aimsweb PLUS

SGP Guide

Introduction

aimswebPlus® is an assessment, data management, and reporting system that provides national and local performance and growth norms for the screening and progress monitoring of math and reading skills for all students in Kindergarten through Grade 8. aimswebPlus uses two types of measures: *curriculum-based measures* (CBMs)—brief, timed measures of fluency on essential basic skills—and *standards-based assessments* (SBAs), which are comprehensive measures aligned to current learning standards. By combining these two types of measures, aimswebPlus provides the data that schools need for program planning and evaluation and for tiered assessment (multi-tiered system of supports [MTSS], also known as response to intervention [RTI]). aimswebPlus data provide the information needed to differentiate instruction and determine who will benefit from intensive intervention.

aimswebPlus reports seasonal and annual growth rates and growth norms for Early Numeracy, Early Literacy, Math, and Reading CBMs and composites (see Appendix A for a list of measures with growth norms, by grade and season). Growth norms supplement and enhance the national and local norms that apply to benchmark scores and have several valuable applications, including:

- Growth norms are used in goal setting for individual progress monitoring plans and indicate the aggressiveness of a goal.
- Growth norms can be used to describe the rate of growth a student must attain to achieve an end-of-year performance target.
- Average growth rates at the group, classroom, grade, and building levels can be used to evaluate the effectiveness of interventions and the core curriculum.
- Growth rates can be used as evidence for whether a student is making adequate progress as part of a learning disability evaluation within the dual-discrepancy model framework.

Growth is reported in aimswebPlus as the average weekly raw score point increase from Fall-to-Winter, Fall-to-Spring, and Winter-to-Spring. This weekly average, called the *rate of improvement* (ROI), is then converted to a *student growth percentile* (SGP), which indicates the percentage of students in the large, representative national norm sample who had an ROI equal to or smaller than a given ROI.

Reporting percentiles simplifies the interpretation of strength of growth. For example, take a student who has a Fall-to-Spring ROI of 0.50. This means the student gained one-half of a point per week on average throughout the Fall-to-Spring interval. Without a frame of reference, it is not possible to know if this ROI is high, average, or low. However, if an ROI of 0.50 corresponds to an SGP of 55 (i.e., the 55th national growth percentile), then one can readily interpret the student's ROI as average. Similarly, if an ROI corresponds to an SGP of 85, then one can easily interpret the student's growth as above average. An additional benefit of SGPs, like all percentiles, is that its meaning remains the same across grades, measures, and time intervals.

Growth norms supplement and enhance the national and local norms that apply to benchmark scores obtained at one point in time. For example, if Peter, a third-grader, had a Fall Oral Reading Fluency (ORF) raw score of 35 (6th percentile on national norms) and a Spring raw score of 90 (17th percentile on national norms), then he improved by 55 raw-score points. If 35 weeks separated the Fall and Spring administration, Peter's growth would equate to an ROI of (90 – 35)/35 = 1.57 points per week. This ROI is at the 85th percentile of the SGP norms. In other words, Peter improved faster than about 85% of third

graders whose Fall scores were in the bottom 10%. Although Peter's Spring score is still in the below-average range, his improvement over the year was unusually rapid when compared with the growth rates of his peers who began the year at a similar score level.

To further illustrate the application of SGPs, consider three students—Jorge, Sara, and Nina—who obtained the same ORF raw score (65) in the Fall of Grade 3. This raw score is at the 24th percentile using national norms. Jorge's raw score increased to 135 in the Spring (64th percentile for Spring scores), Sara's raw score increased to 107 (31st percentile), and Nina's raw score increased to 93 (19th percentile). The ROIs for these students—assuming 35 weeks between Fall and Spring testing—are as follows:

- Jorge's raw score increased by 55 points (135 – 65) over the course of 35 weeks, resulting in an ROI of 2.00 raw score points per week (70 ÷ 35).
- Sara's raw score increased 42 points over 35 weeks, corresponding to an ROI of 1.20 raw score points per week.
- Nina's raw score increased 28 points over 35 weeks, resulting in an ROI of 0.80 raw score points per week.

Based on these results, the corresponding SGPs indicate that:

- Jorge's Fall-to-Spring ROI of 2.00 is at the 95th percentile of ROIs; that is, he improved faster than about 95% of students in the national norm sample with similar Fall scores.
- Sara's ROI is at the 55th percentile, an above-average rate of growth when compared to her peers.
- Nina's ROI is at the 25th percentile, meaning she improved at a below-average rate compared to the national sample of Grade 3 students who had similar Fall scores.

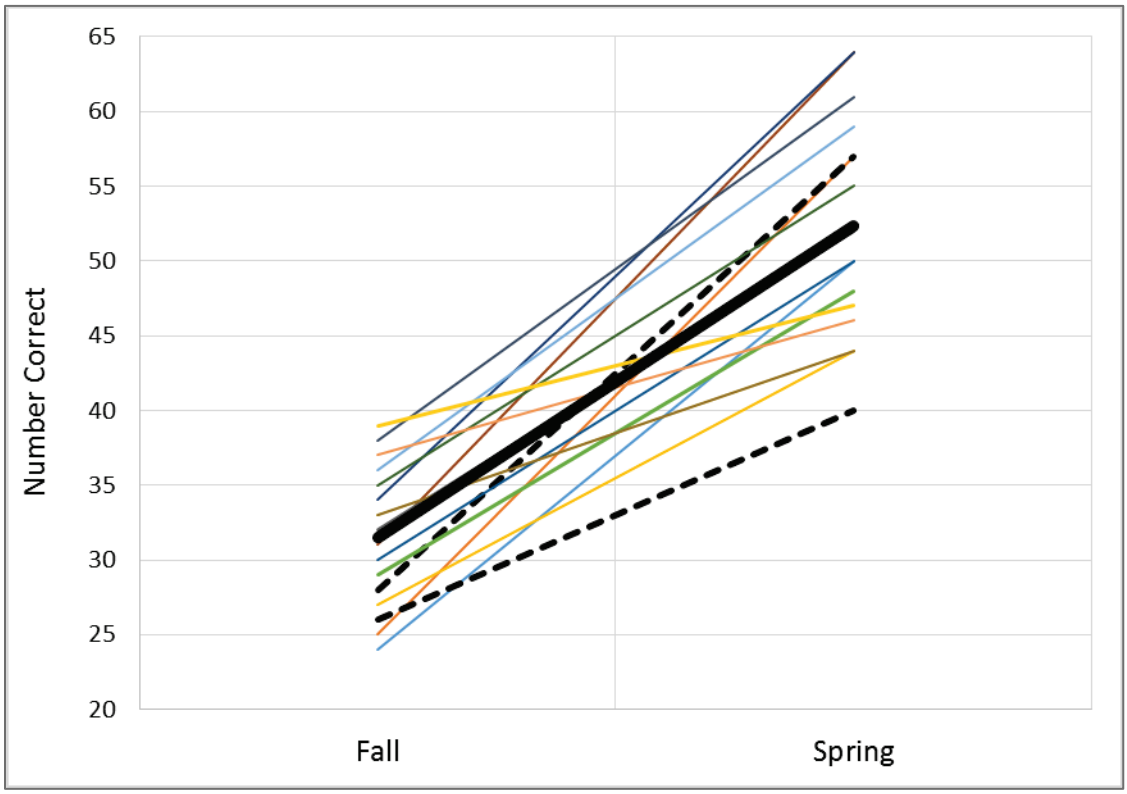
Student Growth Percentile Approach

ROI growth rates are converted to SGPs, which are reported at 10 levels ranging from 5 to 95. That is, the distribution of ROIs is parsed into ten levels with 10% of the national norm sample at each level. This results in ten SGPs that are reported as 5, 15, 25, 35, 45, 55, 65, 75, 85, and 95. The reported SGP corresponds to the midpoint in the range. For example, an SGP of 15 is the mid-point of the second decile, which ranges from 11 to 20. This level of precision is appropriate for reporting SGPs because change scores, such as ROIs, are inherently less precise than raw scores.

This concept is illustrated in Figure 1, which shows the Fall and Spring scores for a random sample of 16 students with an average Fall score of 31 and an average Spring score of 52. The distribution approximates annual growth rates for Number Naming Fluency.

The narrow solid lines connect each student's Fall and Spring score, with steeper lines indicating larger gains. Looking at this graph, it is evident is that this group of students grew at different rates, which is typical. The thick black line is the growth rate at the midpoint (50th percentile) of this distribution and corresponds to the top end of the range for an SGP of 45 (41–50). The steeper of the two dashed lines is as steep as or steeper than 75% of the lines in this group and would correspond to an SGP of 75. The shallower of the two dashed lines is as steep as or steeper than 25% of the lines and would correspond to an SGP of 25.

Figure 1 Fall and Spring Number Correct Scores, Number Naming Fluency



Growth by Initial Performance Level and Season

aimswebPlus researchers determined that growth rates vary by initial level of performance. Generally, students with low Fall scores have higher growth rates than students with high Fall scores. This result is consistent with expectations that low performing students receive additional instruction and remediation to accelerate achievement growth. Additionally, it is influenced by natural regression to the mean. This does not mean that aimswebPlus measures are not sensitive to growth in the upper range; to the contrary, aimswebPlus composites and CBMs have high ceilings, which enable detection of growth across the full ability range.

aimswebPlus provides separate SGP norms by measure, grade, and time interval and for each of five levels of initial performance (very low, low, average, high, and very high). Because growth varies across performance levels, stratifying by initial level of performance helps teachers draw more accurate inferences about each student's progress and set realistic yet challenging goals. The five initial performance levels correspond to the following percentiles:

- Very low: 1st to 10th percentiles
- Low: 11th to 25th percentiles
- Average: 26th to 74th percentiles
- High: 75th to 89th percentiles
- Very high: 90st to 99th percentiles

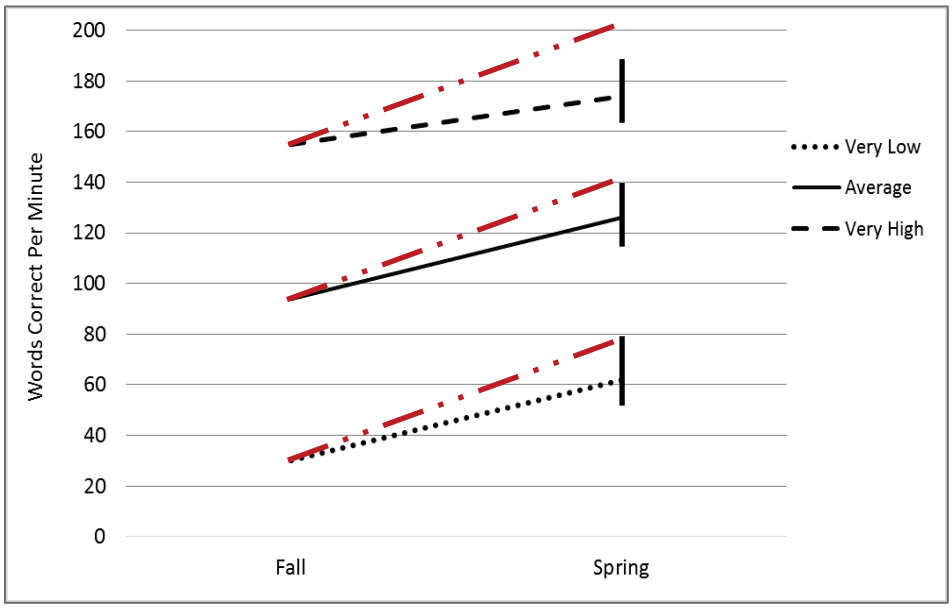
The concept of SGP norms is illustrated in Figure 2. This figure shows the median (50th percentile) Fall-to-Spring raw-score growth on ORF for Grade 3 students with an initial level of performance in the very low, average, and very high range. The vertical lines at the endpoint in the Spring bound the 25th to 75th

percentile range of growth scores for each group. The dashed red line represents Fall-to-Spring growth at a fixed ROI. The line is repeated at each initial level of performance to demonstrate how growth percentiles vary by initial performance levels.

Figure 2 illustrates that the median growth line for the very high group is flatter than the other two groups. The median ROI for students starting in the very low range (0.90) and for students starting in the average range (0.89) of performance are comparable, and higher than the median ROI for students starting in the very high range (0.54), resulting in a steeper slope. This pattern is common among most of the aimswebPlus measures.

The slope of the red dashed line is the same for each of the three groups. What is different is where the red line ends relative to the three black vertical lines. This ROI is at the 75th percentile relative to the very low performing group, at the 85th percentile relative to average performing group, and above the 95th percentile relative to the very high performing group. These differences illustrate that a growth rate this steep is rarer among students with very high initial levels of performance than among students with very low initial levels of performance.

Figure 2 Growth by Initial Performance Level



The SGP norms provide information that is different from and supplementary to the percentiles available for aimswebPlus measures. A benchmark percentile indicates the percentage of students in the norm sample (local or national) who scored at or below a particular raw score at that point in time (e.g., Fall of Grade 3). By contrast, an SGP indicates the percentage of students in the national norm sample whose rate of improvement is at or below a given ROI.

The SGP norms are available for seasonal and annual intervals: Fall–Winter, Winter–Spring, and Fall–Spring. Improvement tends to vary by season, but is typically higher in the Fall. For example, for Grade 1 ORF, the median ROI is 1.53 in the Fall and 1.05 in the Spring; conversely, for the Grade 4 Math composite, the median ROI in the Spring (0.91) is higher than the median ROI in the Fall (0.54).

The figures in Appendix B illustrate this difference at selected grade levels for all aimswebPlus CBMs that have SGP norms for the entire school year. In almost every instance, the Fall–Winter value is greater than the Winter–Spring value, and the average Fall–Spring ROI is between the two values.

Use and Interpretation

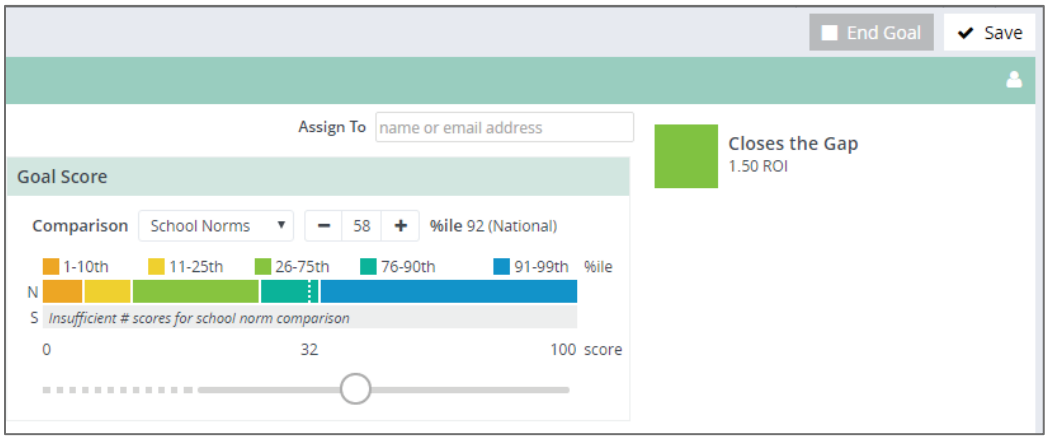
Goal Setting

One of the applications of SGPs is to aid in setting performance goals for students who need frequent progress monitoring. The aimswebPlus progress monitoring system uses SGPs to give feedback about the aggressiveness of a given performance goal. Goals are set by selecting a score the student should attain by a user-defined date. The system shows the national percentile corresponding to the selected score and indicates the strength of the ROI needed to achieve the goal. If the ROI required to reach a proposed goal is equal to the average rate of improvement of a student's peers, that goal may be insufficient to close the performance gap. Conversely, if reaching the proposed goal required an ROI that is higher than the growth rate of 95% of the students in the same grade with the same level of initial performance, that goal may be too ambitious. The strength of the ROI is based on the following SGP levels:

- Insufficient (SGP ≥ 50): The ROI is below average and will not improve the student's percentile rank enough to sufficiently close the performance gap.
- Closes the gap (SGP of 51–84): The ROI is above average and the goal score will improve the student's percentile rank.
- Ambitious (SGP of 85 –97): The ROI is well-above average and the goal score will substantially improve the student's percentile rank.
- Extremely Ambitious (SGP ≤ 98): The ROI is greater than 97% of the ROIs in the national sample for students with a similar initial score and is rarely achieved in typical settings.

Figure 3 shows the goal score slider and feedback section of the aimswebPlus system. As the user moves the slider to the desired goal score, the system automatically computes the ROI and corresponding SGP needed to attain the goal score by the goal date. That information drives the feedback provided by the system. For students receiving intensive intervention, the bottom end of the ambitious range (SGP = 85) is recommended.

Figure 3 Goal Score Slider



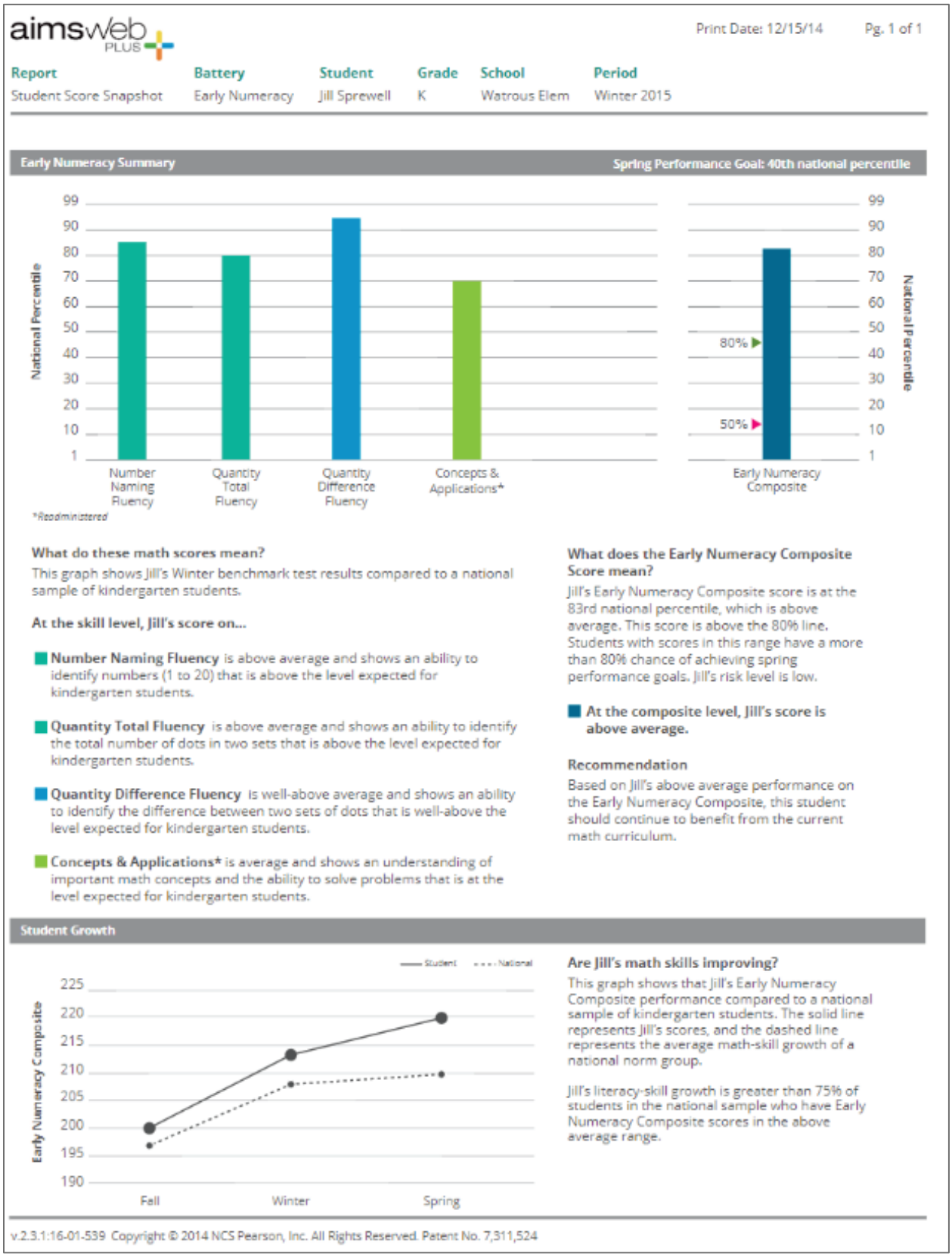
Reports and Software

aimswebPlus reports that include ROI information generally also provide SGPs. For most CBMs, student growth percentiles are available for the entire school year. The exceptions are found in Kindergarten and Grade 1, with some measures available only in select seasons (e.g., Quantity Difference Fluency). For these measures, only Winter–Spring growth norms are available. Appendix A lists the measures and composites for which SGPs are available and the seasons they are available.

At the student level, educators use student growth percentiles and growth trajectories to evaluate each student's progress throughout the year. Student growth data can be used to determine whether a tailored instructional program or intervention is having the desired effect on accelerating growth. To facilitate the evaluation of this data, the Student Score Snapshot report charts a student's growth from Fall, to Winter, to Spring (see Figure 4).

The top section of this report describes the student's performance on each benchmark measure and composite, and indicates the student's level of risk. The bottom section of the report charts the student's benchmark composite scores (solid line) and the corresponding national norms (dashed line). In Figure 4, the solid line is a bit steeper than the dashed line, indicating this student is growing faster than average. The narrative summary accompanying this graph uses SGP data to describe the student's growth compared to his or her peers in the national norm sample. In the sample report, the student's SGP is 75; therefore, her growth is equal or greater than the growth rate of 75% of the students in the national norms.

Figure 4 Sample Student Score Snapshot Report



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Report	Battery	Student	Grade	School	Period
Student Score Snapshot	Early Numeracy	Jill Sprewell	K	Watrous Elem	Winter 2015

Early Numeracy Summary — Spring Performance Goal: 40th national percentile

What do these math scores mean?

This graph shows Jill's Winter benchmark test results compared to a national sample of kindergarten students.

At the skill level, Jill's score on...

- **Number Naming Fluency** is above average and shows an ability to identify numbers (1 to 20) that is above the level expected for kindergarten students.
- **Quantity Total Fluency** is above average and shows an ability to identify the total number of dots in two sets that is above the level expected for kindergarten students.
- **Quantity Difference Fluency** is well-above average and shows an ability to identify the difference between two sets of dots that is well-above the level expected for kindergarten students.
- **Concepts & Applications*** is average and shows an understanding of important math concepts and the ability to solve problems that is at the level expected for kindergarten students.

What does the Early Numeracy Composite Score mean?

Jill's Early Numeracy Composite score is at the 83rd national percentile, which is above average. This score is above the 80% line. Students with scores in this range have a more than 80% chance of achieving spring performance goals. Jill's risk level is low.

At the composite level, Jill's score is above average.

Recommendation

Based on Jill's above average performance on the Early Numeracy Composite, this student should continue to benefit from the current math curriculum.

Student Growth

Are Jill's math skills improving?

This graph shows that Jill's Early Numeracy Composite performance compared to a national sample of kindergarten students. The solid line represents Jill's scores, and the dashed line represents the average math-skill growth of a national norm group.

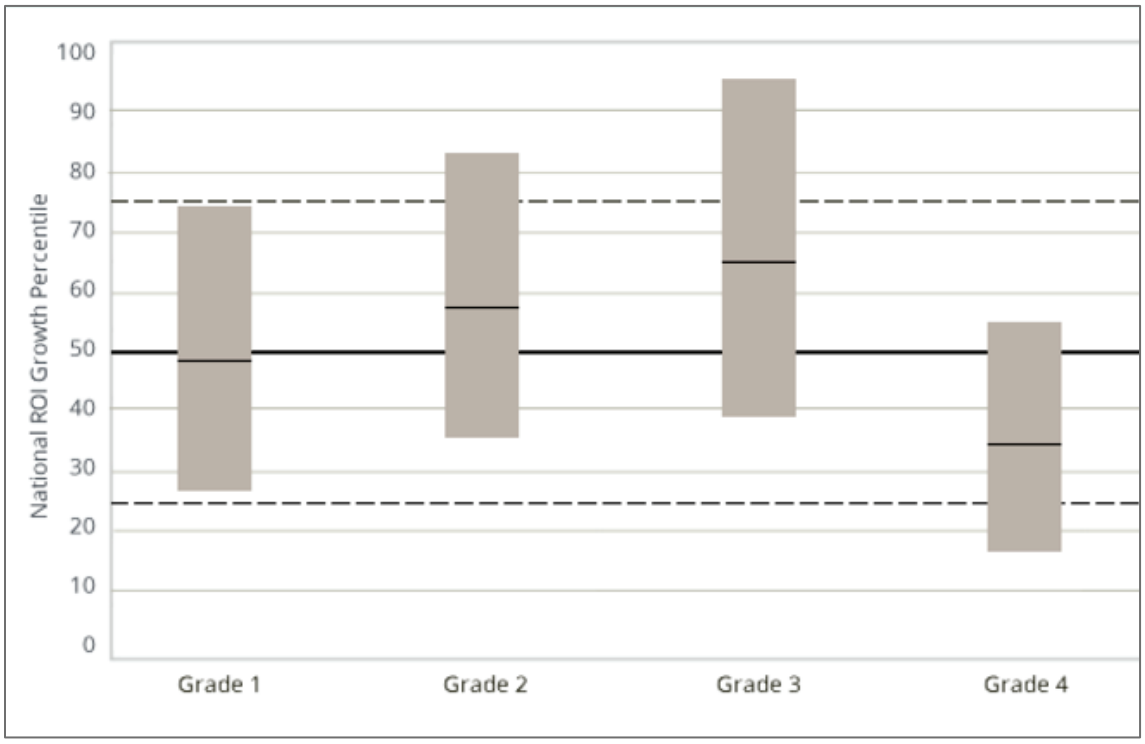
Jill's literacy-skill growth is greater than 75% of students in the national sample who have Early Numeracy Composite scores in the above average range.

Having a frame of reference for ROIs is also beneficial for group applications. For instance, if most of the students in a class had ROIs above the average in the national sample, one could infer that the instruction in that class was particularly effective. For this reason, aimswebPlus includes a group growth report that shows the distribution of growth rates for various user-defined groups, classrooms, grades, and schools, with optional filtering and disaggregation. This report compares the group's distribution of SGPs to the national norm sample's distribution of SGPs, reporting the count and percentage of students in each user-defined group at each SGP decile (from 5 to 95).

Figure 5 shows a ROI Growth Norms group report reporting the distribution of SGPs for Grades 1 through 4 at a sample school. The gray rectangles represent the middle 50% of the distribution of growth rates for each grade. The two dashed lines represent national SGPs of 25 and 75, respectively, and the thick solid line represents an SGP of 50. If the growth rate for a group of students perfectly mirrored the national distribution of ROIs, the bottom end of the rectangle would be exactly at the lower dashed line (SGP=25), the top end would be exactly at the upper dashed line (SGP=75), and the midpoint would be exactly at an SGP=50.

The data shown in Figure 5 indicates that the annual growth for the Grade 1 students was about average, relative to the national population. The annual growth rate for Grades 2 and 3 was substantially higher than the national average, while the growth rate was substantially lower than the national average for Grade 4 students. Grade 3 students had the highest growth rate of in the sample report, with the midpoint of the distribution of ROIs equivalent to the 65th national growth percentile (SGP = 65) and the upper quartile (i.e., upper 25% of the distribution) exceeding the growth rates of 95% of students in that grade in the national sample (SGP = 95).

Figure 5 ROI Growth Norms Group Report



Development of Student Growth Percentiles

The SGP norms are based on the large, representative aimswebPlus national norm sample that was collected during the 2013–14 school year. A detailed description of the sample can be found in the *aimswebPlus Technical Manual*. Briefly, the sample included an average of 1,500 to 3,000 students at each grade and benchmark period. The students came from schools across the country that participated in the standardization of aimswebPlus measures. All participating schools were required to administer all of the aimswebPlus benchmark measures in the designated seasons (Fall, Winter, and Spring for most measures) to all their students, with exceptions made for students with documented moderate-to-severe intellectual disabilities or severe motor disabilities; for students who were deaf and/or blind; and for students with English language proficiency scores below the developing range (Level 3). The final sample for each aimswebPlus measure at each grade closely resembles the national student population with respect to gender, race/ethnicity, and free/reduced lunch eligibility.

The first step in constructing the SGP norms was to subdivide performance into five levels, according to respective percentile scores at the beginning of the time interval (Fall screening for the Fall–Winter and Fall–Spring SGP norms, and Winter screening for the Winter–Spring SGP norms). Next, ROIs were computed for each student by dividing the difference between their beginning and ending raw scores by the number of weeks separating each score. Then, using the frequency distributions of the resulting ROIs, the mid-interval percentile value for each ROI value was calculated and rounded to one of the 10 ROI percentile values (5, 15, 25, 35, 45, 55, 65, 75, 85, and 95) shown in the final SGP norm tables. This results in an SGP of 5 represents all percentiles from 1 to 10, an SGP of 15 represents all percentiles from 11 to 20, and so on.

Appendix A

Availability of Growth Norms

The table below lists the measures and composites with growth norms, by grade and season. Growth norms are available for the entire school year, with a few exceptions. The measures with just Winter-to-Spring growth norms are: Letter Word Sounds Fluency, Phoneme Segmentation, Quantity Difference Fluency, and Math Facts Fluency–Tens. These measures assess skills that are typically taught during the second half of the school year.

Table A1 Availability of Growth Norms, by Measure, Composite, Grade, and Season

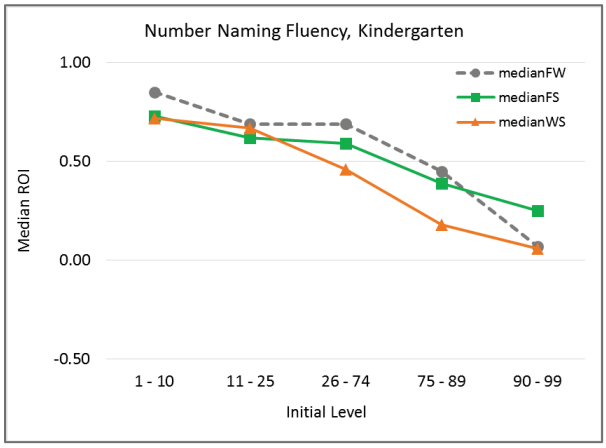
Grade(s)	Measure/Composite	Fall-to-Winter	Winter-to-Spring	Fall-to-Spring
K	LNF	✓	✓	✓
K	LWSF		✓	
K	PS		✓	
K	Early Literacy Composite	✓	✓	✓
K	NNF	✓	✓	✓
K	QTF	✓	✓	✓
K	QDF		✓	
K	Early Numeracy Composite	✓	✓	✓
1	ORF	✓	✓	✓
1	WRF	✓	✓	✓
1	Early Literacy Composite	✓	✓	✓
1	NCF–P	✓	✓	✓
1	MFF–1D	✓	✓	✓
1	MFF–T		✓	
1	Early Numeracy Composite	✓	✓	✓
2–8	ORF	✓	✓	✓
4–8	SRF	✓	✓	✓
2–8	Reading Composite	✓	✓	✓
2–8	NCF–T	✓	✓	✓
2–8	MCF	✓	✓	✓
2–8	NSF	✓	✓	✓
2–8	Math Composite	✓	✓	✓

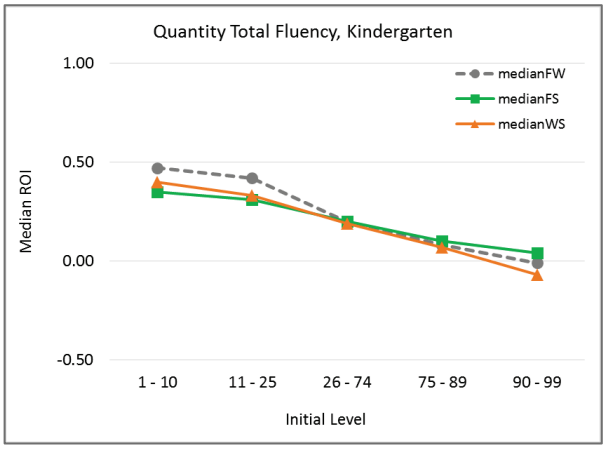
Appendix B

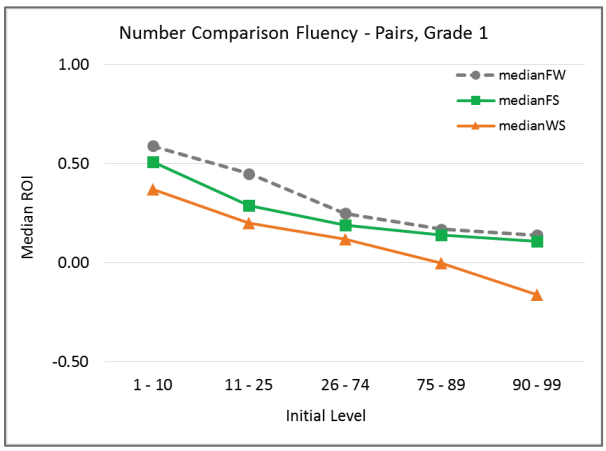
Median ROI Values

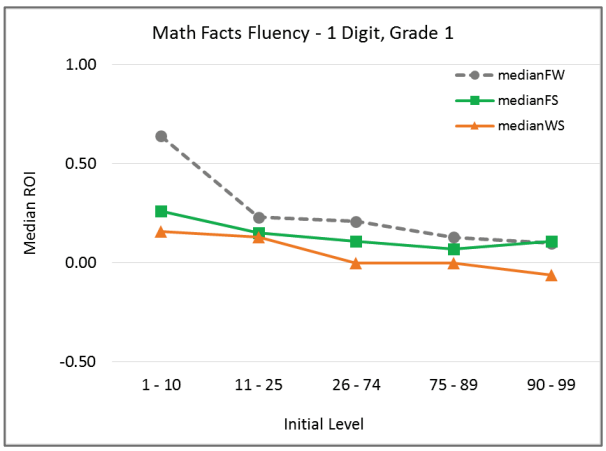
The following figures illustrate median ROI differences at selected grade levels for all aimswebPlus CBMs that have SGP norms for the entire school year. In almost every instance, the Fall–Winter value is greater than the Winter–Spring value, and the average Fall–Spring ROI is between the two values.

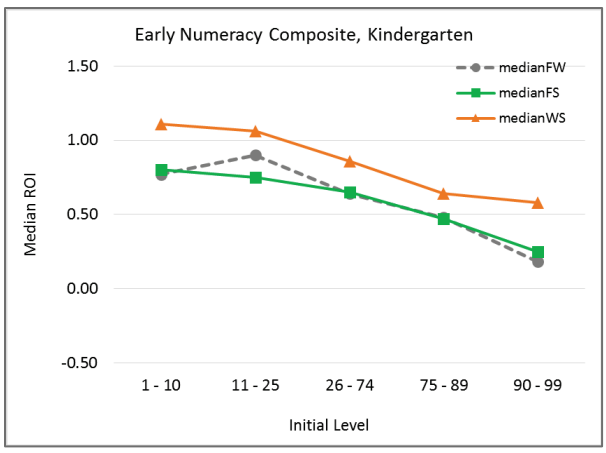
Each figure shows the average ROI (by initial score level) for each of the three time intervals: Fall–Winter (dashed gray line), Winter–Spring (solid orange line), and Fall–Spring (solid green line).

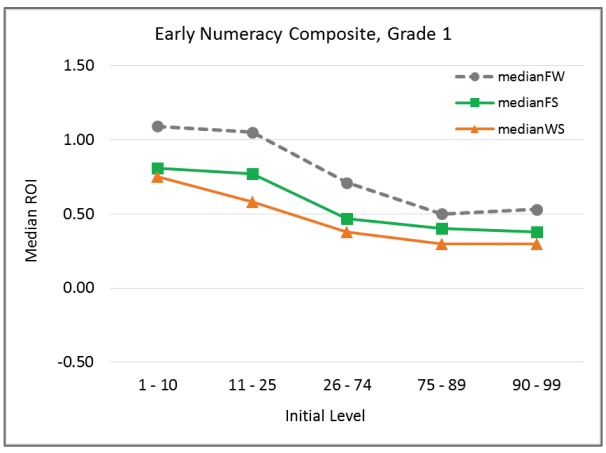


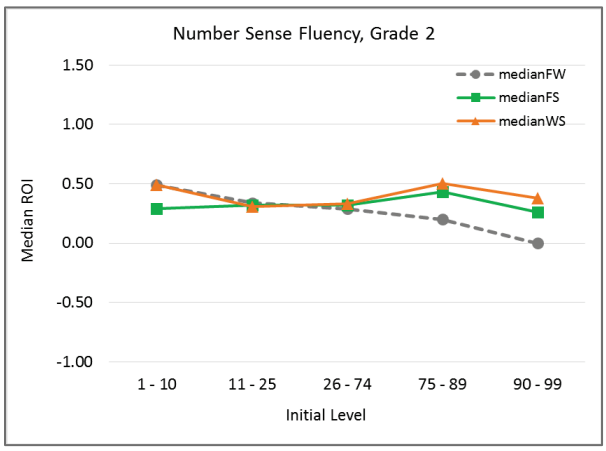


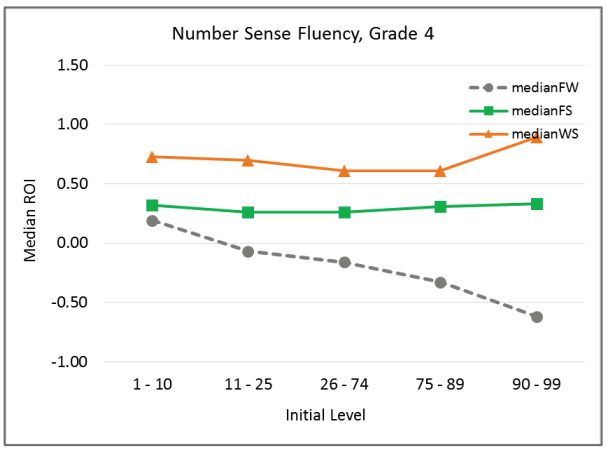


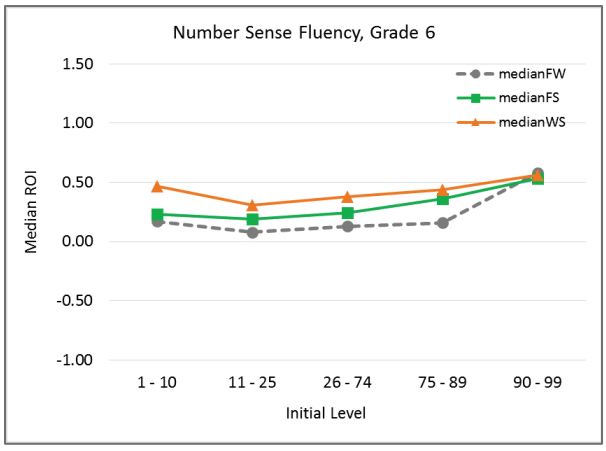


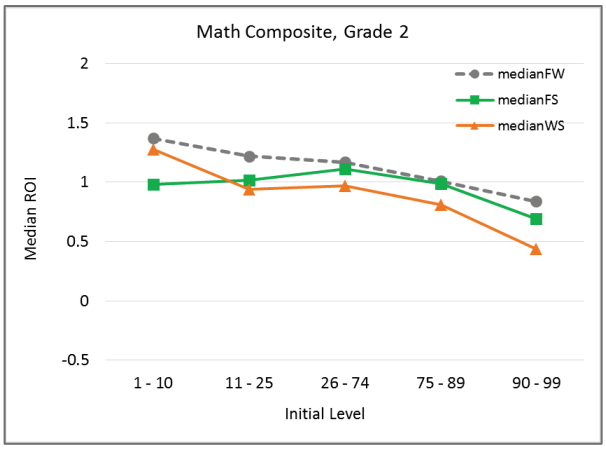


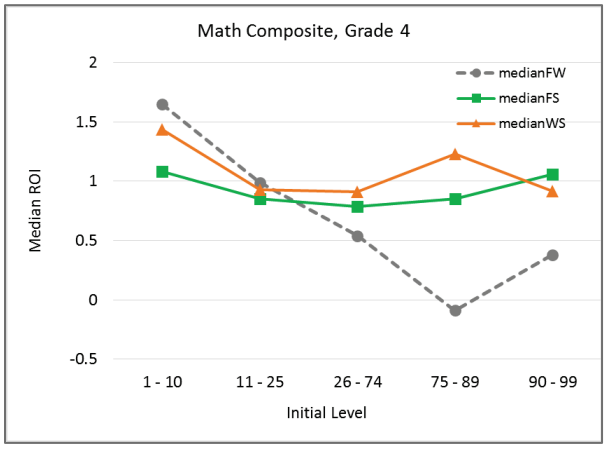


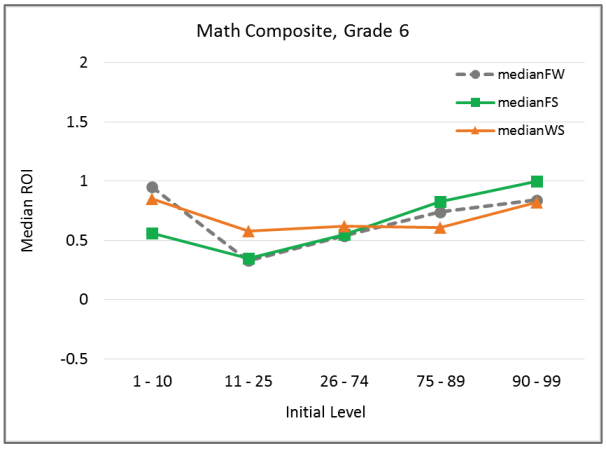


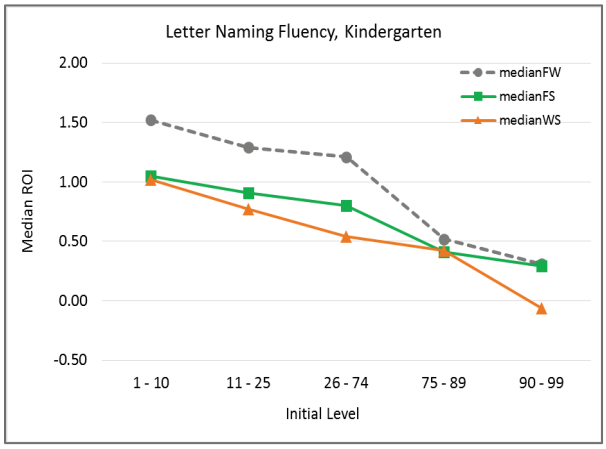


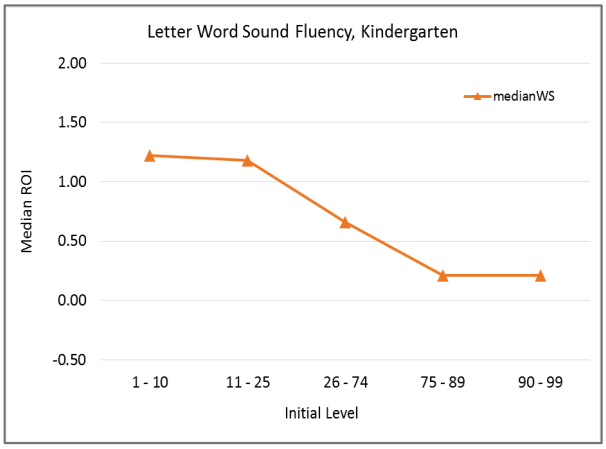


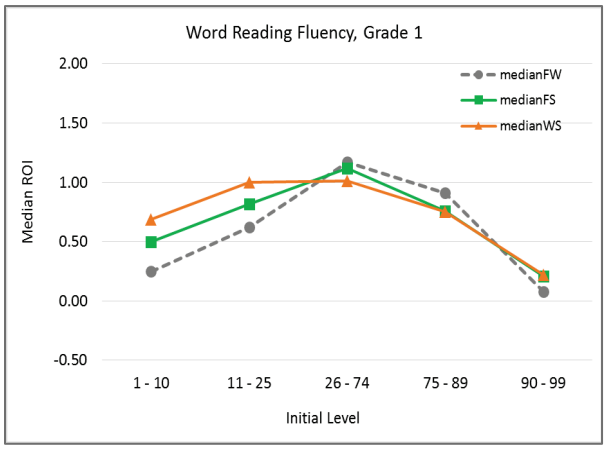


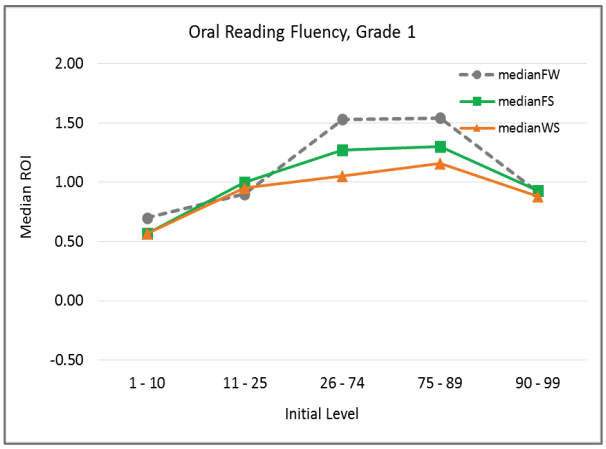


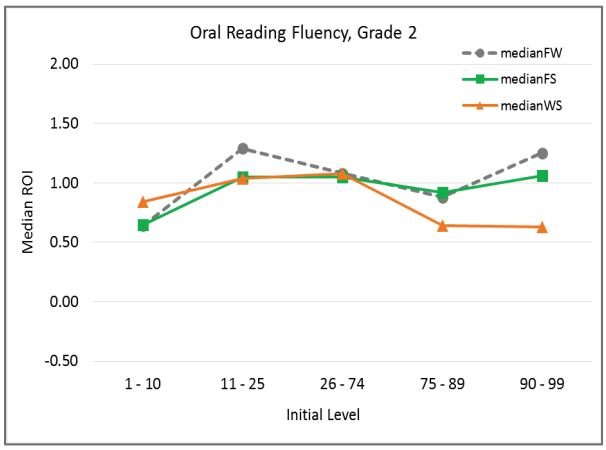


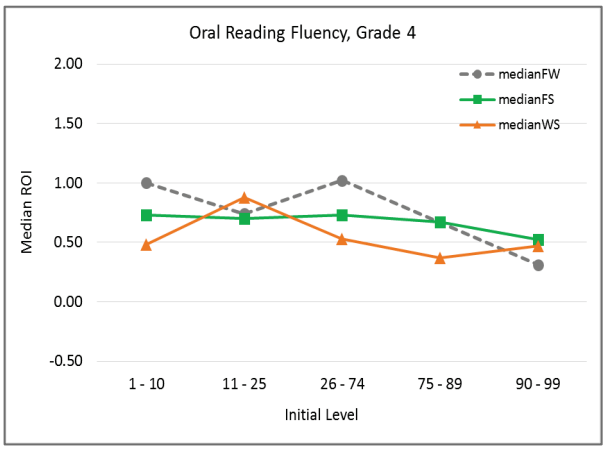


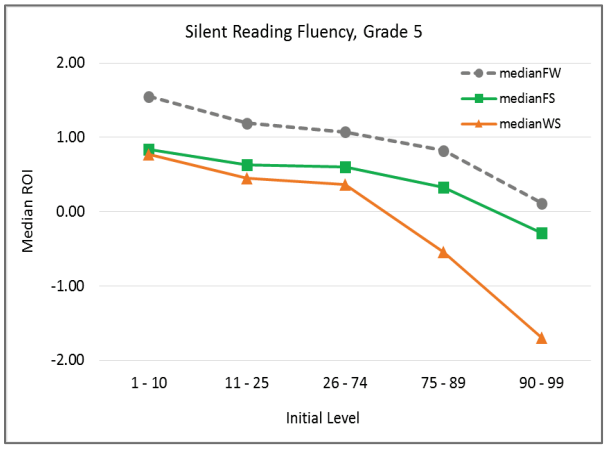


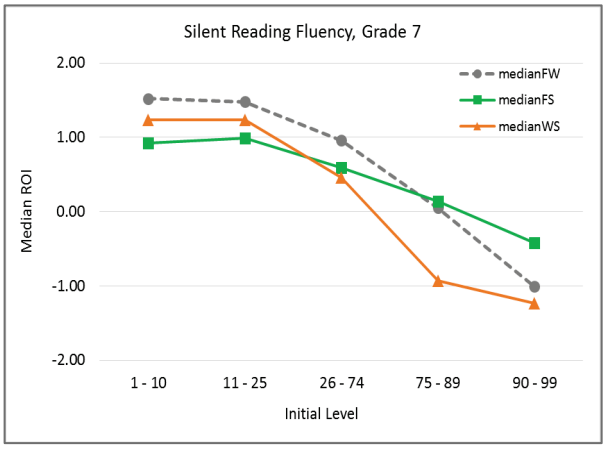


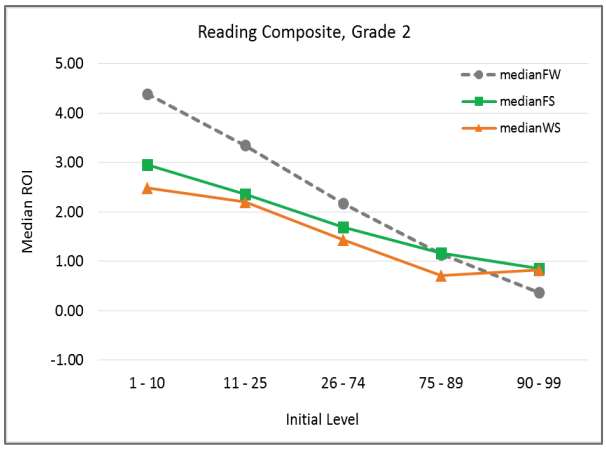


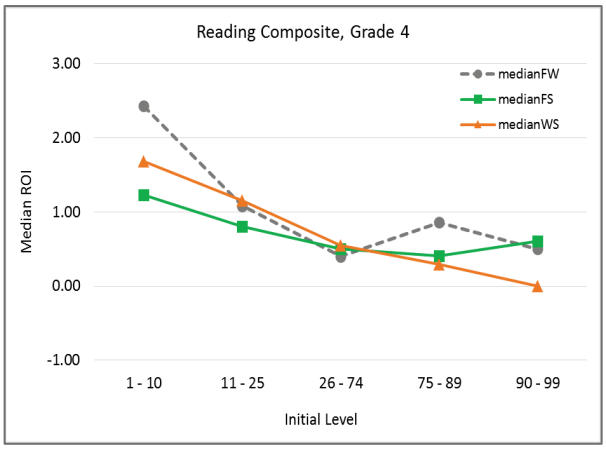


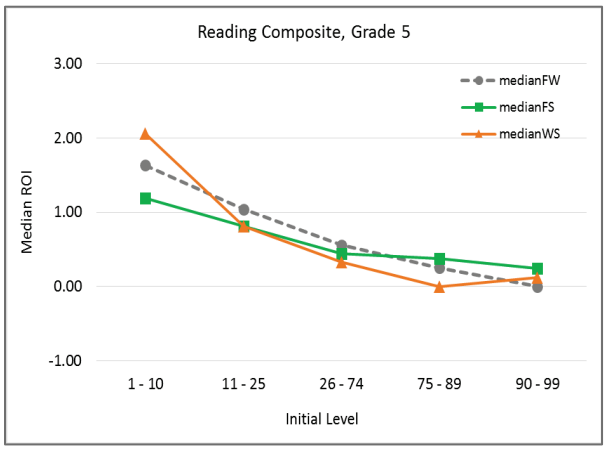


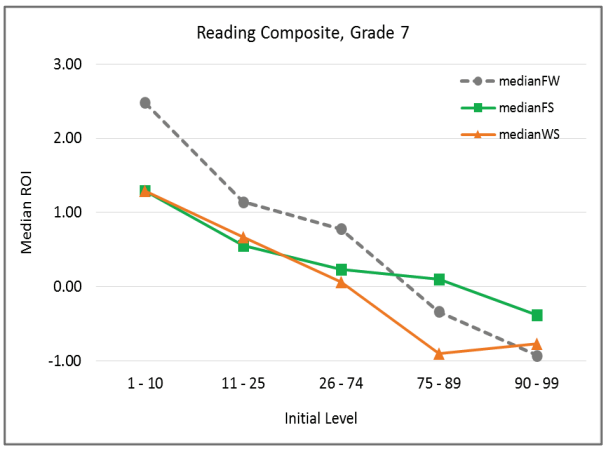












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