Examining Spelling in Relation to Reading Risk in Kindergarten and First Grade

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acadience learning

INTRODUCTION

Research has found that difficulties with spelling are linked to dyslexia (Lohvansuu, et al., 2021; O'Brien et al., 2011). As such, spelling assessment may provide critical information helpful in screening for reading difficulties and for instructional planning. In particular, the assessment of spelling in the early stages of reading development (e.g., kindergarten) may provide information about student application of phonemic awareness and alphabetic principle skills to reading and reading-related tasks (Clemens et al., 2013).

Purpose and Research Questions
The purpose of this study was to evaluate the utility of a new spelling assessment, Acadience® Spelling, for use in kindergarten and first grade. Research questions were:

1. What are the descriptive statistics and distributions of Acadience Spelling Correct Spelling Sequences (CSS) and Correctly Spelled Words (CSW) scores at each grade and time of year?

2. What is the relationship between performance on Acadience Spelling and Acadience Reading measures?

METHOD

Participants
Data used for this research consisted of Acadience Spelling and Acadience Reading scores for students in grades K–2 entered into Acadience Data Management from 2018–2019 to 2021–2022.
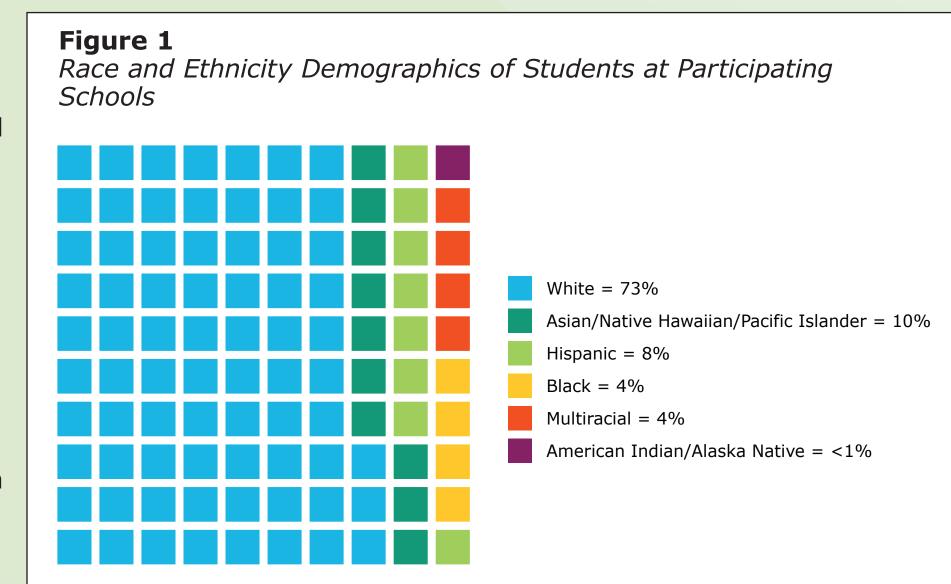
There were two inclusion criteria:
- Students assessed with Acadience Spelling (n = 360)
- Students attending the same schools but who were assessed with Acadience Reading and not Acadience Spelling at an analyzed benchmark period (n = 1,540)

Data were collected from 37 schools in 10 states. Student race and ethnicity information aggregated at the school level from NCES (Broughman et al., 2019; Chen, 2021) was available for 35 of the schools (see Figure 1).

Measures
Acadience Spelling
Acadience Spelling is a new assessment of spelling skills designed based on the principles of General Outcome Measurement. Acadience Spelling is administered from the middle of kindergarten through the end of first grade. Two scores are calculated for Acadience Spelling: Correctly Spelled Words (CSW) and Correct Spelling Sequences (CSS). Samples of Acadience Spelling administration forms are shown in Figure 2. For more information, see the Acadience Spelling Administration & Scoring Guide (Powell-Smith et al., 2021), available at www.acadiencelearning.org.

Acadience Reading K–6
The Acadience Reading measures collected in this study were First Sound Fluency (FSF), Letter Naming Fluency (LNF), Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), Oral Reading Fluency (ORF), and the Reading Composite Score (RCS). Additional information on the design specifications of Acadience Reading measures and the formulas for calculating the RCS are available in the Acadience Reading K–6 Technical Manual (Good et. al., 2019), available at www.acadiencelearning.org.

Analyses
Data analyses included descriptive statistics, distributions of Acadience Spelling scores, and concurrent and predictive correlations between Acadience Spelling and Acadience Reading.

Figure 1
Race and Ethnicity Demographics of Students at Participating Schools

- White = 73%
- Asian/Native Hawaiian/Pacific Islander = 10%
- Hispanic = 8%
- Black = 4%
- Multiracial = 4%
- American Indian/Alaska Native = <1%

Figure 2
Acadience Spelling Examples

Acadience® Spelling
Word List and Scoring Key
Grade K Middle-of-Year
Form 1

Acadience® Spelling
Word List and Scoring Key
Grade 1 Beginning-of-Year
Form 1

RESULTS

Descriptive Statistics
Descriptive statistics are presented in Tables 1–3 for CSS and CSW, the RCS by status of Acadience Spelling assessment, and the Acadience Reading component scores of students who were assessed with Spelling.

- Acadience Spelling scores increase across grades and time points.
- Overall, students assessed with Acadience Spelling had lower RCS compared to students attending the same schools who were not assessed with Spelling.
- The sample was high performing, with most Acadience Reading scores in the At or Above Benchmark and Above Benchmark ranges.

RESULTS (Continued)

Distributions of Acadience Spelling CSS and CSW
The distributions of CSS and CSW by grade and time of year are reported in Figures 3 and 4, respectively. There do not appear to be strong floor effects for CSS or CSW at any of the evaluated time points.

Concurrent and Predictive Validity of Acadience Spelling
Results of the correlational analyses are reported in Tables 4 and 5.

- The concurrent and predictive correlations between Acadience Spelling and Acadience Reading measures are mostly in the moderate to strong range, with some weaker correlations for certain grades and measures.
- Overall, the highest correlations are between the Acadience Spelling scores and the RCS and are in the strong range.

Table 1
Descriptive Statistics of Acadience Spelling Correct Spelling Sequences and Correctly Spelled Words by Grade and Time of Year

	n	M	SD	Min	Max
Kindergarten Middle of Year					
CSS	130	19.32	10.66	0	37
CSW	130	3.60	2.50	0	8
Kindergarten End of Year					
CSS	17	24.12	11.34	0	36
CSW	17	5.71	3.04	0	9
Grade 1 Beginning of Year					
CSS	197	29.91	11.88	0	54
CSW	196	3.50	2.80	0	11
Grade 1 Middle of Year					
CSS	116	37.08	11.11	0	57
CSW	116	5.27	2.93	0	12
Grade 1 End of Year					
CSS	10	48.30	11.03	23	58
CSW	10	8.10	3.03	3	12

Note. CSS = Correct Spelling Sequences. CSW = Correctly Spelled Words.

Table 2
Descriptive Statistics of the Reading Composite Score by Grade, Time of Year, and Status of Assessment with Acadience Spelling

	n	M	SD	Min	Max
Reading Composite Score					
Kindergarten Middle of Year					
Assessed with Spelling	130	154.28	54.53	0	259
Not assessed with Spelling	502	141.68	57.32	5	327
Kindergarten End of Year					
Assessed with Spelling	17	118.29	54.60	1	195
Not assessed with Spelling	76	139.63	50.16	15	276
Grade 1 Beginning of Year					
Assessed with Spelling	196	131.62	37.02	42	258
Not assessed with Spelling	1,107	131.67	47.37	1	278
Grade 1 Middle of Year					
Assessed with Spelling	112	150.98	93.87	1	418
Not assessed with Spelling	341	203.46	103.75	11	453
Grade 1 End of Year					
Assessed with Spelling	9	120.67	61.83	35	191
Not assessed with Spelling	56	178.68	91.82	3	400

Note. "Assessed with Spelling" corresponds to students assessed with Acadience Spelling. "Not assessed with Spelling" corresponds to students attending the same school but who were not assessed with Acadience Spelling at the specified grade and time of year.

Table 3
Descriptive Statistics of Acadience Reading K–6 Measures of Students Assessed with Acadience Spelling

	n	M	SD	Min	Max
Kindergarten Middle of Year					
FSF	130	39.99	14.98	0	60
LNF	130	40.79	16.68	0	83
PSF	130	45.49	18.47	0	75
NWF CLS	130	28.01	13.93	0	74
NWF WWR	129	2.46	4.09	0	26
Kindergarten End of Year					
LNF	17	44.88	22.53	1	80
PSF	17	47.53	22.67	0	73
NWF CLS	17	25.88	13.82	0	60
NWF WWR	16	5.00	5.76	0	19
Grade 1 Beginning of Year					
LNF	196	45.20	13.06	10	91
PSF	196	47.88	13.60	11	75
NWF CLS	196	37.58	23.49	1	143
NWF WWR	195	7.15	8.36	0	47
Grade 1 Middle of Year					
NWF CLS	115	50.43	29.38	1	141
NWF WWR	113	14.83	10.69	0	48
ORF Words Correct	115	32.34	31.61	0	136
ORF Accuracy	114	74.84	19.44	0	100
Grade 1 End of Year					
NWF CLS	9	40.22	13.25	23	61
NWF WWR	9	12.67	4.77	7	20
ORF Words Correct	9	40.00	22.84	14	66
ORF Accuracy	9	82.33	12.76	58	96

Figure 3
Distributions of Acadience Spelling Correct Spelling Sequences for Middle of Kindergarten and Middle and End of First Grade

Note. Distributions for the end of kindergarten and first grade are not reported due to insufficient sample sizes. Samples sizes as follows. Kindergarten middle of year = 130. Grade 1 beginning of year = 196. Grade 1 middle of year = 116.
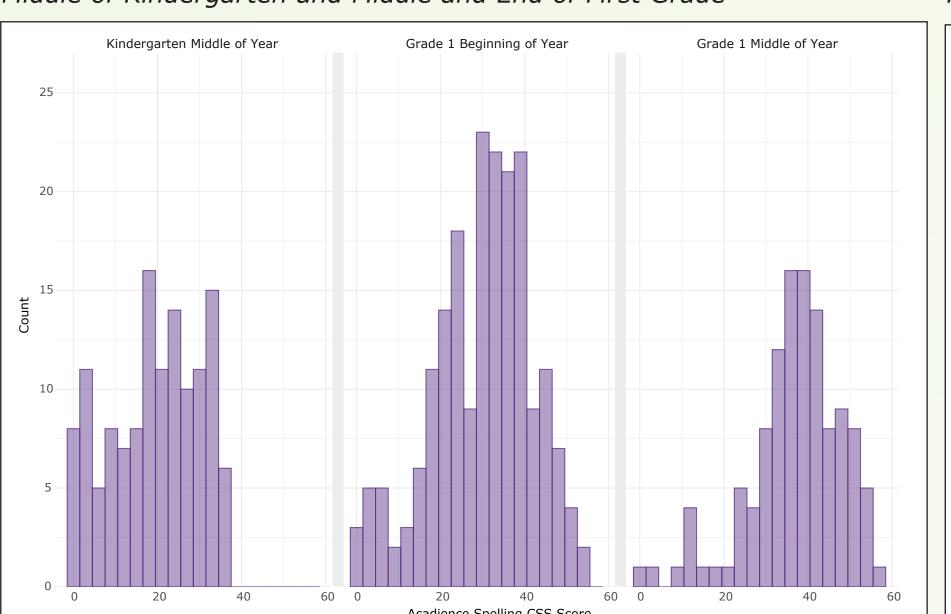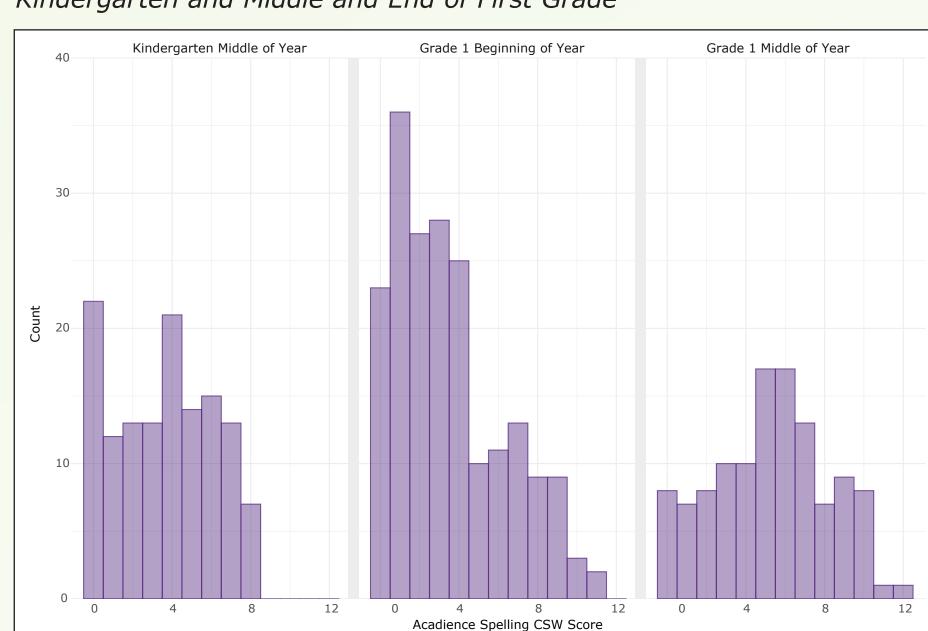
Figure 4
Distributions of Acadience Spelling Correctly Spelled Words for Middle of Kindergarten and Middle and End of First Grade

Table 4
Concurrent Validity of Acadience Spelling with Acadience Reading

				Acadience Reading Measure				
	FSF	LNF	PSF	NWF CLS	NWF WWR	ORF Words Correct	ORF Acc	RCS
Kindergarten Middle of Year								
CSS	.59	.63	.60	.53	.23**	–	–	.70
CSW	.55	.61	.58	.53	.20***	–	–	.67
Grade 1 Beginning of Year								
CSS	–	.43	.34	.43	.39	–	–	.55
CSW	–	.42	.14†	.71	.63	–	–	.65
Grade 1 Middle of Year								
CSS	–	–	–	.52	.59	.51	.65	.61
CSW	–	–	–	.54	.64	.55	.66	.65

Note. Dashes indicate the Acadience Reading measure is not administered at the specified grade and time of year. Correlations for the end of kindergarten and first grade are not reported due to insufficient sample sizes. Pairwise samples sizes as follows. Kindergarten middle of year = 130. Grade 1 beginning of year = 194–197. Grade 1 middle of year = 95–115. Unless marked, correlations significant, p < .0001; *p < .001; **p < .01, ***p < .05; †Not significant.

Table 5
Predictive Validity of Acadience Spelling with Acadience Reading

			Acadience Reading Measure				
	LNF	PSF	NWF CLS	NWF WWR	ORF Words Correct	ORF Acc	RCS
Middle of Kindergarten to Beginning of Grade 1							
CSS	.57	.50**	.52*	.42**	–	–	.63
CSW	.54*	.44**	.52*	.48**	–	–	.60
Beginning to Middle of Grade 1							
CSS	–	–	.44	.51	.35	.46	.46
CSW	–	–	.67	.68	.63	.61	.71
Beginning to End of Grade 1							
CSS	–	–	.49	.53	.64	.67	.69
CSW	–	–	.69	.67	.71	.58	.74
Middle to End of Grade 1							
CSS	–	–	.48*	.51*	.64	.75	.75
CSW	–	–	.50*	.55	.72	.74	.80
Middle of Grade 1 to Beginning of Grade 2							
CSS	–	–	.58	.58	.55	.65	.66
CSW	–	–	.63	.56	.67	.69	.69

Note. Dashes indicate the Acadience Reading measure is not administered at the specified grade and time of year. Correlations for (a) middle to end of kindergarten, (b) end of kindergarten to beginning and middle of first grade, (c) end of first grade to beginning of second grade, and (d) end of first grade to middle of second grade are not reported due to insufficient sample sizes. Pairwise samples sizes as follows. Middle of kindergarten to beginning of first grade = 176–187. Beginning to middle of first grade = 44. Middle of first grade to beginning of second grade = 71–83. Unless marked, correlations significant, p < .0001; *p < .001; **p < .01, ***p < .05; †Not significant.

DISCUSSION

Results from this study provide initial evidence to support the use of Acadience Spelling from the middle of kindergarten through the end of first grade. We found that Acadience Spelling scores are sensitive to increasing spelling skill over that time span. Additionally, the validity coefficients appear to be consistent with those reported in previous CBM Spelling studies (Deno, et al., 1980; Marston, 1982). Acadience Spelling is moderately to strongly related to concurrent and future overall reading performance, which is important because difficulties with spelling are often observed in students with dyslexia (Lohvansuu, et al., 2021) and spelling is frequently cited as a necessary component of dyslexia screening.

Limitations
- The measures were administered under uncontrolled conditions. However, the data examined in this study do represent the way these measures are used in practice.
- The data collected may not be representative of national or local demographics and performance. Both of these factors potentially limit the generalizability of the results.
- Students assessed with Acadience Spelling had lower RCS compared to students who were not assessed with Spelling, indicating potential restriction in range.
- This study included data gathered during the COVID-19 pandemic and did not differentiate between mode of administration (i.e., remote vs. in-person). It is possible there may be differences in scores as a result of these factors.

Future Research
- Replicate these analyses with a larger, more diverse sample of students
- Evaluate results when the sample is limited to data from schools that used Acadience Spelling as a universal screener
- Examine the contribution of Acadience Spelling in predicting future reading outcomes relative to other Acadience Reading measures
- Develop cut points for risk
- Explore the reliability of the Acadience Spelling assessment and obtain user feedback

References available by contacting the authors.