

# The Prevention and Identification of Reading Disability

Douglas Fuchs, Donald L. Compton,  
Lynn S. Fuchs, and Joan D. Bryant

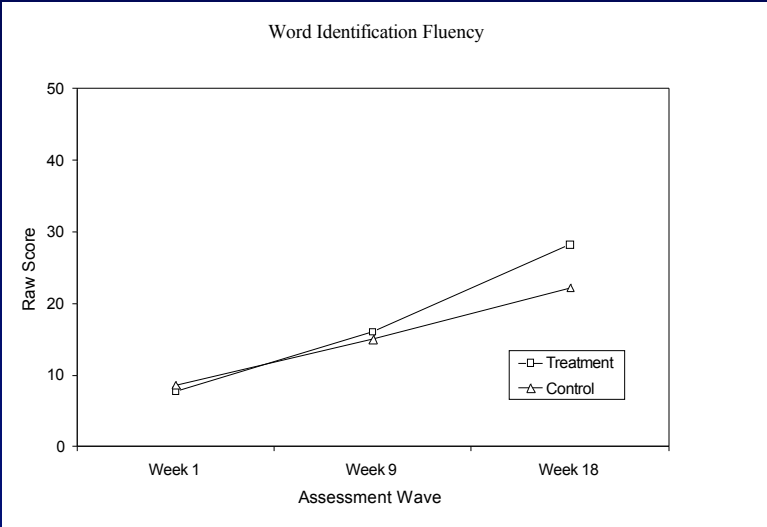
National Research Center on Learning Disabilities  
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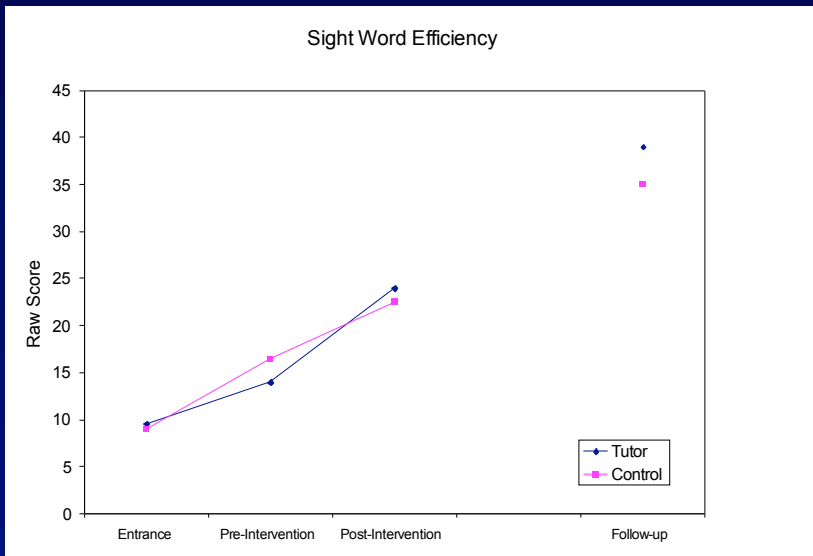
## Purpose and Method of NRCLD Experimental RTI Studies in Reading and Math

- 3 purposes across reading and math studies
  1. Examine efficacy of 1<sup>st</sup>-grade preventive tutoring
  2. Assess RD and MD prevalence and severity as a function of classification method with and without tutoring
  3. Explore pretreatment cognitive abilities associated with development of reading and math skills
- Random assignment to 1<sup>st</sup>-grade study conditions
- Longitudinal follow up to assess stability of disability (RD: 1<sup>st</sup>-4<sup>th</sup> grade; MD: 1<sup>st</sup>-3<sup>rd</sup> grade) as a function of treatment and methods of disability classification
- Reading and math studies initiated in consecutive years so samples do not overlap

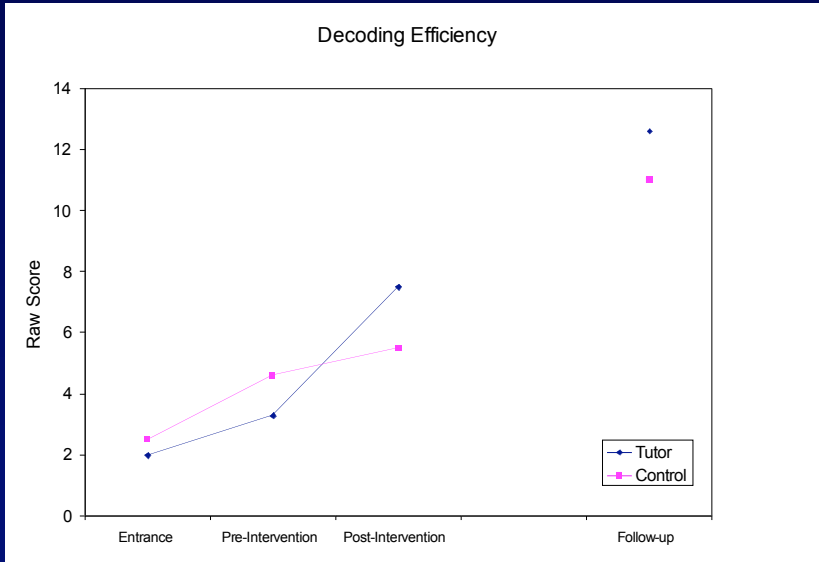
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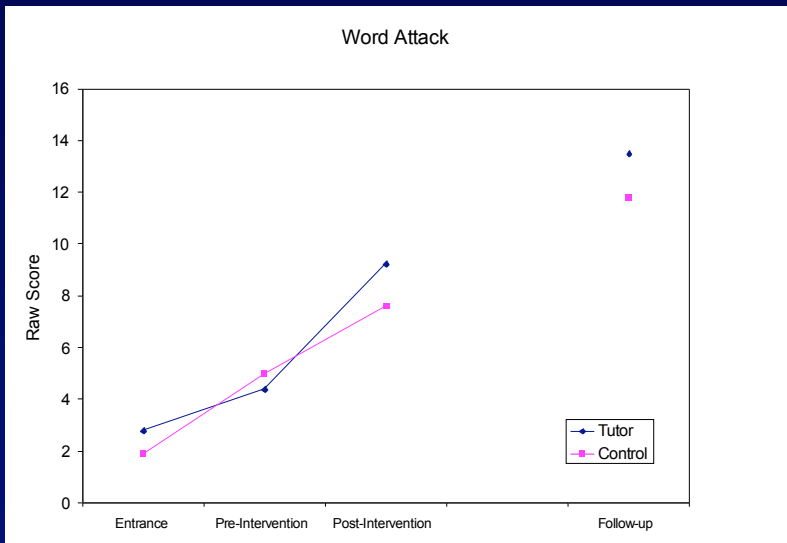
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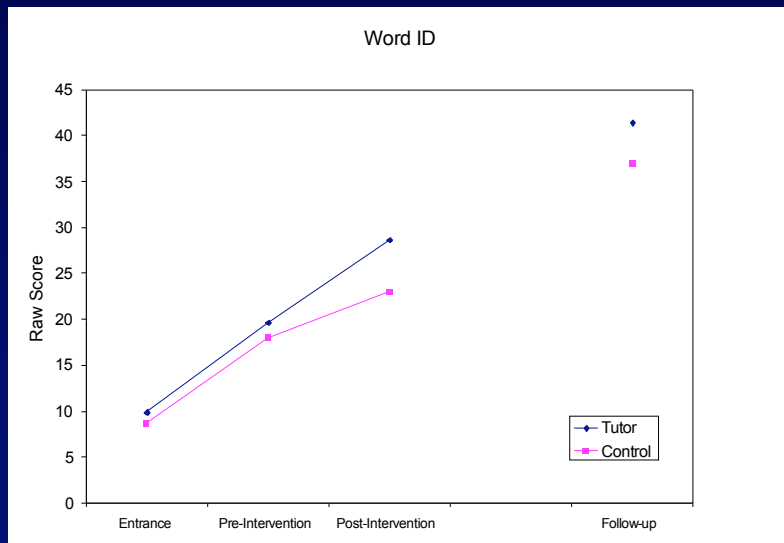
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## Classification Methods Questions

- Using longitudinal data (grade 1 to grade 2), what is the sensitivity and specificity of various classification methods and measures and their associated RD prevalence rates?
- What degrees of RD severity are associated with the methods/measures?

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## Measures, Methods, RD Criterion

- Definitional Methods/Measures in 1<sup>st</sup> Grade
  - \_ WRMT-WID, TOWRE-SWE, CBM-WIF, CBM-PRT
  - \_ Initial Low Achievement, Discrepancy, Normalization, Benchmark, Slope, Dual Discrepancy
- RD Criterion at End of 2<sup>nd</sup> Grade
  - \_ Composite Score
    - WRMT-WID and WA (one-third weight)
    - TOWRE-SWE and DE (one-third weight)
    - WRMT-PC (one-third weight)

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## Criteria for Judging Definitional Methods

1. Sensitivity with respect to end of grade 2 RD ~ .80
2. Specificity with respect to end of grade 2 RD ~ .80
3. Severity ESs (RD vs. non-RD) at end of grade 1 and at end of grade 2 ~ 1.00, across various reading measures (but excluding measure used in definition)
  - Which 1<sup>st</sup>-grade definitional methods/measures identify RD children one year later, while yielding severe reading deficits and expected prevalence?

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*Table 3. RD Prevalence (Percent RD), Severity (ES), and Stability (from End of Grade 1 to End of Grade 2) for Alternative Methods of Classifying RD*

First-Grade Definition	Percent LD	End Grade 1		End Grade 2		Hit Rate	Sensitivity	Specificity
		Avg ES	ES Range	Avg ES	ES Range			
<b>Initial Low Achievement</b>								
WD (-1SD)	3.29	1.47	0.96 -1.74	1.37	0.98 -1.65	.91	.57	.88
SWE (-1SD)	8.48	0.80	0.60 -1.16	0.70	0.55 -0.87	.78	.70	.80
WIF (-1SD)	6.87	1.24	0.97 -1.43	0.99	0.78 -1.47	.85	.78	.85
<b>Final IQ -Ach Discrepancy</b>								
WD (1 SD)	0.79	1.78	1.25 -2.61	1.57	1.14 -1.92	.89	.13	.98
SWE (1 SD)	1.12	1.15	0.46 -1.99	0.94	0.65 -1.25	.90	.22	.99
WIF (1 SD)	5.08	0.42	0.20 -0.72	0.21	0.01 -0.42	.78	.26	.86
<b>Final Normalization</b>								
WD (90SS)	2.36	1.98	1.45 -2.58	1.95	1.43 -2.57	.94	.56	.99
SWE (90SS)	8.28	1.24	0.99 -1.43	1.17	0.88 -1.31	.83	.87	.82
WIF (90SS)	17.67	1.12	0.88 -1.36	1.04	0.69 -1.54	.52	1.00	.49
<b>Benchmark</b>								
WIF (-1SD)	15.67	1.15	0.90 -1.41	1.04	0.64 -1.60	.63	1.00	.58
PRT (<40)	18.12	1.40	0.98 -1.90	1.20	0.91 -1.57	.53	1.00	.49
<b>Slope</b>								
WIF Me dian	16.09	1.10	0.91 -1.36	1.07	0.92 -1.36	.61	1.00	.56
WIF (-1SD)	7.65	1.34	0.88 -1.80	1.18	0.85 -1.54	.83	.83	.84
Slope Split	15.47	1.27	0.95 -1.60	1.27	1.01 -1.69	.62	1.00	.58
<b>Dual</b>								
WIF (-1SD) <sup>a</sup>	9.31	1.63	1.08 -2.12	1.42	0.95 -2.06	.81	.83	.81
PRT (<40) with WIF Slope (-1SD)	7.34	1.47	0.92 -1.95	1.42	0.94 -1.99	.82	.75	.83

*Notes: ESs were based on WRMT-NU WID, WRMT-NU WA, TOWRE SWE, TOWRE DE, & WRMT-NU Passage Comp (excluding measure used for identification). Hit rate, sensitivity, and specificity were based on children scoring 1 SD below national norm on a composite measure of WRMT-NU WID, TOWRE SWE, & WRMT-NU Passage Comp administered at the end of grade 2. <sup>a</sup>Dual model based on an N of 159, whereas Slope models were based on an N of 206.*

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## Methods that Meet Criteria

- Initial Low Achievement using WIF (< -1 SD)
- Normalization using SWE (< 90 SS)
- Slope using WIF (-1 SD)
- Dual Discrepancy using PRT (< 40) and WIF Slope (< -1 SD)

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# How many data points are necessary to achieve a reliable slope?

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Table

*Correlations Among Slope Terms Based on 3-18 Data Points*

Slope Estimates	Slope 9 points	Slope 18 points
Slope 3 points	.31	.19
Slope 4 points	.72	.53
Slope 5 points	.82	.63
Slope 6 points	.89	.68
Slope 7 points	.95	.73
Slope 8 points	.98	.78
Slope 9 points		.82
Slope 10 points		.86
Slope 11 points		.90
Slope 12 points		.93
Slope 13 points		.95
Slope 14 points		.97
Slope 15 points		.98
Slope 16 points		.99
Slope 17 points		.99

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## Conclusions

- Prevention: For students who fail to respond to Tier 1 reading instruction in the fall of 1<sup>st</sup> grade, 9 weeks of tutoring in the spring semester can improve reading outcomes, which are still evident at end of 2<sup>nd</sup> grade.
- Identification: None of the discrepancy options performed well; Sensitivity, specificity, severity, and prevalence change as a function of RTI definitional option, suggesting the need to become clear on which options “work.”
- Slope reliability: Using WIF, 8-10 data points provides a reliable estimate of longer-term slope.