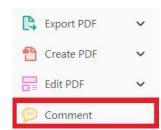




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- 2. Absence of similarity to known proteins.
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3. Commenting Tool – for highlighting a section to be changed to bold or italic or for general comments.

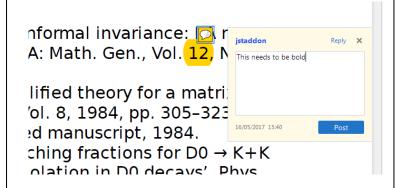


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5. Attach File Tool – for inserting large amounts of text or replacement figures.



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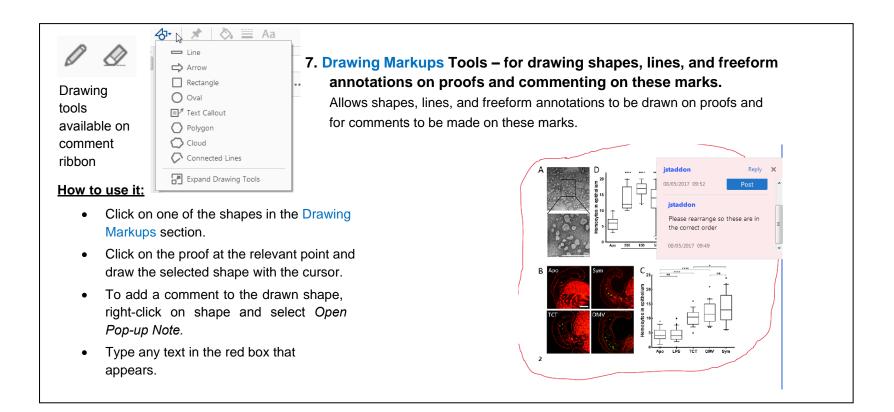


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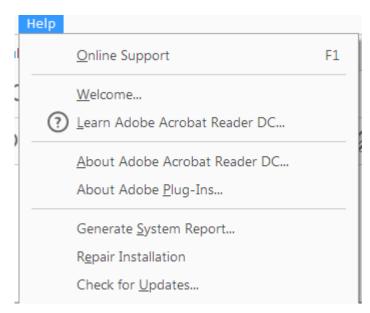
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## SHORT REPORT

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Synthetic phonics and decodable instructional reading texts: How far do these support poor readers?





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This paper presents data from a quasi-experimental trial with paired randomisation that emerged during the development of a reading scheme for children in England. This trial was conducted with a group of 12 children, aged 5-6, and considered to be falling behind their peers in reading ability and a matched control group. There were two intervention conditions (A: using mixed teaching methods and a high percentage of non-phonically decodable vocabulary; P: using mixed teaching methods and low percentage of non-decodable vocabulary); allocation to these was randomised. Children were assessed at pre- and post-test on standardised measures of receptive vocabulary, phoneme awareness, word reading, and comprehension. Two class teachers in the same school each selected 6 children, who they considered to be poor readers, to participate (n = 12). A control group (using synthetic phonics only and phonically decodable vocabulary) was selected from the same 2 classes based on pre-test scores for word reading (n = 16). Results from the study show positive benefits for poor readers from using both additional teaching methods (such as analytic phonics, sight word vocabulary, and oral vocabulary extension) in addition to synthetic phonics, and also non-decodable vocabulary in instructional reading text.

### **KEYWORDS**

decodable text, poor readers, Reading Comprehension, sight word vocabulary, synthetic phonics

## INTRODUCTION

According to the Department for Education in England, all children, including those with dyslexia, learn to read more accurately from being taught using a synthetic phonics approach, alongside decodable instructional texts, rather than using other methods (DfE, 2015). This view has also been expressed in other English-speaking countries, such as Australia (Serry & Oberklaid, 2015) and the USA (Morris, 2015). However, some teachers and researchers have expressed a concern that children may be disadvantaged by having to learn to read via any one particular instructional method ks & Gardner, 2013; Wedell, 2014) and from using only decodable texts n et al., 2009.





Authors of a recent study making a direct comparison of phonics training with sight-word training in children with dyslexia concluded that these children need training in both (McArthur et al., 2015). In the USA, the National Reading Panel (NICHHD, 2000) recommended that phonics be taught within a wider language curriculum, acknowledging that there is no evidence that one method in isolation is superior to others.

Children, who have impaired detection of speech segmentation and tone duration, experience difficulty with mapping speech sounds to letters. This impacts on their ability to "blend" the sounds, a technique that is required in a synthetic phonics approach (Corriveau, Goswami, & Thomson, 2010; Corriveau, Pasquini, & Goswami, 2007; Duff, Hayiou-Thomas, & Hulme, 2012; Kuppen, Huss, Fosker, Fegan, & Goswami, 2011; McArthur & Castles, 2013; Wallach, 2011). There is evidence that a difficulty with blending sounds sequentially results from having limited short-term/working memory often associated with dyslexia (McMurray & McVeigh, 2016). For children with impaired working memory, the use of teaching by analogy or onset-rime (analytic phonics) requires less demand on working memory (Baylis & Snowling, 2011; McGeown & Medford, 2014; McMurray & McVeigh, 2016; Wedell, 2014).

There has long been an understanding that struggling readers need well-matched texts that are not too difficult. Advocates of a phonics-based approach to reading have assumed that "well-matched" implies a controlled vocabulary with phonically decodable texts; that this will reinforce letter-sound correspondences and make learning to read easier (Beverly, Giles, & Buck, 2009; Mesmer, 2001), However, Clark (2014) suggests that an apparently simplified Q6 text may make reading material not only less stimulating but also more difficult to comprehend; that simplicity is not necessarily easier.

The research presented here addressed two questions. The first considers the relative effectiveness of two types of instructional reading texts: one including words that went beyond children's current phonic decoding ability and the other including only words within children's expected phonic decoding ability. The second question considers the effectiveness of the synthetic phonics approach for teaching poor readers, comparing it with an intervention that uses other methods (including analytic phonics, sight-word recognition, and extension of oral vocabulary, in addition to statutory synthetic phonics).

### 2 | METHOD

The study was a quasi-experimental design using a three-armed trial with paired randomisation, including a comparison group, and using a pre-post experimental design. There were two intervention arms: Intervention A (high percentage non-phonically decodable vocabulary with mixed teaching methods) and Intervention P (low percentage non-phonically decodable vocabulary with mixed teaching methods), and a comparison group (phonically decodable text and synthetic-phonics-only teaching methods). Participants were randomly assigned to Intervention A or Intervention P, however, the total intervention sample was non-random but selected by their class teachers. Assignment to the comparison group was done by the researcher. The study was conducted in a single suburban school with two-form entry, in two Year 1 classes (aged 4–5 at pre-test) in England.

### 2.1 | Participants

Class teachers chose six children from each of two classes who were not making expected progress in their reading (Intervention A, n = 6; Intervention P, n = 6). Pre-test assessments had been conducted in the April of the previous year while the children were still in Reception. Children with known specific learning difficulties or existing statements of educational need were excluded from the study. A comparison group of 16 children were matched to the same range of scores at pre-test as the 12 participants, using the Early Word Reading (EWR) test (Snowling et al., 2009). It is not feasible to rule out the possibility that the children in the comparison group may also have been struggling readers or that none were.

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#### 2.2 Measures

Measures were chosen to assess receptive vocabulary using the British Picture Vocabulary Scale (BPVS; Dunn et al., 2009), Letter Sound Knowledge, EWR, phoneme awareness [Sound Deletion (SD) and Sound Isolation (SI)], and Passage Reading Comprehension (PRC), from the York Assessment of Reading for Comprehension (Snowling et al., 2009). PRC was only administered post-test as expected limited word recognition would have resulted in floor effects. Reading speed (RS) was also measured only at post-test, and reported as number of words per minute, to give an indication of fluency.

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## 2.3 | Procedure and design

Two parallel sets of activities and books were developed for Interventions A and P. One set of books and resources was provided for each intervention group. Each set of books contained the same illustrations and storyline, introduced the same number of new words per book, and included the same length of sentences, number of words, and number of pages. The vocabulary used for the text in Intervention P (low percentage non-phonically decodable) contained a majority of words that would be expected to be decodable by children in Reception classes in England who are following the structured sequence of phonic letters and sounds as detailed in the National Curriculum (DfE, 2014). We calculated that the number of words that were replicated across both interventions was 38.7%. For Intervention P, there were 12.2% non-decodable words, high frequency words that children were expected to learn at this stage. For Intervention A, there were 64.2% non-decodable words.

The children were allocated approximately two 1-hr sessions per week for two school terms (26 weeks) and worked in small groups of no more than six. As part of their regular curriculum, all the children were taught synthetic phonics according to the national curriculum statutory requirements in England (DfE, 2014). Therefore, the teaching activities focused on alternative phonic approaches (including teaching single and complex grapheme-phoneme correspondences) and whole-word strategies to build a sight vocabulary. The use of analytic phonics and promotion of the use of analogy was based on evidence that skilled readers do not read in a smooth line from left to right, but focus on particular letters or letter groups (Blais et al., 2009; Engbert, Nuthmann, Richter, & Kliegl, 2005; Pitchford, Ledgeway, & Masterton, 2008; Rayner, Slattery, Drieghe, & Liversedge, 2011; Weiser, 2013), and evidence that larger groupings of letters are more consistent in grapheme-phoneme correspondence in English than individual letters (Diliberto, Beattie, Flowers, & Algozzine, 2008). Target skills for the activities were extended spoken vocabulary, analytic phonics (initial or final letters, letter groups, word families to promote the use of analogy), sight-word recognition, and comprehension.

### **│ RESULTS**

Our first research question was to determine what, if any, differences there might be on our chosen outcome measures following approximately 50 hr of intervention sessions of either the high-percentage non-decodable vocabulary (Intervention A) or the low-percentage non-decodable vocabulary (Intervention P). This involved a straightforward comparison between Interventions A and P (see Table 1).

**T1** 

A one-way ANCOVA was conducted to determine any statistically significant differences between Intervention A and Intervention P on each of the measures, using pre-test scores as a covariate. For the BPVS, there was a significant effect of condition: F(1,9) = 7.25, p = .025. Estimates for adjusted post-test mean scores for Intervention A (Adj. M = 94.422) were higher than for Intervention P (Adj. M = 80.61). The difference in effect sizes pre- to post-test for BPVS (see Table 2) were small (d = 0.09, g = 0.09). For EWR, ANCOVA revealed a significant effect of condition: T2 F(1.9) = 5.4, p = .045. Estimates for adjusted post-test mean scores for Intervention A (Adj. M = 106.80) were higher than for Intervention P (Adj. M = 88.36). The difference in pre- to post-test effect sizes for EWR were larger (d = 0.48, g = 0.53). ANCOVA revealed no statistically significant effects for Letter Sound Knowledge, RS, or either of the

TABLE 1 Standardised scores for group means (standard deviations) for Intervention A and Intervention P

Pre-test			Post-test Post-test			
	Α	Р	A	Р	ANCOVA (p value)	
BPVS	93.16 (10.02)	80.83 (9.06)	91.16 (7.83)	83.66 (8.68)	.025	
LSK	115.00 (13.31)	109.16 (20.41)	120.16 (3.37)	114.33 (16.54)	.503	
EWR	93.33 (9.77)	85.83 (5.74)	103.66 (11.27)	91.50 (15.22)	.045	
SI	110.50 (11.77)	97.66 (9.26)	113.66 (12.69)	112.16 (11.46)	.851	
SD	79.50 (10.05)	82.83 (15.06)	104.83 (8.86)	96.00 (12.61)	.224	
PRC			104.16 (12.87)	88.00 (5.13)	(EWR as covariate)	
RS			44.66 (22.00)	36.5 (22.72)	.073 (EWR as covariate)	

Note. Intervention A: n = 6; Intervention P: n = 6. BPVS = British picture vocabulary scale; LSK = letter sound knowledge; EWR = early word reading; SI = sound isolation; SD = sound deletion; PRC = passage reading comprehension; RS = reading speed (words per minute).

TABLE 2 Standard scores: Pre-test to post-test effect sizes (Cohen's d) Intervention A and Intervention P

	BPVS	LSK	EWR	SI	SD	
Intervention A	0.22	0.53	0.97	0.25	2.67	
Intervention P	0.31	0.06	0.49	1.45	0.94	
Difference	0.09	0.47	0.48	1.20	1.73	

Note. BPVS = British picture vocabulary scale; LSK = letter sound knowledge; EWR = early word reading; SI = sound isolation; SD = sound deletion.

phoneme awareness measures, although differences in effect sizes from pre- to post-test suggest a trend of advantage for SI within Intervention P and a trend of advantage of SD within Intervention A.

PRC and RS could only be measured at post-test, because the pre-test measures were conducted when the children were aged between 4 and 5 years. The mean raw scores for the EWR test at pre-test were 1.5 for children in Intervention P; 2.16 for children in Intervention A. In order to run an ANCOVA for these measures, it seemed reasonable to use the EWR scores at pre-test as a covariate as these correlated most closely with PRC and RS. Applying ANCOVA (EWR as covariate) revealed statistically significant effects of condition for PRC: F(1,9) = 10.45, p = .010. Estimates for post-test adjusted mean scores for Intervention A (Adj. M = 106.00) were higher than for Intervention P (Adj. M = 86.15). The post-test effect size for PRC was d = 1.64 (g = 1.52).

Taken together, these results suggest that the use of a higher percentage of non-phonically decodable vocabulary had a positive impact on word reading and reading comprehension for the children in this study.

Our second research question concerned the effectiveness of the synthetic phonics approach that was being used in the comparison group with a mixed teaching approach. In order to do this, we combined the two intervention groups (n = 12) to compare with the comparison group (see Table 3). A one-way ANCOVA was conducted on each of T3 the measures to determine any statistically significant differences between the intervention group and the comparison group, using pre-test scores as a covariate. There was a significant effect of condition only for the two phoneme awareness measures. For SI: F(1,25) = 6.45, p = .017. Estimates for adjusted post-test mean scores for the intervention group (Adj. M = 112.32) were higher than for the comparison group (Adj. M = 100.82). The difference in pre- to post-test effect sizes for SI (see Table 4) were moderate (d = 0.64). For SD: F(1,25) = 14.84, p = .000. Estimates for T4 adjusted post-test mean scores for the intervention group (Adj. M = 104.02) were higher than for the comparison group (Adj. M = 86.86). The difference in pre-post effect sizes for SD were large (d = 1.44).

At post-test, class teachers clearly stated that they felt that the intervention as a whole had been very beneficial; the children were motivated and looked forward to the sessions. They referred specifically to a number of individuals

TABLE 3 Standardised scores for group means (standard deviations) Intervention (A + P) and Comparison

Pre-test			Post-test Post-test			
	I	С	Ī	С	ANCOVA (p value)	
BPVS	87.00 (11.50)	91.68 (13.20)	87.41 (8.80)	87.12 (10.38)	.582	
LSK	112.08 (16.71)	107.68 (16.29)	117.25 (11.78)	108.75 (15.71)	.183	
EWR	89.58 (8.58)	97.75 (8.22)	97.58 (14.26)	98.75 (12.22)	.683	
SI	104.08 (12.12)	102.25 (19.23)	112.91 (11.55)	100.37 (16.98)	.017	
SD	81.16 (12.33)	92.93 (19.88)	100.41 (11.37)	89.56 (15.87)	.000	
PRC			96.08 (12.59)	92.81 (13.37)	.350 (EWR as covariate)	
RS			41.05 (21.76)	40.98 (28.76)	.721 (EWR as covariate)	

Note. Intervention (A + P): n = 12; Comparison: n = 16. BPVS = British picture vocabulary scale; LSK = letter sound knowledge; EWR = early word reading; SI = sound isolation; SD = sound deletion; PRC = passage reading comprehension; RS = reading speed (words per minute).

**TABLE 4** Standard scores: Pre-test to post-test effect sizes (Cohen's d) Intervention (A + P) and Comparison

	BPVS	LSK	EWR	SI	SD
Intervention (A + P)	0.04	0.35	0.67	0.74	1.62
Comparison	0.38	0.06	0.09	0.10	0.18
Difference	0.34	0.29	0.58	0.64	1.44

Note. BPVS = British picture vocabulary scale; LSK = letter sound knowledge; EWR = early word reading; SI = sound isolation; SD = sound deletion.

who had made progress, and more generally to the others. Although only a small group, class teachers reported improvements in motivation, confidence, comprehension, and enjoyment of reading that generalised to the rest of their learning across the curriculum.

#### **I DISCUSSION**

The first aim of our study was to compare the effects of using a high percentage of non-decodable words with low-percentage in teaching a sight-word vocabulary and instructional reading texts. The outcomes for word reading and comprehension indicate an advantage for Intervention A (high-percentage non-decodable words). These results suggest that children, who are not making expected progress in reading, may benefit, in terms of word reading and comprehension, from instructional reading texts that go beyond their presumed decoding ability. They suggest that an assumption that it is easier for children to learn to read using easily phonically-decodable words may be unfounded and that the reverse may be true.

The second aim of our study was to compare the impact of using a synthetic-phonics-only approach, with a mixed-methods approach. Interestingly, the two measures that showed a statistically significant advantage from the mixed-methods intervention were for phoneme awareness. This may have implications for literacy teachers, because phoneme awareness is frequently cited as the most significant predictor of early reading (Ehri et al., 2001).

We acknowledge that this is only a small study and any conclusions must therefore be treated with caution. Nevertheless, the intervention ran for two school terms and showed high levels of fidelity to programme protocol. Furthermore, the class teachers attributed changes observed in the children to participation in the programme.

In summary, the results from this small study suggest that the use of a high percentage of non-decodable vocabulary within sight-word instruction and instructional reading texts had a positive impact on word reading, PRC. The use of mixed teaching methods (use of analogy, analytic phonics, and sight-word-recognition), in addition

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to synthetic phonics, appeared to have a positive impact on phoneme awareness. We suggest that there is some evidence here that poor readers may benefit not only from a multi-faceted approach to teaching to support phoneme awareness for general literacy, but also from using instructional texts that include words that go beyond their expected decoding ability. We suggest that these results may challenge existing assumptions that poor readers should focus on synthetic phonics and be given only easily decodable texts to read, and hope that a larger-scale study could explore these issues in the future.

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