Technical Report # 1702

An Update to Compiled ORF Norms

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Published by

Behavioral Research and Teaching
University of Oregon • 175 Education
5262 University of Oregon • Eugene, OR 97403-5262
Phone: 541-346-3535 • Fax: 541-346-5689
http://brt.uoregon.edu

Hasbrouck, J. & Tindal, G. (2017). *An update to compiled ORF norms* (Technical Report No. 1702). Eugene, OR, Behavioral Research and Teaching, University of Oregon.

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Acknowledgement

The authors would like to thank the many people who provided valuable feedback on the creation of these new compiled ORF norms including Candyce Ihnot, Karen McKenna, and Karen Hunter from Read Naturally, Inc.; Michelle Hosp, University of Massachusetts Amherst; Doris Baker and Scott Baker, Southern Methodist University; and Deborah Glaser, author and consultant.

Abstract

This paper describes the origins of the widely used curriculum-based measure of oral reading fluency (ORF) and how the creation and use of ORF norms has evolved over time. Norms for ORF can be used to help educators make decisions about which students might need intervention in reading and to help monitor students' progress once instruction has begun. ORF norms were originally developed at the school or district levels using only local data obtained from specific curriculum materials or assessments. Two previous compilations of norms not linked to any specific school, district, curriculum, or assessment have been published in the professional literature. Using data from three widely-used commercially available ORF assessments (DIBELS 6th Edition©, DIBELS Next©, and easyCBM©), a new set of compiled ORF norms forgrades 1-6 are presented here along with an analysis of how they differ from the norms created in 2006.

An Update to Compiled ORF Norms

Oral reading fluency (ORF) is one of several curriculum-based measures (CBM) originally developed in the early 1980s by a team of researchers at the University of Minnesota (Deno, 1982; Tindal, 2013). CBM measures were designed to serve as useful tools for teachers in special and general education, allowing them to make accurate and timely data-driven decisions about their students' progress in functional literacy and numeracy skills. All the CBM measures were designed to be inexpensive, time efficient, easy to administer, reliable, and able to be used frequently in multiple forms (Deno, 2003). Most importantly, CBMs were based on standard, valid assessments that (a) measure something important (b) present tasks of equal difficulty, (c) are tied to the general curriculum, and (d) show progress over time (Deno & Mirkin, 1977). Teachers were then trained to use CBMs in deciding whether and when to modify a student's instructional program (Deno, 1985) and to evaluate the overall effectiveness of the instructional program (Tindal, 2017).

Oral Reading Fluency (ORF)

Of the various CBM measures that have been developed, ORF is likely the most widely used. ORF involves having students read aloud from an unpracticed passage for one minute. An examiner notes any errors made (words read or pronounced incorrectly, omitted, read out of order, or words pronounced for the student by the examiner after a 3-second pause) and then calculates the total of words read correctly per minute (WCPM). This WCPM score has 30 years of validation research conducted over three decades, indicating it is a robust indicator of overall reading development throughout the primary grades (Baker et al., 2008; Fuchs, Fuchs, Hosp, &

Jenkins, 2001; Tindal, 2013; Wayman, Wallace, Wiley, Ticha, & Espin, 2007; Wanzek, Roberts, Linan-Thompson, Vaughn, Woodruff, & Murray, 2010).

Interpreting ORF Scores

ORF is used for two primary purposes: Screening and progress monitoring. When ORF is used to screen students, the driving questions are, first: "How does this student's performance compare to his/her peers?" and then: "Is this student at-risk of reading failure?". To answer these questions, decision-makers rely on ORF norms that identify performance benchmarks at the beginning (fall), middle (winter), and end (spring) of the year. An individual student's WCPM score can be compared to these benchmarks and determined to be either significantly above benchmark, above benchmark, at the expected benchmark, below benchmark, or significantly below benchmark. Those students below or significantly below benchmark are at possible risk of reading difficulties. They are good candidates for further diagnostic assessments to help teachers determine their skill strengths or weaknesses, and plan appropriately targeted instruction and intervention (Hasbrouck, 2010).

When using ORF for progress monitoring the questions to be answered are: "Is this student making expected progress?" and "Is the instruction or intervention being provided improving this student's skills?". When ORF assessments are used to answer these questions, they must be administered frequently (weekly, bimonthly, etc.), the results placed on a graph for ease of analysis, and a goal determined. A student's goal can be based on established performance benchmarks or information on expected rates of progress.

Over a period of weeks, the student's graph might indicate significant or moderate progress, expected progress, or progress that is below or significantly below expected levels. Based on these outcomes, teachers and specialists can decide whether to (a) make small or major changes to the student's instruction, (b) continue with the current instructional plan, or (c) change the student's goal (Hosp, Hosp, & Howell, 2007).

Creating ORF Norms

The process used to create the benchmarks or norms needed to interpret a student's ORF score for screening or progress monitoring decisions has changed. Originally, local norms were created at the school or district level using unpracticed passages from the students' textbooks. Since the early 1990's, researchers have created three sets of ORF norms compiled from a variety of sources.

Creating local ORF norms. The recommendation of the original group of CBM researchers was to use local data to create a set of ORF norms using samples of the actual reading curriculum materials. The performance of a significant proportion (or sometimes all) of the students in a school or district were assessed, and percentile rankings of students' scores were calculated. The students' rate of growth across a school year was determined from these data.

An obvious concern about using this strategy to create norms arises when the academic skills of the student population in a school or district is lower than what would be considered average, typical, or optimal. If the performance of low-skilled students is used to establish benchmarks or determine goals for progress, an anticipated outcome could be that teachers might not instruct students with sufficient rigor or intensity to improve their skills to a meaningful level but rather just enough to meet the low benchmark. Students at-risk for academic failure may be identified as low risk when their performance is compared to norms of other low performing students.

Compiled ORF norms: 1992. As an alternative to locally created norms, Jan Hasbrouck and Gerald Tindal established a set of ORF norms created by compiling school and district norms from several different sites (1992). See Table 1.

Table 1: Compiled ORF Norms 1992*

Grade	Percentile	Fall WCPM	Winter WCPM	Spring WCPM
2	75	82	106	124
	50	53	78	94
	25	23	46	65
3	75	107	123	142
	50	79	93	114
	25	65	70	87
4	75	125	133	143
	50	99	112	118
	25	72	89	92
5	75	126	143	151
	50	105	118	128
	25	77	93	100

*From: Hasbrouck, J. E. & Tindal, G. (Spring, 1992). Curriculum-based oral reading fluency norms for students in grades 2-5. *Teaching Exceptional Children, 24*(3), 41-44.

In this original study, scores from approximately 45,000 students in grades 2 to 5 were obtained from schools that collected the ORF data using passages from their current or recent core reading programs, following standardized CBM procedures (see Hosp, Hosp, & Howell, 2007).

Creating compiled ORF norms: 2006. In 2006, Hasbrouck and Tindal again published a set of compiled ORF norms, this time from a much larger sample of approximately 250,000 students and expanded to include scores from the middle of grade one through the end of grade eight. See Table 2. By this time, most schools and districts were using commercially available CBM assessments including DIBELS© and AIMSweb©, rather than materials created by the districts themselves. The 2006 norms included ORF scores from a variety of sources, primarily commercially available assessments.

Table 2: Compiled ORF Norms 2006*

Grade	Percentile	Fall WCPM	Winter WCPM	Spring WCPM
1	90	NA	81	111
	75	NA	47	82
	50	NA	23	53
	25	NA	12	28
	10	NA	6	15
2	90	106	125	142
	75	79	100	117
	50	51	72	89
	25	25	42	61
	10	11	18	31
3	90	128	146	162
	75	99	120	137
	50	71	92	107
	25	44	62	787
	10	21	36	48

Grade	Percentile	Fall WCPM	Winter WCPM	Spring WCPM
4	90	145	166	180
	75	119	139	152
	50	94	112	123
	25	68	87	98
	10	45	61	72
5	90	166	182	194
	75	139	156	168
	50	110	127	139
	25	85	99	109
	10	61	74	83
6	90	177	195	204
	75	153	167	177
	50	127	140	150
	25	98	111	122
	10	68	82	93
7	90	180	192	202
	75	156	165	177
	50	128	136	150
	25	102	109	123
	10	79	88	98
8	90	185	199	199
	75	161	173	177
	50	133	146	151
	25	106	115	124
	10	77	84	97

* From Hasbrouck, J., & Tindal, G. A. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher*. *59*(7), 636-644.

Creating compiled ORF norms: 2017. Now, 25 years since the first study was published, the compiled ORF norms have again been updated. One change that had occurred in this period was the measures being used by schools to assess their students' ORF. Several publishers have created standardized ORF assessments and compiled their own norms to be used with those commercially available materials. Many, if not most, of the publishers of ORF assessments also manage the data collected by the schools. So, rather than seeking data from schools or districts

for this update, we instead sought access to published data directly from several vendors of commercially available ORF measures. In some cases, publishers had direct access to the students' scores, while others collaborated with a second-party data support service to access and analyze the scores.

We contacted several publishers of ORF assessments so that a broad range of scores could be included in this updated compilation. However, in contrast to our previous experiences in the first two studies, access to student data was significantly restricted for this study. In fact, Pearson, Inc., publisher of the AIMSweb© CBM assessment, refused to provide access to any of their data "due to the changes in student data privacy laws nationwide" (D. Baird, personal communication, December 13, 2016). This was despite our having submitted multiple research requests and completing permission forms at the request of the company, along with our assurance to them, supported by the University of Oregon's Internal Review Board's approval of our study, that all data would be handled securely and with anonymity. This refusal of access was unfortunate but not uncommon. Limited access to student data has become a noteworthy problem to educational researchers (Sparks, 2017).

On the other hand, we were given access to ORF data from both the CBMreading© (FastBridge Learning, LLC) and Benchmark Assessor Live© (Read Naturally, Inc.) assessments, but ultimately did not include those data in our compiled norms. The ORF scores from CBMreading© were significantly different from the scores from the other assessments we analyzed, perhaps due to the way in which their passages were constructed.

We didn't include the Benchmark Assessor Live© data because those ORF scores are most commonly collected only from students already identified as at-risk, vulnerable readers, rather than from whole classrooms that include students from all ability and skill levels.

These newest updated ORF norms were ultimately compiled from three assessments: DIBELS 6th Edition© (using data from 2009-2010), and DIBELS Next© (using data from 2010-2011), both published by Dynamic Measurement Group and available from the UO DIBELS Data System within the University of Oregon Center on Teaching and Learning in the College of Education. We also included scores from the easyCBM© ORF assessment, published by Houghton Mifflin Harcourt Riverside, also available from the UO DIBELS Data System and easyCBM.com. The easyCBM© data were from the 2013-2014 school year.

These new ORF data files were compiled from technical documents that reported norms specific to each individual assessment. These three sets of assessment-specific norms, rather than raw scores from those three assessments, were then averaged to compile this new set of compiled ORF norms. The details of the methodology used to construct the three separate sets of norms used in this study were available in separate technical reports: DIBELS 6th Edition© in Cummings, Otterstedt, Kennedy, Baker, and Kame'enui (2011); DIBELS Next© in Cummings, Kennedy, Otterstedt, Baker, and Kame'enui (2011); and easyCBM© in Saven, Tindal, Irvin, Farley, and Alonzo (2014). All three reports have been published by the College of Education at the University of Oregon.

Table 3 displays the number of scores used for each of the three assessments in their calculation of test-specific norms. Note that the number of scores from both the DIBELS 6th Edition© and DIBELS Next© data represented all the students from whom ORF data were

collected during that testing period. The easyCBM© developers used a stratified random sampling across geographic region, gender, and ethnicity of the students. This sampling plan resulted in norms that are more accurate than if every score is used (Saven, Tindal, Irvin, Farley, & Alonzo, 2014). The total number of ORF scores used in this updated study was 6,886,582.

Table 3: Number of Scores Used For The Norms For Three Assessments

Grade	Fall			Winter			Spring		
	D6	DN	EZ	D6	DN	EZ	D6	DN	EZ
1				660,404	4,612	500	651,275	4,495	500
2	637,017	4,231	500	615,480	4,311	500	608,782	4,176	500
3	523,144	3,855	500	502,368	3,889	500	496,638	3,777	500
4	346,306	3,772	500	325,664	3,840	500	323,097	3,648	500
5	288,493	2,409	500	264,345	2,435	500	264,536	2,393	500
6	113,298	1,456	500	100,537	1,485	500	100,430	1,484	500
TOTAL	1,926,481			2,492,370			2,467,731		

Note: D6 = DIBELS 6th Edition©; DN = DIBELS Next©; EZ = easyCBM©

Calculating the norms in 2017. The individual ORF scores associated with each percentile rank (PR) at each grade and for each season (fall, winter, spring) were extracted directly from the technical reports from the developers of the norms for DIBELS 6th Edition©, DIBELS Next©, and easyCBM©. A master file was created that included the following variables: Grade, season, percentile rank, the specific assessment, and WCPM score. Finally, the average of all scores within a grade, season, and assessment for that specific PR was calculated. In this paper only the 10th, 25th, 50th, 75th, and 90th PR scores are reported, following the report of previous compiled norms (Hasbrouck & Tindal, 2006).

In some instances, a range of scores was reported within and across the three measures for a single PR. For example, the compiled 10th PR reported for the winter in Grade 2 in this set of norms is reported here as 35 WCPM. This calculation represented the average of the following scores (which computed to 35.14 and was rounded to 35):

Table 4: Compiled ORF Norms 2017

Grade	%ile	Fall WCPM*	Winter WCPM*	Spring WCPM*
1	90		97	116
	75		59	91
	50		29	60
	25		16	34
	10		9	18
2	90	111	131	148
	75	84	109	124
	50	50	84	100
	25	36	59	72
	10	23	35	43
3	90	134	161	166
	75	104	137	139
	50	83	97	112
	25	59	79	91
	10	40	62	63
4	90	153	168	184
	75	125	143	160
	50	94	120	133
	25	75	95	105
	10	60	71	83
5	90	179	183	195
	75	153	160	169
	50	121	133	146
	25	87	109	119
	10	64	84	102
6	90	185	195	204
	75	159	166	173
	50	132	145	146
	25	112	116	122
	10	89	91	91

*WCPM = words correct per minute

Changes in Scores from 2006-2017

Table 5 compares the ORF scores from 2006 to 2017. Changes are reported as difference in score values from five percentiles ranks (PR) for 90th, 75th, 50th, 25th, 10th and across the three assessment periods for each grade. In four PR-grade levels, the WCPM score was the same in 2006 and 2017: the 50th percentile of grade 4 in the fall (94 WCPM); the 90th percentiles for winter (195 WCPM) and spring (204 WCPM) in grade 6; and the 25th percentile in the spring of grade 6 (122 WCPM). In grades 1 to 5, the 2017 scores were all higher than the 2006 scores, except in one grade level PR: the 50th percentile scores for fall in grade 2 the score decreased by one WCPM from 51 in 2006 to 50 in 2017. In these first five grade levels, the largest increase was 26 WCPM in grade 3 in the winter for the 10th percentile, changing from 36 WCPM in 2006 to 62 WCPM in 2017.

Different patterns of change emerged in the percentile scores reported for grade 6. Most of the scores reported in grade 6 (8 of 15) increased (from 5 to 21 WCPM), but in four PR-levels the scores decreased in 2017 by 1 to 4 WCPM and three of the scores remained the same. Across all three assessment periods the scores for grade 6 increased on average by 4 WCPM which was the smallest of all the grade level gains. On average across all PR levels, grade one increased by 7 WCPM, grade 2 by 9, grade 3 by 12, grade 4 by 6, and grade 5 by 8. Across all the six grades, the overall increase in WCPM was 5. In the five PR-levels the scores gained an average of 4 WCPM in the 90th percentile, 5 WCPM in the 75th and 50th percentiles, 7 WCPM in the 25th percentile and 9 WCPM in the 25th percentiles scores. These average gains are within the expected range of performance of 5 WCPM for lower grades and 9 WCPM for upper elementary grades (Christ & Silberglitt, 2007). Table 6 displays the average change across all PRs in each grade.

Table 5: Comparison of Norms for 2006 and 2017

%iles	Grade 1	F	W	S	Grade 2	F	W	S
90	2017		97	116	2017	111	131	148
90	2006		81	111	2006	106	125	142
	Difference		16	5	Difference	5	6	6
75	2017		59	91	2017	84	109	124
75	2006		47	82	2006	79	100	117
	Difference		12	9	Difference	5	9	7
50	2017		29	60	2017	50	84	100
50	2006		23	53	2006	51	72	89
	Difference		6	7	Difference	-1	12	11
25	2017		16	34	2017	36	59	72
25	2006		12	28	2006	25	42	61
	Difference		4	6	Difference	11	17	11
10	2017		9	18	2017	23	35	43
10	2006		6	15	2006	11	18	31
	Difference		3	3	Difference	12	17	12

%iles	Grade 3	F	W	S	Grade 4	F	W	S
90	2017	134	161	166	2017	153	168	184
90	2006	128	146	162	2006	145	166	180
	Difference	6	15	4	Difference	8	2	4
75	2017	104	137	139	2017	125	143	160
75	2006	99	120	137	2006	119	139	152
	Difference	5	17	2		6	4	8
50	2017	83	97	112	2017	94	120	133
50	2006	71	92	107	2006	94	112	123
	Difference	12	5	5	Difference	0	8	10
25	2017	59	79	91	2017	75	95	105
25	2006	44	62	78	2006	68	87	98
	Difference	15	17	13		7	8	7
10	2017	40	62	63	2017	60	71	83
10	2006	21	36	48	2006	45	61	72
	Difference	19	26	15	Difference	15	10	11

%iles		Grade 5	F	W	S		Grade 6	F	W	S
90		2017	179	183	195		2017	185	195	204
90		2006	166	182	194		2006	177	195	204
		Difference	13	1	1		Difference	8	0	0
75		2017	153	160	169		2017	159	166	173
75		2006	139	156	168		2006	153	167	177
		Difference	14	4	1		Difference	6	-1	-4
50		2017	121	133	146		2017	132	145	146
50		2006	110	127	139		2006	127	140	150
		Difference	11	6	7		Difference	5	5	-4
25		2017	87	109	119		2017	112	116	122
25		2006	85	99	109		2006	98	111	122
		Difference	2	10	10		Difference	14	5	0
10		2017	64	84	102		2017	89	91	91
10		2006	61	74	83		2006	68	82	93
		Difference	3	10	19		Difference	21	9	-2

Table 6: Average Differences in ORF Across PRs For Each Grade Level

Difference				
Grade	Fall	Winter	Spring	Ave*
1		41	30	7
2	32	61	47	9
3	57	80	39	12
4	28	30	36	6
5	43	31	38	8
6	54	18	-10	4

*Average across all PR values.

Summary

The curriculum-based measure of oral reading fluency (ORF) has been proven to be a reliable, useful, and practical measure to help determine which students might need to be provided with additional assistance to learn to read proficiently. Since the development of CBM measures in the early 1980s many adaptations and changes have appeared in the way these

various measures have been developed and used. Originally, schools and districts were encouraged to develop their own assessments from the local instructional materials. Norms and performance benchmarks were also created locally. Now, 35 years later, several commercial publishers have created CBM assessment materials for schools to purchase, and most of those publishers have created their own norms and benchmarks for use with their specific assessment.

Beginning in 1992 and then again in 2006, Hasbrouck and Tindal collaborated to create a set of norms compiled from a variety of sources. These compiled norms were published to prevent a low-performing school or district from setting benchmark goals for their students at a level that was lower than it should be. Compiled norms also have been used by educators interested in interpreting students' ORF performance outside of a specific assessment product.

This updated report contains norms compiled from three widely-used and commercially available ORF assessments, and represents a far larger number of scores than either of the previous compiled norms. And while these current scores only provide norms through grade 6, it is hoped that this set of three studies, conducted over a period of 25 years, can give educators a perspective on the stability of ORF scores across materials and grades, and nearly three decades of reading instruction in schools in the United States.

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