

Reading and Language Intervention for Children at Risk of Dyslexia

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Family Risk Interventions

- Small research base (≈ 7 interventions)
 - Delivered before literacy instruction onset; mostly by parents
 - Short term effects on letter-knowledge and phoneme awareness
 - Usually poor transfer to literacy skills, and intervention effects tend to wash out over time

York At-Risk Study

- Longitudinal at-risk study of SLI and dyslexia
 - What are the causes, development and overlap?
 - Tracking at-risk children from 3 to 9 years
 - Family risk and pre-school language impairment
 - Later phases include intervention for children with weakest literacy skills

Reading and Language Intervention

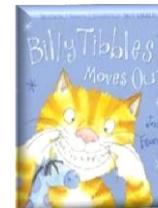
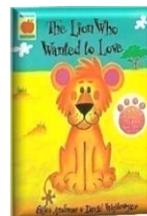
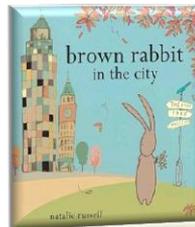
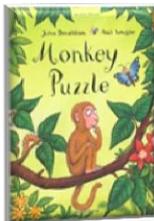
- **Based on previous interventions** (Bowyer-Crane et al., 2008; Burgoyne et al., 2012; Duff et al., 2008; Fricke et al., 2013; Hatcher et al., 2006b)
- **Daily intervention**
 - 3 x 20min individual reading sessions per week
 - 2 x 30min small group language sessions per week
- **Delivered by teaching assistants (TAs)**
 - 3 days of training; fortnightly phone support
 - Prescribed programme, with flexibility

Reading and Language Intervention

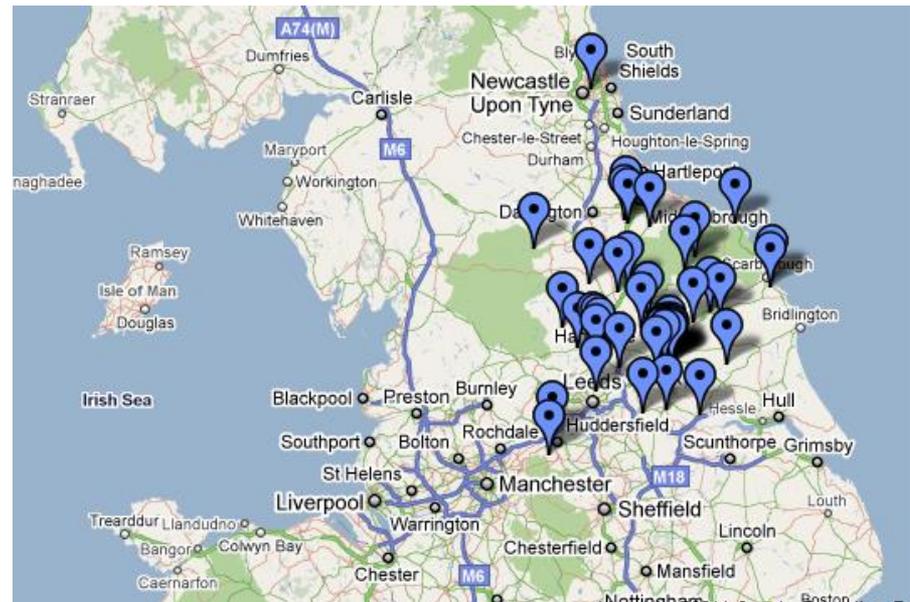
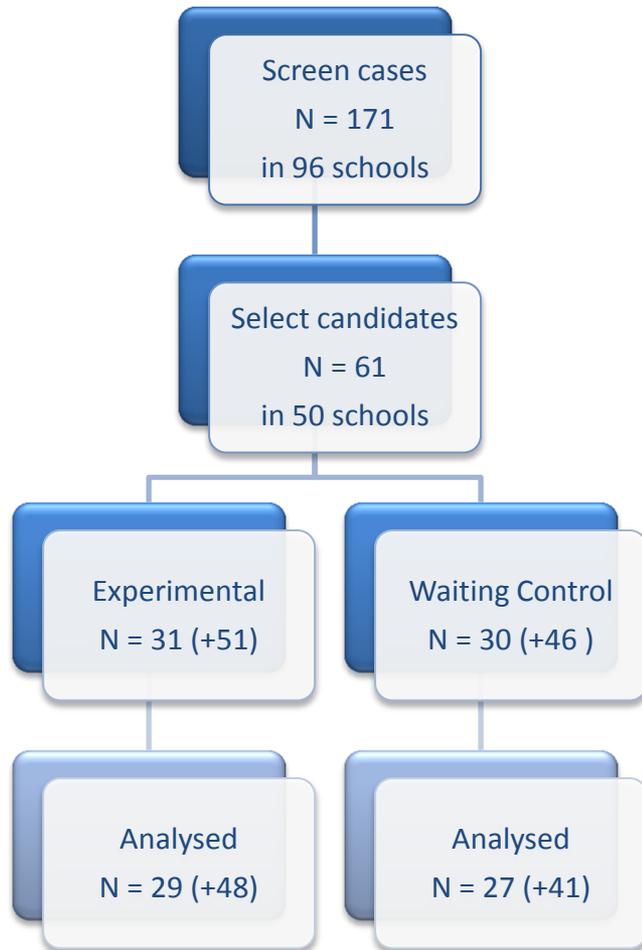
Component	Description
Easy book reading	Reading a familiar book of the child's choice (read with >94% accuracy)
Instructional book reading	Assessing the child's reading of a slightly trickier book (read with 90-94% accuracy)
Sight word learning	Multi-sensory learning of irregular and high frequency words
Letters, sounds and linkage	Training in letter knowledge (if necessary), phonological awareness and phonics
New book reading	Shared/guided reading of new book (read with 90-94% accuracy)

Reading and Language Intervention

Component	Description
Active listening	Story book introduction and reading
Vocabulary instruction	Explicit, multi-contextual and interactive teaching and consolidation of target words from story books
Spoken and written narrative	Re-telling the story (planning for writing), shared writing, guided/independent writing



Randomised Controlled Trial



RALI Sample

	Control (68)		Experimental (77)	
	Mean (SD)	Range	Mean (SD)	Range
Age	6;04 (0;06)	61-68	6;06 (0;07)	62-101
Expressive vocabulary	93.74 (17.45)	46-124	92.75 (20.12)	46-136
Letter-sounds	102.54 (13.50)	68-124	94.90 (14.10)	68-121
Sound deletion	92.82 (13.02)	64-129	91.53 (10.83)	69-111
Early-word reading	91.75 (10.52)	67-119	91.22 (11.78)	67-117
Single-word reading	85.51 (13.79)	69-120	84.36 (13.80)	69-111

Baseline Comparison

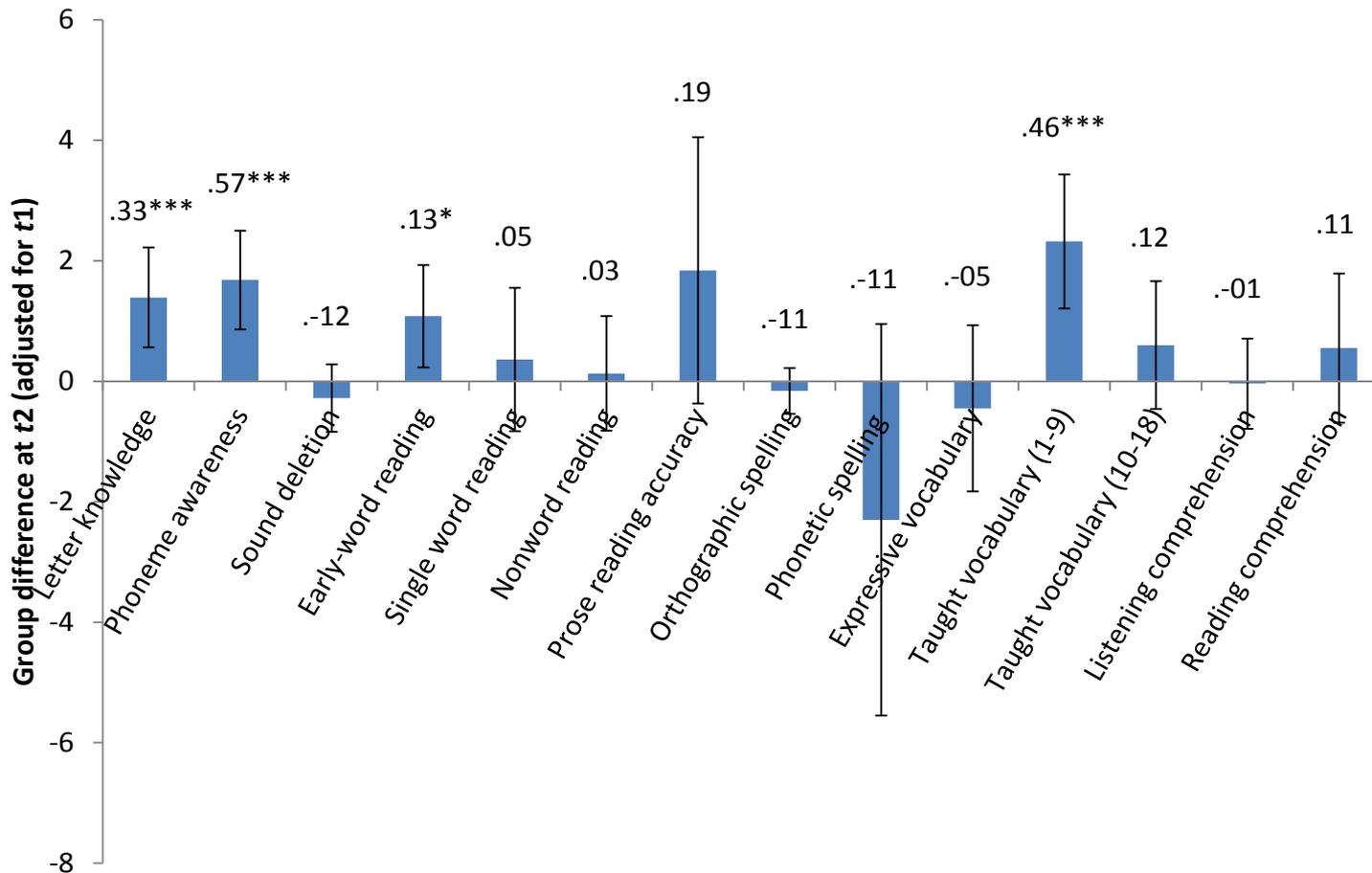
	Control (68)		Experimental (77)	
	Mean	SD	Mean	SD
Letter knowledge	28.59	4.59	27.53	3.79
Phoneme awareness	8.91	2.93	7.97	2.88
Sound deletion	5.63	2.65	5.74	2.03
Early-word reading	25.56	15.73	26.30	15.64
Single-word reading	9.43	7.56	9.60	7.65
Nonword reading	4.46	4.89	3.67	4.01
Prose reading accuracy	36.62	10.27	37.23	9.27
Orthographic spelling	2.62	1.73	3.14	1.73
Phonetic spelling	72.50	23.09	77.92	17.97
Expressive vocabulary	25.66	9.26	26.56	9.51
Taught vocabulary 1-9	13.28	5.21	13.21	5.02
Taught vocabulary 10-18	14.88	4.83	14.12	5.13
Listening comprehension	7.15	2.97	7.22	2.76
Reading comprehension	6.28	5.50	5.89	4.46

Analytic Approach

- Intention to treat analysis
- Analyse effects for full sample and at-risk subsample
- Mixed-effects regressions (xtmixed)
 - Cluster analyses by school (n=44)
 - Testing group differences at t2/3, controlling for t1
 - Control Group×Covariate interaction, where needed
 - Bootstrapping (changes S.E. but not β) to deal with non-normally distributed data

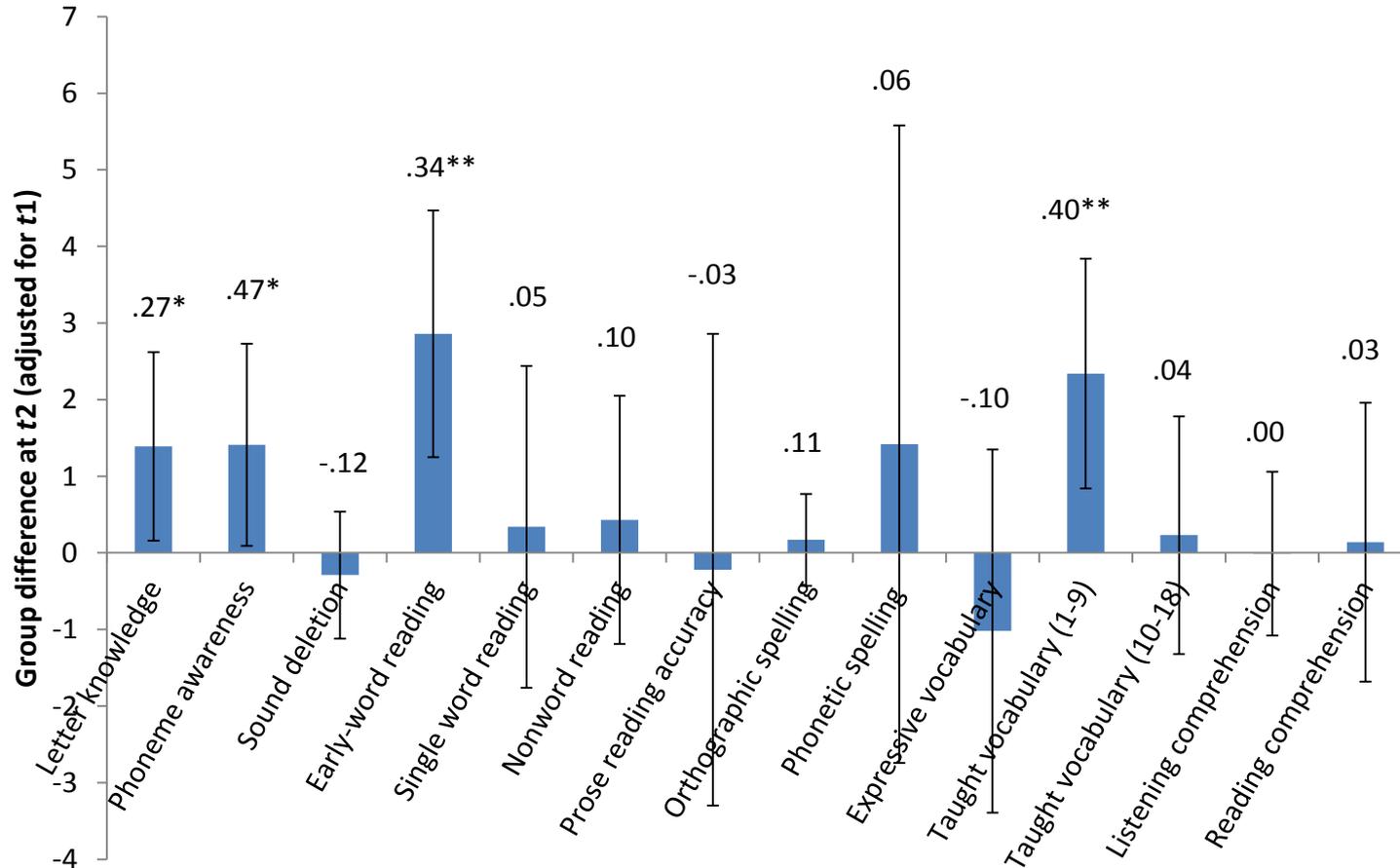
Effects at 9 Weeks

Full sample



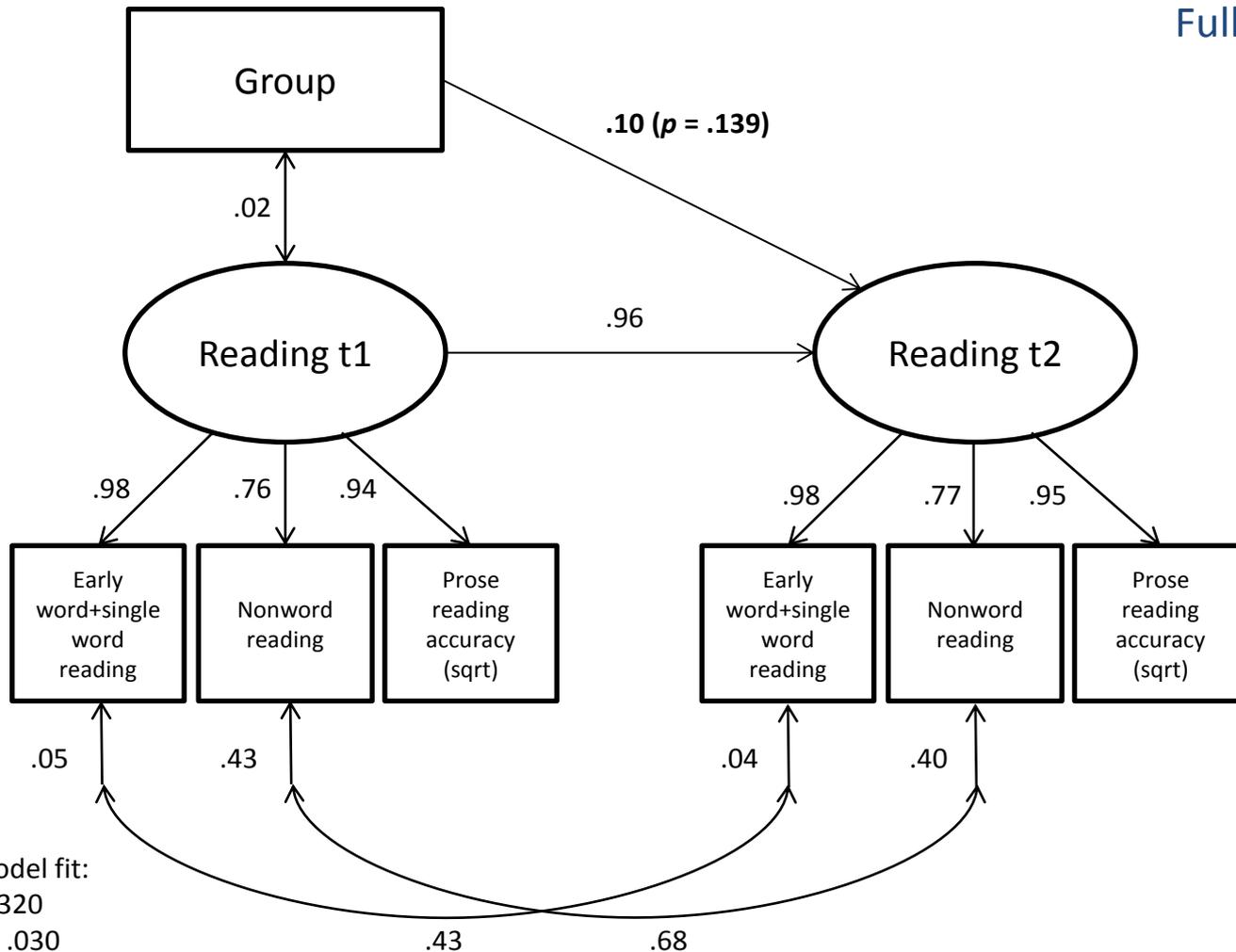
Effects at 9 Weeks

At-risk sample



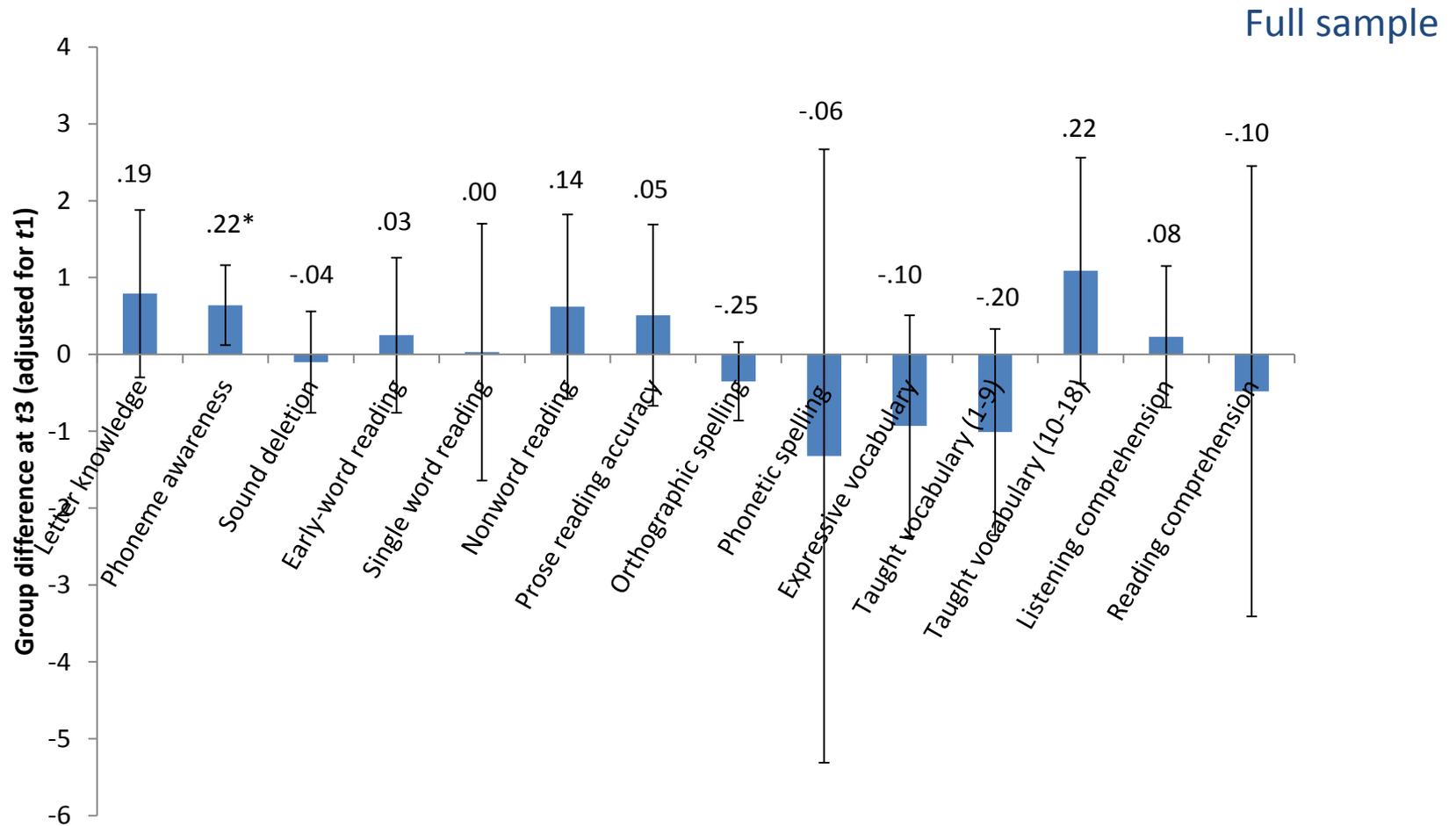
Effects at 9 Weeks

Full sample

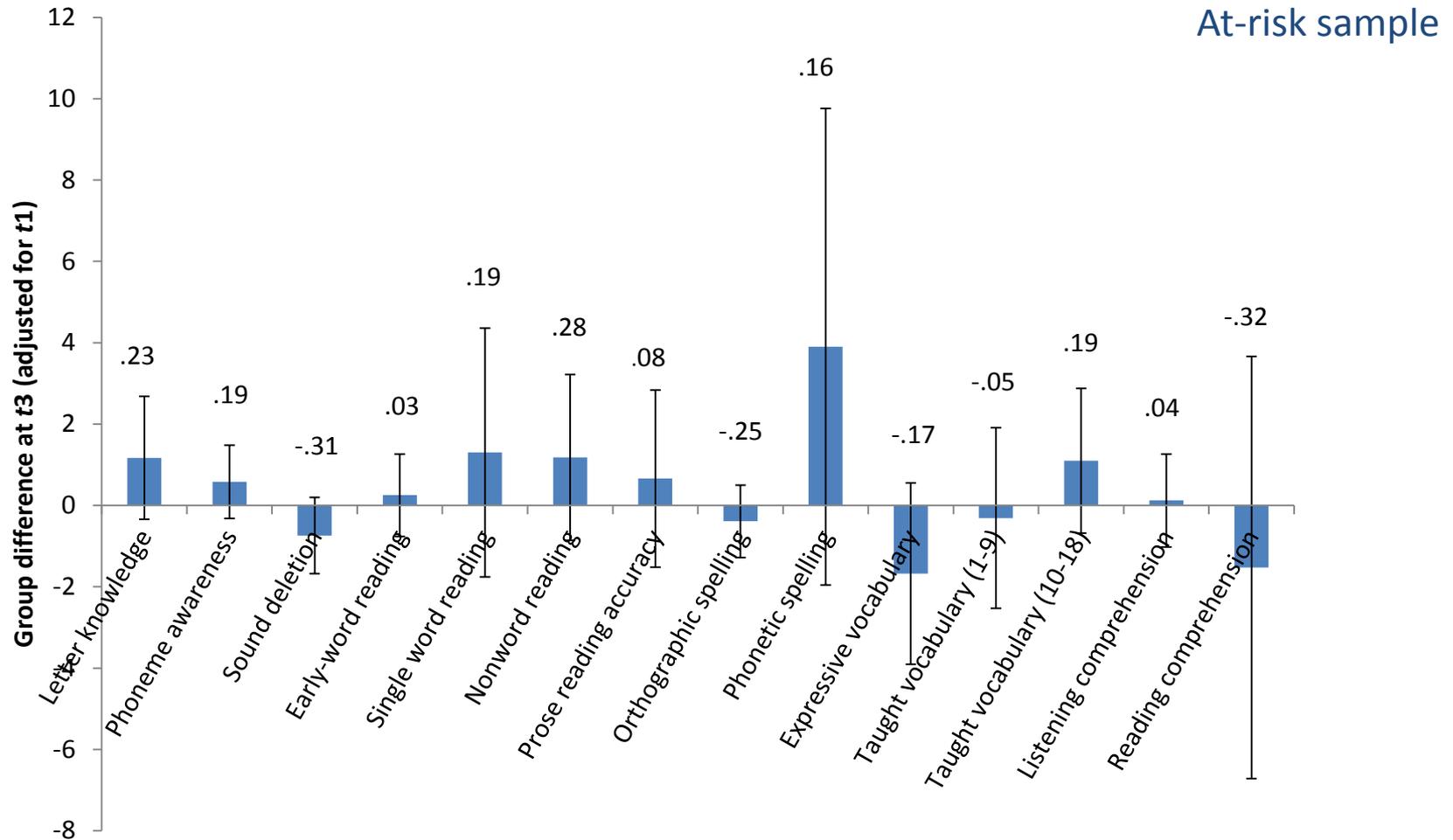


Chi-square test of model fit:
 $\chi^2 (17) = 19.16, p = .320$
CFI = .998; RMSEA = .030

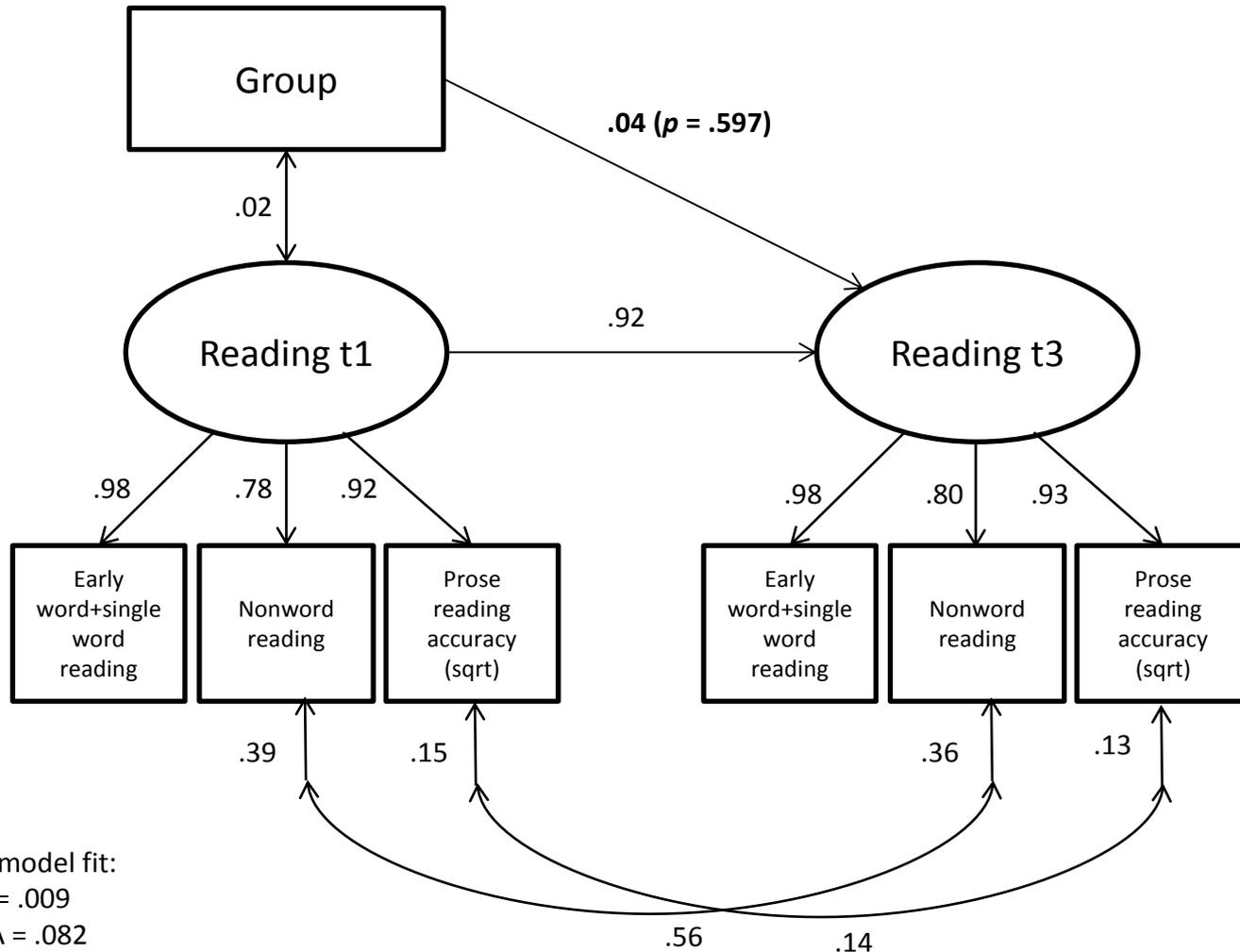
Effects at 18 Weeks



Effects at 18 Weeks



Effects at 18 Weeks



Chi-square test of model fit:
 $\chi^2 (21) = 33.63, p = .009$
 CF1 = .971; RMSEA = .082

Predicting Response

- Clinical group did not affect growth in reading or vocabulary from t1 to t3

Predictor	β	SE	Z	p
Model 1: Reading growth				
Family risk (FR)	1.11	1.71	0.65	.516
Language impairment (LI)	0.62	3.53	0.18	.860
FR+LI	1.16	4.16	0.28	.780
Model 2: Vocabulary growth				
FR	2.77	1.63	1.70	.090
LI	2.61	2.14	1.22	.221
FR+LI	-1.17	0.71	-1.65	.100

Summary of Results

- Pattern of results similar in full and sub-sample:
 - After 9 weeks, small-moderate effects on letter knowledge, phoneme awareness and taught vocabulary
 - No effects on literacy (reading accuracy, reading comprehension, spelling); no generalisation to untrained language measures
 - Effects washed out by 18 weeks

Family Risk Interventions

- Very small research base (≈ 7 interventions)
 - Delivered before literacy instruction onset; mostly by parents
 - **Short term effects on letter-knowledge and phoneme awareness**
 - **Usually poor transfer to literacy skills, and intervention effects tend to wash out over time**

Possible Explanations

- Too short

- Language: Effects on listening comprehension and untrained vocabulary shown after 30 weeks (Fricke et al., 2013)

- Reading:

	Hatcher et al. (2006b) After 10 weeks	RAI After 9 weeks
Effect size on EWR	0.79	0.13
Experimental Group SS gain	5 points; 0.50 points per week	4 points; 0.44 points per week
Control Group SS gain	1 point; 0.10 points per week	3 points; 0.33 points per week

Possible Explanations

- Many children already identified as needing support – by parents and/or teachers
 - 76 children receiving literacy support at t1 (54% controls; 51% experimental)
- Children's start level too high
 - Average word reading SS \approx 88 (cf. 81 in Hatcher et al., 2006b)
- Intervention not sufficiently different from instruction

Conclusions

- Under the circumstances reported here, a 9-week combined reading and language intervention for children at risk of dyslexia had:
 - Small-moderate effects on ‘foundations for literacy’ (letter knowledge, phoneme awareness and trained vocabulary)
 - No consistent effects on literacy (spelling, reading accuracy and comprehension)
 - No effects on untrained language measures

Conclusions

- However, interventions CAN speak to mechanisms of reading; especially when combining RCTs with mediation analyses:
 - Letter knowledge and phoneme awareness are two causal influences on learning to decode print (Hulme et al., 2012)
 - Vocabulary is one causal influence on learning to comprehend print (Clarke et al., 2010)

Research Report

The Causal Role of Phoneme Awareness and Letter-Sound Knowledge in Learning to Read: Combining Intervention Studies With Mediation Analyses

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Research Article

Ameliorating Children's Reading-Comprehension Difficulties: A Randomized Controlled Trial

Paula J. Clarke, Margaret J. Snowling, Emma Truelove, and Charles Hulme
University of York

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- Faye Smith
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- Suzy Harrison
- Silvana Mengoni
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- Isabel Bjork

TA Effectiveness

- Average effectiveness ratings:
 - TAs observed delivering a reading or a language session
 - TAs graded (1-3) on quality of every teaching activity in the sessions; and on general qualities e.g. organisation, behaviour management. Their average grade was calculated (1-3).
- Reading Strand:
 - Experimental group = 2.4 (1.7-3.0); Control group = 2.3 (1.6-2.9)
- Language Strand:
 - Experimental group = 2.6 (2.0-3.0); Control group = 2.5 (2.0-3.0)
- TA effectiveness did not predict growth in reading ($\beta = 0.32$, 95% CIs = -3.20–3.83)

TA Effectiveness

- TAs completed questionnaires at the end of the intervention, self-reporting the extent to which they agreed with various statements
- The scale was from 1 (disagree) to 7 (agree)
- Their feedback was very positive, e.g.:
 - Felt confident/sufficiently prepared: 5.8/7
 - The quality of training was good: 6.6/7
 - The resources were good and useful: 6.6/7
 - Support during intervention was valuable: 6.7/7

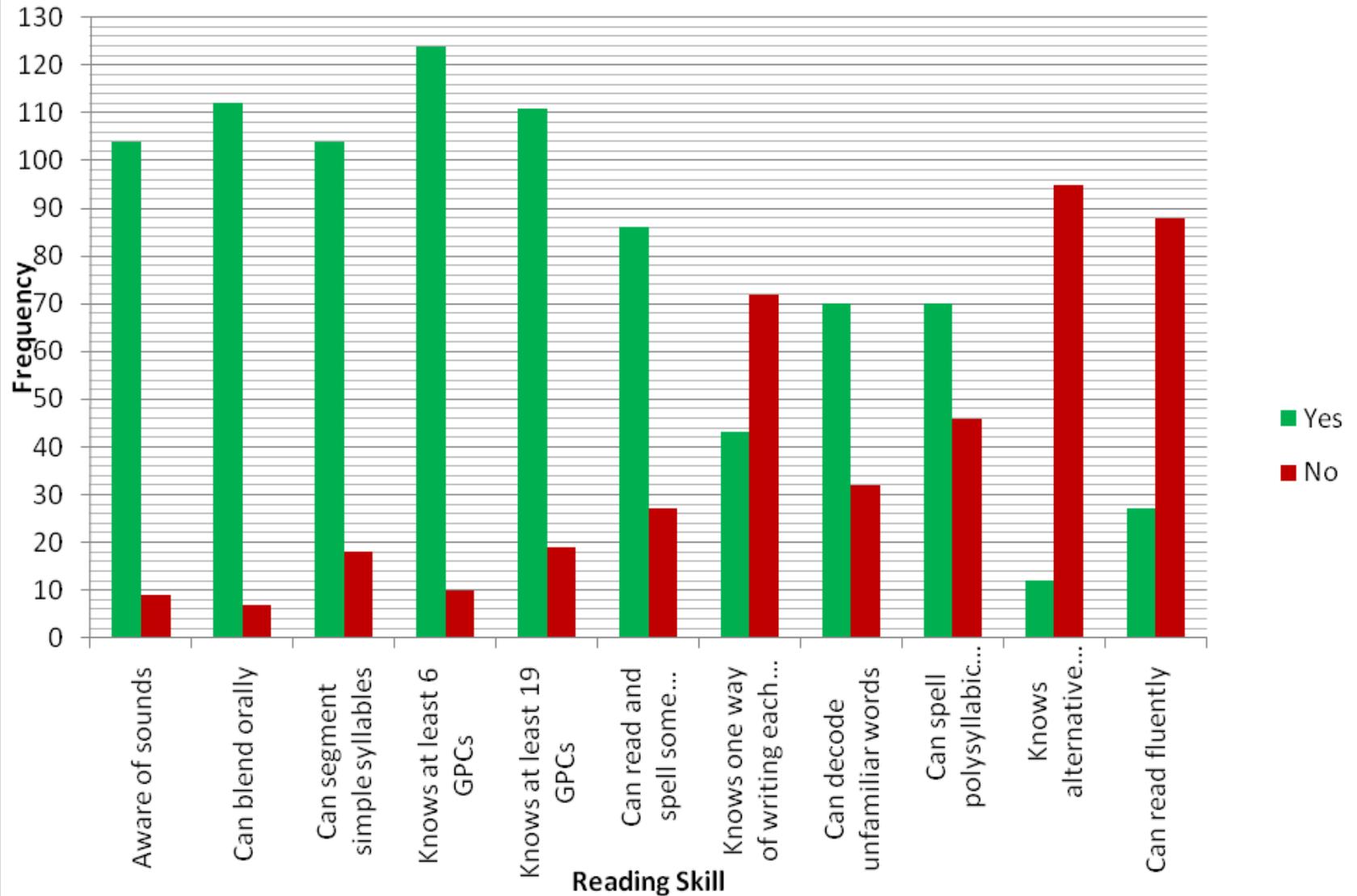
RALI Sample

- Questionnaire data on 136/145 children
 - 49 on the SEN register
 - Mostly multiple difficulties; typically speech, language and literacy
 - Formal diagnoses
 - Dyslexia = 5; Language Impairment = 17

Additional Literacy Support

- 121 returns re: additional literacy support at $t1$
 - 76 children having additional support
 - Full sample: 54% controls; 51% experimental
 - Wellcome sample: 43% controls; 35% experimental
- Rate and types of literacy support
 - Variability in frequency (1–5 times a week); length (10-60 minutes); and deliverer (parents-SENCOs)
 - Modal responses:
 - 1 or 5 times a week;
 - For 20 minutes;
 - By a TA

Children's Reading Skills



Variations in Reading Gains

