RoxieReading Skills Assessment™

Technical Reference

TeachingBasics

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This document is a supplement to the *RoxieReading Skills Assessment* Administration & Scoring Guide.

TeachingBasics

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Section I: Assessment Type and Purpose

Background

The National Assessment of Educational Progress is a program mandated and funded by the U. S. Congress to monitor how well our students are reading. It began tracking reading scores in 1992, and despite the heroic efforts of teachers, the results are disheartening. Every year since 1992, 65% –70% of our students leave school reading at *Below Proficient* level. In other words, they cannot read well enough to read an article or story, make inferences, and draw conclusions. And it has been that way every year for almost twenty years (NCES, 2011).

One of the issues in addressing the problem is that many poor readers in our schools do not fit the criteria for learning disabilities or qualify for other special education services. (Moats, 2004). These students have no identifiable special needs, and yet they cannot read well or read at all. These students fall through the cracks, often receiving no extra help

The toll on our society is devastating. The impact of poor literacy ripples through every segment of our culture and costs billions of dollars a year. It not only affects the poor reader but affects the entire society (NCES, 2011). We need to be able to identify these students and provide teachers with the information they need to provide appropriate instruction.

Essential Skills for Proficient Reading

What is required to become a proficient reader? A huge body of research has identified the essential skills of phonemic awareness, an understanding of the alphabetic principle, and grapheme knowledge.

Phonemic Awareness

Phonemic awareness, one of the forms of phonological awareness, is the ability to recognize that a spoken word consists of a sequence of individual sounds. Ball & Blachman, (1991), Henderson (1992); Calfee and Henry, (1996), and Liberman (cited in Morais, 1991) all assert, with a large body of research to support them, that the English language requires an understanding at the phonemic levels. One of the most consistent relationships to emerge from the past decades of research on reading is the relationship between phonemic awareness and reading acquisition (Spector, 1992). According to Liberman (cited in Shankweiler, 1991), good and poor readers are distinguished in their performance on tasks requiring phoneme segmentation of spoken words.

> "If someone lacks the principle, mere experience with print will not instill the ability to read new words. That ability, she[Liberman] insists, is the acid test of reading in an alphabetic system . . . the degrees to which phoneme awareness exists is the best single predictor of reading success. (Shankweiler, 1991, p. xvi)."

Blachman (1984), Bradley and Bryant (1985), and Juel (1988) found that success with phonemic tasks is predictive of early reading and spelling success which, in turn, affects later achievement. Juel (1988) found that kindergarten and first graders with poor segmentation skills were likely to be among the poorest readers and spellers. Lundberg (1984 cited in Juel, 1988) also found that the linguistic awareness of words and phonemes in first grade correlated .70 with reading achievement in sixth grade. Unless the ability to hear and segment the individual sounds in words is acquired, reading achievement will remain poor.

Those who are at risk for dyslexia lack this ability. The definition of dyslexia provided by the International Dyslexia Association (2002) underscores the importance of phonemic awareness. The difficulties with word recognition, spelling, and decoding "typically result from a deficit in the phonological component of language.

> "Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge" (Adopted by the IDA Board of Directors, Nov. 12, 2002).

In summary, to identify those who are poor readers or those at risk of becoming poor readers, we must know to what degree they can hear and segment the individual sounds in spoken words, no matter the age of the individual.

The Alphabetic Principle

Another essential skill is an understanding of the alphabetic principle. Although knowing the alphabet is indispensable for reading, students can know all of the "letters and sounds" and not

be able to read. An individual must understand that speech sounds are represented in print with letters and letter combinations (graphemes).

> "The learner must realize that letters (or combinations of letters) represent the individual phonemes in spoken words. This awareness is referred to as gaining an understanding of the alphabetic principle. An awareness of individual phonemes, subsequently linked with corresponding letters, provides an insight about the nature of writing that is essential for learning to read and writing" (International Dyslexia Association, 2022).

The problems in reading are associated not only with weaknesses in phonemic awareness but also with the inability to associate speech sounds with graphemes (Wagner & Torgesen, 1987). Individuals who do not have phonemic awareness almost always fail to understand the relationship between spoken words and the words on the page. As far as they are concerned, the letters on the page are arbitrary and the words must be memorized as logograms.

In summary, to identify those who are poor readers or at risk of becoming a poor reader, we must not only identify their ability to hear and segment sounds in spoken words but also identify their ability to understand the connection between speech sounds and the letters that represent those sounds in print.

The Graphemes and Basic Phonics

Students must also know the graphemes (the alphabet and graphemes beyond the alphabet) and the basic phonics rules that govern the choice of the right grapheme. Students can know the letters of the alphabet and still not be able to decode words.

Linguists refer to languages as having a "shallow orthography" or a "deep orthography." What does that mean? *Orthography* simply means "the study of correct spelling." So what does "shallow" and "deep" mean? In languages with a "shallow orthography," there is an obvious connection between the speech sound and the letter on the page. What you see is what you get. Finnish and Spanish are "shallow orthographies" so when you look at a word you usually know exactly how to pronounce it. These languages are called "*phonemic orthographie*s." There is a one-to-one relationship between the speech sounds (phonemes) and the letters in a word. The spelling of words is very consistent with the way they are pronounced.

English is a language with "deep orthography." That means that knowing the letters of the alphabet is not enough. However, that does not mean there is inconsistency in the rules that govern the

spelling of words. In fact, English is very consistent. It just means we have to know the graphemes beyond the alphabet and look deeper to understand what those rules are (Venezky, 1970; Schmalz et al., 2015; Frost, 2005). Decoding is dependent on phonemic awareness, understanding the alphabetic principle, and knowledge of the graphemes and the rules that govern them. If any of these skills are weak or missing, students will not be able to decode effectively.

Research Basis of the *RRSA*

The *RoxieReading Skills Assessment*™ (*RRSA*) is based on decades of research on the Stages of Spelling Development and the relationship of these stages to phonemic awareness, encoding ability, and orthographic knowledge (Read 1971, 1975; Henderson 1980, 1992; Henderson & Beers, 1980; Henderson & Chard, 1980; Henderson & Templeton, 1986; Tangel,1995).

The Stages of Spelling Development

These stages reflect a progression in the student's awareness of the relationship between the speech sound and its representation in print and the ability to hear and represent the correct letters in spelling words. (See *RoxieReading Skills Assessment* document).

Table 1. The Stages of Spelling Development

Stage 0:	Precommunicative Stage	t gm pbw	Arbitrary letters
Stage 1:	Prephonetic Stage	i lc t g hm	Hears beginning and/or end sounds
Stage 2:	Phonetic Stage	i lik t go homº	Hears beginning, end, and middle sounds
Stage 3:	Transitional Stage	I lick to go hoem.	Hears all the sounds but words are not spelled correctly
Stage 4:	Conventional Stage	I like to go home.	Correct spelling

The Developmental Spelling Test

Researchers found that the stages of spelling development were not only a window into the progress in phonemic awareness and orthographic knowledge but also correlated to reading achievement.

Morris and Perney (1984) designed a developmental spelling test to assess incoming phonemic awareness and orthographic awareness. This 18-word test was developed using the research of Read (1975) and Henderson and Beers (1980). The test was also based on studies conducted which substantiated a significant relationship between phoneme awareness and first-grade reading achievement (Helfgott, 1976; Liberman, 1973; Liberman, et al., 1974). When spellings were analyzed within this developmental spelling framework, spelling became a powerful diagnostic

tool for determining how much progress the student had made in learning the sound/symbol system and what further instruction was needed (Henderson, 1980; Morais and Perney, 1984). In addition, other researchers have described in detail how children who spontaneously engage in invented spellings were likely to become better readers (Bradley, 1988; Bryant & Bradley, 1980; Chomsky, 1971, 1979; Ehri, 1989; Read, 1971).

The research on the correlation of the developmental spelling test with reading achievement is the basis the *RRSA* uses to determine which students are at risk for dyslexia.

Section 2: Components

The *RoxieReading Skills Assessment*™ (*RRSA*)

The *RRSA* assesses the foundational reading skills that are essential for proficient reading: phonemic awareness, encoding ability, grapheme knowledge, and basic phonics knowledge. A list of 20 words is given like a spelling test but scored differently than a regular spelling test or traditional developmental spelling test. The assessment can be given to a whole class, to a group, or to an individual student. and takes no longer to give than a 20-word spelling test. The *RRSA* is designed to identify students who have weak foundational reading skills that are critical for proficient reading. These individuals are at risk for dyslexia.

Students are scored on their ability to hear the individual sounds in a word and choose a grapheme that represents that sound. This score assesses encoding ability and is used to determine if the student needs small group or individual instruction. The *RRSA* also produces additional scores that provide a phonemic awareness level and identify areas of weakness in grapheme knowledge and basic phonics.

Table 2: Scores Generated by the *RRSA*

Used to determine Phonemic Awareness Level - Ability to hear and encode sounds	Used to determine At Risk for dyslexia	Used to determine instructional needs
Beginning sounds Middle vowel sounds End sounds Added or omitted sounds	Developmental test score (overall encoding ability that determines if a student is at risk for dyslexia	Short vowel spellings Long vowel spellings Other vowel spellings Consonant spellings Prefixes/suffixes spellings

How the *RRSA* is scored

The *RRSA* uses a unique scoring system based on the stages of spelling development. Points are assigned to words based on the ability of the student to hear the individual sounds in a word and to choose a grapheme that represents those sounds. This differs from other developmental spelling tests that give a score of right or wrong for each word or that look at all of the letters and not particular sounds in the word.

RRSA scores the sounds a student hears in a word using the stages that have been identified by the researchers. The exception is that the *RRSA* has divided Stage 1 into two levels: the beginning sound and the end sound are scored separately. Each assessment form has an accompanying Answer Key that identifies the acceptable graphemes for each sound in the word.

Each word receives a point for each sound that is represented with an acceptable grapheme, resulting in a score of 0, 1, 2, 3, 4, or 5. The total word scores generate the *RRSA* test score. Other scores are also generated that determine phonemic awareness level and the specific instructional needs of students.

Table 3. Scoring the *RoxieReading Skills Assessment*

			***RRSA* Points**
Stage 0:	Precommunicative Stage	Arbitrary letters	0
Stage 1:	Prephonetic Stage	Hears beginning and/or end sounds	1
			1
Stage 2:	Phonetic Stage	Hears beginning, end, and middle sounds	1
Stage 3:	Transitional Stage	Hears all the sounds but words are not spelled correctly	1
Stage 4:	Conventional Stage	Correct spelling	1

The assessment forms have two sides, the left side identifies the ability to hear the sounds in words and choose an acceptable grapheme while the right side identifies the spelling errors. The totals are used to determine phonemic awareness, encoding ability, and specific instructional needs.

	Phonemic Awareness						Graphemes						
Word	**Beg Sound**	**Middle Sound**	**End Sound**	**Added/ Omitted**	**Student spelling**	**Score**	**Reversed/ Capitals**	**Short Vowels**	**Long Vowels**	**Other Vowels**	**Consonants/ Digraphs**		**Suffixes/ Prefixes**
1. back	(b)	(a)	(ck)					a			b	ck	
TOTALS													

	A phonemic awareness level is determined by these totals		**Encoding ability determines at risk for dyslexia**	**Specific instructional needs are determined by these totals**

RoxieReading Skills Assessment Levels

Assessment forms with different spelling lists have been developed for students in Mid-Kindergarten through Grade 12 and can be used for a wide range of intellectual abilities.

Table 4. *RoxieReading Skills Assessment* Forms
Mid-K–Beginning Grade 1 Forms A and B
Grade 1
Grades 2–3
Grades 4–5
Grades 6–8
Grades 9–12

Although the goal is early identification of students at risk for dyslexia, some go undetected because of their sophisticated compensation skills that allow them to read fairly well in the early grades. These students have memorized many words but lack the essential skills for proficient reading. In Grades 4, 5, or 6, their weaknesses cause fluency and comprehension issues. For the first time, they are reading below grade level. When we adopt cut scores at the 20th percentile, most students who are at risk will be identified. However, some students remain unidentified and will continue to struggle with reading. Torgensen (1998) recognized that even if we adopt the 30th percentile as a standard for adequate reading, "the proportion of the total population remaining at risk . . . ranges from 5 percent to 7 percent." The *RRSA Grades 3–12* assessment forms are designed to identify many of these older struggling readers.

Development of the Word Lists

Word lists were carefully developed to reflect the grapheme knowledge and basic phonics rules appropriate for the grade level. Traditional classroom spelling lists for each grade level were heedful in selecting words that fit the identified criteria. Charts were used to guarantee the appropriate graphemes and suffixes were used. For example, for the Mid-Kindergarten–Beginning Grade 1 assessment, every grapheme was tallied to ensure that all of the parameters were met. The words progress from single syllable words in the assessment for Mid-Kindergarten–Beginning Grade 1 to three- and four-syllable words in the Grades 9–12 assessment. 1

All levels assess the ability to:

- Write each letter of the alphabet without reversals.
- Distinguish between capital and lowercase letters and use them properly.
- Hear the beginning, end, and middle vowel sounds in a word and choose the graphemes that represent those sounds.
- Hear and properly represent the vowel sounds.
- Hear the distinctive sounds in the blends used at the beginning of words.
- Hear each sound in the word and choose graphemes that represent those sounds.
- Hear and write graphemes beyond the alphabet that are appropriate for the grade level.
- Add and spell prefixes and/or suffixes (except Mid-Kindergarten–Beginning Grade 1 that are appropriate for the grade level.
- Implement basic phonics rules appropriate for the grade in spelling each word, such as which spelling to use for these sounds: /k/, /ch/, /j/, or /s/.

Using the *RRSA*

Teachers must enter the word as the student spelled it and score the word. Once the word is scored, all the other scores and interpretations are automatically generated in the assessments.

Three resources help teachers reliably score the *RRSA* and receive accurate results.

- *RoxieReading Skills Assessment* Administration & Scoring Guide

  This document provides the basis for the assessments as well as detailed instructions on how to score each word and interpret the scores.

- Answer Keys

  Answer Keys are provided for each assessment level to guide the teacher in scoring the word accurately.

- Video instructions

  Videos explain each part of the Administration & Scoring guide as well as give examples of errors in the test. They also show how to interpret and place students who need intervention.

Here is an example of a real Kindergarten student who received the *RRSA* slightly past mid-Kindergarten. This is a student who is not receiving any services from the school.

The totals for the score columns generate information on phonemic awareness, encoding ability (understanding the alphabetic principle), and grapheme knowledge. This student was also given a letter/sound recognition test and passed it with 100%. That means the issue is not tied to a lack of knowledge of letters and sounds.

The second and third pages of the assessment produce automatic scores in phonemic awareness and grapheme knowledge. This student should be able to hear both beginning and end sounds but is only hearing the beginning sounds in words. The high number of grapheme errors is not due to a lack of knowledge of these letters but the inability to attach speech sounds to those letters (the alphabetic principle), two critical skills that the IDA(2020) has identified as essential for proficient reading. A lack of these skills signals that this student is at risk for dyslexia. We also see that the assessed reading level is already below the expected level.

Page 1

RoxieReading Skills Assessment Results

Name _____ Grade K Date 2/28/2023

	Phonemic Awareness						Graphemes					
End of Kindergarten–Beginning Grade 1	Beg Sound	Middle Sound	End Sound	Added/ Omitted	Student spelling	Score	Reversed/ Capitals	Short Vowels	Long Vowels	Other Vowels	Consonants/ Digraphs	
1. fun	(f)	(u)	(n)	✓	f	1		u			f	n
2. jog	(j)	(o)	(g)		jog	5		o			j	g
3. fish	(f)	(i)	(sh)	✓	f	1		i			f	sh
4. yes	(y)	(e)	(s)	✓	ys	2	✓	e			y	s
5. thin	(th)	(i)	(n)	✓	f	0		i			th	n
6. best	(b)	(e)	(t)	✓	bs	2		e			b	s t
7. drop	(d)	(o)	(p)	✓	j	0		o			d	r p
8. chat	(ch)	(a)	(t)	✓	cht	2		a			ch	t
9. had	(h)	(a)	(d)	✓	hb	2	✓	a			h	d
10. lump	(l)	(u)	(p)	✓	l	1		u			l	m p
11. cab	(c)	(a)	(b)	✓	cd	2	✓	a			c	b
12. bend	(b)	(e)	(d)	✓	dt	1	✓	e			b	n d
13. gum	(g)	(u)	(m)	✓	gm	2		u			g	m
14. duck	(d)	(u)	(ck)	✓	b	1	✓	u			d	ck
15. quit	(qu)	(i)	(t)	✓	qt	1		i			qu	t
16. van	(v)	(a)	(n)	✓	vn	2		a			v	n
17. fox	(f)	(o)	(x)	✓	fx	2		o			f	x
18. zip	(z)	(i)	(p)	✓	zd	1		i			z	p
19. flop	(f)	(o)	(p)	✓	fd	2	✓	o			f	l p
20. when	(wh)	(e)	(n)	✓	wn	1		e			wh	n
TOTAL	2	18	10	19	TOTAL	31	7	18			22	

Pages 2 and 3

☐ ELL ☐ Title I ☐ SPED ☑ Regular ☐ Other _____

Summary of Areas of Concern

Click to place a ✓ before each true statement based on the totals from the Skills Assessment Results form.

				Totals from the RRSA Results form are here. ▼
Phonemic Awareness	1.		Student has difficulty hearing 3 or more beginning sounds.	2
	2.	✓	Student has difficulty hearing 3 or more end sounds.	18
	3.	✓	Student has difficulty hearing 3 or more middle vowel sounds.	10
	4.	✓	Student added or omitted sounds in 3 or more words.	19
Alphabet	5.	✓	Student reversed letters or used capital letters in the middle or at the end of words.	7
Short Vowels	6.	✓	Student did not know how to spell 3 or more of the short vowels.	18
Consonants	7.	✓	Student did not know how to spell 3 or more of the graphemes for the consonants.	22

Phonemic Awareness Level

The Phonemic Awareness Level is the highest level where the student consistently performs with 0–2 errors and with that accuracy at all previous levels.

____ Has little or no phonemic awareness
✓ Level 1: Consistently hears beginning sounds
____ Level 2: Consistently hears beginning end sounds in words
____ Level 3: Consistently hears beginning, end, and middle vowel sounds in words
____ Level 4: Consistently hears all the sounds in words

Notes:

Gave correct scores for the reversed letters d/b.
Does not hear many end sounds nor most middle v
sounds.
Inability to hear the sounds meant the graphemes w
missed.
An additional assessment of letter/sounds showed t
students knows all of the letters and their sounds. T
issue is attaching speech sounds to those letters.

Current reading level **A** Target reading level **C** *(Assess reading level if the RRSA score is below 90.)*

RR Skills Assessment Score **31** Recommendations:

Phonemic Awareness Level **1**

Grapheme Knowledge

Lacks understanding of the alphabetic principle because could not attach letters she
knows with the speech sound; low phonemic awareness level. Needs instruction in P
and practice attaching speech sounds to letters (encoding).

✓ Reversed letters or used capitals in the middle or at the end
✓ Weakness with short vowels
✓ Weakness with consonants

Interpreting the Scores

Score: 80–100	Score: 51–79	✓ Score: 50 and below
Strong Foundational Skills These students can hear the beginning and end sounds in almost every word. They can also hear the middle vowel sound in most words. However, they may not hear all the sounds in words with four or more sounds. They can write every letter of the alphabet correctly. They also know how to write some of the consonant digraphs such as *ch, sh, th*, and possibly *ck* and *wh*. By the middle of Kindergarten, students should have a Phonemic Awareness Level of 2 or 3.	**Emerging Foundational Skills** The skills of these students are marginal. They may need extra practice with hearing the middle vowel sounds. These students usually do not hear all of the sounds in words with four or more sounds. These students can write every letter of the alphabet but may reverse some letters. They usually do not know the consonant digraphs. These students are at risk if they do not receive some extra help with hearing the sounds in words and writing letters.	**Weak Foundation Skills** These students cannot consistently hear t beginning and/or end sounds of words. Th also cannot distinguish many of the vowel sounds. They may not know every letter, may reverse some letters, and definitely d not know the consonant digraphs. ***These students need intervention.***

Section 3: Technical Validity

The *RRSA* has been used with hundreds of students across two states with individuals and entire schools. These are students in public, private, and homeschool across all ethnicities. Teachers report the ease and the specificity of the assessments to identify those with poor reading skills. They are able to see the weaknesses in phonemic awareness and grapheme knowledge. The total score shows how much students understand about the alphabetic principle. The following statistics demonstrate the validity and reliability of the *RRSA* for all grades K–11.

Structural/Construct Validity

Results of an exploratory factor analysis using data from 101 students in grades K-9 revealed that all items of the *RRSA* load onto one factor and are highly intercorrelated with a Cronbach's alpha of .83.

Exploratory Factor Analysis

Chi-squared Test

Model	Value	df	p
	119.209	27	< .001

Factor Loadings

	Factor 1	Uniqueness
End Sound	0.8 12	0.340
Middle Sound	0.764	0.417
Add/ Omit	0.728	0.470
Consonants	0.705	0.503
Short Vowels	0.675	0.544
Beg Sound	0.669	0.553
Pref/suff	0.642	0.587
Rev/cap		0.938
Long Vowels		0.861

Note. Applied rotation method is promax.

Factor Characteristics

		Unrotated solution			Rotated solution		
	Eigenvalues	Sum Sq. Loadings	Proportion var.	Cumulative	Sum Sq. Loadings	Proportion var.	Cumulative
Factor 1	4.288	3.787	0.421	0.421	3.787	0.421	0.421

Unidimensional Reliability

Frequentist Scale Reliability Statistics

Estimate	McDonald's ω	Cronbach's α
Point estimate	0.858	0.829
95% CI lower bound	0.816	0.779
95% CI upper bound	0.901	0.870

Note. Of the observations, pairwise complete cases were used.

External Validity/Criterion Validity/Convergent Validity

Using a sample of 94 first graders, the scores of the *RRSA* were paired with scores on the Woodcock Reading Mastery Test-R measure. The *RRSA* is strongly correlated with the Woodcock measure, R (93) = .57, p < .001.

Correlation

Pearson's Correlations

Variable		RRSA Score	Total Reading
RRSA Score	Pearson's r	—	
	p-value	—	
WRMT-R Total Reading	Pearson's r	0.573	—
	p-value	< .001	—

Using a sample of 74 students in grades 1-11, the scores of the *RRSA* were paired with scores on the Woodcock Reading Mastery Test-R measure. The *RRSA* is strongly correlated with the Woodcock measure, R (73) = .50, p < .001.

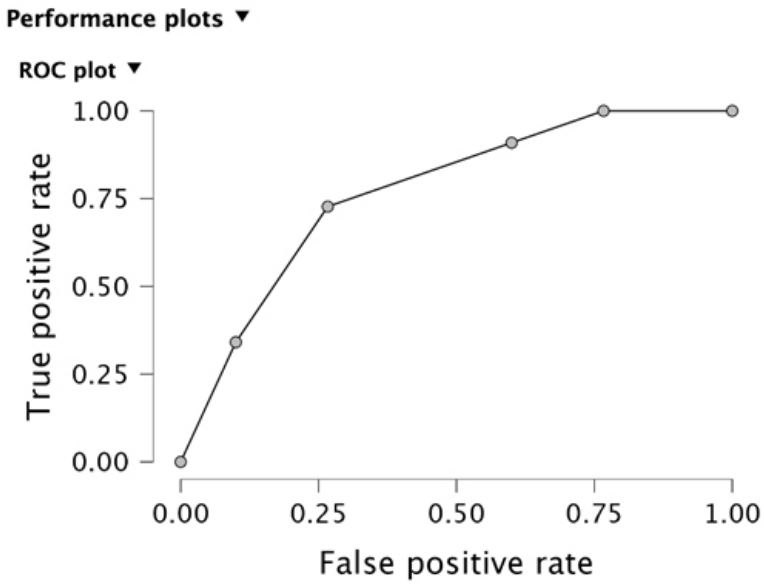
Pearson's Correlations

Variable		RRSA Score	W Score
RRSA Score	Pearson's r	—	
	p-value	—	
W Score	Pearson's r	0.496	—
	p-value	< .001	—

Classification Accuracy

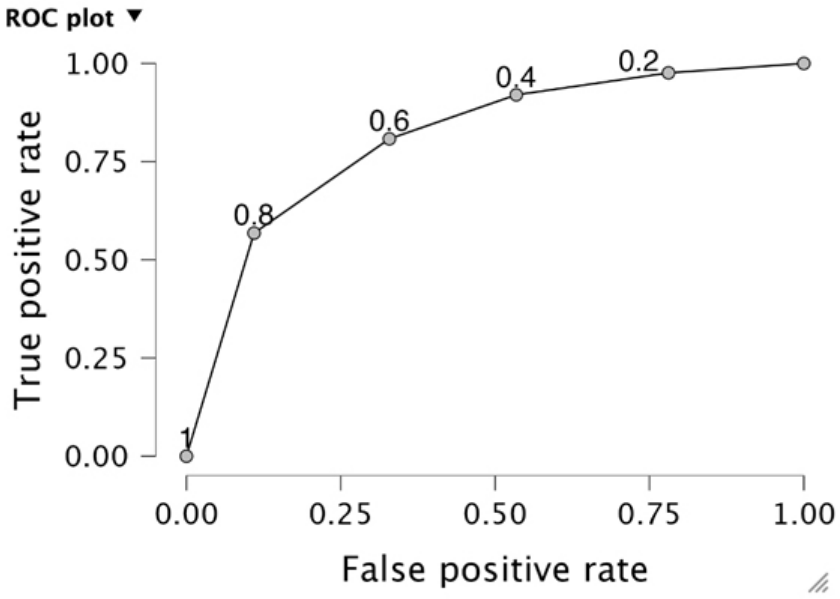
Classification Accuracy Using the Woodcock Reading Mastery Test-R as the Standard Measure

In order to assess the accuracy of the *RRSA* as a diagnostic tool, using 74 students in grades 1-11, the sensitivity and specificity rates were calculated relative to the Woodcock Reading Mastery Test-R. The Woodcock test establishes their cut-off rate score of below the 20% for students who are designated as low performers. Using Woodcock scores as the standard, the results of a logistic regression reveals that the RRSA has a sensitivity score of .80 and a specificity score of .63 at identifying studying who are low performers. It is capable of explaining .79 or 79% of the area under the curve (AUC). The results of the ROC plot are displayed below.



Classification Accuracy Using the NWEA as the Standard Measure

In order to assess the accuracy of the *RRSA* as a diagnostic tool, the sensitivity and specificity rates were calculated relative to the NWEA English Language Arts test for 198 students in grades sixth through eighth. The NWEA establishes their cut-off rate score of 208 for students who are designated as low performers. Using NWEA scores as the standard, the results of a logistic regression reveals that the RRSA has a sensitivity score of .86 and a specificity score of .60 at identifying studying who are low performers. It is capable of explaining .83 or 83% of the area under the curve (AUC). The results of the ROC plot are displayed below.



In summary, the *RRSA* provides an assessment tool with good evidence of content, construct, and criterion-related validity that can be used reliably to screen students in Grades K–12 for weaknesses in the three essential reading skills: phonemic awareness, understanding of the alphabetic principle, and grapheme knowledge.

Section 4: Reliability

Internal Consistency Reliability

The total RRSA score assesses the encoding ability which is a indicates the student's understanding of the alphabetic principle. In addition, the RRSA produces total scores for the beginning sound, middle vowel, end sound, and whether the student added or omitted sounds to assess the phonemic awareness level of the student. The RRSA also produces total scores for the vowels, consonants, affixes, and whether the student used capitals randomly or reversed letters. These totals are used to assess grapheme knowledge and the ability to apply basic phonics rules. Results of an exploratory factor analysis using data from 101 students in grades K-9 revealed that all items of the RRSA load onto one factor and are highly intercorrelated with a Cronbach's alpha of .83

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Note. Of the observations, pairwise complete cases were used.

Interrater Reliability

With the instructions provided to teachers, they are able to score the RRS with fidelity. The correlation between scores from one teacher and another teacher for the same set of 127 students was both strong and statistically significant, R (126) = .99, p < .001.

Correlation

Pearson's Correlations

Variable		First Score	Second Score
First Score	Pearson's r	—	
	p-value	—	
Second Score	Pearson's r	0.996	—
	p-value	< .001	—

Rater Agreement

Cohen's Unweighted kappa

			95% CI	
Ratings	Unweighted kappa	SE	Lower	Upper
Average kappa	0.551			
First Score - Second Score	0.551	0.045	0.463	0.639

Note. 127 subjects/items and 2 raters/measurements. Confidence intervals are asymptotic.

Fleiss' kappa

			95% CI	
Ratings	Fleiss' kappa	SE	Lower	Upper
Overall	0.550	0.017	0.516	0.584
52		0.089		
53		0.089		

54	0.089
55	0.089
56	0.089
59	0.089
60	0.089
63	0.089
65	0.089
67	0.089
69	0.089
70	0.089
71	0.089
72	0.089
73	0.089
74	0.089
75	0.089
76	0.089
77	0.089
78	0.089
79	0.089
80	0.089
81	0.089
82	0.089
83	0.089
84	0.089
85	0.089
86	0.089
87	0.089
88	0.089
89	0.089
90	0.089
91	0.089
92	0.089
93	0.089
94	0.089
95	0.089
96	0.089
97	0.089
98	0.089
99	0.089
100	0.089

Note. 127 subjects/items and 2 raters/measurements. Confidence intervals are asymptotic.

Krippendorff's alpha

Method	Krippendorff's alpha	SE	95% CI Lower	95% CI Upper
Nominal	0.552	0.047	0.459	0.644

Note. 127 subjects/items and 2 raters/measurements.

Intraclass Correlation

Intraclass Correlation

Type	Point Estimate	Lower 95% CI	Upper 95% CI
ICC1,1	0.996	0.994	0.997

Note. 127 subjects and 2 raters/measurements. ICC type as referenced by Shrout & Fleiss (1979).

In summary, the *RRSA* shows evidence of both internal consistency and inter-rater reliability, indicating that it can be administered and scored consistently by different users.

Section 5: Indicators for Dyslexia

The *RRSA* and Dyslexia

The *RRSA* has been used with hundreds of students in across two states with individuals and entire schools. Teachers report the ease and the specificity of the assessments to identify those with poor reading skills. They are able to see the weaknesses in phonemic awareness and grapheme knowledge. The total score shows how much students understand about the alphabetic principle.

The *RRSA* produces scores that assess the three foundational reading skills identified by the IDA (2022) that are essential for proficient reading: phonemic awareness, understanding of the alphabetic principle, and grapheme knowledge. These are the skills that are weak with those who have dyslexia. By identifying weaknesses with these skills, we can identify students who are at risk for dyslexia.

As the assessments were developed and field tested with students in public, private, and homeschool across two states, the data was used to determine the sensitivity of the *RRSA* in identifying poor readers.

Cut Scores for Grades 1–12

90–100	These students need no intervention. We all make some mistakes in spelling. Good readers benefit from good instruction in comprehension and vocabulary. Ninety-nine percent of these students most likely read at grade level and above.
80–89	These students have some skill deficiencies that need to be addressed. They may or may not read at grade level. If reading below grade level, small group instruction is needed. Words they have not memorized show weaknesses in phonemic awareness, grapheme knowledge, and/or the ability to add suffixes. The lower the score, the more weaknesses there are.
51–79	These students need small group or individual instruction even if they are reading only slightly below the target reading level. The lack of foundational skills will cause reading problems in later grades. These students need instruction in phonemic awareness and graphemes. Even traditional phonics instruction does not benefit them much. Most dyslexic and other poor readers fall into this group.
Below 50	These students need small group or individual instruction. They usually read one to several levels below grade level. Vocabulary development has been grossly impaired due to a lack of reading. Some of these students may receive special services from the school. For this reason, they may need to learn at a slower pace.

Cut Scores For Mid-K–Beginning Grade 1

80–100	These students can hear the beginning and end sounds in almost every word. They can also hear the middle vowel sound in many words. However, they may not hear all the sounds in words with four or more sounds. They can write every letter of the alphabet correctly. By the middle of Kindergarten, students should have a Phonemic Awareness Level of 2 or 3.
79–51	The skills of these students are marginal. They need extra practice with hearing the beginning, end, and/or middle vowel sounds. These students can write most letters of the alphabet but may reverse some letters or not use capital letters properly. These students are at risk if they do not receive some extra help with hearing the sounds in words and writing the letters of the alphabet.
Below 50	The skills of these students are weak. They do not consistently hear the beginning and/or end sounds of words. They also cannot distinguish many of the vowel sounds. They may not know every letter and may reverse some letters.

Interpreting Scores

- *RRSA* scores between 90–100 indicate that the student has sufficient phonemic awareness, understanding of the alphabetic principle, and grapheme knowledge to become a proficient re
- *RRSA* scores between 80–89 on the Grades 1–12 assessments are always mixed, with some students reading at grade level and others not. All those in this group have weak foundational reading skills that need to be addressed to prevent reading failure or reading failure in later grades. It is recommended that students who fall into this score range also be given an additional assessment to determine their reading level. If the student is not reading below the expected level, the weakness can often be remediated within the classroom setting.
- *RRSA* scores between 80–89 on the Mid-Kindergarten–Grade 1 show growing skills and do not need special attention unless other assessments show they are reading below the expected level.
- *RRSA* scores between 51–79 indicate that students are missing significant skills with phonemic awareness, understanding of the alphabetic principle, and grapheme knowledge. These students are either currently reading below the expected level or will be in the future. The scores in this range identify students who do not have the skills to progress in reading. Many

of these students fall into the 20%ile or below in nationally normed reading tests. Small group and possibly individual instruction is recommended to shore up the missing skills.

- *RRSA* scores of 50 and below indicate gross deficiencies in phonemic awareness, understanding of the alphabetic principle, and grapheme knowledge. Individual or very small group instruction is needed to teach the missing skills. Students in Grades 3–12 who score this low rarely read above the first or second grade level and usually receive services from the school. Students in Kindergarten–Grade 2 who score this low are already struggling with the components of reading.

Additional Assessments

The *RRSA* provides a wealth of information about the foundational reading skills of students. The phonemic awareness level, understanding of the alphabetic principle, grapheme knowledge, and understanding of some of the basic phonics rules have been assessed. However, for students with scores below 80, further assessments in the following areas will provide more information.

- Assessment of the Instructional Reading Level

  Students must be reading at the instructional level to make the best progress in reading (Sporleder, 2013, p.180-181). Reading texts that are too difficult causes frustration and a distaste for reading. Because so much working memory is used to read the text, fluency is interrupted, vocabulary knowledge stalls, and comprehension plummets.

- Letter/sound assessment for students in K–Grade 1

  Although letter knowledge can be ascertained from the *RRSA*, it is important to know how well students know the alphabet. It will help differentiate those who know the alphabet but do not understand the alphabetic principle from those who are also missing basic letter knowledge.

Intervention

Intervention must include instruction in the foundational skills: phonemic awareness level, understanding of the alphabetic principle, grapheme knowledge, and knowledge of basic phonics rules that govern the graphemes. Phonemic awareness and grapheme knowledge taught in isolation of each other is not as effective as tying the ability to hear the phoneme with the grapheme that represents it (Ball & Blachman, 1991; Bradley & Bryant, 1985; Foorman & Francis, 1994; Lundberg et al., 1988; Shankweiler, 1991

Placement for intervention is determined by the grade and grapheme knowledge of the student. Here are some general guidelines for placing students at risk for dyslexia at the proper instructional level.

- Knowledge of the graphemes is the major determining factor.

  All poor readers have weak phonemic awareness skills so strategies that build this skill are important in any intervention. However, the key to unlocking the reading code requires linking speech sounds to the graphemes (International Dyslexia Association, 2022). The graphemes that are age-appropriate must be taught. The *RRSA* identifies the graphemes that are weak at each grade level and the basic phonics rules that govern them. Students in K–1 may need to focus on just learning the alphabet while older students focus on learning the graphemes beyond the alphabet. At all levels students are engaged in encoding to strengthen the connection between the speech sound and the grapheme that represents it.

- The words used to instruct students need to be age-appropriate.

  While some programs go back to first-grade type curriculums to help older students learn to read, other programs skip these skills because they know it is not age-appropriate. Both approaches discourage students. Students are able to learn the foundational skills using words that are appropriate for their grade level. The type of grapheme errors on the *RRSA* provides insight into what words can be used.

- The intervention curriculum must be explicit, systematic, and cumulative (International Dyslexia Association, 2020).

  That means intervention does not just target specific individual graphemes but provides instruction that explains how each element fits into the whole. Concepts build upon one another.

  Information from the *RRSA* can be used to plan an intervention curriculum. The following chart shows how the *RRSA* is used with the *RoxieReading* intervention curriculum. Phonemic awareness is taught at all levels and tied to the graphemes that represent each sound. Students also engage in encoding, using the graphemes they are learning.

Ability Level A	Ability Level 1	Ability Level 2	Ability Level 3	Ability Level 4
Does not know the alphabet(	Does not know all of the alphabet; Review of the alphabet	Knows the alphabet but has weak knowledge of short vowels and other common graphemes beyond the alphabet such as *ch, sh, th, igh*	Knows the alphabet and common consonant graphemes beyond the alphabet but is weak with long vowels and more advanced graphemes	Knows the alphabet and common consonant graphemes beyond the alphabet but is weak with long vowels and more advanced graphemes Ready for Latin and Greek roots
• Kindergarten, • ELL Grades K–3 • Those having difficulty learning the alphabet	• Grade 1 • ELL Grades 4+ • Those with very weak alphabet knowledge	• Grades 2–12	• Grades 3–12	• Grades 5–12 who read at Grade 4 or above
	Sample words from the first lessons: *we, the, a, ran, cat, sat, sits*	Sample words from the first lessons: *handed, faster, fished, peeked, jumpy, asked*	Sample words from the first lessons: *likely, hopeful mistake, evening*	Sample words from the first lessons: *completely extremely reclining*
May read at Primer–Grade 4 grade level				Reads at Grade 4 or above but below grade level

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