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## Pandemic's Impact on K-3 Reading Achievement in Idaho, IRI Fall 2018, 2019 & 2020: Percentiles and Effect Sizes

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This “first look” study examined student reading performance at the beginning of grades 1-3 as measured by the Idaho Reading Indicator (IRI) in the fall of 2018, 2019, and 2020. Achievement results for the beginning of the first grade, for example, reflected on the instructional program in Kindergarten, the summer between Kindergarten and the first grade, and the instructional program from the start of the first grade to the administration of the fall IRI. Student results for the beginning of first grade in 2020, for example, were compared only with beginning first grade results from 2018 and 2019.

The study looked at Idaho student reading performance in two ways. First, five percentiles provided a look at how students across-the-board were doing from year to year. Beginning of grade percentiles were identified for high, high average, average for grade level, low average, and low performing students each year. Second, effect sizes (aka “magnitude of change”) were calculated based on the average score for all students at grade level. Effect sizes for each grade indicated the overall student performance from 2018 to 2019 (i.e., before pandemic) and from 2019 to 2020 (i.e., during pandemic).

### Findings

With the confusing in Idaho schools accompanying the state's overall response to the pandemic, we might expect that student reading skills would be lower in 2020 than in 2018/19. The study observed this, but not to the extent that many educators feared. The percentile findings are presented on pages 2-6, and the effect size findings are presented on pages 7-10.

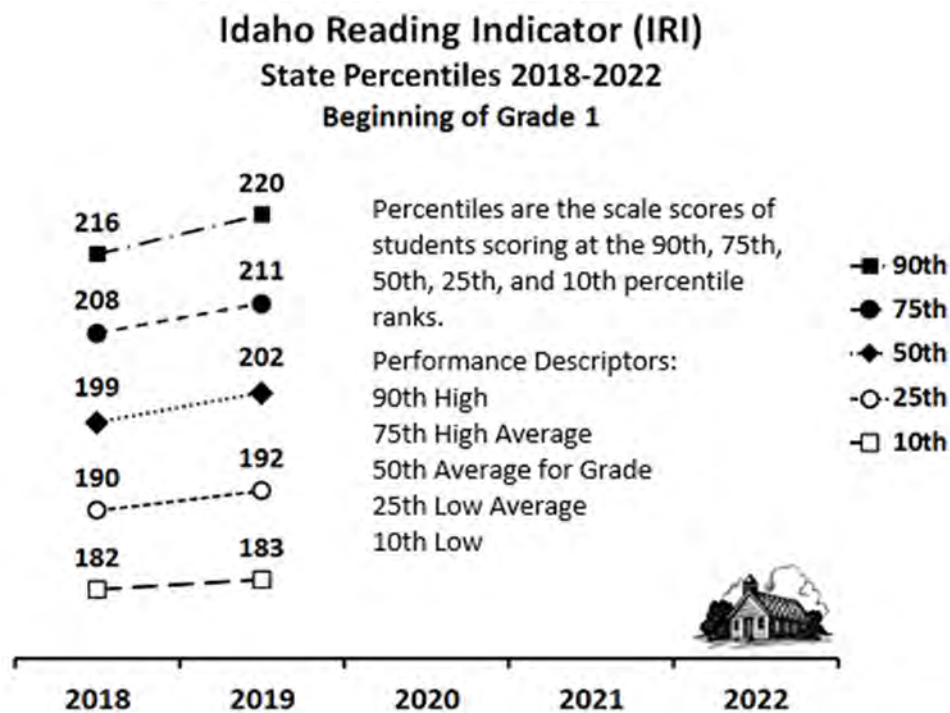
## IRI and the Pandemic: Percentiles

Percentiles (with performance descriptors) examined in this study were the scale scores of students scoring at the 90th (high), 75th (high average), 50th (average for grade level), 25th (low average) and 10th (low) percentile ranks.

The State Department of Education provided the fall Idaho Reading Indicator (IRI) results including the number of students tested in each grade K-3, grade level mean scale scores and standard deviations for 2018, 2019 and 2020.

Each of the five percentiles was calculated by adding the mean score to the product of its standard deviation and its Z score. The Z scores were retrieved from a *Proportions of Area under the Normal Curve* table of a beginning statistics textbook.

*Percentile ranks* (from 1 to 99) are used to compare one student against all other students; *percentiles* are used to compare one scale score against all other scale scores.



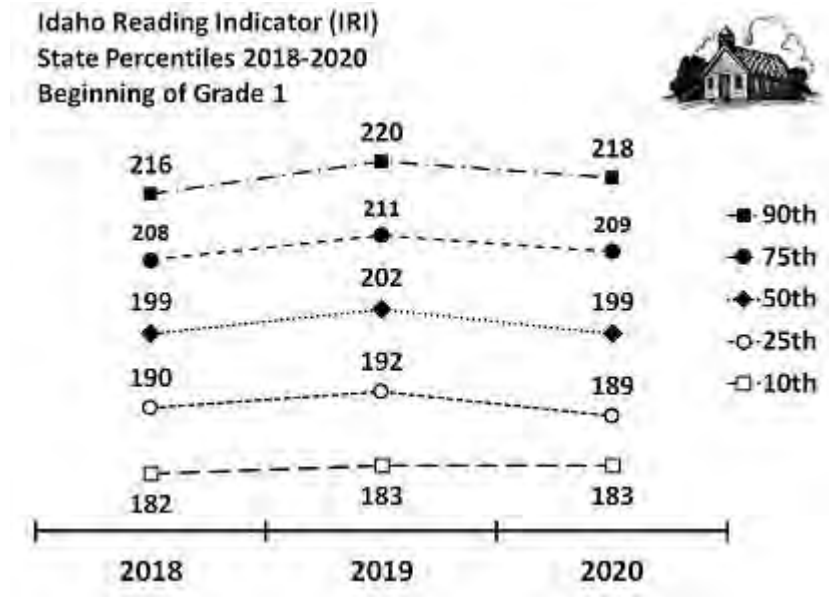


Figure 1  
Entering Grade 1  
Percentiles

Figure 1 Narratives:

- First-grade students at the 90th (high), 75th (high average), and 10th (low) percentiles were better prepared mid-pandemic in the fall of 2020 for beginning Grade 1 reading than in the fall of 2018.
- The first-grade student at the 50th (average for grade level) percentile exhibited the same level of readiness mid-pandemic in the fall of 2020 for beginning Grade 1 reading than in the fall of 2018.
- The first-grade student at the 25th (low average) percentile exhibited a lower level of readiness mid-pandemic in the fall of 2020 for beginning Grade 1 reading than in the fall of 2018.
- What else do you see in the chart of interest to you?

Look at the scale scores (182-183-183) for the 10<sup>th</sup> percentile (low performing students). No loss here in the pandemic.

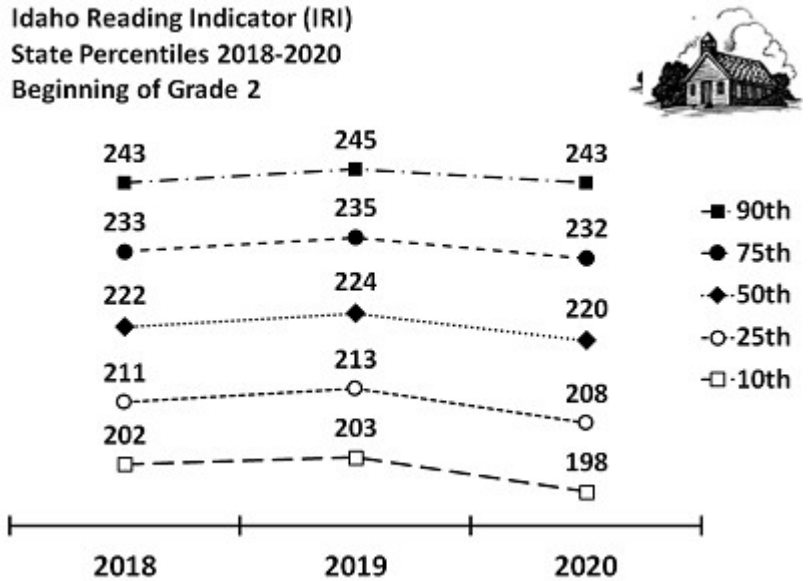


Figure 2  
Entering Grade 2  
Percentiles

Figure 2 Narratives:

- The second-grade student at the 90th (high) percentile exhibited the same level of readiness mid-pandemic in the fall of 2020 for beginning Grade 2 reading as in the fall of 2018.
- The second-grade students at the 75th (high average) percentile, 50th (average for grade level) percentile, 25th (low average) percentile, and 10th (low) percentile all exhibited a lower level of readiness mid-pandemic in the fall of 2020 for beginning Grade 2 reading than in the fall of 2018.
- What else do you see in the chart of interest to you?

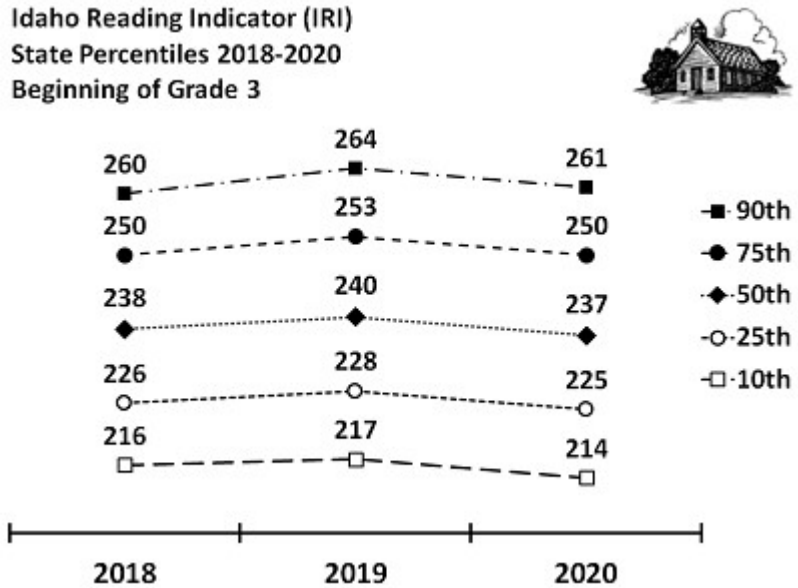


Figure 3  
Entering Grade 3  
Percentiles

Figure 3 Narratives:

- The third-grade student at the 90th (high) percentiles was better prepared mid-pandemic in the fall of 2020 for beginning Grade 3 reading than in the fall of 2018.
- The third-grade student at the 75th (high average) percentile exhibited the same level of readiness mid-pandemic in the fall of 2020 for beginning Grade 3 reading than in the fall of 2018.
- The third-grade students at the 50th (average), 25th (low average), and 10th (low) percentiles exhibited a lower level of readiness mid-pandemic in the fall of 2020 for beginning Grade 3 reading than in the fall of 2018.
- What else do you see in the chart of interest to you?

Figure 4. Statewide Gains and Losses Across the Five Percentiles for Fall 2018 vs. Fall 2019, and Fall 2019 vs. Fall 2020

<b>Idaho Reading Indicator (IRI), Fall 2018 and Fall 2019</b>									
<b>Percentiles at Beginning of Grade 1, Grade 2, and Grade 3</b>									
Percentile	Beginning Grade 1			Beginning Grade 2			Beginning Grade 3		
	1st '18	1st '19	Change	2nd '18	2nd '19	Change	3rd '18	3rd '19	Change
90th	216	220	4	243	245	2	260	264	4
75th	208	211	3	233	235	2	250	253	3
50th	199	202	3	222	224	2	238	240	2
25th	190	192	2	211	213	2	226	228	2
10th	182	183	1	202	203	1	216	217	1
			<b>13</b>			<b>9</b>			<b>12</b>

Source: Idaho State Department of Education. Idaho Reading Indicator (IRI), Fall 2018 and Fall 2019, Grades 1, 2, and 3.

<b>Idaho Reading Indicator (IRI), Fall 2019 and Fall 2020</b>									
<b>Percentiles at Beginning of Grade 1, Grade 2, and Grade 3</b>									
Percentile	Beginning Grade 1			Beginning Grade 2			Beginning Grade 3		
	1st '19	1st '20	Change	2nd '19	2nd '20	Change	3rd '19	3rd '20	Change
90th	220	218	-2	245	243	-2	264	261	-3
75th	211	209	-2	235	232	-3	253	250	-3
50th	202	199	-3	224	220	-4	240	237	-3
25th	192	189	-3	213	208	-5	228	225	-3
10th	183	180	-3	203	198	-5	217	214	-3
			<b>-13</b>			<b>-19</b>			<b>-15</b>

Source: Idaho State Department of Education. Idaho Reading Indicator (IRI), Fall 2019 and Fall 2020, Grades 1, 2, and 3.

- The beginning first-grade students at the five percentiles had a combined point gain of 13 points from 2018 to 2019, but a loss of 13 points from 2019 to 2020. Net change: zero points.
- The beginning second-grade students at the five percentiles had a combined point gain of 9 points from 2018 to 2019, but a loss of 19 points from 2019 to 2020. Net change: 10 point loss.
- The beginning third-grade students at the five percentiles had a combined point gain of 12 points from 2018 to 2019, but a loss of 15 points from 2019 to 2020. Net change: 3 point loss.
- What do you see in the tables of interest to you?

## IRI and the Pandemic: Effect Sizes

The effect size describes the combined performance of all of the students in a group, be it state; district, school or classroom. It is the “practical significance” of the difference between two means. The effect size (i.e., the magnitude of the difference between two means) is calculated by dividing the difference between two means by their pooled standard deviation.

$$\text{Effect Size} = \frac{\bar{X}_2 - \bar{X}_1}{\sqrt{\frac{S_1^2 + S_2^2}{2}}}$$

Difference between two means

Pooled standard deviation

Legend:

Subscript 1 = Pretest (baseline or last year)  
 Subscript 2 = Posttest (this year)  
 $\bar{X}$  = Average or mean score  
 $S$  = Standard deviation

When there is no difference between the two mean scores, the effect size is zero (0). When the posttest mean is lower than the pretest mean, the effect size is negative (i.e., a loss).

Accountability Goal 1: When this year’s mean is higher than last year’s mean, the effect size is positive, a gain. The expectation is for a positive effect size (a gain) in student performance each year.

Accountability Goal 2: Each annual effect size may be added to the existing trend effect size to generate a performance trend. The expectation is for a positive trend effect size from year to year.

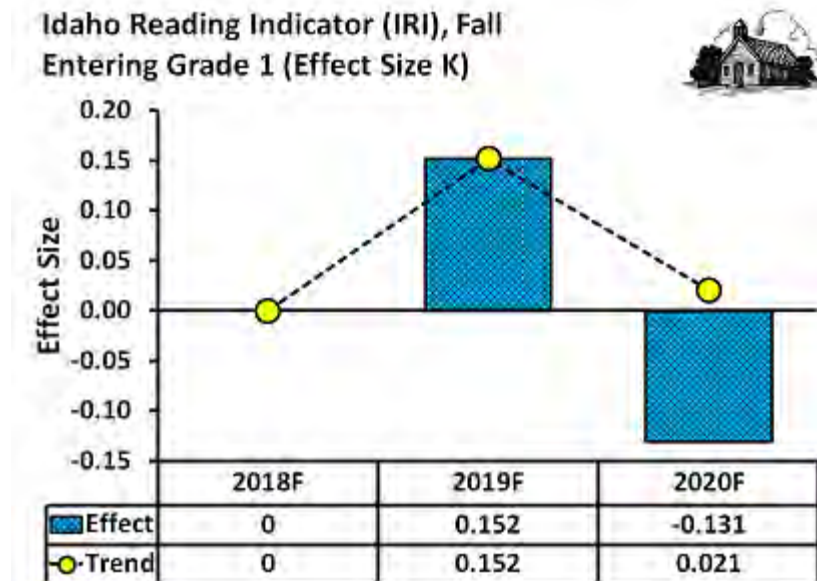


Figure 5

Entering Grade 1  
Effect Sizes

Figure 5 Narratives

- Idaho students entering Grade 1 in the fall of 2019 were better prepared for grade-level reading instruction than students entering Grade 1 in the fall of 2018.
- Idaho students entering Grade 1 in the fall of 2020 (during the pandemic) were less prepared for grade-level reading instruction than students entering Grade 1 in 2019.
- [Trend] Idaho students entering Grade 1 in the fall of 2020 (during the pandemic) were slightly better prepared for grade-level reading instruction than students entering Grade 1 in 2018.
- What else do you see in the chart of interest to you?



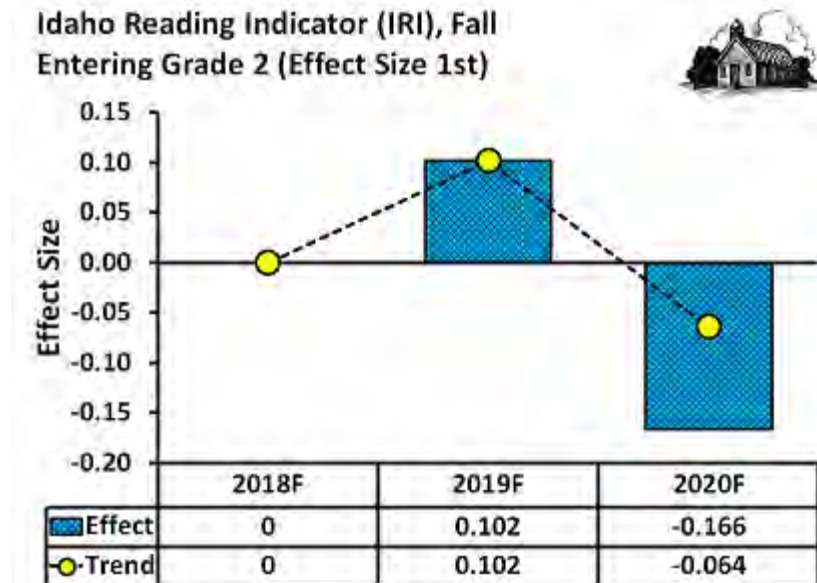


Figure 6

Entering Grade 2  
Effect Sizes

Figure 6 Narratives

- Idaho students entering Grade 2 in the fall of 2019 were better prepared for grade-level reading instruction than students entering Grade 2 in the fall of 2018.
- Idaho students entering Grade 2 in the fall of 2020 (during the pandemic) were less prepared for grade-level reading instruction than students entering Grade 2 in 2019.
- [Trend] Idaho students entering Grade 2 in the fall of 2020 (during the pandemic) were less prepared for grade-level reading instruction than students entering Grade 2 in 2018.
- What else do you see in the chart of interest to you?

Figure 7

Entering Grade 3  
Effect Sizes

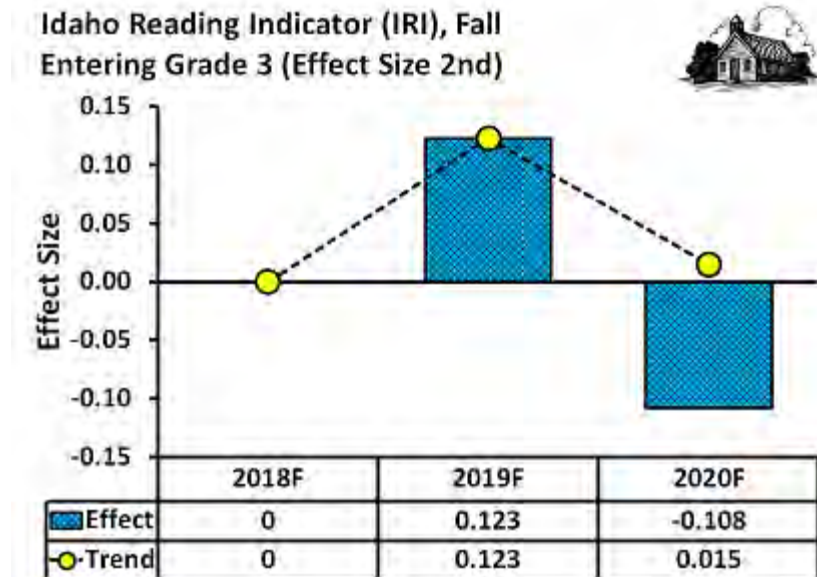


Figure 7 Narratives

- Idaho students entering Grade 3 in the fall of 2019 were better prepared for grade-level reading instruction than students entering Grade 3 in the fall of 2018.
- Idaho students entering Grade 3 in the fall of 2020 (during the pandemic) were less prepared for grade-level reading instruction than students entering Grade 3 in 2019.
- [Trend] Idaho students entering Grade 3 in the fall of 2020 (during the pandemic) were slightly better prepared for grade-level reading instruction than students entering Grade 3 in 2018.
- What else do you see in the chart of interest to you?

**Suggested citation:**

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**Contact information:**

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**Recommended reading regarding the basics about two once and future tools for analyzing school performance: percentiles and effect sizes:**

Learning Point Associates. (2009, August). *Connecting Research to Practice: Knowing Who Is Proficient Isn't Always Sufficient*. Available online at <http://files.eric.ed.gov/fulltext/ED509965.pdf>