Reading Foundations to Reading Linking Study and Recommendations

by the Assessment Services Team, Scantron Corporation

The Performance Series K-2 *Reading Foundations* exam was specifically designed to address the early- and pre-reading skills that prepare students for complex reading comprehension at higher grade levels, where there is a greater emphasis on critical thinking skills. Because evaluating foundational reading skills requires assessment of a different constructs, *Reading Foundations* was developed as a separate exam from Performance Series *Reading* for Grades 2–9.

Like Performance Series *Reading*, *Reading Foundations* is administered in a computer-adaptive testing environment. In addition, the *Reading Foundations* environment supports young students throughout the assessment process by integrating rich images and on-demand audio. This allows emergent readers to demonstrate their reading ability and content knowledge.

While *Reading* and *Reading Foundations* are two separate exams within Performance Series, steps were taken during the field-test phase of the *Reading Foundations* exam to link the scores to the *Reading* scale. This allows both for comparison of scaled scores, as well as tracking growth, across the two exams.

A question that often arises from Scantron clients is when to transition students from *Reading Foundations* to *Reading*. The information contained within this study provides educators with assistance in making that determination.

Performance Series Reading Foundations and Reading Exams

The skills measured, as well as the format of the passages and items, are the key differences between Performance Series *Reading Foundations* and *Reading*. Table 1 shows the content areas and key skills measured by the *Reading Foundations* and *Reading* exams.

Table 1. Reading Foundations and Reading Testlet Definitions

Reading Foundations			*Reading*		
Testlet	*Key Skills*	*% of Exam*	*Testlet*	*Key Skills*	*% of Exam*
Phonological Awareness	• Identify, blend, substitute phonemes • Count and blend syllables	~25%	Vocabulary	Understand and use grade-appropriate words	24%-28%
Phonics	• Decode and spell words • Identify letters, letter and sound correspondence	~25%	Long Passage	Understand overall idea of passage while identifying key points	36%-46%
Vocabulary	Understand and use grade-appropriate words Interpret words in context	~25%	Fiction	Short narrative with comprehension of story elements	15%-18%
Text Comprehension	• Low level: concepts of printed word • High level: basic word comprehension	~25%	Non-Fiction	• Informational topic (e.g., history or wildlife) • All passage testlets assess literal, inferential, and critical thinking skills	15%-18%

The *Reading Foundations* content areas of phonological awareness, phonics, and text comprehension assess basic skills needed for a developing reader. The *Reading* exam focuses on passage comprehension and critical thinking. The 2nd grade skills included in the text comprehension testlet in *Reading Foundations* provide a transition towards reading as the student is expected to read and comprehend informational texts without audio assistance.

Validity of Performance Series Reading Foundations

Concurrent validity evaluates the relationship between measures administered during the same time period (typically within a 1-2 week period). Predictive validity evaluates the degree to which one measure can predict the outcome or performance on a second measure administered at a different time (e.g., predicting Spring performance based on Fall performance).

Between the years 2002 and 2015, Performance Series *Reading* was found to be valid in relation to 27 different state and national tests (as demonstrated through both concurrent and predictive validity studies conducted with Scantron clients). *Reading Foundations* differs from *Reading* in terms of the item and passage layout as well as in the skills being measured. Specifically, *Reading Foundations* is focused on assessing foundational skills needed for reading and comprehending language. As such, the goal of this study was to directly investigate the concurrent and predictive validity of *Reading Foundations* in relation to *Reading*.

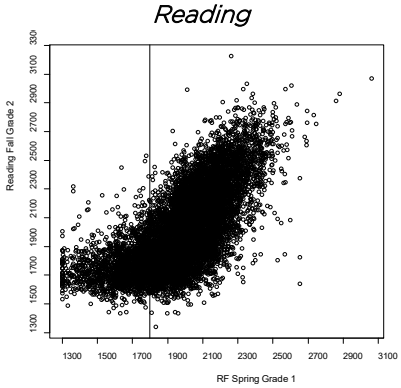
Study Data

The data for this study included Performance Series *Reading Foundations* and *Reading* exam results from Fall 2014 through Fall 2015 (Fall, Spring, Fall testing windows). This large dataset covered all grades and included 2,326,791 student scores over the three testing windows.

Validity Evidence

As a natural part of evaluating the relationship between *Reading Foundations* and *Reading*, a scatterplot was created that made *Reading Foundations* Spring Grade 1 the *x*-axis and *Reading* Fall Grade 2 the *y*-axis. The resulting graph (shown in Figure 1) revealed information about both *Reading Foundations* and *Reading* and when each is most appropriate for students.

Figure 1. Relationship between Reading Foundations and Reading



A vertical line was added to the graph where the *Reading Foundations* scaled score equals 1800. This 1800 scaled score was found to divide the relationship into two parts:

- Left side: flat with little rise
- Right side: steep with a prominent rise showing that an increase in the *Reading Foundations* scaled score corresponds to an increase in the *Reading* scaled score.

The concurrent and predictive validity correlations between *Reading Foundations* and *Reading* were evaluated for multiple testing windows and grade levels. The relationship was also separately examined for students with low *Reading Foundations* scores (≤ 1800) versus students with high *Reading Foundations* scores (> 1800).

The results of the concurrent and predictive validity analyses can be seen in Table 2. The predictive correlations were generally quite strong, ranging from .687 to .730. The concurrent validity correlations in the Fall and Spring of Grade 2 were similar in magnitude and suggested that the constructs measured by *Reading Foundations* and *Reading* are strongly related.

Table 2. Concurrent and Predictive Validity Correlations between Reading Foundations and Reading by Testing Window and Grade

Reading Foundations Window and Grade	*Reading* Window and Grade	N	Validity *Corr.*	*Reading Foundations* Score ≤ 1800 N	*Reading Foundations* Score ≤ 1800 *Corr.*	*Reading Foundations* Score > 1800 N	*Reading Foundations* Score > 1800 *Corr.*
Fall Gr. 1	Spring Gr. 1	990	.687 (P)	715	.358	275	.607
Spring Gr. 1	Fall Gr. 2	10,171	.698 (P)	2037	.210	8,134	.659
Fall Gr. 2	Spring Gr. 2	5,123	.730 (P)	1472	.303	3,651	.662
Fall Gr. 2	Fall Gr. 2*	3,581	.740 (C)	1091	.180	2,490	.731
Spring Gr. 2	Spring Gr. 2*	2,280	.726 (C)	374	.200	1,906	.697

(P) predictive validity correlation; (C) concurrent validity correlation
*Completed *Reading* test within 2 weeks of *Reading Foundations* to avoid learning bias

However, a clear difference emerged when the correlations were calculated separately for the *Reading Foundations* high versus low scorers. The correlations between *Reading Foundations* and *Reading*, both within and across testing windows, ranged from .180 to .358 when *Reading Foundations* scores were less than or equal to 1800. By comparison, *Reading Foundations* high scorers (*Reading Foundations* > 1800) had observed correlations that ranged from .607 to .731. These findings indicate that *Reading Foundations* and *Reading* are, in fact, measuring different constructs in reading ability, and that *Reading Foundations* is a more appropriate assessment for use with early and emerging readers.

Transition between Reading Foundations and Reading

One goal of this study was to provide educators with score guidelines for when a student is ready to transition from *Reading Foundations* to *Reading*. A review of the foundational reading standards indicates that *Reading Foundations* measures basic skills needed to become a successful reader. Once a student has become proficient in these basic skills, the student is ready for the *Reading* test.

As previously noted, scores from the two tests were linked to the same score scale. Therefore, it can be said that students who score at or below 1800 are scoring in the foundational reading zone. There also exists overlap between *Reading Foundations* and *Reading* where both tests are equally appropriate (2000 to 2250).

There are three main questions that arise regarding the transition from *Reading Foundations* to *Reading*:

- What *Reading Foundations* score in Spring of Grade 1 is recommended for a student to move to the *Reading* test in the Fall of Grade 2?
- What *Reading Foundations* score in Fall of Grade 2 is recommended for a student to move to the *Reading* test in Spring Grade 2?
- At what score on *Reading* during Fall of Grade 2 should a teacher also consider administering the *Reading Foundations* test?

The best approach to address these questions is to review Table 2 and consider the implications for detecting growth.

Growth and Transition Evidence

As discussed above, when the relationship between performance on *Reading Foundations* and *Reading* is not strong (i.e., when students score at or below 1800 on *Reading Foundations*), then growth on *Reading Foundations* equates to *little gain* on *Reading*. Therefore, the student is better served continuing on the *Reading Foundations* test so the growth captured accurately reflects the learning that is taking place.

Spring Grade 1 to Fall Grade 2 example: Suppose a student completed the *Reading Foundations* test in the Spring of Grade 1 and then proceeded to complete the *Reading* test in the Fall of Grade 2. If the student scored below the 1800 threshold on *Reading Foundations* in the Spring, it is likely that s/he would struggle when taking the *Reading* test in the Fall. This can be seen in Figure 1 where most students who scored at or below 1800 on *Reading Foundations* in Grade 1 received similar scores on *Reading* during fall of Grade 2. A much stronger positive relationship emerges once we move above the 1800 threshold and confirms the 1800 rule for the Spring-to-Fall comparison.

Fall Grade 2 to Spring Grade 2 example: The Fall Grade 2 *Reading Foundations* to Spring Grade 2 *Reading* relationship provided evidence that students show great growth in reading skill during the 2nd grade school year. Students who scored 1502 on *Reading Foundations* in the Fall of Grade 2 were predicted to score 1816 on *Reading* in the Spring. Most students who completed the *Reading* test in the Spring of Grade 2 scored above the 1800 score threshold. The growth evaluation found that 96% of students were ready for the *Reading* test by Spring Grade 2.

Fall Grade 2 concurrent validity example: Scores for Fall *Reading Foundations* and *Reading* were matched to produce a sample of students who completed both tests within two weeks of each other. The comparison of Fall Grade 2 students revealed similar trends as the Spring-to-Fall analysis discussed above. It was difficult to capture the relationship between *Reading Foundations* and *Reading* for those who scored below 1800 as most students in that range struggled with the *Reading* test. These results, along with the evidence provided in Table 2, support the 1800-scoring rule of thumb for moving from *Reading Foundations* to *Reading*, and that students scoring at or below 1800 on *Reading* in the Fall should consider taking *Reading Foundations*.

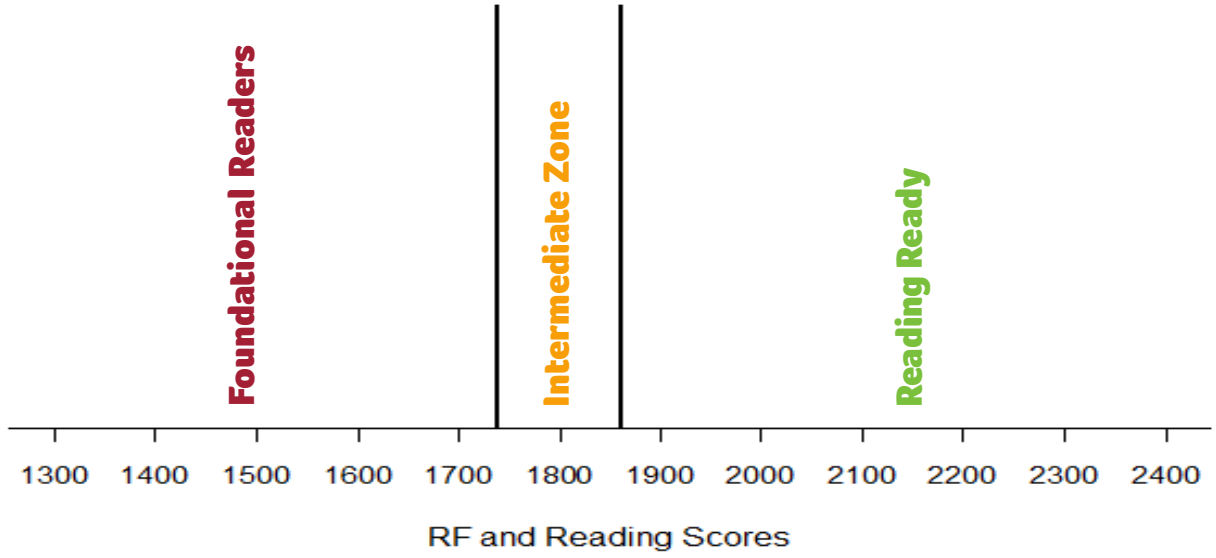
Transition Guidelines

Based on the evidence discussed above and supporting work, most students are ready for the *Reading* exam by Spring of Grade 2. However, the following recommendations (and Figure 2 below) can be used to assist in determining the appropriate exam for students:

- Students who score above 1800 on *Reading Foundations* in Spring Grade 1 (beyond the standard error of measurement or SEM) are ready to take *Reading* in the Fall of Grade 2.
- Students who do not score above 1800 (beyond the SEM) on *Reading* should consider taking *Reading Foundations* as well.

For most students, the SEM on the *Reading Foundations* test is around 62 points. This would establish the target zones shown in Figure 2 for educators to reference.

Figure 2. Performance Series Reading Foundations Transition Guidelines: Target Zones



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