

Table 1. Descriptions and Outcomes of Research Studies

Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Level Ib (Randomized Control Trial) and Level IIa (Controlled Without Randomization) Evidence (ASHA)						
Abbott & Berninger (1999)	Randomized Control Trial	20 children Grades 4–7 Performed low average in reading	Treatment (Tx) Group: Explicit instruction of morphological awareness and structural analysis of syllables (Henry, 1990) Control Group: Study skills training Both groups received Tx in orthographic knowledge (spelling rules and phoneme–grapheme correspondences), phonological awareness (deletion), decoding (phoneme blending), and reading comprehension.	16 sessions, 1 hour duration, over a 4-month period Individual sessions	Spelling Writing Decoding Word ID Reading comprehension (RC) Phonological Awareness (PA) Orthographic Knowledge (OK)	Children in both treatment (Tx) and control groups significantly improved growth curve in all outcome areas. No significant differences were found on outcome measures between the control group and Tx group which may have been due to decreased power as a result of small group sample sizes and/or common shared Tx.
Berninger, Abbott, Zook, Ogier, Lemos-Britton, & Brooksher (1999)	Randomized Control Trial	48 children Grade 1 Performed low average in decoding and/or recognition	Tx Groups: Whole Word Tx Word ID , phonological blending activities, matching the whole-word orthographic code to blended sounds Subword Tx Word ID and phonological blending activities, matching orthographic code of single/multi-letter units to sounds Combined Tx Whole word and subword Tx All Tx groups read connected text	8 sessions, 30 minutes duration, in the summer following 1st grade year, 1 session per week Individual sessions	Spelling Writing Decoding Word ID	Growth curve analysis revealed significant increases in word-level reading for all Tx groups, with the subword Tx resulting in the most effective Tx in word ID scores as measured by a significant interaction of Tx and time. Pre-Tx phonological awareness and orthographic knowledge scores predicted children's success in the all Tx.

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Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Blachman, Tangel, Ball, Black, & McGraw (1999)	Controlled/ Not Randomized	128 children Grade 1 Tx ($n = 66$) Control ($n = 66$)	Continued longitudinal study in which Tx group received phonological awareness instruction (Blachman et al., 1994) Tx Group: Phonemic awareness instruction linked to spelling, alphabetic code (orthographic knowledge), and decoding Control Group: Traditional basal-reader program	30-minute daily instruction for first-grade school year. Class instruction	Spelling Decoding Word ID PA	The Tx group performed significantly better than control group on phonemic awareness, spelling, and reading measures.
Abbott (2001)	Controlled/ Not Randomized	16 children Grade 3 Tx Group ($n = 8$) Control: ($n = 8$)	Tx Group: Orthographic knowledge focus word-study (Bear, Invernizzi, Templeton, & Johnston, 1996) Control Group: Traditional spelling Tx	45 minutes daily, 1 school-year. Class instruction	Spelling OK	Children receiving word-study spelling instruction with orthographic knowledge focus performed significantly better on orthographic knowledge spelling measures ($\eta_p^2 = .39$) (no confidence interval reported), and their spellings reflected more sophisticated orthographic spellings. No significant differences found between children's abilities to produce low/high frequency word spellings.

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Table 1., continued

Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Berninger et al. (2002)	Randomized Control Trial	96 children Grade 3 Performed low average on writing fluency composition	Tx Groups: Spelling Only: Phonemic awareness and orthographic knowledge Writing Composition Only Executive functioning, information/persuasive writing Combined Spelling and Writing Control: Handwriting, keyboard training, composing practice	24 sessions, 20 minutes duration, over 4-month period Class instruction	Spelling Writing Decoding	For all Tx groups children significantly improved spelling and writing abilities from pre- to post-test performance. Children in the spelling training only program performed significantly better on a decoding test than those children receiving the spelling with compositional writing component. Other performance areas were not significantly different
Nunes, Bryant, & Olsson (2003)	Randomized Control Trial	457 children 7- and 8-year-old children	Tx Groups: (<i>n</i> = 220) Morphological Awareness Training Alone (oral only) Segmenting, blending, manipulating affixes Morphological Awareness Training with Spelling segmenting, blending, manipulating affixes with base words linked to spelling Phonological Awareness Training Alone (oral only) Segmenting, blending, and manipulating phonemes Phonological Awareness with Spelling Linking phoneme segmenting, blending, and manipulating to spelling rules (orthographic knowledge) Control Group: (<i>n</i> = 237) No additional small-group training	12 sessions, weekly Small-group instruction (4–8 children)	Spelling Writing Decoding Word ID Morphological Awareness (MA) OK	For all intervention groups, children performed significantly better than controls on standardized reading measures. For both morphological awareness Tx groups, children performed significantly better than controls on morphologically-based spelling measures, although no significant differences found between groups on morphologically-based reading measures. No significant differences found between groups on orthographic knowledge-spelling and reading.

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Table 1., continued

Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Graham & Harris (2005)	Randomized Control Trial	60 children Grade 2 Low average spelling	Tx Group: Orthographic knowledge activities with spelling word sorts Control: Math lessons	48 sessions, 20 minutes duration, 3 times a week, for 16 weeks Small-group instruction (2 students)	Spelling Writing Decoding	Tx group outperformed control group on spelling measures immediately (effect sizes range = .66 to 1.05), and 6-months post-Tx (effect sizes range = .70 to 1.07) Tx group outperformed control group on writing (effect size = .78) and decoding (effect size = .82)
Vadasy, Sanders, & Peyton (2005)	Study 1: Controlled/ Not Randomized Study 2: Randomized Control Trial	Study 1: 31 children Grade 2 Low average reading scores Study 2: 21 children Grade 2 (n = 6) Grade 3 (n = 15) Low average decoding	Study 1: Tx Group: (n = 10) Phonological awareness, orthographic knowledge, morphological awareness, and word ID linked to spelling of sight words. Oral readings which included words of multiple-linguistic linkages. Control: (n = 19) No additional tutoring Study 2: Tx Group: (n = 11) Phonological awareness, orthographic knowledge, morphological awareness, and word ID linked to spelling of sight words. Oral readings which included words of multiple-linguistic linkages. Control: (n = 10) No additional tutoring	Study 1: (M = 42.2 hours) 30 minutes duration, 4 days/ week, 20 weeks Individual instruction Study 2: (M = 36 hours) 30 minutes duration, 4 days/week, 20 weeks Individual instruction	Study 1: Spelling Decoding Word ID Reading fluency RC Study 2: Spelling Decoding Word ID Reading fluency RC	Study 1: Children in the Tx group significantly improved on a composite of decoding and recognition (d = .86), reading fluency (d = .82), reading comprehension (d = .75), and spelling (d = 1.06) compared to control group Study 2: Children in the Tx group improved significantly more than the control group on a decoding and recognition composite (d = 1.06), reading fluency (d = 1.09). No significant differences were found between groups on reading comprehension (d = .32), and spelling (d = -.32).

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Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Berninger, et al., (2008)	Randomized Control Trial	Study 1: Grades 4–6 (n = 22) Grades 7–9 (n = 17) Diagnosis Dyslexia	Study 1: Tx Groups: Orthographic Knowledge Spelling Tx (n = 20) Morphological Awareness Spelling Tx (n = 19) All Tx groups received writing composition instruction	Study 1: 14 sessions, 120 minutes duration, consecutive week days Small-group instruction	Study 1: Spelling Writing Decoding	Study 1: Children who received morphological awareness spelling Tx significantly improved the most on nonword spelling. Children who received orthographic knowledge spelling Tx improved significantly on real word spelling and decoding. All Tx groups significantly improved in spelling and writing.
		Study 2: 24 children Grades 4–6 Diagnosis Dyslexia	Study 2: Language Tx Group: (n = 12) Phoneme-grapheme correspondence - applied to decoding, spelling applied in writing, note taking strategies, computer-assisted report writing Nonverbal Control Tx Group: (n = 12) Computer-based problem-solving activities	Study 2: 4 small group sessions 180 minutes total Small-group instruction	Study 2: Spelling Writing Decoding	Study 2: Both Tx groups resulted in significantly improved nonword decoding, spelling, and written note-taking.
Level III (Case Study) Evidence (ASHA)						
Masterson & Crede (1999)	Case Study	10:5-year-old male Grade 5 Diagnosed with learning disability	Phonemic Awareness Activities Phonemic segmenting and blending linked to corresponding spelling Orthographic Knowledge Activities Orthographic rule word sorts and focus on the mental graphemic representation of the words	12 sessions, 60-minute duration, 6 weeks, bi-weekly. Individual sessions	Spelling Writing	Significant increases were found in spelling based on non-overlapping SEMs from pretest to post-test. Writing appeared to improve given increased post-Tx percentage of words correct in 4 of 5 writing samples. Inconsistent baselines and unknown reliability prevented effectiveness interpretation of these results.

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Study	Design	Sample Description	Intervention/ Comparison	Intensity/Duration/ Groups	Language Outcomes	Findings
Apel & Masterson (2001)	Case Study	13-year-old female Grade 8 Diagnosis ADD/ Language-Literacy Deficit	Phonemic Awareness Activities: Phonemic segmentation with written links to spelling Orthographic Knowledge Activities: Orthographic spelling rule word sorts (Bear et al., 2000) Morphological Awareness Activities: Derivational morphology spelling word games Phonemic Decoding Activities Continuous voicing of phonemes when blending words	15 sessions, 90 minute duration, daily, (23 hrs total) Individual instruction	Spelling Writing Decoding Word ID MA PA	Large effect sizes found for the difference in spelling ability pre- and post-test ($d = .84$). Significant increases in decoding and word ID based on non-overlapping SEMs from pretest to post-test. Marked increases of phonemic awareness and morphological awareness skills pre-test to post-test.
Kelman & Apel (2004)	Case Study	11-year-old female Grade 4 Low average spelling	Tx Groups: Phonemic Awareness Activities: Phonemic segmentation links to spelling Orthographic Knowledge Activities: Orthographic spelling rule word sorts (Bear et al., 2000)	11 sessions, average session 60 minutes), over 8 weeks Individual instruction	Spelling Writing Decoding Word ID	A multiple-linguistic spelling approach resulted in clinically significant increase in spelling abilities ($d = .5$). Word level decoding and ID skills markedly increased as measured by non-overlapping SEM.