Istation's Indicators of Progress (ISIP™) Reading and Rapid Automatized Naming as a Dyslexia Screener

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September 2023

Abstract

Students at risk for dyslexia and other reading difficulties often respond well to specialized intervention if their risk is identified early in elementary school. Identifying these students can be difficult as it requires screening an entire classroom. Istation's Indicators of Progress-Reading (ISIP™ Reading) and Rapid Automatized Naming (ISIP RAN) are reliable and valid screening measures for assessing student reading ability and risk for dyslexia. They are often used as a formative assessment to help teachers differentiate instruction. This research demonstrates that the scores from the ISIP Reading and ISIP RAN subtests can be used to determine students who may be at risk of dyslexia or other reading difficulties. Cut points are provided starting in the winter of kindergarten through third grade.

Introduction

Students who are at risk of dyslexia respond well to treatment or therapy if they are identified early in their school careers, and until recently most students were not identified before third grade (International Dyslexia Association, 2019). Istation's Indicators of Progress (ISIP™) Reading is a formative assessment based on the science of reading and recommendations from the National Reading Panel. ISIP Reading assesses skills that are associated with the risk of dyslexia, including phonemic awareness, phonics, letter sounds, letter recognition, spelling or encoding, reading comprehension, and fluency (Mathes et al., 2016). Using the ISIP subtest scores can help educators identify students at risk of dyslexia as early as first grade (Locke & Patarapichayatham, 2021).

Dyslexia is a neurological variation in brain development that affects how a person processes language and sound. Typically this manifests as difficulties with phonological awareness, which is recognizing the sounds in language (Meyler & Breznitz, 2005). They may also have difficulty with the alphabet, phonics, and spelling or encoding (Adlof & Hogan, 2018; Niileksela & Templin, 2019). Deficits in rapid automatized naming (RAN) are also associated with a risk of dyslexia (Mather & Wendling, 2012). These early deficits can also impair students' reading comprehension skills, as difficulties in comprehension often result from difficulties in learning to read (Padget, 1998). If their risk of dyslexia is discovered early enough, these students will respond quickly to intervention and treatment (Snowling, 1996).

Need for Early Screening

Students with dyslexia typically are not identified until after a clear pattern of failure has occurred, often in the third grade (Shaywitz et al., 2016). Federal law requires that students struggling in reading be evaluated for a specific learning disability. The risk of dyslexia is now better understood, and several states have implemented earlier screening to identify students before they fall behind in reading (International Dyslexia Association, 2018). Early identification gives students the opportunity to receive intensive intervention and treatment sooner to help them keep up with their peers in the same grade.

The ISIP Reading formative assessment is used by millions of school children across the United States. It is an approved dyslexia screener in several states, including Washington, Indiana, Kansas, Oklahoma, Texas, and Arkansas. ISIP Reading assesses

skills that are associated with a risk of dyslexia, such as phonemic awareness and letter knowledge. ISIP Reading is a computer-adaptive test that uses a two-paramater model that adapts to a student's ability in reading. Students in prekindergarten start with the Listening Comprehension, Vocabulary, and Letter Knowledge subtests. The Phonemic Awareness subtest is then added in kindergaten. As students make progress in their reading ability, they begin to receive subtests that require more highly developed skills, and as they progress, some of the easier subtests are no longer administered. Table 1 shows the progression of skills by grade level.

Phonemic Awareness (PA) is comprised of beginning, ending, and rhyming sounds and phonemic blending of two to six phonemes in a word. Letter Knowledge (LK) consists of letter recognition, which assesses how many letters a student can identify in one minute, and letter sounds, which assesses how many sounds a student can correctly identify in one minute. Vocabulary (VOC) is designed to test a student's knowledge of words that are frequently encountered in text but not necessarily used in daily conversation. Listening Comprehension (LC) assesses a student's ability to listen and understand grade-level sentences and paragraphs. Alphabetic Decoding (AD) measures the ability to blend letters into nonsense words. It contains items for vowel-consonant (vc) and consonant-vowel-consonant (cvc) combinations. Items that are more difficult include patterns with a silent e, four- or five-phoneme blends not represented by one letter, or two-syllable words with more complex blends. Reading Comprehension (CMP) assesses a student's ability to read and understand grade-level sentences and paragraphs. Spelling (SPL) assesses whether a student is developing orthographic representations of words (Mathes et al., 2016). Text Fluency, which is not included in the overall ISIP score, uses a maze task to assess a student's ability to read the text and select the correct maze responses. This type of task is highly correlated to fluency and reading comprehension (Mathes et al., 2016). An oral reading fluency (ORF) subtest was added in 2019. ISIP ORF has an automated scoring feature that calculates words read correctly per minute (Istation, 2020).

Table 1

Progression of Subtests Administered to Students on the ISIP Reading Assessment

Grade	Listening Comprehension	Letter Knowledge	Vocabulary	Phonemic Awareness	Alphabetic Decoding	Reading Comprehension	Spelling	Text Fluency
Prekindergarten	Standard	Standard	Standard	Added after reaching threshold	Not standard	Not standard	Not standard	Not standard
Kindergarten	Standard, may be dropped	Standard	Standard	Standard	Added after reaching threshold	Added after reaching threshold	Not standard	Not standard
1	Not assessed	Standard, may be dropped	Standard	Standard, may be dropped	Standard	Standard	Standard	Added after reaching threshold
2–8	Not assessed	Not Standard, may be added	Standard	Not Standard, may be added	Not Standard, may be added	Standard	Standard	Standard

ISIP Rapid Automatized Naming (RAN) consists of rapidly naming letters, numbers, and objects (Istation, 2023). RAN assessments make a unique contribution to the prediction of reading success, as students at risk of dyslexia will typically have lower RAN scores than other students well before students have learned to read (Mather & Wendling, 2012). Performance on RAN can predict growth in text-reading fluency even after skills such as phonemic awareness have been controlled for in the statistical model (Lervåg & Hulme, 2009). In a longitudinal study of reading risk in English, the best predictors of reading poorly in grades 1 and 2 were difficulties with letter knowledge, phonological awareness, and RAN (Furnes & Samuelsson, 2010); thus ISIP RAN is an important addition to the dyslexia screener. ISIP RAN can be administered to classrooms and scored by a teacher or other qualified professional from the recordings. ISIP RAN was standardized using scaled scores that have a mean of 100 and a standard deviation of 15, similar to other RAN assessments.

ISIP Reading and Dyslexia

Our initial research demonstrated that, when used to identify students' dyslexia risk, the ISIP Reading subtests provided valuable information to identify those at risk of dyslexia or other reading difficulties (Locke & Patarapichayatham, 2021).Using the ISIP Reading assessment saved time in schools as educators could use data from a formative assessment that is commonly administered in group settings and did not have to individually administer subtests to all students. Cut scores were provided from the winter of first grade through the end of third grade. Cut scores were not available for kindergarten and the fall of first grade.

Since that research was first implemented, Istation has made changes to the assessment, including adding a vertical scale across grades prekindergarten through 8, and we composed new norms in June 2022 using data from the 2018–2019 school year. We also created separate subscores for the Letter Recognition (LR) and Letter Sounds (LS) subtests, using item-level data from the LK subtest.

This research has several goals. First, we wanted to determine if by including subscores for LS and LR and adding RAN, we could identify students at risk for dyslexia as early as kindergarten. Second, we wanted to determine if we could now also offer cut points for the fall of first grade. Third, we wanted to update the cut scores with the new norms and add cut scores for Text Fluency, which was not part of the original study. Further, we have collected additional validity evidence with other assessments, including the dyslexia screener index from the Wechsler Individual Achievement Test – Fourth edition (WIAT®-4) (Breaux, 2020), the RAN subtests of the Kauffman Test of

Educational Achievement – Third edition (KTEA™-3) (Kaufman & Kaufman, 2014), and ISIP RAN. Correlations between the ISIP Overall scores and the WIAT-4 Dyslexia Index (DI) scores were strong, ranging from .78 to .82. A full report of the correlations is available in the ISIP Reading Technical Report (Mathes et al., 2023) and the ISIP RAN Technical Manual (Istation, 2023).

Kindergarten Screener

The prior work on dyslexia and the ISIP Reading assessment showed that there were mean differences on the subscores in kindergarten between students at risk and those not at risk of dyslexia; however, the differences were not enough to provide the sensitivity and specificity typically required for a screener (Locke & Patarapichayatham, 2021). To determine if we could create valid cut scores for kindergarten, we used the data from the WIAT-4 DI validity study mentioned previously. The WIAT-4 DI consists of phonemic proficiency and word reading in kindergarten through third grade. Phonemic proficiency measures the development of phonological and phonemic skills. Word reading measures letter and letter-sound knowledge and word reading.

Over 100 kindergarten students took part in the validity study. They took the ISIP Reading standard battery for kindergarten, the ISIP RAN assessment, and the WIAT-4 DI. Students were administered the research protocol in a counterbalanced fashion. Half of the students took ISIP Reading and ISIP RAN first, and the other half took the WIAT-4 DI first. Demographics of the sample used for the study are available in Table 2. Consent forms from a parent or guardian were obtained before testing began, and the assessments were administered by a qualified psychologist. Approximately half of the students were male, and the other half were female. The sample consisted of students who were Black or African American (12%), Hispanic or Latino (16%), white (66%), and those who were Asian or other, including mixed races (6%). The education level of the parent or guardian who was identified as the primary caregiver was reported on the consent form. Eighteen percent of the participants had a primary parent with a secondary education, 19% had a primary parent with some college, and 52% had a primary parent with a bachelor's degree or more.

Table 2

Demographic Characteristics of the Kindergarten Sample Used for the Validity Study

Assessments	Number of Students	Parent Education (Primary Caregiver)	Gender	Race Ethnicity
WIAT-4 Dyslexia Index and ISIP Reading	109	Less than High School 8% HS or GED: 19% Some college: 20% BA/BS or more: 53%	46% Male 49% Female 5% unknown	Black: 12% Hispanic: 16% White: 66% Asian or Other: 6%

Next, we used the WIAT-4 DI categorization system to identify students at risk of dyslexia: very low risk, low risk, elevated, moderate, high, and very high. We created two categories of "at risk" or "not at risk." Students who had WIAT-4 DI scores in the elevated through very high categories were considered "at risk," and those who were low or very low risk were considered "not at risk." Bivariate analyses for students at risk and not at risk are available in Table 3.

Table 3

Means and Standard Deviations for WIAT-4 DI, ISIP Reading, and ISIP RAN Subscores by At-Risk Status

Assessment	Subtest	Not at Risk of Dyslexia	At Risk of Dyslexia	Mean Difference
WIAT-4 DI	Phonemic Proficiency	101.01 (9.33)	81.59 (8.90)	19.42
	Word Reading	104.58 (12.48)	84.76 (8.31)	19.92
	Dyslexia Index	102.45 (10.81)	80.91 (6.55)	21.55
ISIP Reading	Listening Comprehension	258.68 (58.17)	214.00 (47.03)	44.68
	Phonemic Awareness	338.24 (42.76)	217.62 (36.79)	66.62
	Letter Sounds	318.07 (56.53)	239.50 (45.59)	78.57
	Letter Recognition	337.27 (57.62)	241.75 (54.13)	95.52
	Vocabulary	352.52 (50.80)	298.66 (45.86)	53.86
	Overall Score	334.46 (38.78)	275.22 (32.41)	59.24
ISIP RAN	Letters	101.84 (11.64)	86.19 (10.26)	15.64

	Numbers	103.27 (13.23)	85.00 (11.74)	18.27
	Objects	102.59 (13.04)	89.67 (12.95)	12.92
	Composite	102.61 (13.46)	86.29 (12.51)	16.32

Since we are using the WIAT-4 DI scores to categorize students at risk of dyslexia, we are reporting the correlational analyses between the overall scores and the subtests in the ISIP Reading and WIAT-4 DI for students in kindergarten. Sample sizes range from 56 to 106.

Table 4

Correlations between ISIP Reading Overall Score and Subtests with the WIAT-4 Dyslexia Index and Related Subtests

ISIP Score	WIAT-4 Dyslexia Index	WIAT-4 Phonemic Proficiency	WIAT-4 Word Reading
ISIP Overall	0.78***	0.73***	0.72***
Phonemic Awareness	0.72***	0.68***	0.66***
Letter Recognition	0.77***	0.69***	0.74***
Letter Sounds	0.75***	0.70***	0.70***
RAN Objects	0.49***	0.36**	0.46***
RAN Numbers	0.51***	0.52***	0.57***
RAN Letters	0.53***	0.55***	0.60***

***p <.0001, ** p <.001

Given the moderate to strong correlations between ISIP Reading and the WIAT-4 DI, we used the ISIP Reading subtests for the screener rather than ISIP RAN. This is consistent with literature on the relationship between RAN and reading in kindergarten, where there may be some lack of familiarity with the letters and numbers, which may impact overall RAN performance (Georgiou et al., 2011). Therefore, we focused on the ISIP Reading subtests to conduct classification accuracy. These analyses determine cut points that can help differentiate between students who are not at risk or at risk, based on their WIAT-4 DI score. Classification accuracy indexes are available in Table 5, and the cumulative risk factors are reported in Table 6.

Table 5

Classification Accuracy for Kindergarten

ISIP Subtest	Cut Point	AUC	Sensitivity	Specificity
Letter Recognition	35th percentile	.83	.81	.85
Letter Sound Correspondence	25th percentile	.80	.75	.85
Phonemic Awareness	21st percentile	.73	.85	.62

Table 6

Cumulative Risk Factors for Kindergarten

Number of Risk Factors	Percentage	Cumulative Percentage
0	32.0%	32.0%
1	53.4%	85.4%
2	6.8%	92.2%
3	7.8%	100%

Students with zero or one risk factor constitute 85% of the sample, and therefore one risk factor or less is deemed low risk for dyslexia. Having two risk factors is considered moderate risk, and if a student has three risk factors, they are at high risk for dyslexia.

First Grade Screener – Fall

For the fall cut scores for first grade, we obtained data from a school district in a southeastern state that had also participated in the ISIP RAN norming study in the 2021–2022 school year. The district provided information on whether the participating students had been identified with dyslexia by the end of the school year. Demographics of the district are available in Table 7. Since there was missing data in the Istation database, we are reporting racial/ethnic data available from the National Center of Education Statistics (NCES) for the district's schools that participated in data collection. The analytic sample consisted of students who had an Overall ISIP score and at least one RAN subtest score. This sample consisted of 361 students; 45 of them had been identified with dyslexia by the end of the school year. The ISIP Reading and ISIP RAN subtest scores are available in Table 8.

Table 7

Demographic Characteristics of the School District

Demographic	Description	Percentage
Race/Ethnicity	Asian or Other	6.8%
	Black or African American	20.5%
	Hispanic or Latino	18.8%
	White	54.3%
Socioeconomic Status	Receiving Free or Reduced Priced Lunch	45.6%
Gender	Female	47.18%
	Male	52.82%
Dyslexia	Identified with Dyslexia	12.47%

Note: Percentages may not add up to 100 due to rounding

Table 8

Bivariate Analysis for the Analytic Sample, Means and Standard Deviations

Assessment	Score	Not at Risk of Dyslexia	At Risk of Dyslexia	Difference in Means
ISIP Reading	Phonemic Awareness	345.13 (57.06)	283.38 (41.77)	61.75
	Alphabetic Decoding	335.53 (52.16)	280.96 (46.28)	54.57
	Comprehension	318.40 (57.62)	273.11 (40.79)	45.29
	Spelling	340.15 (42.32)	286.58 (43.06)	53.57
	Letter Recognition	349.56 (61.97)	279.33 (75.92)	70.23
	Letter Sound Correspondence	355.12 (48.55)	307.02 (70.06)	48.10
	Letter Knowledge	354.98 (57.49)	294.84 (74.34)	60.14
	Vocabulary	369.42 (61.58)	290.20 (69.12)	79.22
	Overall	342.64 (41.62)	285.13 (39.76)	57.51
ISIP RAN	Objects	101.38 (14.37)	90.91 (13.47)	10.47
	Numbers	93.57 (14.18)	82.95 (12.86)	10.62
	Letters	95.82 (12.77)	83.59 (10.21)	12.23

The mean differences in Table 8 demonstrate that there are meaningful differences between students who have and have not been diagnosed with dyslexia. We

next conducted classification accuracy to establish set cut points with the best sensitivity and specificity, and this information is available in Table 9.

Table 9

Classification Accuracy for Grade 1, Fall

Assessment	Subtest	Cut Point	AUC	Sensitivity	Specificity
ISIP Reading	Alphabetic Decoding	30th percentile	.79	.84	.73
	Letter Recognition	45th percentile	.71	.69	.73
	Letter Sounds	45th percentile	.65	.60	.70
	Phonemic Awareness	45th percentile	.78	.76	.81
	Spelling	30th percentile	.77	.78	.75
	Comprehension	35th percentile	.69	.76	.62
ISIP RAN	Letters	91 scale score (27th–28th percentile)	.68	.78	.59
	Numbers	91 scale score (27th–28th percentile)	.61	.71	.52

The cumulative risk factors for the ISIP Reading subtests are available in Table 10. Students with zero to two risk factors are at low risk, students with three risk factors are considered at moderate risk, and students with four or more risk factors are at high risk for dyslexia. Students at moderate or high risk should be assessed with ISIP RAN.

Table 10

Cumulative Risk Factors for First Grade, Fall – ISIP Reading

Risk Factors	Not at Risk Cumulative Percentage	At Risk Cumulative Percentage
0	35.0%	4.4%
1	53.0%	11.1%
2	72.0%	17.8%
3	83.7%	26.7%
4	92.7%	44.5%
5	98.0%	71.1%
6	100%	100%

First Grade Winter through Spring of Third Grade – Updated Screener

The data for the ISIP dyslexia study came from three medium to large school districts in two different states. We obtained a file from the districts from the 2018–2019 school year that contained information on their third grade students, including information on students who had been diagnosed with dyslexia. We matched these students with their ISIP test scores going back to kindergarten. For this update, we then also applied the new scaling conversions and the updated norms. The sample was somewhat different at each benchmark period due to attrition; however, the demographics stayed consistent throughout. The one exception was the results from the Spelling subtest in second grade in one school district. Students with dyslexia did not perform differently than typically developing students in the winter and spring benchmark periods due to instructional practices in the classroom, and these students were eliminated from the analysis for the Spelling subtest.

Table 11 shows the demographics of the study by grade and benchmark period. In grade 2, sample 1 was used for the Spelling subtest, and sample 2 was used for all other subtests. The means and standard deviations between students at risk and those not at risk are available in Table 12.

Table 11

Demographics of the Analytic Sample – ISIP Reading

Grade(Sample)	Demographic Characteristic	Fall Benchmark	Winter Benchmark	Spring Benchmark
Grade 1			*N* = 4,651	*N* = 4,732
	Gender: Female		49%	49.2%
	Gender: Male		51%	50.8%
	Race/Ethnicity: White/Non-Hispanic		20.6%	20.5%
	Race/Ethnicity: African American or Black		18.9%	18.7%
	Race/Ethnicity: Hispanic or Latino origin		51.9%	52.2%
	Race/Ethnicity: Asian or Other		8.6%	8.6%
	Dyslexia Identification		8.6%	8.8%
Grade 2 (Sample 1)		N = 3,023	*N* = 3,826	*N* = 3,984
	Gender: Female	48.6%	48.7%	48.8%
	Gender: Male	51.4%	51.3%	51.2%
	Race/Ethnicity: White/Non-Hispanic	20.8%	20.9%	20.2%
	Race/Ethnicity: African American or Black	12.5%	14.0%	14.0%
	Race/Ethnicity: Hispanic or Latino origin	58.1%	54.9%	55.8%
	Race/Ethnicity: Asian or Other	8.6%	10.1%	10.0%
	Dyslexia Identification	4.6%	4.8%	4.6%
Grade 2 (Sample 2)		*N* = 4,537	*N* = 5,368	*N* = 5,611
	Gender: Female	48.9%	48.8%	49.0%
	Gender: Male	51.1%	51.2%	51.0%
	Race/Ethnicity: White/Non-Hispanic	19.3%	19.5%	18.9%
	Race/Ethnicity: African American or Black	19.1%	19.5%	19.3%
	Race/Ethnicity: Hispanic or Latino origin	54.4%	52.5%	53.4%
	Race/Ethnicity: Asian or Other	7.3%	8.6%	8.4%
	Dyslexia Identification	9.0%	8.5%	8.3%
Grade 3		*N* = 4,680	*N* = 5,634	*N* = 5,611
	Gender: Female	48.4%	49.1%	48.8%
	Gender: Male	51.6%	50.9%	51.2%
	Race/Ethnicity: White/Non-Hispanic	18.3%	16.8%	17.0%
	Race/Ethnicity: African American or Black	19.8%	19.9%	19.9%
	Race/Ethnicity: Hispanic or Latino origin	55.4%	56.1%	56.1%
	Race/Ethnicity: Asian or Other	6.5%	7.2%	6.9%
	Dyslexia Identification	9.0%	8.3%	7.8%

Table 12

ISIP Reading Means and Standard Deviations for Students Not at Risk and at Risk, by Overall and Subtest Scores

Grade	Subtest	Benchmark	Students Not at Risk	Students at Risk	Difference
1	Overall	Winter	376.46 (51.65)	333.35 (29.60)	43.11
	Vocabulary	Winter	386.75 (64.09)	364.50 (53.39)	22.25
	Spelling	Winter	374.12 (51.80)	328.61 (37.25)	45.51
	Reading Comprehension	Winter	371.18 (70.05)	301.97 (39.45)	69.21
	Alphabetic Decoding	Winter	377.26 (61.20)	326.84 (39.32)	50.42
1	Overall	Spring	405.52 (54.31)	355.15 (36.68)	50.37
	Vocabulary	Spring	411.86 (67.30)	385.03 (60.79)	26.83
	Spelling	Spring	403.24 (53.88)	356.05 (36.87)	47.19
	Reading Comprehension	Spring	409.08 (70.20)	334.73 (45.17)	74.35
	Alphabetic Decoding	Spring	407.02 (67.89)	346.19 (41.89)	60.83
2	Overall	Fall	408.91 (52.32)	359.79 (33.55)	49.12
	Vocabulary	Fall	410.51 (53.14)	388.03 (44.68)	22.48
	Spelling	Fall	400.99 (54.65)	347.69 (35.90)	53.30
	Reading Comprehension	Fall	418.12 (64.24)	349.00 (48.51)	69.12
	Text Fluency	Fall	27.42 (30.57)	2.99 (7.28)	24.43
2	Overall	Winter	434.86 (57.54)	375.74 (38.52)	59.12
	Vocabulary	Winter	443.47 (68.73)	410.92 (55.91)	32.55
	Spelling	Winter	425.41 (58.57)	360.95 (37.11)	64.46
	Reading Comprehension	Winter	447.39 (73.55)	365.74 (52.41)	81.65
	Text Fluency	Winter	44.69 (34.84)	8.04 (13.44)	36.65
2	Overall	Spring	453.55 (61.56)	393.94 (41.71)	59.61
	Vocabulary	Spring	463.79 (76.30)	426.82 (60.61)	36.97
	Spelling	Spring	443.52 (61.13)	375.17 (41.17)	68.35
	Reading Comprehension	Spring	468.17 (78.03)	391.80 (55.28)	76.37
	Text Fluency	Spring	57.19 (37.59)	19.59 (21.21)	37.60
3	Overall	Fall	452.80 (57.70)	401.73 (35.66)	51.07
	Vocabulary	Fall	453.94 (60.91)	427.50 (47.57)	26.44

	Spelling	Fall	443.28 (61.19)	385.45 (39.66)	57.83
	Reading Comprehension	Fall	466.25 (70.58)	404.45 (49.91)	61.80
	Text Fluency	Fall	56.92 (38.37)	22.41 (23.03)	34.51
3	Overall	Winter	468.98 (62.39)	410.52 (45.92)	58.46
	Vocabulary	Winter	485.04 (77.60)	445.34 (65.38)	39.70
	Spelling	Winter	457.37 (61.72)	392.42 (45.26)	64.95
	Reading Comprehension	Winter	484.88 (81.11)	415.09 (56.52)	69.79
	Text Fluency	Winter	59.38 (36.36)	22.61 (56.45)	36.77
3	Overall	Spring	481.97 (67.56)	424.13 (48.91)	57.84
	Vocabulary	Spring	504.98 (83.86)	462.79 (71.26)	42.19
	Spelling	Spring	469.02 (64.44)	406.37 (47.98)	62.65
	Reading Comprehension	Spring	498.32 (88.06)	428.41 (62.82)	69.91
	Text Fluency	Spring	65.85 (40.56)	32.42 (28.50)	33.43

After applying the new scale and norms and reviewing the differences in means between students at risk of dyslexia and students not at risk of dyslexia, we established cut points for the Alphabetic Decoding, Spelling, and Reading Comprehension subtests in first grade, and for the Spelling, Reading Comprehension, and Text Fluency subtests in second and third grades. Results are available in Table 13.

Table 13

Cut Points with Sensitivity, Specificity, and Area Under the Curve (AUC)

Grade	Benchmark	Subtest	Percentile	Specificity	Sensitivity	AUC
1	Winter	Alphabetic Decoding	42	.67	.72	.70
	Winter	Spelling	42	.70	.76	.73
	Winter	Comprehension	35	.72	.76	.74
	Spring	Alphabetic Decoding	42	.69	.79	.74
	Spring	Spelling	42	.69	.74	.71
	Spring	Comprehension	35	.73	.79	.76
2	Fall	Spelling	30	.72	.79	.75
	Fall	Comprehension	35	.71	.77	.74
	Fall	Text Fluency	20	.71	.78	.75
	Winter	Spelling	30	.72	.79	.76
	Winter	Comprehension	35	.75	.78	.76
	Winter	Text Fluency	20	.78	.73	.75
	Spring	Spelling	30	.74	.78	.76

	Spring	Comprehension	35	.71	.77	.74
	Spring	Text Fluency	40	.74	.73	.73
3	Fall	Spelling	30	.70	.78	.74
	Fall	Comprehension	37	.70	.74	.72
	Fall	Text Fluency	35	.70	.78	.74
	Winter	Spelling	30	.71	.80	.75
	Winter	Comprehension	37	.63	.75	.69
	Winter	Text Fluency	35	.61	.85	.72
	Spring	Spelling	30	.70	.78	.74
	Spring	Comprehension	35	.56	.81	.69
	Spring	Text Fluency	30	.64	.74	.69

For second and third grade, cut points were established for the Text Fluency, Spelling, and Reading Comprehension subtests. We used chi-square analysis and receiver operator characteristics (ROC) to determine sensitivity, specificity, and the area under the curve (AUC). Typical screeners will have an AUC of .70 to .80.

We then evaluated the incremental value of risk factors for students who are at risk of dyslexia versus those who are not at risk. Results in Table 14 demonstrate that — across the grades and benchmark periods — students not at risk typically have one risk factor or none, while students who are at risk have two or three risk factors. For example, in second grade at the winter benchmark, 75.8% of students not at risk have zero or one risk factor. Conversely, 84.2% of students at risk have two or more risk factors. Students with zero or one risk factor are considered to have a low risk of dyslexia, those with two risk factors are considered to have a moderate risk, and students who have three or more have a high risk of dyslexia. We note that in spring of third grade, the percentage of students at risk with one or two risk factors is 42.6%, an increase from the previous benchmark, where 33.3% had one or two risk factors, indicating overall lower performance at the spring benchmark.

Table 14

Incremental Risk Factors for Students at Risk and Not at Risk

Grade	Number of Risk Factors	Fall Not at Risk	Fall at Risk	Winter Not at Risk	Winter at Risk	Spring Not at Risk	Spring at Risk
1	0			51.9%	5.9%	53.9%	6.0%
	1			19.0%	14.0%	18.4%	13.5%
	2			14.8%	31.4%	13.2%	23.1%
	3			14.4%	48.8%	14.6%	57.5%
2	0	54.0%	5.8%	57.5%	8.2%	54.9%	10,9%
	1	19.8%	10.8%	18.3%	7.6%	23.5%	19.9%
	2	16.8%	35.3%	14.4%	33.7%	14.4%	44.0%
	3	9.4%	48.2%	9.8%	50.5%	7.2%	25.2%

3	0	52.5%	6.9%	44.4%	4.7%	37.6%	3.6%
	1	19.8%	14.5%	21.9%	13.5%	28.2%	13.9%
	2	14.4%	22.7%	16.9%	19.8%	19.8%	28.7%
	3	13.3%	55.9%	16.7%	61.9%	14.4%	53.8%

Students who have zero or one risk factor are at low risk of dyslexia. Students with two risk factors are at moderate risk and should receive regular progress monitoring and differentiated instruction. Students with three risk factors should be closely monitored according to the school district's policies, and perhaps referred for additional assessment by qualified professionals. We recommend that students at moderate or high risk of dyslexia also be assessed with ISIP RAN.

Conclusion

The ISIP Reading assessment — based on theory from the science of reading and extensive research conducted by reading experts Joe Torgesen, Patricia Mathes, and Jeannine Herron — is a valid and reliable assessment of early literacy skills that can be used to screen students for a risk of dyslexia and other reading difficulties. ISIP Reading has strong correlations with the WIAT-4 dyslexia screener. As a separate measure, the ISIP RAN can also give valuable information about a student's rapid-naming skills and allows teachers to identify those students who may have RAN deficits.

Results from ISIP Reading can be used to identify where students may have challenges, and educators can intervene early to help prevent students from falling behind. Research with dyslexia shows that if students receive intervention early enough, it can mediate the impact of dyslexia (International Dyslexia Association, 2019), and using a universal screener such as ISIP Reading can help save instructional and testing time.

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