier 2	113	116	117

Conclusions

Local assessments continue to provide strong predictive validity, with respect to the MCA-III-R. Both the MAP-R and ORF (both versions) yielded strong correlations with the state test, and meaningful target scores could be established on each of these local assessments.

This study was completed to investigate the possibility that the target scores on local assessments would change across the 2013 and 2014 administrations of the MCA-III-R, due to the 2013 administration being the first year of testing using the MCA version III in reading. In the past, statewide performance on the MCA assessment series has tended to decline significantly in the first year of a new version of that assessment, and then recover in ensuing years. When this has happened, performance on local assessments has remained consistent (rather than also fluctuating), since any changes to that local assessment are either nonexistent or less significant. If this were to have happened across the 2013 and 2014 administrations of the MCA-III-R, we would have seen a sharp decline in target scores on local assessments, when established relative to the 2014 MCA-III-R administration, as compared with target scores established relative to the 2013 MCA-III-R administration. Instead, we saw little to no change in target scores on both the MAP-R and ORF (AIMSweb version).

Given the lack of any practical significance in fluctuations in target scores, it is recommended that target scores remain at the levels established using the 2013 study. Minor changes across 2013 to 2014 were

seen, but they were generally sporadic, rather than systematic, with low practical significance. Simply put, there is no reason to believe that 2014 targets will be any better than 2013 targets at predicting performance in 2015 and beyond, which of course is the primary goal of target-setting. In contrast, the operational impact of changes to target scores is quite high: teachers and students are asked to readjust to new target scores, longitudinal reporting becomes increasingly complicated, and the face validity of the relationship between local and state assessments can be compromised. The negative impact of a change to target scores is clear, while any positive impact on quality of prediction in this case is unlikely, and certainly not significant enough to justify these negative implications.

This study also had the opportunity to establish targets on the ORF (CES version). This was a very preliminary study, since sample sizes were limited, and data from both ORF (CES version) and MCA-III-R were only available in grades 3 through 5. It appears that target scores across CES and AIMSweb versions were roughly comparable, with CES targets tending to be very slightly lower, except at grade 4 winter and spring administrations, where they were lower by a more significant margin. Despite those differences, the small sample size should rightfully instill caution in how these target scores are used to predict performance for future, larger samples of students. Because the two sets of target scores are so comparable, it is recommended that the AIMSweb targets be applied to districts using the CES passages. As there is a lack of multi-year data on the CES passages, no targets could be established in grades 1, 2, or 6. AIMSweb targets should also be used (with some caution) at these grade levels. Future research will explore the relationship between CES passages and the MCA-III-R, with a larger sample and across multiple years. At that point, targets for the ORF (CES version) will be revisited.