A Brief Analogy Strategy-Based Intervention supports the Development of Invented Spelling and Decoding

Angela Evans, Alison Arrow & Keith Greaney

Research Paper

Keywords: analogy instruction, decoding, encoding, literacy, phonological skills

ABSTRACT

Recent research in literacy acquisition has led to an elaboration of instructional programmes that focus on supporting children's progress through successive developmental levels. An example of such an approach is *analogy instruction,* the basis of which is that children develop a system of recognition of shared patterns within words and strategies for applying them to reading and spelling in context. This study evaluated the implementation of a modified analogy strategy-based programme. A group of Y3 and 4 children with reading and spelling difficulties were taught, for eight weeks, specific phonological skills and analogy strategies for reading and spelling. The key finding was that the intervention significantly improved children's letter-sound knowledge, phonemic awareness decoding (non-word reading), and invented spelling skills compared with that of a control group. This finding suggests that an analogy strategy-based programme may be effective in improving children's decoding and encoding skills.

INTRODUCTION

As their reading abilities develop, children acquire an increasing sight word vocabulary, which consists of words that are securely and completely represented in memory so that their pronunciation, meaning, and spelling can be quickly recalled (Ehri, 1992). Words become sight words through repeated phonological recoding (Ehri, 2005; Share, 2004). The process of phonological recoding involves mapping sounds onto letters, or groups of letters (Share, 2004). According to Share, Jorm, MacLean, and Matthews (1984), phonological recoding skills enable children to decode unknown words, providing a method of self-teaching, and also serving to consolidate visual-phonological pathways in memory for the new words. Difficulty with phonological awareness is one of the most commonly implicated causes of literacy difficulties (Conrad & Levy, 2011; Hoover & Tunmer, 1993; Tunmer & Chapman, 2002). In addition, early phonological skills are highly predictive of later reading ability (Conrad & Levy, 2011). Wren (2000) notes that if children have reading and spelling difficulties in Year 4, they are likely to continue to struggle as they grow older. However, with appropriate intervention, it may be possible to significantly improve the development of children's phonological skills (Torgesen & Davis, 1996).

Salient features of effective reading and spelling interventions include the use of systematic, explicit instruction in phonological skills, onset and rime-based spelling patterns, and analogy strategies integrated with plenty of contextual reading practice, discussion and writing in response to what has been read (Allen, 1998). Such an approach enables children to develop critical skills for reading along with an interest in, and purpose for, reading (Allen, 1998; White, 2005). As reading words and spelling them are dependent on the same fundamental orthographic and phonologic information, they may both be taught using analogy strategies (Adams, 1990; Brown, Sinatra & Wagstaff, 1996; Ehri, 1992, 1998, 2000). In fact, Cunningham and Cunningham (1992) note that decoding and spelling are "mirror-like processes" (p. 106). Furthermore, analogy-based programmes do not need to be overly time-consuming, particularly when the teacher implements the programme with the whole class, and is therefore able to embed the strategies throughout the school day (Allen, 1998; Ehri, Satlow, & Gaskins, 2009; Greaney, Tunmer & Chapman, 1997; Lovett et al., 2000; Peterson & Haines, 1992; White, 2005).

The basis of analogy instruction is that children develop a system of recognition of shared patterns within words (Goswami, 1998). Analogy-based programmes utilise children's knowledge of onset-rime units and rhyme to facilitate reading and spelling. Onset-rime is an intermediate sub-syllabic level between phonemes and syllables (Share & Blum, 2005). A syllable can be subdivided into the

onset and rime. The onset is the initial consonant(s) preceding the vowel, and the rime is the vowel and any consonants that follow it e.g., *r-ain, sh-op* (Adams, 1990; White, 2005). Wylie and Durrell (1970) list 37 rimes e.g., at, ack, ap, ash, eat, op, ing that appear in over 500 common primary school level words. Onset-rime segmentation e.g., l-ake, br-ake, s-eat, m-eat is naturally intuitive to most children and adults, and moderates the level of ambiguity that is typical of written English (Adams, 1990; Goswami, 1998; Treiman, Mullinnex, Bijeljac-Babic, & Richmond-Welty, 1995). Rime-based coding enables children to make analogies between known words and new words (Goswami & Bryant, 1992; Goswami & Mead, 1992; Roberts & McDougall, 2003). Analogy use is further facilitated by the fact that the pronunciation of vowels is more predictable when they are analysed at the level of rime unit. For example, the vowel in rime units /at/, /ad/, /ay/, and /ate/ is much more predictable than /a/ on its own (Ehri & Robbins, 1992; Adams, 1990; Treiman et al., 1995). Analogy instruction involves systematically teaching children how and when to use orthographic rimes e.g., *–at, -ice, eat-, ope* strategically in reading and spelling unfamiliar words (Brown et al., 1996).

Benchmark Programme

The intervention programme in the current study is based upon the Benchmark Word Detectives Programme, which is an example of an analogy strategy-based approach to reading and spelling instruction (Gaskins et al., 1988; Gaskins, Gaskins, Anderson, & Schommer, 1995). The programme is based on onset-rime analysis and use of analogy strategies with the additions of explicit phonological instruction and contextual practice in applying skills and strategies through reading and writing (Gaskins, 2004).

Key findings from research based on the Benchmark Word Identification programme are listed below:

- Analogy strategy-based programmes can be successfully implemented by classroom teachers as an integrated part of literacy instruction (White, 2005).
- Analogy strategy-based intervention has also been implemented as a stand-alone (i.e. outside the regular classroom) programme. Allen (1998) describes such a programme in which 100 percent of primary school aged participants were reading well-below grade level when they entered, and after six months of participation 70 percent were reading at age-appropriate levels.
- Brown et al. (1996) studied the effects of analogy instruction on spelling development. Results showed that children of all abilities increased the rate at which they independently used rimes from instruction to generate spellings. Children with lower spelling achievement demonstrated the greatest gains; in fact, they overtook average achievers and were using rimes to generate spellings almost as often as children achieving in the top third of the class.
- Research indicates that learning outcomes improved significantly when phonological and strategy-based approaches were combined (Ehri et al., 2009; Lovett et al., 2000).

The Current Study

The aim of the current study was to implement and evaluate an analogy strategy-based intervention programme to teach phonological skills and analogy strategies for reading and spelling. The hypothesis was that explicit training in analogy strategies would lead to improved letter-sound knowledge and phonemic awareness, gains in decoding and spelling words, and that new reading and spelling skills would generalise to novel words. Phonemic awareness is the ability to understand that words can be divided into subunits smaller than syllables, and the ability to reflect upon and manipulate these speech segments, when represented by letters, to form words (Blachman, 1997; Catts & Kamhi, 2005; Cunningham, 1990; Hatcher, Hulme & Ellis, 1994; Ryder, Tunmer & Greaney, 2007).

Method

A non-randomised, pretest-intervention-posttest design was used to compare the performance of a group of Year 3 and 4 children with reading and spelling difficulties with an age and ability matched control group. The participants were 15 Year 3 and 4 children, 12 girls and three boys, aged from seven years and four months to nine years. The participants were selected based on reading and spelling assessment data held by their teachers, and the results of word and pseudo-word reading assessments administered by the researcher. Children with the lowest scores on these assessments were invited to participate in the study, and those for whom consent was obtained were selected. More female than male participants met the criteria for inclusion.

All participants were individually assessed on receptive vocabulary, letter knowledge, analogy use in word reading, phonemic awareness, word reading in isolation, reading connected text, pseudo-word decoding, and spelling pre- and post-intervention. There was no significant difference between the groups on pretest measures except on the invented spelling assessment. However, when the invented spelling

assessment was scored according to the number of phonemes correctly represented, no significant difference between the groups was apparent.

The children in the intervention group were taught by the researcher for 32 sessions of 30-60 minutes duration over eight weeks for a total instruction time of 28 hours. The sessions were held at the beginning of the school day, four mornings a week. The children in the intervention group were out of class during registration and the beginning of reading and writing lessons. On Fridays the session duration was longer, so that the group could apply strategies and skills to a piece of writing. Therefore, the intervention group received most of their reading, writing and spelling instruction through the intervention in addition to some parts of the class programme. During the intervention phase of the study the control group received no intervention in addition to their regular classroom reading, spelling and writing programme. The duration of the sessions was selected based on research about similar intervention programmes, practicality for the school involved, and the understanding that the specific strategies weren't being reinforced during the rest of the school day. The programme incorporated key features of the Benchmark Word Detectives Programme (Gaskins, 1998) and followed a structured, predictable sequence of lessons. The programme was modified to be briefer, both in session duration and overall length, in order to assess its potential for use in New Zealand classrooms. Activities were designed to be engaging, interesting, and multisensory in order to maintain children's enthusiasm and motivation. For example, in the activity 'What's In My Head? (Gaskins, 2005) up to five clues were verbally provided on the identity of a mystery word that shared a spelling pattern with a key word (Figure 1). Children wrote a guess for every clue, modifying their answers as new clues were provided. This fun activity engaged the children in thinking creatively about orthographic and phonologic features of words.

My word has _____ sounds. It has _____ letters. The vowel makes the same sound as you hear in _____. The word begins with the same letter as the word _____. The word ends with the same letter as the word _____. The spelling pattern in the word is _____

Figure 1. *Examples of clues provided for* What's In My Head *activity (Gaskins, 2005).*

A set of key words and a poem containing key rimes were introduced in the first session each week. Initial consonants or consonant clusters were selected to provide instruction and practice with a range of blends, digraphs, and consonant strings (e.g. str-ing, bl-ack, br-ight, sn-ore). Some specific activities that were included in the weekly cycle were, for example, word analysis, in which the key words were fully analysed using a template (Figure 2). Word analysis was initially done collaboratively, with children writing responses on the form. Over time, this process became familiar enough to be completed verbally by individual children using the template as a prompt. Some examples of other activities included in the programme were:

- generation of lists of rhyming words and sorting them according to rime and/or rhyme
- decoding challenging multisyllabic words containing key rimes
- swapping onsets, rimes, or vowels to create new pseudo-words, which were then decoded before being presented to a partner to attempt.

Analysing Words

1. The word is _____
2. Stretch the word.

   I hear _____ sounds.
3. I see _____ letters because _____
4. The spelling pattern is _____
5. This is what I know about the vowel_____

   _____
6. Another word on the Word Wall like _____is

   _____ they are alike because

Figure 2.*The Talk to Yourself Word Analysis Chart (Gaskins, 2005).*

Results

A one-way analysis of variance (ANOVA) was conducted to compare the mean scores for each of the assessments for the control and intervention groups at the pretest phase. Both groups improved in their knowledge of letter sounds, however, the intervention group made significantly ($f(1.13) = 6.56$, $p = .024$) more progress (see Table 1). In addition, the intervention group made significantly ($f(1.13) = 4.94$, $p = .045$) greater improvement in phonemic awareness than the control group as measured by the Gough-Kastler-Roper (GKR) Phonemic Awareness Assessment (Gough, Kastler, & Roper, 1984), a language assessment that measures children's understanding of, and ability to manipulate, individual phonemes in words.

Table 1

Means and standard deviations for measures of letter sound knowledge reading as a function of group and time of testing

	Pretest				Posttest			
	Intervention n=8		Control n=7		Intervention		Control	
	M	SD	M	SD	M	SD	M	SD
Letter Sounds								
Lower case (26)	22.25	2.05	23.29	1.50	25.63	0.74	24.57	1.27
Upper case (26)	22.63	2.72	23.86	1.95	25.75	0.46	24.29	1.50

The intervention group also made significant ($f(1.13) = 17.97$, $p = .001$) gains in invented spelling compared with the control group (Figure 3). In addition, the children in the intervention group spelled words with increasing conventionality, even if they were still incorrect. For example, at pretest a child spelled the word *fill* as *filp*. At posttest her attempt, *fil*, while still incorrect was more conventionally spelled and more phonetically accurate. Similarly, another child spelled the word *yell* as *yeuy* at pretest, and *yal* at posttest. Similar improvements in conventionality were not present in the control group. However, in a standardised spelling test, the South Australian Spelling Test (SAST); (Westwood, 2005), whilst the intervention group had higher mean scores than the control group at both pretest ($m = 25.75$) and post-test ($m = 28.75$), the difference in progress made between the two groups did not reach significance ($f(1.13) = 2.91$, $p = .112$) (Table 2).

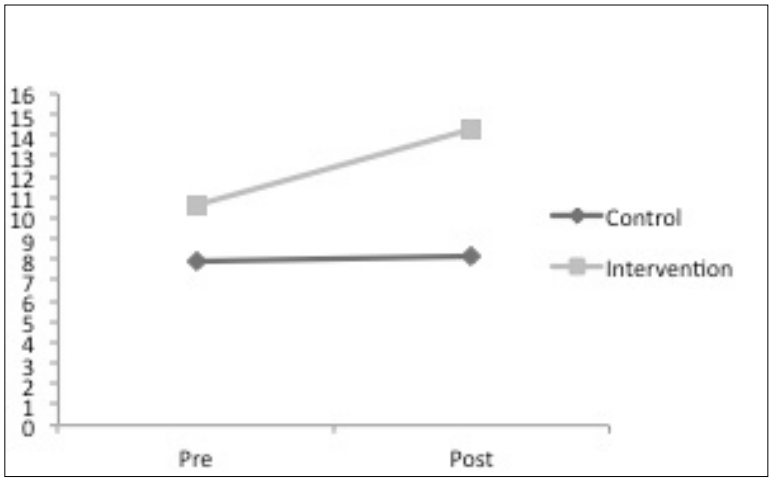

Figure 3. *Mean number of words spelled correctly in the Invented Spelling Test (Nicholson, 2005) for the control and intervention groups as a function of time of testing.*

Table 2

Means and standard deviations for measures of spelling as a function of group and time of testing

	Pretest				Posttest			
	Intervention n=8		Control n=7		Intervention		Control	
	M	SD	M	SD	M	SD	M	SD
Invented spelling								
Total words (18)	10.63	2.45	7.71	4.11	14.25	2.92	8.14	4.63
Phonemic scoring (72)	59.13	5.74	51.00	8.52	65.88	4.51	52.86	11.70
South Australian Spelling Test								
Total words (70)	25.75	4.71	22.29	6.58	28.75	5.39	22.14	8.25

Use of Analogy Strategies

Spelling tests comprising 25 words containing the key rime patterns, that is, words that were analogous to key words (excluding actual key words) from current and previous weeks, were administered weekly from Week 5 to Week 8. These tests provided a measure of how well the children were able to use an analogy strategy to spell novel words. The number of words spelled correctly by each participant is displayed in Figure 4.

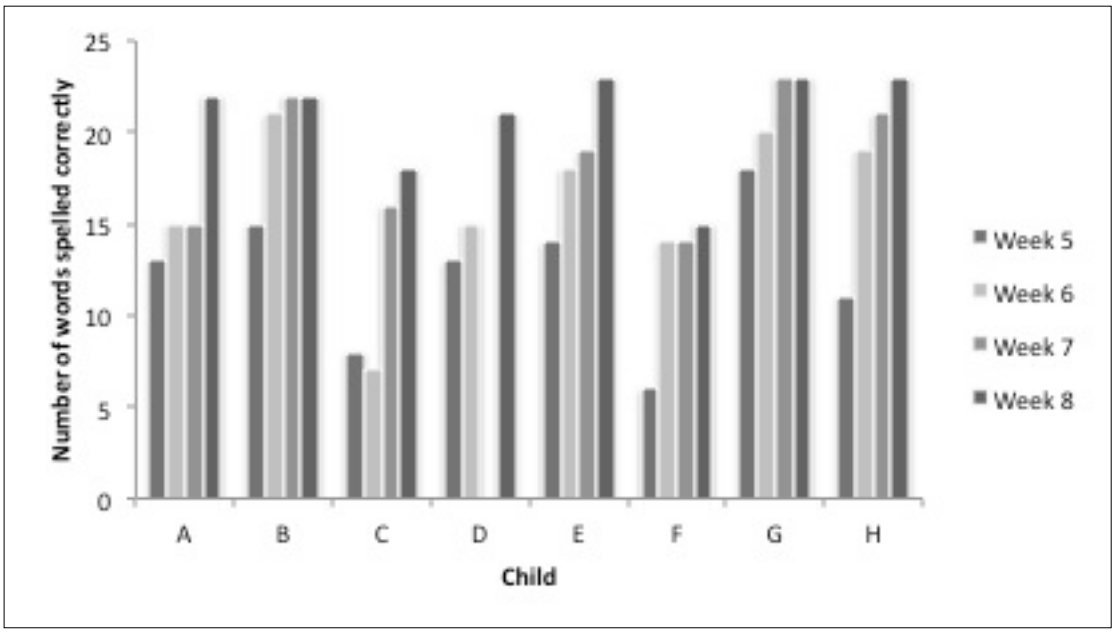

Figure 4. Number of correctly spelled words for each child in the intervention group as a function of a four-week of intervention programme.

Note: Child D was absent in Week 7

Word Reading and Decoding

The Burt Word Reading Test (Gilmore, Croft & Reid, 1981) was used to assess the children's ability to read real words isolated from context. At pretest, the control group (m = 37) and intervention group (m = 38) means were similar (Table 3). Post-test means were 45.38 for the intervention group and 37.86 for the control group. However, this difference did not quite reach significance (f(1.13) = 4.24, p = .06).

Table 3

Means and standard deviations for measures of isolated word reading as a function of group and time of testing

	Pretest				Posttest			
	Intervention n=8		Control n=7		Intervention		Control	
	M	SD	M	SD	M	SD	M	SD
Bryant Test of Basic Decoding Skills								
Total words (50)	12.63	5.40	15.43	5.47	29.38	7.33	21.86	6.74
Burt Word Reading Test								
Total words (110)	38.00	11.15	37.00	9.83	45.38	11.39	37.86	8.23

In addition, the intervention group made significantly (f(1.13) = 15.33, p = .002) greater gains than the control group in decoding, indicated by a pseudo-word reading assessment (Figure 5).

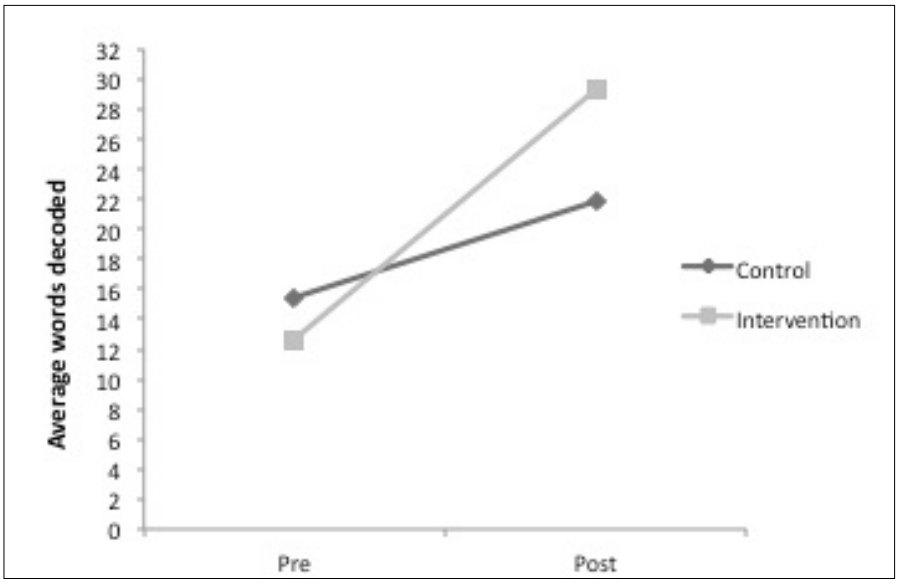

Figure 5. *Mean total number of non-words decoded correctly in the Bryant Test of Basic Decoding Skills (Bryant, 1975) by the control and intervention groups as a function of time of testing.*

Reading in Context

The results of the Neale Analysis of Reading Ability (NARA) (Neale, 1999) produced separate scores for accuracy, comprehension, and rate of reading in context. The intervention group scored higher on all three sections of the Neale at both pre- and post-test (Table 4), but the difference between their scores and the control group's scores was not significant.

Table 4

Neale Analysis of Reading Ability (NARA) as a function of group and time of testing

	Pretest				Posttest			
	Intervention n=8		Control n=7		Intervention		Control	
	M	SD	M	SD	M	SD	M	SD
NARA								
Accuracy	26.63	5.48	22.86	8.95	31.25	9.45	24.71	8.36
Comprehension	11.00	1.60	10.29	1.80	14.38	4.31	11.14	3.80
Rate	49.38	19.62	45.57	25.13	45.50	13.80	37.43	15.58

In summary, the groups possessed comparable levels of receptive vocabulary, phonemic awareness, and reading and spelling achievement at pre-intervention. The results showed that the intervention group made greater gains than the control group in letter-sound knowledge, phonemic awareness, decoding, and invented spelling. However, there were no significant differences between the groups' rate of progress in standardised word reading and spelling. This may be attributed in part to a lack of specificity in standardised measures, and the brief duration of the programme.

Discussion

The hypothesis of this study was that explicit instruction using analogy strategies would lead to improved letter-sound knowledge, phonemic awareness, decoding, and spelling, and that these improvements would facilitate generalisation of skills to non-instructed words for Year 3 and 4 children with reading and spelling difficulties. The results of the study support the first part of the hypothesis but not the generalisation reading and spelling in context as measured by standardised assessments. However, children in the intervention group did demonstrate increasing proficiency in applying analogy strategies to spelling uninstructed words. It is possible that generalisation would have begun to occur if the intervention had been in place over a longer period of time. However, even given the brief duration, the results of this study are promising.

The intervention group made significantly greater gains in phonemic awareness than the control group during the intervention. This indicates that children in the present study were at a developmentally-appropriate stage to take full advantage of analogy strategy instruction. The intervention group also made significant progress in decoding. This result can be explained in terms of the phonological awareness focus of the modified Benchmark Programme. Children learned to fully analyse words using the steps in the *talk to yourself word analysis chart* (Gaskins et al., 1998), and as a result, were able to pay attention to all of the grapheme-phoneme correspondences in words, rather than, for example, concentrating overly on boundary letters (characteristic of readers with developing levels of phonemic awareness) (Spear-Swerling & Sternberg, 1996). The participants were effectively armed with a set of efficient strategies with which to approach the decoding of, and invent spellings of, unknown words. The programme enhanced their phonological skills and advanced their decoding abilities towards a subsequent developmental phase. Similarly, the intervention group's spelling scores indicated that they had, on average, advanced in terms of the way they spelled words according to the phase model of spelling acquisition. Furthermore, increased conventionality in spelling indicates progression in the developmental spelling phase that reflects children's increasing knowledge of phonology, orthography and the alphabetic principle (Sénéchal, Ouellette, Pagan & Lever, 2012).

The results of the present study indicate that analogy-based instruction is potentially beneficial for students in New Zealand classrooms. Although the study has been to some extent limited by its small sample size and separation of the intervention from regular classroom activity, the results were consistent with previous research findings that demonstrate the utility of combining spelling and reading instruction in literacy programmes.

References

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: The MIT Press.

Allen, L. (1998). An integrated strategies approach: Making word identification instruction work for beginning readers. *The Reading Teacher, 53*(3), 254-268.

Blachman, B. A. (1997). Early intervention and phonological awareness: A cautionary tale. In B. Blachman (Ed.), *Foundations of Reading Acquisition and Dyslexia: Implications for Early Intervention* (pp. 409-430). Mahwah, NJ, USA: Lawrence Erlbaum Associates.

Brown, K. J., Sinatra, G. M., & Wagstaff J. M. (1996). Exploring the potential of analogy instruction to support students' spelling development. *The Elementary School Journal, 97*(1), 81-99.

Bryant, N. D. (1975). The Bryant test of basic decoding skills. *Journal of Educational Psychology, 78*, 243-255.

Catts, H. W., & Kamhi, A. G. (Eds.). (2005). Language *and reading disabilities, (2nd Ed.)*. Boston, MA, USA: Pearson.

Conrad, N. J. (2008). From reading to spelling and spelling to reading: Transfer goes both ways. *Journal of Educational Psychology, 100*(4), 869-878.

Conrad, N.J., & Levy, B. A. (2011). Training letter and orthographic pattern recognition in children with slow naming speed. *Reading and Writing, 24*, 91-115.

Cunningham, A. E. (1990). Explicit versus implicit instruction in phonemic awareness. *Journal of Experimental Child Psychology, 50*, 429-444.

Cunningham, P.M., & Cunningham, J.W. (1992). Making words: Enhancing the invented spelling-decoding connection. *Reading Teacher, 46*, 106-115.

Ehri, L. C., (1992). Reconceptualizing the development of sight word reading and its relationship to recoding. In P. Gough, L. Ehri, & R. Treiman: *Reading Acquisition* (pp. 107-144). New Jersey: Lawrence Erlbaum Associates.

Ehri, L. C. (1998). Word reading by sight and by analogy in beginning readers. In C. Hulme & R. Malatesha Joshi (Eds.), *Reading and Spelling: Development and Disorder* (pp. 87-112). Mahwah NJ: Lawrence Erlbaum Associates.

Ehri, L. C. (2000). Learning to read and learning to spell: Two sides of a coin. *Topics in Language Disorders, 20*, 19-36.

Ehri, L. C. (2005). Development of sight word reading: Phases and findings. In M. J. Snowling & C. H. Hulme (Eds.), *The Science of Reading: A Handbook* (pp. 135-154). Malden, MA: Blackwell.

Ehri, L. C., & Robbins, C. (1992). Beginners need some decoding skill to read words by analogy. *Reading Research Quarterly, 27*(1), 12-26.

Ehri, L. C., Satlow, E., & Gaskins, I. (2009). Grapho-phonemic enrichment strengthens keyword analogy instruction for struggling young readers. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 25*(2-3), 162-191.

Gaskins, I. W. (1998). A beginning literacy program for at-risk and delayed readers. In J. L. Metsala & L.C. Ehri (Eds.), *Word Recognition in Beginning Literacy (pp.209-232)*. Mahwah NJ: Lawrence Erlbaum Associates.

Gaskins, I. W. (2004). Word detectives. *Educational Leadership*, 61, 70-73.

Gaskins, I. W. (2005). *Success with Struggling Readers: The Benchmark School Approach*. Media, Pa: Guilford Press.

Gaskins, I. W, Downer, M. A., Anderson, R. C., Cunningham, P. M., Gaskins, R. W., & Schommer, M. (1988). A metacognitive approach to phonics: Using what you know to decode what you don't know. *Remedial and Special Education, 9*(1), 36-41.

Gaskins, R. W., Gaskins, I. W., Anderson, R. C., & Schommer, M. (1995). The reciprocal relationship between research and development: An example involving a decoding strand for poor readers. *Journal of Reading Behavior, 27*(3), 337-377.

Gilmore, A., Croft, C., & Reid, N. (1981). *Burt Word Reading Test-New Zealand Revision*. Wellington, New Zealand: NZCER.

Goswami, U. (1998). The role of analogies in the development of word recognition. In J. L. Metsala & L.C. Ehri (Eds.), *Word Recognition in Beginning Literacy* (pp. 41-63). Mahwah NJ: Lawrence Erlbaum Associates.

Goswami, U., & Bryant, P. (1992). Rhyme, analogy, and children's reading. In B. Gough, L. C. Ehri, & R. Treiman (Eds.), *Reading Acquisition* (pp. 49-63). Hillsdale NJ: Lawrence Erlbaum Associates.

Gough, P.B., Kastler, L., & Roper, D.W. (1984). GKR Phonemic Awareness Test. Unpublished manuscript, University of Texas at Austin, Texas.

Goswami, U., & Mead, F. (1992). Onset and rime awareness and analogies in reading. *Reading Research Quarterly, 27*(2), 152-162.

Greaney, K. T., Tunmer, W. E., & Chapman, J. W. (1997). Effects of rime-based orthographic analogy training on the word recognition skills of children with reading disability. *Journal of Educational Psychology, 89*(4), 645-651.

Hatcher, P. J., Hulme, C., & Ellis, A. W. (1994). Ameliorating early reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis. *Child Development, 65*, 41-57.

Hoover, W. A., & Tunmer, W. E. (1993). The components of reading. In G. B. Thompson, W.E. Tunmer, & T. Nicholson (Eds.), *Reading acquisition processes* (pp. 1-19). Clevedon, UK: Multilingual Matters.

Lovett, M., Lacerenza, L., Borden, S. L., Frijiters, J. C., & Steinbach, K. A. (2000). Components of effective remediation for developmental reading disabilities: Combining phonological and strategy-based instruction to improve outcomes. *Journal of Educational Psychology, 92*(2), 263-283.

Neale, M. D. (1999). *Neale Analysis of Reading Ability* (3rd Ed.). Berkshire, UK: NFER-Nelson.

Nicholson, T. (2005). *Phonics handbook*. Chichester, England: Wiley & Sons.

Peterson, M. E., & Haines, L. P. (1992). Orthographic analogy training with kindergarten children: Effects on analogy use, phonemic segmentation, and letter-sound knowledge. *Journal of Reading Behavior, 24*(1), 109-127.

Roberts, L., & McDougall, S. (2003). What do children do in the rime-analogy task?

An examination of the skills and strategies used by early readers. *Journal of Experimental Child Psychology (84*), 310–337.

Ryder, J. F., Tunmer, W. E., & Greaney, K. T. (2007). Explicit instruction in phonemic awareness and phonemically based decoding skills as an intervention strategy for struggling readers in whole language classrooms. *Reading and Writing, 21*, 349-369.

Sénéchal, M., Ouellette, G. P., Pagan, S., & Lever, R. (2012). The role of invented spelling on learning to read in low-phoneme awareness kindergartners: A randomized-control-trial study. *Reading and Writing, 25*, 917–934.

Share, D. L. (2004). Orthographic learning at a glance: On the time course and developmental onset of self-teaching. *Journal of Experimental Child Psychology 87*, 267–298.

Share, D. L., & Blum, P. (2005). Syllable splitting in literate and preliterate Hebrew speakers: Onsets and rimes or bodies and codas? *Journal of Experimental Child Psychology, 92*, 182–202.

Share, D. L., Jorm, A. F., MacLean, R., & Matthews, R. (1984). Sources of individual differences in reading acquisition. *Journal of Educational Psychology, 76,* (6), 1309-1324.

Spear-Swerling, L., & Sternberg R. L. (1996). *Roads to reading disability. Off track: When poor readers become "learning disabled"* (113-152). Boulder, CO, USA: Westview Press.

Torgesen, J. K., & Davis, C. (1996). Individual difference variables that predict response to training in phonological awareness. *Journal of Experimental Child Psychology, 63*, 1-21.

Treiman, R., Mullinnex, J., Bijeljac-Babic, R., & Richmond-Welty, E. D. (1995). The special role of rimes in the description, use, and acquisition of English orthography. *Journal of Experimental Psychology, 124*(2), 107-136.

Tunmer, W. E., & Chapman, J. W. (2002). The theoretical contexts of reading: How children learn to read (and why some don't). In P. Adams & H. Ryan (Eds.), *Learning to Read in Aotearoa New Zealand* (pp. 52-65). Palmerston North: Dunmore Press.

Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry, 45*(1), 2-40.

Westwood, P. (2005). Spelling: Approaches to teaching and assessment. Camberwell: ACER Press.

White, T. G. (2005). Effects of systematic and strategic analogy-based phonics on grade 2 students' word reading and reading comprehension. *Reading Research Quarterly, 40(*2), 234-255.

Wren, S. (2000). The cognitive foundation of learning to read: A framework. Austin TX: Southwest Educational Development Laboratory.

Wylie, R.E., & Durrell, D.D. (1970). Teaching vowels through phonograms. *Elementary English, 47*, 787-791.

AUTHOR PROFILES

Angela Evans

Angela Evans is an intern educational psychologist currently completing the Post Graduate Diploma in Educational Psychology at Massey University and is placed as an intern at the Ministry of Education. She trained and worked as a primary school teacher in Oxfordshire, UK, which ignited an interest in the field of educational psychology. On returning to New Zealand Angela combined raising her children with studying educational psychology. Angela has a particular interest in the implementation of evidence-based practice and social neuroscience. She is passionate about supporting children to engage and succeed in education.

Email:

ang.evans.2001@gmail.com

Dr Keith Greaney

Dr Keith Greaney is a senior lecturer in the Institute of Education at Massey University where he teaches both undergraduate and post-graduate papers in literacy education. He also researches and supervises students completing research theses in the area of literacy learning difficulties. Keith was a primary school teacher for 28 years including twelve years as a Resource Teacher: Literacy.

Email:

K.T.Greaney@massey.ac.nz

Alison Arrow

Alison Arrow PhD, is a senior lecturer in literacy at Massey University. Alison's research interests include the development of emergent literacy, particularly alphabet knowledge and phonological awareness, and what knowledge primary-school children use to read and spell. Alison is currently involved in research that examines how children use digital technology for their literacy learning, and in longitudinal research following children learning to read and write.

Email:

A.W.Arrow@massey.ac.nz