



## An Empirical First Look at the Effectiveness of IMSE's Orton-Gillingham Approach

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## STUDY OVERVIEW

This report summarizes findings for student growth and achievement measured through “practicum exit reports” submitted by teachers as a final step to completing their IMSE Orton-Gillingham Certification Program.

### *The IMSE Orton-Gillingham Approach*

IMSE Orton-Gillingham (IMSE OG) is a structured, multi-sensory approach based on extensive research, designed to teach students to read. The key methodology of IMSE OG is to incorporate two or more senses involved in language acquisition to engage visual, auditory, and kinesthetic learning. As an approach, IMSE OG allows flexibility for formative assessment. Teachers continuously monitor their students’ progress and create lessons specifically designed to address needs.

### *Study Goal*

This study aims to show the efficacy of the IMSE OG teaching method, using currently available data.

## DATA COLLECTION

IMSE collects “exit reports” from teachers going through the IMSE advanced Orton-Gillingham Certification Program. These exit reports contain a variety of assessments, including a few core tests (described below), given to students chosen by their teacher. Most teachers supply data on one student, and they test students prior to instruction and after instruction. Data was extracted, aggregated, and organized from these core tests to display student growth.

### *Participants*

Data on 64 students, provided by 52 different teachers, is included in this study. Teachers and students are from a wide variety of locations within the United States (roughly 20 different states). 95% of students included were between kindergarten and 5<sup>th</sup> grade (the remaining reports were for a seventh grader and two adults).

Of the 64 students included, 18 have been diagnosed with a learning disorder (typically some form of dyslexia). Most other students are suspected by their teachers of having some learning disorder that has not yet been diagnosed. 21 students included are learning English as a second language.

### *Duration*

Individual student data was recorded over the course of a year, in some cases from spring to spring, but most often over the course of a school year (average program duration, in some cases counting summer months when instruction did not happen, was 9.9 months, with a median of 9.1). Students were most

often instructed multiple times per week in 45-minute one-on-one or small group sessions. Exit reports used fall between early 2015 through the spring of 2017.

### **Challenges**

Of the reports analyzed, roughly half contained complete and usable data for any given test. The exact number of reports used is noted in each section. It's also important to recognize that sample sizes were small, and not necessarily random (teachers chose which students to supply data for). With this in mind, it's recognized that data from this study is preliminary and not yet entirely definitive. The aim is to discover empirical signs of IMSE OG's effectiveness that can be further scrutinized in future studies.

Additionally, the majority of tests included are designed specifically for IMSE's Orton-Gillingham approach and are used for teachers to assess student ability and progress. Because these tests are specific to IMSE OG, there are not always standards of comparison. Also, because reports included are strictly for students being taught using the IMSE OG approach, there is no control sample to compare results.

## **TEST DESCRIPTIONS**

### **Level 1 Initial Test**

This is a custom assessment designed by IMSE to assess students on their basic ability to read and write real and pseudo words.

Decoding:	students must accurately identify real and pseudo words from a list
Encoding:	students must accurately spell real and pseudo phonetic words from a list
Sight Words:	students must accurately identify a set of irregular words
Spelling:	students must accurately spell a set of high frequency words
Sentence Dictation:	students are read a sentence, and they must write it with accurate capitalization, organization, punctuation, and spelling

### **Beginning Reading Test**

This assessment tests students on letter sounds and the ability to write the alphabet.

Capital Letter Recognition:	students must correctly say each capital letter when shown
Lower Case Letter Recognition:	students must correctly say each lower-case letter when shown
Sound Production:	students must say each letter and letter combination sound
Writing Capital Letters:	students must write each capital letter when prompted aloud
Writing Lower Case Letters:	students must write each lower-case letter when prompted aloud

### **Oral Reading Fluency**

Students are given a timed passage to read, and correct words per minute are calculated. The majority of fluency tests given used DIBELS.

## DATA RESULTS

### LEVEL 1 INITIAL TEST

Data from 31 students in grades K-5 was used for this report. The first chart shows averaged initial results for each category, and compares them to averaged final results to display student growth. Students were tested on their ability to read and write real and pseudo words.

LEVEL 1 INITIAL TEST SCORES						
	<i>Average Initial Score</i>	<i>Average Initial % Correct</i>	<i>Average End Score</i>	<i>Average End % Correct</i>	<i>Average Growth Score</i>	<i>Average % Correct Growth</i>
<i>Decoding</i>	8.7	58.3%	13.4	89.5%	4.7	31.2%
<i>Encoding</i>	6.9	46.0%	12.9	86.0%	6.0	40.0%
<i>Sight Words</i>	7.3	73.3%	9.4	94.0%	2.0	20.7%
<i>Spelling</i>	4.5	45.3%	8.0	80.3%	3.4	35.0%

#### **Level 1 Initial Test Findings**

Students could correctly identify or write roughly half the given words (and 3/4ths of sight words) to begin with, and post-instruction they were able to correctly identify or write roughly 90%. Of the total 62 decoding and encoding tests given, 38 had either a single or no errors. Of the 60 sight-word and spelling tests, 33 had perfect scores. This displays significant improvement.

In addition, there is a clear, logical correlation between initial test scores and growth, meaning that students with lower test scores typically grew more. This is logical because students with lower initial scores have more room to grow, but they also often grow at a slower rate. This is vital to note because test results show that students consistently succeeded in attaining this available growth.

The correlation between initial test scores and growth was confirmed by a linear regression with a significance level of  $P = 1.69 \times 10^{-9}$ , and a coefficient of -0.8 (roughly every point the initial score goes up, the growth score drops by 0.8).

#### **Low Performer Growth**

The following table displays test results exclusively for students who initially scored at or below 50% correct. The intent is to reveal how successful students are who struggled the most at first. This aims to answer the question: are these students catching up, and how effective is IMSE OG with at-risk students?

<b>Level 1 Initial Test Scores - beginning at or below 50% correct</b>						
	<b>Average Initial Score</b>	<b>Average Initial % Correct</b>	<b>Average End Score</b>	<b>Average End % Correct</b>	<b>Average Growth Score</b>	<b>Average % Growth</b>
Decoding	3.8	25.3%	12.1	80.7%	8.3	55.3%
Encoding	4.6	30.5%	12.6	84.2%	8.1	53.7%
Sight Words	2.7	27.1%	7.6	75.7%	4.9	48.6%
Spelling	3.2	31.5%	7.5	75.0%	4.4	43.5%

### **Level 1 Initial Test – Low Performer Findings**

Students initially scoring at or below 50% on this test were able to reach average scores nearly equal to the overall mean. Their growth was significantly higher than average, and they were able to correctly identify and write roughly 80% of the words given. This shows that while they still have some room to grow, they made significant growth—nearly catching up to their peers—which suggests that IMSE OG was particularly effective with under-performing students.

### **SENTENCE DICTATION**

Students were given a sentence to write, and they were scored based on a variety of factors, including:

COPS - capitalization, organization, punctuation, and spelling

Sight Words

Phonetic Words

The following chart details the aggregate scores from a sample of 35 students in grades K-5, for two dictation tests. The top scores provide average initial, ending, and growth values. The bottom scores show the same values for students who began at or below 50% initially correct.

<b>SENTENCE DICTATION</b>			
	<b>Avg Initial Score</b>	<b>Avg Ending Score</b>	<b>Avg Growth</b>
<i>Dictation 1</i>	74.54%	96.80%	22.26%
<i>Dictation 2</i>	69.87%	91.62%	21.75%
<i>Dictation 1 &lt; 50% initial score</i>	37.34%	95.00%	57.66%
<i>Dictation 2 &lt; 50% initial score</i>	38.33%	79.99%	41.66%

### ***Sentence Dictation Findings***

Students initially wrote roughly 70% of the given sentences correctly, and post-instruction sentences were over 90% correct. Students who initially scored very low (at or below 50% correct), were able to make huge gains, and perform similarly to their peers who scored higher initially.

This is particularly important to note because students at a lower ability (and lower percentile for their grade and age) often grow at a slower rate than their similarly-aged but more capable peers. This data suggests that students taught using IMSE OG can produce similarly capable results, even if they begin at a disadvantage.

## **BEGINNING READING TEST**

Beginning reading scores were taken from 17 students. These assessments were given to emergent readers: students not yet reading or just beginning to read. All scores are out of a maximum correct of 26, except for “sound production,” which is out of 36.

<b>BEGINNING READING TEST SCORES</b>					
	<b><i>Initial Avg</i></b>	<b><i>Initial % Correct</i></b>	<b><i>Ending Avg</i></b>	<b><i>Ending % Correct</i></b>	<b><i>Avg Growth</i></b>
<i>Capital Letter Recognition</i>	24.6	94.8%	25.9	99.8%	5.0%
<i>Lower Case Letter Recognition</i>	22.4	86.0%	25.9	99.5%	13.6%
<i>Sound Production</i>	22.1	61.3%	33.9	94.3%	33.0%
<i>Writing Capital Letters</i>	17.5	67.4%	24.4	94.0%	26.6%
<i>Writing Lower Case Letters</i>	14.8	56.7%	24.9	95.7%	38.9%

### ***Beginning Reading Test Findings***

Most assessed students were able to recognize the majority of the alphabet when first tested, and essentially all students were able to recognize the entire alphabet when the final assessment was given (9 of 17 students were able to perfectly identify all letters and sounds).

Students struggled primarily with sounds and writing both capital and lower-case letters, but post-instruction, most students were able to perform these tasks accurately. This test is not broken down further because it shows that regardless of where a student began, all were able to perform very well by the end of instruction (the lowest performing student scored 40 out of 140 possible correct at first, and scored 127 out of 140 post-instruction).

## ORAL READING FLUENCY

Students were given a timed passage to read, and words per minute (WPM) were calculated (words read incorrectly were subtracted from total WPM). Data from 38 students, from grades K-5, is included in this section.

Note that the grade level of passages given is based on student ability, and roughly equal in relative difficulty. For example, a student with a lower ORF score might read a 1<sup>st</sup> grade level passage, while a student with a higher score might read a 2<sup>nd</sup> grade level passage. While difficulty was roughly equal, this factor was not always well documented and may account for some unknown variability. This is an important factor to note because ORF scores can vary greatly based on the difficulty of a passage.

Also note that 4<sup>th</sup> grade scores are somewhat skewed (fall and spring WPM averages are significantly lower than others) because many students included in this grade came from the same classroom and teacher (and they performed at relatively similar levels). This was not the case for any other grade.

### ***Fluency Standards***

There are numerous well-documented fluency standards available. Appendix A displays the chosen standards used—an average of Hasbrouck & Tindal and AIMS Web, which were chosen because of their middle-ground scores and readily available data on various percentile norms. Other standards were considered as well (see Appendix B and Appendix C). It was determined that average growth was similar between all standards considered and the two used, but percentile norms were not as readily available for all standards. Because of this, the two (Hasbrouck & Tindal and AIMS Web) were used to benchmark student growth.

### ***Average Fluency Scores***

The below chart provides a quick snapshot of student growth (in WPM) and compares it to national standards at various percentile ranges (note Appendix A for national standards used).

Oral Reading Fluency Averages (grades 1-5)					
	<i>IMSE's OG</i>	<i>25th Percentile</i>	<i>50th Percentile</i>	<i>75th Percentile</i>	<i>90th Percentile</i>
<i>Average Initial score</i>	48.8	48	71	98	126
<i>Average Ending Score</i>	82.6	76	103	132	158
<i>Average Growth</i>	33.8	28	32	34	33

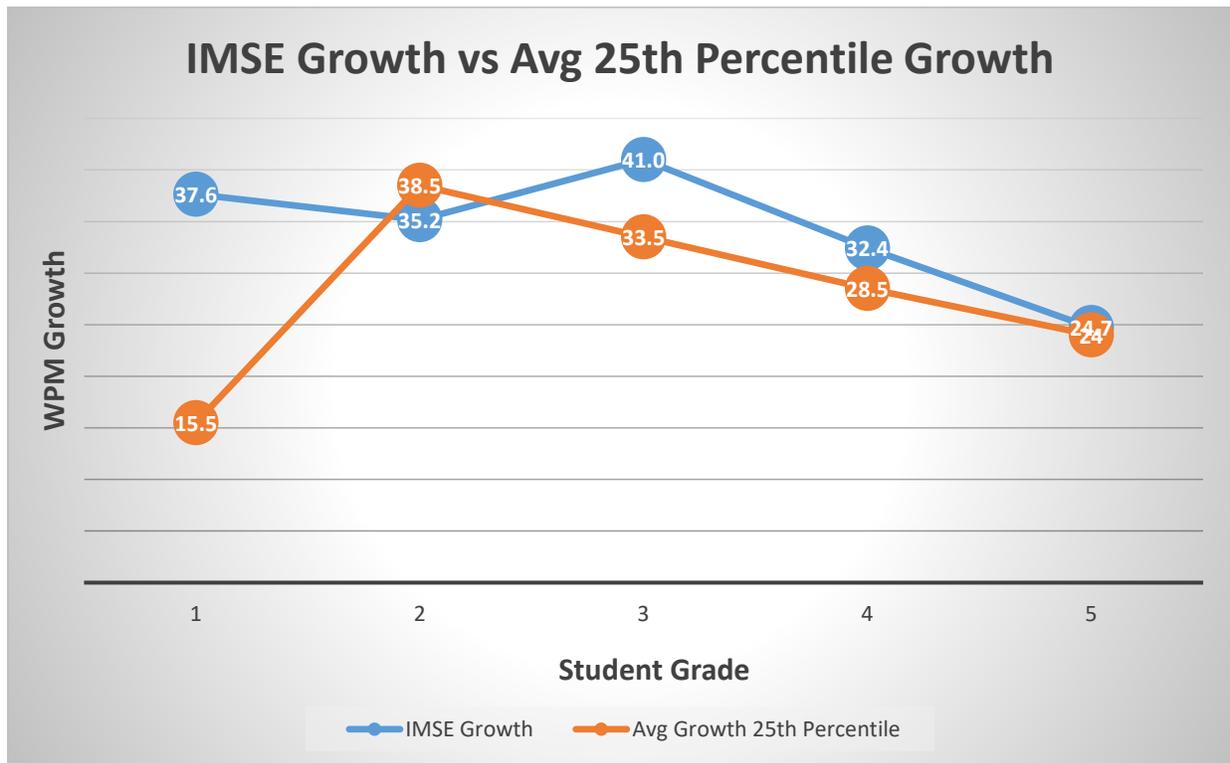
**Aggregate Findings**

Students from this study, on average, fall near the 25<sup>th</sup> percentile. This suggests that their average growth should be near 28 words per minute, but results are significantly higher. To see this in closer detail, we broke down student data based on grade.

**Grade Level Breakdown**

The following chart compares growth of students taught using IMSE OG to average growth (all students in a grade) and to 25<sup>th</sup> percentile growth, by grade level. The final two columns note the percentage difference in these growth values.

AVG ORF Growth by Year					
Grade	IMSE Growth	Avg Growth 50th Percentile	Avg Growth 25th Percentile	% Difference	% Diff from 25th Percentile
1	37.6	29.5	15.5	27.5%	142.7%
2	35.2	38.0	38.5	-7.5%	-8.7%
3	41.0	34.5	33.5	18.8%	22.4%
4	32.4	28.0	28.5	15.8%	13.8%
5	24.7	29.0	24	-14.8%	3.0%



### **Grade Level Breakdown Findings**

In 2<sup>nd</sup> grade and above, IMSE OG instruction seems to have moderate or little confirmed effect (though the difference is roughly 10% higher for grades 2-5 when compared to average growth using the mean—shown in Appendix B—of all six standards considered). A larger sample will be needed to further understand these numbers. Most notably, however, there is a clear, massive impact on first grade students. Students in the 25<sup>th</sup> percentile taught using IMSE OG increased fluency by more than double the expected word count. This continues to suggest that IMSE OG is particularly effective at teaching emergent readers.

This is especially noteworthy because a student’s percentile has a direct impact on expected growth. This is especially true for first graders, where percentile has almost triple the predicted impact (Appendix D). A linear regression comparing percentile and grade to expected growth for grades 2-5 (see Appendix E) shows that as a student’s percentile increases, growth expectations also increase, and as a student’s grade increases, their growth expectations decrease. Students being instruction with IMSE OG, however, are able to grow at roughly the average rate (despite beginning at a lower percentile, with lower growth expectations), and significantly faster in first grade.

The following two charts show additional detail into how these students have made gains away from the high-risk category.

### **Student Change in Percentile<sup>1</sup>**

The following chart shows the students’ change in percentile position (using DIBELS fluency assessment). The middle two columns show student average percentile rank at the beginning of the school year and at the end of the school year. The final column tallies this difference.

<b>ORF Percentiles &amp; Percentile Change</b>					
<b>Grade</b>	<b>Avg Initial WPM</b>	<b>Avg End WPM</b>	<b>DIBELS Percentile (fall)</b>	<b>DIBELS Percentile (spring)</b>	<b>Percentile Change</b>
K	0.8	11.4			
1	18.0	55.6	30	47	17
2	42.0	77.2	30	30	0
3	62.4	103.4	28	43	15
4	41.0	73.4	7	30	23
5	87.9	112.6	28	30	2

<sup>1</sup> <https://dibels.org/papers/DIBELSNextNormsTechReport17.pdf> (pages 36 - 48)

### ***DIBELS Cut Point – Growth Out of “High Risk” Category<sup>2</sup>***

DIBELS testing provides three primary target numbers: above benchmark, benchmark, and cut point for risk. Students at “benchmark,” according to DIBELS, have a high chance of “achieving later important reading outcomes.” Students at or below the “cut point for risk” have a very low chance of achieving these same important reading outcomes.

The following chart shows IMSE students’ initial and final WPM scores, comparing them to the “cut point” and “benchmark” DIBELS scores. The intent is to reveal if students (who largely start near the cut point for risk) are making progress towards the “benchmark” score. The final column shows how much growth students had, on average, above normal cut point growth (thus approaching the benchmark).

<b>ORF - Growth Out of High Risk Category</b>						
<i>Grade</i>	<i>Avg Initial WPM</i>	<i>Avg End WPM</i>	<i>DIBELS Cut Point (fall)</i>	<i>DIBELS Cut Point (spring)</i>	<i>DIBELS Benchmark (spring)</i>	<i>Gain Towards Benchmark</i>
K	0.8	11.4				
1	18.0	55.6	16	32	47	21.6
2	42.0	77.2	37	65	87	7.2
3	62.4	103.4	55	80	100	16.0
4	41.0	73.4	70	95	115	7.4
5	87.9	112.6	96	105	130	15.7

### ***DIBELS Percentile and Growth Findings***

We can see that in most cases students start just above or below the cut point for risk, and in every instance (except for 4<sup>th</sup> grade, which starts particularly low) students end significantly above the cut point. In some cases (1<sup>st</sup> and 3<sup>rd</sup> grades) they are able to reach or exceed the benchmark score, and in every case, students get closer to the benchmark.

## **CONCLUSION**

While some findings were inconclusive, current data strongly suggests that IMSE OG is extremely effective with emergent readers; the biggest gains were noticed with students who struggled the most. This was found in all given tests. In the “beginning reading” test, for example, results show the majority of students (who are primarily kinder or first grade aged) achieved perfect or near-perfect letter and sound recognition, even if they started far behind. Students in first grade, beginning with low percentile reading fluency scores, were able to grow much more than expected, pushing them from the lower third percentile to near the 50<sup>th</sup> percentile.

These findings are especially important because students who fall behind early on tend to grow slower than average, and they continue to fall further and further behind. This is particularly true at the 3<sup>rd</sup> grade mark because students *learn to read* through second grade, but they *read to learn* in 3<sup>rd</sup> grade. Numerous

<sup>2</sup> <https://dibels.org/papers/DIBELSNextBenchmarkGoals.pdf> (page 7)

studies have found that students who cannot read by 3<sup>rd</sup> grade are significantly less likely to graduate from high school. If students are behind in 3<sup>rd</sup> grade, it is extremely difficult to catch up.

This is, again, particularly noteworthy, because it suggests that students instructed with IMSE OG grow beyond the normal expectations (despite disabilities or ESL struggles they may have), which means they're not just pacing average students—they're catching up.

## APPENDIX

### APPENDIX A – Oral Reading Fluency WPM Standards<sup>3</sup>

		Hasbrouck & Tindal				AIMS Web				COMPOSITE			
Percentile	Grade	Fall*	Spring	Growth	ROI	Fall*	Spring	Growth	ROI	Fall*	Spring	Growth	ROI
10	1	6	15	9	0.50	6	15	9	0.50	6	15	9	0.5
25	1	12	28	16	0.89	13	28	15	0.83	13	28	16	0.9
50	1	23	53	30	1.67	23	52	29	1.61	23	53	30	1.6
75	1	47	82	35	1.94	46	80	34	1.89	47	81	35	1.9
90	1	81	111	30	1.67	78	106	28	1.56	80	109	29	1.6
10	2	11	31	20	0.56	14	42	28	0.78	13	37	24	0.7
25	2	25	61	36	1.00	27	68	41	1.14	26	65	39	1.1
50	2	51	89	38	1.06	54	92	38	1.06	53	91	38	1.1
75	2	79	117	38	1.06	79	118	39	1.08	79	118	39	1.1
90	2	106	142	36	1.00	103	143	40	1.11	105	143	38	1.1
10	3	21	48	27	0.75	30	52	22	0.61	26	50	25	0.7
25	3	44	78	34	0.94	49	82	33	0.92	47	80	34	0.9
50	3	71	107	36	1.00	77	110	33	0.92	74	109	35	1.0
75	3	99	137	38	1.06	103	139	36	1.00	101	138	37	1.0
90	3	128	162	34	0.94	130	163	33	0.92	129	163	34	0.9
10	4	45	72	27	0.75	48	73	25	0.69	47	73	26	0.7
25	4	68	98	30	0.83	73	100	27	0.75	71	99	29	0.8
50	4	94	123	29	0.81	99	126	27	0.75	97	125	28	0.8
75	4	119	152	33	0.92	123	155	32	0.89	121	154	33	0.9
90	4	145	180	35	0.97	149	184	35	0.97	147	182	35	1.0
10	5	61	83	22	0.61	60	82	22	0.61	61	83	22	0.6
25	5	85	109	24	0.67	85	109	24	0.67	85	109	24	0.7
50	5	110	139	29	0.81	112	141	29	0.81	111	140	29	0.8
75	5	139	168	29	0.81	142	171	29	0.81	141	170	29	0.8
90	5	166	194	28	0.78	169	198	29	0.81	168	196	29	0.8

ROI = rate of improvement (found by dividing growth by 18 weeks for 1<sup>st</sup> grade, and by 36 weeks for others)

\*Initial grade 1 score is for winter, not fall (many students are not yet reading at the beginning of 1<sup>st</sup> grade)

### APPENDIX B – all fluency growth standards considered (and average score)<sup>4</sup>

ORF - 50th Percentile WPM Growth by Test & Grade										
Grade	Rasinski	Hasbrouck & Tindal	Manzo	Harris & Sipay	AIMS Web	DIBELS	MIN	MAX	AVG	STDEV
1	25	30	24	30	29	24	24	30	27.0	2.7
2	25	38	38	35	38	35	25	38	34.8	4.6
3	15	36	38	25	33	30	15	38	29.5	7.7
4	10	29	35	30	27	25	10	35	26.0	7.8
5	10	29	32	25	29	19	10	32	24.0	7.5

<sup>3</sup> Hasbrouck & Tindal: <https://www.readnaturally.com/userfiles/ckfiles/files/orf-national-norms.pdf>

AIMSWeb: [https://sw031.k12.sd.us/fluency\\_assessment\\_and\\_fluency\\_r.htm](https://sw031.k12.sd.us/fluency_assessment_and_fluency_r.htm)

<sup>4</sup> <https://www.readinga-z.com/fluency/fluency-standards-table/>

**APPENDIX C – fluency standards, 50<sup>th</sup> percentile fall to spring scores by test**

50th Percentile Fall to Spring WPM by Test												
Grade	Rasinski		Hasbrouck		Manzo		Harris & Sipay		AIMS Web		DIBELS	
1	35.0	60.0	23	53	30	54	60	90	23	52	23	47
2	75.0	100.0	51	89	66	104	85	120	54	92	52	87
3	95.0	110.0	71	107	86	124	115	140	77	110	70	100
4	105.0	115.0	94	123	95	130	140	170	99	126	90	115
5	115.0	125.0	110	139	108	140	170	195	112	141	111	130

**APPENDIX D – Linear regression comparing percentile effect on growth in 1<sup>st</sup> grade only**

PERCENTILE EFFECT ON EXPECTED GROWTH - 1st GRADE ONLY												
<i>Regression Statistics</i>												
Multiple R	0.88970151											
R Square	0.79156877											
Adjusted R Square	0.7220917											
Standard Error	5.66247918											
Observations	5											
<i>ANOVA</i>												
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>							
Regression	1	365.308989	365.308989	11.39323677	0.043238							
Residual	3	96.1910112	32.0636704									
Total	4	461.5										
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>				
Intercept	9.1741573	4.94226993	1.85626391	0.160423607	-6.55435	24.90267	-6.55435	24.90267				
Percentile	0.28651685	0.08488415	3.37538691	0.043238365	0.016378	0.556656	0.016378	0.556656				

Note the coefficient for “percentile” is 0.29, roughly three times the percentile coefficient for grades 2-5. Also note the P-Value of 0.043 – this is significant, but by a narrow margin. Logic further strengthens the finding that a student’s percentile rank has a strong effect on their expected growth: cognitively advantaged students will improve faster, especially in the early years when they have much room to grow.

**APPENDIX E – Linear Regression comparing impact of grade level and percentile on WPM growth**

- GRADE & PERCENTILE impact on Growth								
<i>Regression Statistics</i>								
Multiple R	0.849							
R Square	0.721							
Adjusted R Square	0.688							
Standard Error	3.044							
Observations	20							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	2	407.418	203.709	21.985	1.93E-05			
Residual	17	157.520	9.266					
Total	19	564.938						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept (growth)	36.17634831	2.51097	14.40734	0.00000	30.87867	41.47402	30.87867	41.47402
Percentile	0.104073034	0.02282	4.56147	0.00028	0.05594	0.15221	0.05594	0.15221
Grade	-2.93	0.60880	-4.81276	0.00016	-4.21445	-1.64555	-4.21445	-1.64555

The above regression compares grade level and student percentile to WPM growth (for grades 2-5). Note the overall significance level of  $1.93e^{-5}$  (better than either regressions of percentile or grade level alone), and the P-Values of each variable (percentile: 0.00028 and grade: 0.00016). This analysis reveals that each point of percentile increases growth by 0.104, and each grade level decreases growth by 2.93.

Note that first grade was not included in this test. Percentile remains relevant in this test, but because growth expectations are much lower for first grade (and they peak in second and third grade), this confuses the linear regression and suggests that grade level has no impact on growth.

A quick logic check reveals that the above information makes sense. Students in higher percentiles, by definition, perform better, and by nature tend to improve faster. This is somewhat counteracted as it becomes more difficult to improve a score as it goes up; this factor is somewhat explained by the negative impact that grade level has on expected growth (higher grade levels result in higher WPM scores, which leaves less room for growth, making each WPM increase harder to achieve).