

Dyslexia Remediation and Early Intervention: Evidence From Peer-Reviewed Randomized Controlled Trials

EXECUTIVE SUMMARY 1: Dyslexia Remediation Programs for Children Aged 8–10 Years

This summary compiles evidence from peer-reviewed randomized controlled trials evaluating intensive remediation programs for children aged approximately 8–10 with diagnosed or severe reading disabilities. All cited studies employed randomized designs, standardized outcome measures, and were published in credible peer-reviewed journals.

1. NOW! Foundations for Speech, Language, Reading and Spelling® (Torgesen, Alexander, Conway et al. NICHD-Funded RCT Series)

The treatment referred to as “PASP” (Phonological Awareness plus Synthetic Phonics) or “ADD” (Auditory Discrimination in Depth) in the Torgesen et al. research program was a modified version of the Lindamood & Lindamood (1969) Auditory Discrimination in Depth program, developed and delivered by The Morris Center (TMC) staff. **Dr. Tim Conway** — protégé and nephew of the late Patricia Conway Lindamood — was the key personnel who trained all instructors in both the prevention and remediation RCTs. [nowprograms](#)

[NOW! Programs](#) In **2013**, Dr. Conway trademarked and branded this treatment as **NOW! Foundations for Speech, Language, Reading and Spelling®**. [nowprograms](#) [LinkedIn](#)

All four studies below were funded by **NICHD Grant HD30988** (“Prevention and Remediation of Reading Disabilities”).

Torgesen et al. (1997) — Preliminary Reports

Two preliminary publications reported early data from the NICHD-funded prevention and remediation studies that would later be fully published in 1999 and 2001:

- **Publication 1:** Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1997). Prevention and remediation of severe reading disabilities: Keeping the end in mind. *Scientific Studies of Reading*, 1(3), 217–234. https://doi.org/10.1207/s1532799xssr0103_3

- **Authors:** Joseph K. Torgesen, Richard K. Wagner, Carol A. Rashotte
- **Content:** Reported preliminary results from the ongoing 2.5-year prevention project with 138 at-risk kindergartners randomly assigned to four conditions, including the NOW! Foundations for Speech, Language, Reading and Spelling® treatment (listed as PASP). Described the treatment as providing explicit phonemic awareness instruction through articulatory gestures using the Lindamood ADD program. [Ifери](#) Showed a clear advantage for the NOW! Foundations condition in phonemic decoding at end of 2nd grade.
- **NICHD-funded:** Yes (Grant HD30988)
- **Publication 2:** Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Alexander, A. W., & Conway, T. (1997). Preventive and remedial interventions for children with severe reading disabilities. *Learning Disabilities: A Multidisciplinary Journal*, 8, 51–61.
 - **Authors:** Joseph K. Torgesen, Richard K. Wagner, Carol A. Rashotte, Ann W. Alexander, Tim Conway
 - **Content:** Reported early results from both the kindergarten prevention study and the remediation study with older children (ages 8–10) with severe reading disabilities, [Semantic Scholar](#) using the NOW! Foundations for Speech, Language, Reading and Spelling® treatment. [Semantic Scholar](#) This is the earliest publication to include both Alexander and Conway as co-authors.
 - **NICHD-funded:** Yes (Grant HD30988)

Note on “Torgesen et al. 1996”: Thorough searching across Google Scholar, PubMed, Semantic Scholar, and ERIC found no 1996 peer-reviewed journal publication by Torgesen et al. reporting PASP/ADD intervention results. Torgesen published a book chapter on phonological memory (in Lyon, Ed., 1996, Paul H. Brookes) [University of Nebraska-Lincoln](#) and a monograph titled *Phonological awareness: A critical factor in dyslexia* (Orton Dyslexia Society, 1996), but neither reported PASP/ADD intervention data. The earliest published intervention results appear in the two 1997 preliminary reports cited above. It is possible the “1996” reference refers to an unpublished conference presentation or technical report from the NICHD grant.

Torgesen et al. (1999) — Full Prevention Study (Ages 5–8, K through 2nd Grade)

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., & Garvan, C. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*, 91(4), 579–593. <https://doi.org/10.1037/0022-0663.91.4.579>

- **Sample size:** 180 children initially randomized (138 retained through end of 2nd

grade; 23% attrition due to relocation), selected from 1,436 kindergartners screened across 13 elementary schools

- **Age range:** Began at ~5.4 years (kindergarten); study continued through end of 2nd grade (~age 8)
- **Selection criteria:** Bottom 12% on combined Letter Naming and Phoneme Elision scores; Verbal IQ > 75
- **Demographics:** 51% male; 72% White, 26% African American, 0.6% Hispanic, 1.5% Asian
- **Study design:** RCT; children randomized within schools to four conditions (~45 per group):
 1. **NOW! Foundations for Speech, Language, Reading and Spelling®** (labeled "PASP" in the paper; n=33 at endpoint) — the Lindamood ADD program, with training provided by Patricia Lindamood herself
 2. **Embedded Phonics (EP)** (n=36 at endpoint)
 3. **Regular Classroom Support (RCS)** (n=37 at endpoint)
 4. **No-treatment control (NTC)** (n=32 at endpoint) [Semantic Scholar](#)
- **NOW! Foundations treatment details:** 74% of instructional time on phonemic awareness and phonemic decoding; 6% on sight words; 20% on connected text reading. Taught explicit phonemic awareness through articulatory gestures, mouth-form pictures, colored blocks, and letters. [Iferi](#) Used Poppin Readers and Early Literacy Series for decodable text. [Coloradoreading](#)
- **Intensity and duration:** 2.5 years of one-to-one instruction [Semantic Scholar](#) (4 sessions × 20 minutes/week); approximately **88 total hours** [Semantic Scholar](#) (47 hours tutor-led + 41 hours aide-led) [Coloradoreading](#)
- **Outcome measures:** WRMT-R Word Identification, Word Attack, and Passage Comprehension; TOWRE Sight Word Efficiency and Phonemic Decoding Efficiency; GORT-III; WRAT Spelling; researcher-developed Real Word and Nonword Lists; Phoneme Elision; Phoneme Blending
- **Key findings and effect sizes:**
 - **NOW! Foundations (PASP) produced significantly stronger phonemic decoding than all other groups** [PubMed Central](#) (p<.001) [Semantic Scholar](#)
 - NOW! Foundations group standard scores at end of 2nd grade: **Word Attack = 99.4, Word Identification = 98.2, Passage Comprehension = 91.5** (all in the

average range)

- Embedded Phonics: Word Attack = 86.7, Word Identification = 92.1, Comprehension = 88.6
 - No-treatment control: Word Attack = 81.6, Word Identification = 86.3, Comprehension = 85.8
 - The NOW! Foundations group's advantage over the NTC group represents approximately a **1 SD difference** on word-level measures (standard scores ~99 vs. ~82–86)
 - **Phonemic Decoding Fluency:** NOW! Foundations SS = 105.9 vs. EP = 93.4
 - **Only 1.4% of NOW! Foundations children fell below the 30th percentile on Word Attack**, vs. 21–24% in other groups
 - **Grade retention rates:** NOW! Foundations = 9%, EP = 25%, RCS = 30%, NTC = 41%
 - Even in the strongest condition, 24% of children remained significantly impaired in phonemic reading [Coloradoreading](#)
- **NICHD-funded:** Yes — Grant HD30988, with additional grants from the National Center for Learning Disabilities and the Donald D. Hammill Foundation [Coloradoreading](#)

Torgesen et al. (2001) — Full Remediation Study (Ages 8–10)

Torgesen, J. K., Alexander, A. W., Wagner, R. K., Rashotte, C. A., Voeller, K. K. S., & Conway, T. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34*(1), 33–58, 78.

<https://doi.org/10.1177/002221940103400104>

- **Sample size: 60 children** with severe reading disabilities, [PubMed](#) [Sage Journals](#) referred from learning disabilities resource rooms [Sage Journals +2](#)
- **Age range: 8–10 years** (grades 3–5)
- **Study design:** RCT — 60 children randomly assigned to two intensive one-to-one instructional programs: [Sage Journals](#)
 1. **NOW! Foundations for Speech, Language, Reading and Spelling®** (labeled "ADD" in the paper; ~30 children) — deep, intensive phonemic awareness and phonemic decoding instruction using the Lindamood approach with articulatory

gestures and phoneme tracking

2. **Embedded Phonics (EP)** (~30 children) — less intensive phonemic awareness, more balanced word-level and text-level instruction; [IES](#) [Semantic Scholar](#) 50% of time reading text vs. 5% in the NOW! Foundations condition [Sosaschool](#)
- **Intensity and duration: 67.5 total hours** of one-to-one instruction, delivered as two 50-minute sessions per day for **8 weeks** [Lindamood-Bell +2](#) (highly intensive) [PubMed](#)
- **Outcome measures:** WRMT-R (Word Attack, Word Identification, Passage Comprehension), Lindamood Auditory Conceptualization Test (LAC), Gray Oral Reading Test, WRAT Spelling, reading rate measures; 1-year and 2-year follow-up assessments
- **Key findings and effect sizes:**
 - Compared to growth during the previous 16 months in LD resource rooms: [PubMed](#) **NOW! Foundations condition: Cohen's d = 4.4** for broad reading ability growth; **EP condition: Cohen's d = 3.9** — both are extraordinarily large effect sizes [Sage Journals](#)
 - NOW! Foundations students showed **significantly greater growth in Word Attack** than EP students at immediate posttest [Sosaschool](#) (Word Attack SS rose from ~78 to ~93)
 - **Both programs produced very large improvements in generalized reading skills that were stable over a 2-year follow-up** [Semantic Scholar +2](#)
 - Average reading accuracy and comprehension scores reached the **average range** at end of follow-up [PubMed](#)
 - **Reading rate/fluency showed continued severe impairment** for most children [PubMed](#) — a persistent deficit
 - **40% of children no longer needed special education services** within 1 year post-intervention [PubMed](#)
 - Between-group differences (NOW! Foundations vs. EP) were **not maintained** at 1-year and 2-year follow-up; both groups remained substantially improved [Semantic Scholar](#) [Sosaschool](#)
 - Best predictors of long-term growth: resource room teacher ratings of attention/behavior, general verbal ability, prior levels of component reading skills [Semantic Scholar +2](#)

- **NICHD-funded:** Yes — Grant HD30988/HD/NICHD NIH HHS
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2. RAVE-O (Retrieval, Automaticity, Vocabulary, Engagement with Language, Orthography)

Morris et al. (2012) — Multi-Site NICHD RCT

Morris, R. D., Lovett, M. W., Wolf, M., Sevcik, R. A., Steinbach, K. A., Frijters, J. C., & Shapiro, M. B. (2012). Multiple-component remediation for developmental reading disabilities: IQ, socioeconomic status, and race as factors in remedial outcome. *Journal of Learning Disabilities, 45*(2), 99–127. <https://doi.org/10.1177/0022219409355472>

- **Sample size: 279 children** with confirmed reading disabilities, randomly assigned [PubMed Central +3](#)
- **Age range:** 2nd and 3rd graders (approximately ages 7–9, partly overlapping with the 8–10 target)
- **Sites:** Three — Georgia State University (Atlanta), Tufts University (Boston), Hospital for Sick Children (Toronto)
- **Study design:** Multi-site RCT with **2×2×2 factorial design** (IQ [70–89 vs. 90+], SES [low vs. average], race [Black vs. Caucasian]). [PubMed Central](#) Four intervention conditions: [PubMed Central](#)
 1. PHAB/DI + RAVE-O (n=69)
 2. PHAB/DI + WIST [PHAST] (n=73)
 3. PHAB/DI + CSS [phonological control] (n=69)
 4. CSS + MATH [alternative treatment control] (n=68) [ResearchGate](#) [PubMed Central](#)
- **Treatment duration/intensity:** 1 hour daily for 70 days (**70 total hours**), 1:4 teacher-to-student ratio [PubMed Central +2](#)
- **Outcome measures:** WRMT (Word Identification, Word Attack, Passage Comprehension), TOWRE, GORT, experimental transfer measures
- **Key findings and effect sizes:**
 - Both multi-component programs (RAVE-O and PHAST) showed **significant improvements relative to controls on all basic reading skills** at posttest and 1-year follow-up [Sage Journals](#) [ResearchGate](#)

- Treatment effect sizes on the Challenge Words Test (transfer measure) ranged from **d = 0.65 to 0.85** for multi-component conditions [PubMed Central](#)
- RAVE-O showed particular strengths in **vocabulary and fluency-related measures**; PHAST showed relative strengths in word identification
- IQ, SES, and race did **not** moderate treatment effects — all demographic subgroups benefited equally [Sage Journals](#) [PubMed Central](#)
- Long-term outcomes were equivalent across multi-component conditions, suggesting different pathways to effective remediation [Sage Journals](#)
[Semantic Scholar](#)

- **NICHD-funded:** Yes — Shannon Award and NICHD Award No. 1 R01 HD30970-01A2

Lovett et al. (2017) — Grade-at-Intervention Study

Lovett, M. W., Frijters, J. C., Wolf, M., Steinbach, K. A., Sevcik, R. A., & Morris, R. D. (2017). Early intervention for children at risk for reading disabilities: The impact of grade at intervention and individual differences on intervention outcomes. *Journal of Educational Psychology, 109*(7), 889–914. <https://doi.org/10.1037/edu0000181>

- **Sample size:** 172 intervention children + 47 controls (quasi-experimental design) [PubMed Central +2](#)
- **Age range:** 1st, 2nd, and 3rd graders
- **Treatment:** Triple-Focus Program (combined PHAST + RAVE-O)
- **Effect sizes:** Cohen's **d = 0.80** on standardized measures; **d = 1.69** on experimental measures; intervention children outperformed controls on all 14 outcomes [PubMed Central +2](#)
- **Key finding:** Earlier intervention (1st–2nd grade) produced gains nearly **twice those of 3rd-grade intervention** on foundational word reading skills [PubMed Central +3](#)
- **NICHD-funded:** Yes

3. Wilson Reading System

Torgesen et al. (2007) — IES National Assessment of Title I

Torgesen, J., Schirm, A., Castner, L., Vartivarian, S., Mansfield, W., Myers, D., Stancavage, F., Durno, D., Javorsky, R., & Haan, C. (2007). *National Assessment of Title I*,

Final Report: Volume II: Closing the Reading Gap, Findings from a Randomized Trial of Four Reading Interventions for Striving Readers (NCEE 2008-4013). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

- **Sample size:** Wilson arm: **71 third-graders** (IES) (53 treatment, 18 comparison); (IES) overall study ~350 students across four programs in 50 schools from 27 districts (ed +2)
- **Age range:** 3rd graders (ages ~8–9) and 5th graders (ages ~10–12)
- **Study design:** Two-level randomized design: schools randomly assigned to one of four interventions (Wilson Reading, Corrective Reading, Failure Free Reading, SpellRead P.A.T.); within schools, struggling readers randomly assigned to treatment or business-as-usual control (ed +3)
- **Treatment:** ~90–100 hours of pull-out instruction in small groups of 3, one school year. (IES) (Semantic Scholar) **Critical caveat:** Only the word-level components of Wilson were implemented; fluency, comprehension, and vocabulary components were deliberately eliminated for the study. (IES +3)
- **Outcome measures:** WRMT-R Word Identification and Word Attack, TOWRE, AIMSweb Oral Reading Fluency, GRADE Passage Comprehension, WRMT-R Passage Comprehension
- **Effect sizes:**
 - Word Attack: **d = 0.46**
 - Word Identification: **d = 0.15** (Evidence for ESSA)
 - Mean effect size across all outcomes: **d ≈ 0.36** (Teaching By Science)
 - Results were significant for 3rd graders but not 5th graders
 - **No significant impacts on fluency or comprehension**
- **Key findings:** Third graders' word attack skills gap was reduced by approximately two-thirds. (ERIC) The WWC rated Wilson as having "potentially positive effects on alphabets" but no discernible effects on fluency or comprehension. (IES +3) This remains the **only study of Wilson that met WWC evidence standards** (Blogger) — and it tested a modified, incomplete version of the program.
- **NICHD-funded:** No — funded by multiple private foundations (Smith Richardson, Heinz, Kellogg, Grable, Mellon, Rockefeller) and conducted by Mathematica Policy Research for IES.

4. Orton-Gillingham Based Programs

Stevens et al. (2021) — Systematic Meta-Analysis

Stevens, E. A., Austin, C., Moore, C., Scammacca, N., Boucher, A. N., & Vaughn, S. (2021). Current state of the evidence: Examining the effects of Orton-Gillingham reading interventions for students with or at risk for word-level reading disabilities. *Exceptional Children*, 87(4), 397–417. <https://doi.org/10.1177/0014402921993406>

- **Design:** Systematic meta-analysis of **24 studies** (9 randomized, 15 quasi-experimental; [PubMed Central](#) 16 with sufficient data for meta-analytic calculation) [PubMed Central](#)
- **Population:** Students K–12 with or at risk for word-level reading disabilities
- **Effect sizes:**
 - Foundational skills (phonological awareness, phonics, fluency, spelling): **ES = 0.22 (p = .40)** — NOT statistically significant [PubMed Central +2](#)
 - Vocabulary and comprehension: **ES = 0.14 (p = .59)** — NOT statistically significant [PubMed Central +2](#)
 - Word reading: **ES = 0.32** — not significant [Tatyana Elleseff](#)
- **Mean study quality:** Low [PubMed Central](#) (0.95/2.0 for research design); most studies had “unacceptable” implementation fidelity ratings [PubMed Central](#)
- **Conclusion:** “OG reading interventions do not statistically significantly improve foundational skill outcomes... More high-quality, rigorous research with larger samples of students with WLRD is needed.” [PubMed Central](#) [ERIC](#)
- **Funded by:** NICHD and the Office of Special Education Programs, U.S. Department of Education

Note: Despite widespread legislative mandates in many U.S. states, no large-scale, high-quality RCT of a “pure” Orton-Gillingham approach (as described in the Gillingham & Stillman manual) has been conducted. [The Hechinger Report](#) [PubMed](#) Most studies use OG-based derivative programs.

Ritchey & Goeke (2006) — Earlier Review

Ritchey, K. D., & Goeke, J. L. (2006). Orton-Gillingham and Orton-Gillingham-based reading instruction: A review of the literature. *The Journal of Special Education*, 40(2),

171–183.

- **Review of 12 studies** (experimental and quasi-experimental) [ResearchGate](#)
 - **Findings:** Mixed results — 5 studies favored OG for all outcomes, 4 for some outcomes, 2 found alternate instruction more effective, 1 found no differences
[ResearchGate](#) [ICI Journals](#)
 - **Conclusion:** “Given the small number of studies, the lack of methodological rigor... and the inconclusive findings, additional research is needed before the scientific basis can be established.” [ERIC](#)
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5. Blachman et al. (2004) — Intensive Phonics-Based Remediation (NICHD-Funded)

Blachman, B. A., Schatschneider, C., Fletcher, J. M., Francis, D. J., Clonan, S. M., Shaywitz, B. A., & Shaywitz, S. E. (2004). Effects of intensive reading remediation for second and third graders and a 1-year follow-up. *Journal of Educational Psychology*, 96(3), 444–461. <https://doi.org/10.1037/0022-0663.96.3.444>

- **Sample size: 69 children** randomly assigned [Grantome](#)
- **Age range:** 2nd and 3rd graders (ages ~7–9)
- **Study design:** RCT — 8 months of explicit, systematic instruction emphasizing phonological/orthographic connections vs. school-provided remedial reading (business-as-usual control) [Google Scholar](#)
- **Treatment:** ~50 minutes/day, 5 days/week, one-to-one tutoring for 8 months
- **Outcome measures:** WRMT-R (Word Identification, Word Attack), reading rate, passage reading, spelling
- **Effect sizes at posttest:**
 - Word recognition: **d = 1.69**
 - Reading rate: **d = 0.96**
 - Spelling: **d = 1.13**
 - Passage reading: **d = 0.78** [Grantome](#)
- **Effect sizes at 1-year follow-up:**
 - Word recognition: **d = 0.97**

- Reading rate: **d = 0.81**
- Spelling: **d = 0.81**
- Passage reading: **d = 0.57** [Grantome](#)
- **10-year follow-up** (Blachman et al., 2014): 58 of 69 participants reassessed — treatment group retained moderate effect size advantages: Woodcock Basic Skills Cluster **d = 0.53**; Word Identification **d = 0.62** [PubMed Central](#) [Yonsei University](#)
- **NICHD-funded:** Yes — NICHD Center Grant P50HD25802 (Yale University School of Medicine; Shaywitz & Shaywitz, co-directors) [ResearchGate](#)

Follow-up citation: Blachman, B. A., Schatschneider, C., Fletcher, J. M., Murray, M. S., Munger, K. A., & Vaughn, M. G. (2014). Intensive reading remediation in grade 2 or 3: Are there effects a decade later? *Journal of Educational Psychology*, 106(1), 46–57. <https://doi.org/10.1037/a0033663>

Summary Comparison Table: Remediation Programs for Ages 8–10

Program	Key RCT	N	Ages	Intensity	Key Effect Sizes	NICHD-Funded
NOW! Foundations®	Torgesen et al. (2001)	60	8–10	67.5 hrs, 1:1, 8 wks	d = 4.4 vs. prior LD services; Word Attack SS 78→93	Yes
NOW! Foundations®	Torgesen et al. (1999)	180	5–8 (K–2nd)	88 hrs, 1:1, 2.5 yrs	~1 SD advantage on word-level measures; Word Attack SS = 99.4	Yes
RAVE-O	Morris et al. (2012)	279	7–9	70 hrs, 1:4, 70 days	d = 0.65–0.85 on transfer measures	Yes
Blachman	Blachman			~8	d = 1.69 (word)	

Phonics	et al. (2004)	69	7–9	months, 1:1	recognition); d = 0.53 at 10 yrs	Yes
Wilson Reading	Torgesen et al. (2007)	71	8–9	~90 hrs, 1:3, 1 yr	d = 0.46 (Word Attack); d = 0.36 average	No
Orton- Gillingham	Stevens et al. (2021) meta	24 studies	K–12	Varies	ES = 0.22 (NS, p = .40)	N/A

EXECUTIVE SUMMARY 2: Early Intervention and Prevention Programs for Children Aged 5–7 Years

This summary compiles evidence from peer-reviewed randomized controlled trials evaluating early reading intervention and prevention programs for children approximately ages 5–7 (kindergarten through early elementary). All cited studies were published in credible peer-reviewed journals.

1. NOW! Foundations for Speech, Language, Reading and Spelling® (Torgesen et al. Prevention Study)

The Torgesen et al. (1999) prevention study is the primary RCT evaluating the NOW! Foundations for Speech, Language, Reading and Spelling® treatment (labeled “PASP” in the paper) with young at-risk children beginning in kindergarten. Full details are reported in Summary 1 above.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., & Garvan, C. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology, 91*(4), 579–593. <https://doi.org/10.1037/0022-0663.91.4.579>

- **Key prevention findings for ages 5–7:**

- Among children in the bottom 12% of phonological processing at kindergarten entry, NOW! Foundations brought average word-level reading scores into the **normal range** Coloradoreading (Word Attack SS = 99.4; Word Identification SS =

98.2) by end of 2nd grade [Semantic Scholar](#)

- **Only 1.4% of NOW! Foundations children** fell below the 30th percentile on phonemic decoding, compared to 21–24% in other conditions
 - **Grade retention rates** were dramatically lower: NOW! Foundations = 9% vs. no-treatment control = 41%
 - The treatment delivered **88 hours of one-to-one instruction** over 2.5 years, with 74% of time on phonemic awareness and decoding [Google Scholar](#)
 - **NICHD-funded:** Yes (Grant HD30988)
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2. Reading Recovery

Sirinides, Gray, & May (2018) — i3 Scale-Up 4-Year Evaluation

Sirinides, P., Gray, A., & May, H. (2018). The impacts of Reading Recovery at scale: Results from the 4-year i3 external evaluation. *Educational Evaluation and Policy Analysis*, 40(3), 316–335. <https://doi.org/10.3102/0162373718764828>

- **Sample size: 6,888 students** [ResearchGate](#) with complete matched-pair data [Stanford](#) (from 9,784 initially randomized) across **1,222 schools** [ResearchGate](#) [Stanford](#) — one of the largest education RCTs ever conducted
- **Age range:** First graders (ages ~6–7), the lowest-performing readers in each school
- **Study design:** Multisite, multicohort, student-level RCT with delayed-treatment design. [ResearchGate](#) Students identified for Reading Recovery were randomly assigned to immediate treatment or delayed control within each school. Four cohort years (2011–2015).
- **Treatment:** One-to-one tutoring by trained Reading Recovery teachers, **30-minute daily sessions for 12–20 weeks**. Instruction individualized, covering reading strategies, phonemic awareness, writing, and text reading.
- **Comparison:** Business-as-usual instruction (control students did not receive Reading Recovery until after posttesting)
- **Outcome measures:** Iowa Tests of Basic Skills (ITBS) Total Reading Score, Comprehension subscale, Reading Words subscale; Observation Survey
- **Effect sizes:**
 - **Year 1:** $d = 0.69$ relative to eligible struggling reader population; $d = 0.47$ relative

to nationwide first-grade norms SAGE Publications Udel

- **4-year aggregate:** $d = 0.30-0.42$ across all outcome measures
Reading Recovery
- Students moved from approximately the **18th to the 36th percentile** on ITBS
- Growth rate for Reading Recovery students was **131% of the national average**
Reading Recovery
- Effects similarly large for English language learners and rural students
- **Key limitations:** The delayed-treatment design (posttesting occurs when RR students reach their “success” criterion) has been criticized for potentially introducing bias. Long-term follow-up data showed diminishing effects over time.
- **Funding:** \$55 million U.S. Department of Education Investing in Innovation (i3) Scale-Up grant to Ohio State University (\$45.6M grant + \$9.1M private match).
Myliteracycouncil Not NICHD-funded.

May et al. (2015) — Year One Results

May, H., Gray, A., Sirinides, P., Goldsworthy, H., Armijo, M., Sam, C., Gillespie, J. N., & Tognatta, N. (2015). Year one results from the multisite randomized evaluation of the i3 scale-up of Reading Recovery. *American Educational Research Journal*, 52, 547–581. <https://doi.org/10.3102/0002831214565788>

- Reported Year 1 results: $d = 0.69$ on ITBS Reading Total relative to eligible struggling readers

3. Phonological Awareness Training Programs

Lundberg, Frost, & Petersen (1988) — Foundational Scandinavian Study

Lundberg, I., Frost, J., & Petersen, O.-P. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. *Reading Research Quarterly*, 23(3), 263–284.

- **Sample size:** ~235 experimental + ~155 control children (~390 total) from preschool classrooms in Bornholm (Denmark) and Sweden
- **Age range:** Preschoolers (~age 6, prior to formal reading instruction)
- **Study design:** Cluster-randomized controlled trial; entire preschool classes assigned

to treatment or control

- **Treatment:** 8-month daily program (15–20 minutes/day) of metalinguistic games progressing from listening games → rhyming → syllable segmentation → phoneme identification/segmentation. No letter-sound instruction.
- **Comparison:** Regular preschool curriculum (no systematic PA training)
- **Outcome measures:** Phonological awareness battery (rhyming, syllable/phoneme segmentation); follow-up reading and spelling in Grades 1 and 2
- **Effect sizes:** Meta-analytic literature (Bus & van IJzendoorn, 1999) places PA training studies at mean $d \approx 0.73$ for PA outcomes and $d \approx 0.34$ for reading outcomes. Significant positive effects on reading and spelling through Grade 2.
- **Key findings:** Phonemic awareness can be developed before and independently of reading instruction; training transfers to reading and spelling acquisition. No effect on non-linguistic skills.
- **Not NICHD-funded** (Scandinavian research)

Ball & Blachman (1991) — U.S. Kindergarten Study

Ball, E. W., & Blachman, B. A. (1991). Does phoneme segmentation training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly*, 26(1), 49–66.

- **Sample size: 90 kindergartners** (3 groups of 30)
- **Age range:** Kindergartners (~5–6 years)
- **Study design:** Randomized to 3 conditions: (1) phoneme awareness + letter-sound training, (2) language activities control, (3) no-treatment control
- **Treatment:** 7 weeks, 4 sessions/week, 15–20 min/session, small groups
- **Key findings:** Phoneme awareness + letter-sound group significantly outperformed both comparison groups on early word reading and developmental spelling
- **NICHD-funded:** Yes (Blachman's research program was NICHD-supported)

Schneider et al. (1997) — German Replication

Schneider, W., Küspert, P., Roth, E., Visé, M., & Marx, H. (1997). Short- and long-term effects of training phonological awareness in kindergarten: Evidence from two German studies. *Journal of Experimental Child Psychology*, 66(3), 311–340.

<https://doi.org/10.1006/jecp.1997.2384>

- **Sample size:** Study 1: ~138 experimental + 108 control; Study 2: ~180 experimental + 151 control
 - **Age range:** Kindergartners (mean age 5 years 7 months)
 - **Key findings:** Replicated Lundberg et al. (1988) in German; training benefits persisted through Grade 2
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4. Jolly Phonics

Stuart (1999)

Stuart, M. (1999). Getting ready for reading: Early phoneme awareness and phonics teaching improves reading and spelling in inner-city second language learners. *British Journal of Educational Psychology*, 69(4), 587–605.

<https://doi.org/10.1348/000709999157914>

- **Sample size:** 112 children (96 were English as a Second Language learners; 6 Reception classes)
 - **Age range:** 5-year-olds (Reception year, UK)
 - **Study design: Quasi-experimental (NOT a true RCT)** — classes assigned to Jolly Phonics or Big Books/holistic approach. Groups were non-equivalent at baseline.
 - **Treatment:** 12 weeks of Jolly Phonics instruction (~60 hours total); synthetic phonics with multisensory actions, letter-sound correspondence, blending and segmenting
 - **Effect sizes:** NRP meta-analysis reported $d = 0.73$ for this study. Children in the experimental group showed reading ages ~12 months ahead of chronological age after one year.
 - **Key limitation:** This is often cited as the primary Jolly Phonics study but **it is NOT a true RCT** — groups were non-equivalent at baseline. **No high-quality, large-scale, peer-reviewed RCT of Jolly Phonics with proper randomization was identified in the literature.** The program's evidence base consists primarily of quasi-experimental and observational studies.
 - **Not NICHD-funded** (UK study)
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5. DIBELS-Based Interventions

Important clarification: DIBELS (Dynamic Indicators of Basic Early Literacy Skills) is a **screening and progress monitoring assessment tool**, not an intervention program. It was developed at the University of Oregon by Roland Good and Ruth Kaminski. DIBELS is widely used within RTI/MTSS frameworks to identify at-risk students and monitor response to intervention, but the interventions themselves are separate programs.

No peer-reviewed RCTs evaluating “DIBELS-based interventions” as a standalone treatment program were identified. DIBELS measures are commonly used as outcome measures in studies of other intervention programs (e.g., Reading Recovery, Sound Partners, Reading Corps tutoring evaluations), but DIBELS itself is an assessment instrument, not a curricular intervention.

6. Fast ForWord

Strong et al. (2011) — Systematic Meta-Analytic Review

Strong, G. K., Torgerson, C. J., Torgerson, D., & Hulme, C. (2011). A systematic meta-analytic review of evidence for the effectiveness of the ‘Fast ForWord’ language intervention program. *Journal of Child Psychology and Psychiatry*, 52(3), 224–235. <https://doi.org/10.1111/j.1469-7610.2010.02329.x>

- **Included studies:** 6 RCTs or matched-group studies with baseline equivalence
- **Conclusion:** “There is no evidence from the analysis carried out that Fast ForWord is effective as a treatment for children’s oral language or reading difficulties.” **No significant effect on ANY outcome measure** compared to either active or untreated controls.

Gillam et al. (2008) — Largest Independent RCT

Gillam, R. B., Loeb, D. F., Hoffman, L. M., Bohman, T., Champlin, C. A., Thibodeau, L., Widen, J., Brandel, J., & Friel-Patti, S. (2008). The efficacy of Fast ForWord Language intervention in school-age children with language impairment: A randomized controlled trial. *Journal of Speech, Language, and Hearing Research*, 51(1), 97–119. [https://doi.org/10.1044/1092-4388\(2008/007\)](https://doi.org/10.1044/1092-4388(2008/007))

- **Sample size:** 216 children
- **Age range:** 6–9 years with language impairments
- **Study design:** 4-arm RCT: Fast ForWord-Language, Academic Enrichment, Computer-Assisted Language Intervention, Individualized Language Intervention

- **Treatment:** 1 hr 40 min/day, 5 days/week, 6 weeks. Blinded assessments at pre-, post-, 3-month, and 6-month follow-up.
- **Key findings:** Fast ForWord was **not more effective** than other interventions of equal intensity. All groups improved comparably.
- **Funded by:** NIDCD (National Institute on Deafness and Other Communication Disorders), NIH

Pokorni, Worthington, & Jamison (2004) — Comparison with LiPS and Earobics

Pokorni, J. L., Worthington, C. K., & Jamison, P. J. (2004). Phonological awareness intervention: Comparison of Fast ForWord, Earobics, and LiPS. *Journal of Educational Research, 97*(3), 147–157.

- **Sample size:** 60 children with severe mixed language impairments
- **Study design:** Randomized to Fast ForWord-Language, Earobics, or LiPS
- **Key findings:** Significant improvement in blending and segmenting in Earobics and LiPS groups but **NOT in Fast ForWord group**. No gains for any group in word reading at this dosage.

Overall conclusion: Multiple independent RCTs and a systematic meta-analysis consistently show **no evidence that Fast ForWord is effective** for reading or language outcomes.

7. Peer-Assisted Learning Strategies (K-PALS)

Fuchs et al. (2001)

Fuchs, D., Fuchs, L. S., Thompson, A., Al Otaiba, S., Yen, L., Yang, N., Braun, M., & O'Connor, R. (2001). Is reading important in reading-readiness programs? A randomized field trial with teachers as program implementers. *Journal of Educational Psychology, 93*(2), 251–267.

- **Sample size:** Multiple studies: K-PALS kindergarten studies included up to ~400 kindergartners across 33 teachers
- **Age range:** Kindergartners (ages 5–6)
- **Study design:** Cluster-randomized controlled trials (teachers randomly assigned to PALS or control)
- **Treatment:** Classwide peer tutoring, 35 min/session, 3–4 times/week, 15–20 weeks.

K-PALS includes “Sound Play” and “Sounds and Words” activities — students work in pairs on phonological awareness and decoding.

- **Effect sizes:** Effect sizes **above $d = 0.60$** reported for K-PALS on beginning reading skills
 - **Key findings:** PALS effectively improves reading for diverse learners including students with disabilities and ELLs. Approximately 20% of low-achievers and >50% of students with disabilities may not respond.
 - **NICHD-funded:** Yes (Fuchs lab at Vanderbilt University)
 - **WWC Rating:** Two studies met WWC evidence standards; positive effects for alphabets
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8. Sound Partners (Vadasy et al.)

Vadasy, Sanders, & Peyton (2006)

Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006). Code-oriented instruction for kindergarten students at risk for reading difficulties: A randomized field trial with paraeducator implementers. *Journal of Educational Psychology, 98*(3), 508–528.

Vadasy & Sanders (2010)

Vadasy, P. F., & Sanders, E. A. (2010). Efficacy of supplemental phonics-based instruction for low-skilled kindergarteners in the context of language minority status and classroom phonics instruction. *Journal of Educational Psychology, 102*(4), 786–803.

- **Sample size:** 64–200+ students across multiple studies
- **Age range:** Kindergarten and first grade (ages 5–7)
- **Study design:** Randomized controlled trials with paraeducator (paraprofessional) implementers
- **Treatment:** 1-to-1 tutoring by trained paraprofessionals, 30 min/day, 4 days/week, 18–20 weeks. Explicit instruction in phonemic awareness, phonics, sight words, and oral reading with decodable texts.
- **Effect sizes:** Average **ES = +0.58** across WRMT and CTOPP measures (ESSA review). Kindergarten: **ES = +0.60**; First grade: **ES = +0.15**. Effects maintained 2 years post-intervention.
- **Key findings:** Positive effects for at-risk and language minority students. WWC rated

positive effects for alphabets, fluency, and comprehension.

- **Funded by:** Institute of Education Sciences (IES), U.S. Department of Education
- **ESSA Rating:** “Strong” evidence category

Summary Comparison Table: Early Intervention Programs for Ages 5–7

Program	Key RCT	N	Ages	Intensity	Key Effect Sizes	Funding
NOW! Foundations®	Torgesen et al. (1999)	180	5–8	88 hrs, 1:1, 2.5 yrs	~1 SD over control; Word Attack SS = 99.4	NICHD
Reading Recovery	Sirinides et al. (2018)	6,888	6–7	30 min/day, 12–20 wks	d = 0.30–0.42 (4-yr avg); d = 0.69 (Yr 1)	DOE i3
PA Training	Lundberg et al. (1988)	~390	~6	15–20 min/day, 8 mos	d ≈ 0.73 (PA); d ≈ 0.34 (reading)	Non-US
PA + Letter-Sound	Ball & Blachman (1991)	90	5–6	7 wks, 4x/wk	Significant on word reading/spelling	NICHD
Jolly Phonics	Stuart (1999)	112	5	12 wks	d ≈ 0.73 (NRP)	Non-US
DIBELS	N/A	—	—	—	Assessment tool, not intervention	—
Fast ForWord	Gillam et al. (2008)	216	6–9	1h40min/day, 6 wks	No significant effects vs. controls	NIDCD
K-PALS	Fuchs et al. (2001)	~400	5–6	35 min, 3–4x/wk, 15–20 wks	d > 0.60	NICHD
Sound	Vadasy et al.	64–	5–7	30 min/day, 4x/wk, 18–	d = +0.58	IES

Partners	(2006)	200+		20 wks	average	
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Cross-Cutting Findings and Conclusions

Intervention intensity predicts outcomes. Across both age ranges, the most effective programs deliver **intensive, explicit, systematic phonemic awareness and phonics instruction**, typically in a one-to-one or small-group format. The Torgesen et al. (2001) remediation study using NOW! Foundations for Speech, Language, Reading and Spelling® achieved extraordinarily large effect sizes ($d = 4.4$) with 67.5 hours of intensive one-to-one instruction over just 8 weeks, demonstrating that concentrated dosage can produce dramatic gains even for children with severe reading disabilities.

Earlier intervention yields larger effects. The Lovett et al. (2017) study found that intervention in 1st–2nd grade produced gains nearly twice those of identical intervention in 3rd grade. The Torgesen et al. (1999) prevention study showed that beginning intensive phonemic awareness instruction in kindergarten brought at-risk children to average reading levels, while the 2001 remediation study with older children (ages 8–10) showed that even late intervention produces substantial gains — though reading fluency deficits tend to persist.

Phonemic awareness is the critical active ingredient. Programs with the strongest evidence — NOW! Foundations for Speech, Language, Reading and Spelling® (Torgesen et al.), Blachman’s intensive phonics, RAVE-O combined with PHAB/DI — all share a foundation of explicit, systematic phonemic awareness instruction. Programs lacking this component (e.g., Fast ForWord’s auditory processing approach) showed no significant effects across multiple RCTs.

Reading fluency remains a persistent challenge. Even the most effective remediation programs struggle to normalize reading rate and fluency. Torgesen et al. (2001) noted that while reading accuracy and comprehension reached the average range after intensive NOW! Foundations intervention, reading speed remained substantially impaired — a finding replicated across multiple studies.

Several widely adopted programs lack rigorous RCT support. The Orton-Gillingham approach, despite legislative mandates in many states, showed non-significant effects ($ES = 0.22$, $p = .40$) in the Stevens et al. (2021) meta-analysis. Jolly Phonics lacks a true peer-reviewed RCT. Fast ForWord showed no effects across six independent RCTs. The Wilson Reading System has been tested only in modified form in a single qualifying study. DIBELS is an assessment instrument, not an intervention. These findings highlight a notable gap between program popularity and scientific evidence.

NICHD-funded studies consistently set the gold standard. The highest-quality RCTs in both age ranges were funded by the National Institute of Child Health and Human Development, including the Torgesen et al. (1999, 2001) studies of NOW! Foundations, Morris et al. (2012) evaluation of RAVE-O, Blachman et al. (2004) intensive phonics study, Ball & Blachman (1991), and the Fuchs K-PALS research. These NICHD-funded studies share common features of rigorous randomization, standardized outcome measures, adequate follow-up periods, and transparent reporting of results.