

UNIVERSITY OF THE WITWATERSRAND
DEPARTMENT OF APPLIED ENGLISH LANGUAGE STUDIES

Gwyn Randleff-Rasmussen

7507890

MA Research Report 2009

Supervisors: Dr Kerry Dixon

Prof. Hilary Janks

Research Title

An experimental intervention for reading fluency and comprehension using RAVE-O:
A case study of one Grade 2 reading group in one Johannesburg school.

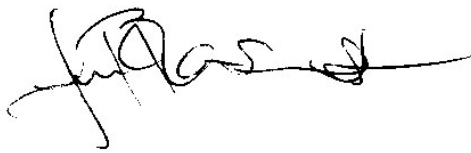
This research report is submitted in partial fulfilment of the requirements for an MA in
English Language Education by coursework and research report.

Abstract

RAVE-O (Retrieval, Automaticity, Vocabulary Elaboration (or Engagement with language) and Orthography) is a reading intervention developed using scientific principles specifically aimed at teaching dyslexic children to read. This study examines the effects of a RAVE-O intervention on fluency and comprehension in reading. It follows the application of the intervention by one teacher with a group of seven children with severe reading difficulties in a Johannesburg school, using participant observation to document how she adapted the resources and concepts of the program to meet the specific needs of the children in the group, over the course of one year. The results of reading tests administered before and after the intervention were compared. The generally positive results in reading fluency, comprehension, phonological awareness and RAN in this small group of children with reading difficulties indicate that the program would help in improving literacy outcomes in other South African contexts. The study highlights the specific difficulties encountered during the South African application with regard to the American-developed materials and the constraints of the program in relation to the South African school timetable. It also elaborates on particular strengths of the program, primarily vocabulary acquisition and an increased engagement with and enjoyment of language.

Declaration

I declare that this research report is my own unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Arts in English Language Education to the university of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

A handwritten signature in black ink, appearing to read 'G. Rasmussen', with a long horizontal stroke extending to the right.

(Gwynneth M. Randleff-Rasmussen)

1st day of February, 2010.

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Chapter 1

Introduction

South Africa is currently facing a literacy crisis: many children do not know how to read and are not being adequately taught, the education department has admitted (Blaine, 2007). Dixon, Place and Kholowa found that “school practices do not offer sustained and meaningful engagements with literacy” (2008, p.6). As a result of this overall lack of literacy engagement, South Africa’s Grade 4 pupils came last in a study of 40 countries that took part in the Progress in International Reading Literacy Study (PIRLS) in 2006 (Mullis et al., 2007). A study by the Department of Education in 2003 revealed that 61% of South African pupils do not develop age-appropriate reading skills by the time they reach Grade 3, which means that they do not have the reading literacy necessary to cope with learning in later grades (CEA, 2006). In addition, teaching itself is facing a potential crisis. Fewer school-leavers are achieving a university entrance pass and of those that do, very few choose to teach, particularly in the foundation phase (Blaine, 2007).

Howie, Venter and Van Staden (2006) in their preliminary analysis of the PIRLS data, speculated that the poor state of reading literacy among South African pupils could be attributed to poor teaching and training practices. Such findings have been highlighted by other research. In their investigation into effective primary literacy instruction, Wharton-McDonald et al. concluded that “the failure to develop basic reading abilities during the first few years of school portends a host of later academic, economic, and even social-emotional difficulties” (1998, p.101). Willenberg (2005) points out that high levels of adult functional illiteracy in South Africa are being inadequately addressed by adult basic education programmes and that these levels will only be exacerbated as inadequately schooled children reach adulthood. She also says that government and civil society institutions work on the assumption that consumers are literate, while the vast amount of information available on the Internet to those who are literate is responsible for increasing the divide between literate and illiterate. This is also borne out by the skills crisis, which is attributed to the failure of the education system, which is “sorely lacking resources to equip a nation adequately

for future growth” (<http://www.mg.co.za/article/2008-02-03-report-sa-education-in-crisis-mode>). Half of the South African primary schools assessed in the PIRLS 2006 study did not have a library or adequate access to instructional materials, while half of the households studied had fewer than 10 books, indicating low levels of parental education, which strongly correlated with children’s reading achievement (Howie et al., 2008).

The importance of early literacy education can thus not be over-emphasised. Children must be taught to read and teachers need training in teaching reading at levels that reach all children. Since approaches to reading instruction in use in South Africa at the moment appear to be inadequate, investigations into approaches to teaching reading that are likely to be effective in the South African context are important, having implications for both learners and teachers.

Research at the Centre for Reading and Language Research (CRLR) at Tufts University in Boston, Massachusetts, has developed a reading intervention program called RAVE-O based on scientific studies of how the brain learns to read. It focuses on teaching fluency and comprehension to children with learning difficulties. If children with severe learning disabilities, described by their teachers as “the worst readers”, can learn to read fluently and understand what they are reading through their RAVE-O programme, which focuses on “Retrieval, Automaticity, Vocabulary, Engagement with language, and Orthography”, then it bodes well as a method that teachers can utilise for mainstream children.

“RAVE-O can be utilized in a whole group setting for first grade students and in a small group or individual setting for struggling readers, English Language Learners, and students in second through fifth grade with phonemic awareness and naming speed deficits.” (FCRR, 2008, p.1). Experimental interventions in the USA and Canada using the RAVE-O programme with struggling readers have been successful, although the final quantitative report of the five-year longitudinal study carried out in three centres is still under review (see Wolf et al., 2009). There is potential for the use of RAVE-O as an additional aid to reading instruction in South Africa. An independent preparatory school in Johannesburg, which caters for children “with learning potential who are experiencing specific or generalised learning difficulties” (description from school website), sent two teachers from the school, one

of whom is an educational psychologist, to Tufts University for training in the RAVE-O programme. The school then proactively negotiated with the CRLR at Tufts to use the programme in South Africa, and both Tufts and the school were keen for a local application of the intervention to be properly researched. They agreed to base the South African research at the University of the Witwatersrand after negotiation with Prof. Hilary Janks, who offered a Masters student to conduct this research and suggested that I observe the participants' interactions with the RAVE-O materials, as well as examining pre- and post-intervention test results to see if the 16-week intervention produced a measurable difference in the children's reading abilities.

1.1 Background to RAVE-O

RAVE-O is an additional reading intervention developed by cognitive neuroscientists and teachers at Tufts University, in collaboration with several other institutions, such as Georgia State University and the Hospital for Sick Children in Toronto. The programme was self-published in 2006 by Maryanne Wolf and Tufts University, after a five-year longitudinal, experimental study in three cities (FCRR, 2008). The name was first coined as an acronym for Retrieval, Automaticity, Vocabulary Elaboration and Orthography (Wolf, Miller and Donnelly, 2000), which has since been slightly altered to include "Engagement (with language)" – expanding children's knowledge of oral and written language by teaching common patterns and multiple meanings of words. The major premise of RAVE-O is that "the more the child knows about a word (i.e., phonemes, orthographic patterns, semantic meanings, syntactic uses, and morphological roots and affixes), the faster the word is decoded, retrieved, and comprehended" (FCRR, 2008, p.2. See also Wolf, 2006). It is not designed as a stand-alone programme (Wolf, Miller and Donnelly, 2000): rather, it is an experimental, fluency-based approach aimed at struggling second- and third-grade readers and is designed to be used in conjunction with a phonics or phonological awareness programme, such as THRASS (Teaching Handwriting, Reading And Spelling Skills – Brown, 2006), which is currently taught at the Johannesburg school.

Although RAVE-O primarily addresses naming-speed deficits and fluency issues, the programme is also designed to benefit reading-impaired children with primary phonological deficits. It teaches component skills, such as word identification and

lexical comprehension, which combine vision- and auditory-related processes towards a fluent reading outcome. Researchers at Tufts argue that

[t]he RAVE-O program works systematically and simultaneously not only at the word level, but also on multiple linguistic components at the connected text level. A major goal, therefore, is quite literally to teach our struggling readers explicitly in multiple ways, and over many different exposures, what we want their brains to do on their own.

(<http://ase.tufts.edu/crlr/raveo.html> Retrieved 15 June 2008.)

In this instance, the programme was used in its formulation as a 16-week “pull-out” intervention: small groups of children in need of extra reading tuition were given an hour- or half hour-long lesson four times a week.

1.2 Aims of the Research

The purpose of this research was to investigate the application of RAVE-O in an independent preparatory school for children with learning difficulties, using the two weakest reading groups of children in Grade 2 (i.e. those with the greatest learning disabilities), as identified by their teachers. The weaker of the two groups had the RAVE-O intervention instead of their normal guided reading programme. By comparing the reading test results of the children before and after the 16-week intervention, we aimed to determine whether or not the intervention could be successfully used to help weak readers in the South African context.

The aims of the research were dual: a qualitative analysis of *how* the teacher used RAVE-O and of the children’s reactions to and engagement with the materials, and a quantitative arm to find out whether the approaches used in RAVE-O are effective in measurably improving reading fluency and comprehension in children with reading difficulties in a Grade 2 class in Johannesburg. This was done by comparing the results of reading tests administered before and after the intervention.

The research focus and questions were developed in joint consultation with the principal and teachers from the school and my supervisors, Dr Kerry Dixon and Prof. Hilary Janks.

1.3 Research Questions

- How do two teachers in a school for children with learning disabilities apply the principles and practices of RAVE-O in a Grade 2 reading group?
- How do the children interact with the RAVE-O materials and how do they respond to the teaching?
- Are the approaches used effective in improving reading fluency and comprehension?

1.4 Rationale

The rationale for this research was that if the intervention is successful with those children who have the most difficulty in learning to read, it could be used to benefit the literacy development of all children. After all, as Torgesen (1998, p.2) says, “[t]he ultimate purpose of reading instruction is to help children acquire the skills that enable learning from, understanding, and enjoyment of written language.”

Since enjoyment of language is fundamental to the enjoyment of reading, the “fun” aspect of the RAVE-O intervention, using playful instruction (Yopp and Yopp, 2000), was researched by asking the children about their own reactions to the programme, as well as observing their interactions with the teacher and the materials, many of which are game-like, such as charades and Bingo. This will add a South African context to the extensive body of research into playful means of teaching literacy (Scully and Roberts, 2002) generally and RAVE-O specifically.

“Research and teacher education in relation to early literacy issues is presently inadequate in South Africa despite ongoing evidence of low literacy achievement and high drop out rates in the majority of schools” (Bloch, Stein and Prinsloo, 2001, p.121). The present research extends the growing body of knowledge in reading and

literacy development in South Africa (Seeff-Gabriel, 2003; Bloch, 2006; Wildsmith-Cromarty and Gounden, 2006). It also explores the use of the intervention programme in different environments (Lyon and Moats, 1997), expanding the body of RAVE-O research materials to include countries outside North America (Wolf et al., 2002), while giving us some insights into how this programme works in the South African environment.

Since RAVE-O, like THRASS, is a relatively new teaching intervention in South Africa (Brown, 2006), research is needed into its approaches and the ways in which they are taken up in the local context, as this will also have implications for future teacher education. The research findings indicate where the approaches need to be adapted to suit the South African context. It also extends the body of reading intervention research (Lyon and Moats, 1997; Torgesen, 1998; Torgesen et al., 2001; Pierce, Katzir, Wolf and Noam, 2007; etc.) with specific reference to the South African context. This is not to say the research findings can claim to be extrapolated to the broader educational system.

This research took the form of a case study, and such studies, by their very nature, are small, focused studies of single social units. As such, it focused on the “*local particulars* of some abstract social phenomenon.” (Haas Dyson and Genishi, 2005, p.3, emphasis in original). However, case studies are important in themselves, as they enable researchers to gain insight into specific situations within a larger phenomenon, in this case, research into reading interventions.

The research at Tufts has concentrated on fluency and comprehension in reading. This is also a growing research field (Katzir et al., 2006 and 2008; Hudson, Lane and Pullen, 2005; Lyon and Moats, 1997). The researchers argue that struggling readers have most difficulty with rapid and automatic naming of letters, which affects their accuracy in word recognition, which in turn affects their reading fluency and comprehension of what is being read. The RAVE-O programme is used to attack fluency and comprehension in reading (Wolf, Miller and Donnelly, 2000) working in conjunction with a phonemic awareness programme, such as THRASS, which “is predominantly an auditory spelling and reading system that provides the link between phonemic awareness and graphemes”, (Brown, 2006, n.p.) to improve naming-speed processes and word recognition. The research at Tufts has shown that children who

received the RAVE-O treatment and a phonemic awareness programme consistently outperformed those who received other interventions, in fluency and comprehension measures as well as phonological awareness (Wolf et al, 2009).

The fact that the reading intervention grew out of research into the way the human brain learns to read and was established with scientific as well as educational roots implies that it may more effectively address those areas where particular problems occur. This research documents the process used in teaching severely reading impaired children. Positive outcomes of the intervention in the severely reading disabled child have encouraging implications for future reading teaching interventions for all children, since “children with extreme deficits in basic reading skills are much more difficult to remediate than children with mild or moderate” or no deficits (Lyon, 1996, p.54).

Chapter outline

Chapter 2. Literature Review

In this chapter I review the main bodies of literature with which my research was concerned:

- Theories and approaches to teaching reading
- The research background to the RAVE-O intervention
- Specific learning disabilities with particular reference to both the RAVE-O research and the specific difficulties encountered in the experimental group of children

Chapter 3. Methodology

This chapter introduces the research site and participants and outlines the research and data collection and data analysis methods I used.

Chapter 4. Data report and analysis - Quantitative

and

Chapter 5. Qualitative

In these two chapters I report on my findings, analysing the data using various methods outlined in the literature and method chapters.

Chapter 6. Conclusion and Implications

In this chapter I summarise my findings and make recommendations and suggest other avenues for research.

Chapter 2

Literature Review

In order to see how RAVE-O works to improve fluency and comprehension, aspects of the literature that pertain to the background of the program are discussed, including what it means to learn to read, approaches to teaching reading and the research underpinning the RAVE-O intervention. Since the RAVE-O program is designed around teaching dyslexic children to read, learning disabilities are then considered, with particular reference to both the RAVE-O research and the specific difficulties encountered in the reading group in this study.

2.1 Learning to Read

What does it mean to learn to read? Although the acquisition of language is a natural cognitive development, reading is not. Reading requires complex rewiring of the cognitive pathways that the brain uses for processing language, as has been shown through scientific studies of the brain (Sherman, 2008; David et al., 2006; Richards et al., 2006; Shaywitz, Lyon and Shaywitz, 2006; Pugh et al., 2000). The rewiring of these pathways must be achieved through thousands of exposures to patterns of letters, words, sounds and meanings until “networks of cells responsible for recognizing letters and letter patterns learn to ‘fire together’”(Wolf, 2007, p.14) to create more rapidly retrieved visual information of orthographic patterns, i.e. recognition of words and “letter pattern chunks” (Wolf, 2006, p.22). Repetition is an important aspect of the learning process, which helps to ‘hard-wire’ the pathways into the brain, so that it links all the components simultaneously, making a quick and efficient route to reading.

Children who are brought up in a literate, reading environment tend to have better phonological awareness than those with less access to print and less discussion with care-givers about words and their own environment (Bloch, 2006; Willenberg, 2005; Torgesen, 1998). This discussion about words and sounds is one of the most important scaffolding strategies for children’s early language and vocabulary acquisition. Vocabulary elaboration, in turn, is an important step towards fluency and

comprehension in reading (Wagner, Muse and Tannenbaum, 2007). Most children require direct reading instruction, although there are children who teach themselves to read (Margrain, 2005). Stuart (1999) notes that children who have good phonological awareness and letter-sound knowledge can readily recognise printed words, teaching themselves to read. Also, Ehri and Wilce (1987) showed that children who received specific spelling instruction beginning with letter-sound correlations and phonemic awareness learnt to segment and read words more readily than those who were taught spelling using lists of words that included high-frequency, non-phonetic words. Early difficulties with phonemic decoding can lead to difficulties with reading comprehension (Torgesen et al., 2001).

Phonological awareness is a necessary tool for reading as it helps children decode the printed words (Reading and Van Deuren, 2007; Fielding-Barnsley, Hay and Ashman, 2005; Nation and Hulme, 1997). But, as Fielding-Barnsley, Hay and Ashman (2005) point out, while phonological processing skills are a necessity for reading, phonological awareness training in itself is not sufficient for most children to achieve reading competence. Luke and Freebody (1999), in their Four Resources model, posit four roles for readers: *code-breaker*, *meaning-maker*, *text user* and *text critic*. Children should be taught in the first three fields in order to become fluent readers – to learn to read and to scaffold them towards the next step of reading to learn. They need linguistic competence in addition to phonological and orthographic awareness – semantic knowledge as well as structural. They need to be taught not only about letter-sound correlations, or how to decode the words, but also about the different *meanings* words can take on, and how to *use* the words in their own writing, expanding their vocabulary, interpellating themselves into the texts they read, relating their reading to their own lives and finding the relevance for themselves – showing their understanding of the texts and also being able to argue, for instance, when reading about a party that ‘this happened at my party’, or ‘that wouldn’t *really* happen’ when reading a fairy story. This is about fluency and comprehension, not about decoding the words without looking at textual meaning at the same time, as pure “rigid, authoritarian, and mindless” phonics instruction methods might teach (Anderson, 2000). Thus, phonological awareness is a necessary part of a reading instruction programme since it is an important scaffolding tool, but it is not an entire approach. Wolf (2006) emphasises that the RAVE-O program also is not a stand-

alone program, despite its multidimensional aspect which includes phonology, but must be taught alongside an explicit phonological awareness program.

David, Wade-Woolley, Kirby and Smithrim (2006) highlighted the roles of phonological awareness, letter knowledge and RAN (random automatised naming) as reliable predictors of reading ability. RAN is a measure of the rapid naming of familiar visual stimuli: objects, pictures and words. Dyslexic readers are often slower than average readers at naming, but there is no consensus as to the reason for this. It was thought to be related to phonological processes, but later research (Torgesen et al., 1997; Wolf and Bowers, 1999) has found the two to be separate, emphasising the visual and speed components of rapid naming, rather than the phonological recognition of letter patterns of words. Further, fMRI (functional magnetic resonance imaging) studies have shown that both phonological awareness and naming speed activate neurological networks in the brain that are related to reading, and yet are different from each other (Misra, Katzir, Wolf and Poldrack, 2004). In the RAVE-O program, RAN tests are run every week to stimulate rapid word recognition and in turn improve reading fluency.

2.2 Approaches to Teaching Reading

Because most children need direct instruction to learn to read, there are various approaches that have been used to facilitate this learning. The first and most commonly used approach is phonics, which can provide children with an effective decoding strategy if taught alongside other programmes to improve fluency and comprehension.

2.2.1 Phonics

Phonics is a strategy used by many teachers to teach children to read by sounding out letters, learning the letter name-sound relationships. Juel and Minden-Cupp (2000) found “the major strategy of use to children who enter first grade with few reading skills is sounding and blending phonemes. However, it also appears that they cannot use this strategy successfully without considerable instruction” (p.481). If

children are taught how to sound out easy words they will have a strategy to work out the spelling of more difficult words. In addition, teaching *phonemic awareness* (PA), which is the ability to understand that spoken words are made of different sounds and to identify individual sounds and the differences between them, sets the stage for meaningful phonics instruction, “which teaches the relationship between sounds and written symbols” (Reading and Van Deuren, 2007, p.268). This allows children to break up words into individual sounds, which is important in learning to read and spell, but “once a certain level of proficiency in reading is achieved, readers no longer rely on PA skills to decode written words by sound” (Reading and Van Deuren, 2007, p.269).

Yopp (1992) says that, since phonemes are “abstract units of speech” (p.696) with no physically definable boundaries and are influenced by their phonological context, children’s *awareness* of them is problematic. She cites studies proving that phonemic awareness can be taught not only using formal training programmes, but informally through reading books with rhymes, assonance and alliteration and then directing children’s notice to the smaller units of words that have these features. This teaches children structure and phonological awareness, as well as contextualising the words and making reading fun. Yopp (1992) also says that children learn readily through games and gives examples of activities incorporating sound-matching, isolating, segmentation and blending and substitution of phonemes to make nonsense words and songs. Songs are incorporated into the THRASS phonics programme, while RAVE-O uses fun game formats like charades and Bingo to teach words, putting them into Word Webs¹ and calling children Word Wizards. The programme introduces the key words into Minute Stories each week, which use the words in connected text as part of the programme’s introduction to comprehension.

While phonics as part of a phonological awareness program is a necessary and important strategy in learning to read, it needs to be further bolstered by vocabulary training so that once they have decoded a word, children can quickly work out its meaning in a particular context without losing track of the flow of a sentence, which affects fluency and comprehension. The RAVE-O program emphasises fluency and

¹ See Chapter 4. A Word Web is a graphic of a spider’s web mapping the relationship between the many meanings of a particular core word and other words associated with these meanings. As Wolf, Miller and Donnelly (2000, p.378) put it: “By calling children ‘word magicians’ or ‘speed wizards,’ we place them more in control of their own ‘bag of tricks.’”

comprehension and should be taught in conjunction with a phonological awareness program. The programme that was already in use in the school in this study was THRASS.

2.2.1.1 THRASS

There are several phonics instruction programmes available, such as THRASS (Davies, 2003), which teach grapheme-phoneme (letter-sound) correspondences, as well as phonemic awareness and the skills of segmenting words into recognisable phonemes and then blending them together to read the word. Many of these programmes incorporate games, songs and rhymes to do this (Yopp, 1992) – the THRASS programme is no exception, as it includes raps and songs.

Brown (2006) recommends THRASS as a therapeutic tool for children with reading difficulties, as it provides “more practical tools for reading and writing and it has a positive impact on their phonemic awareness and auditory perceptual skills”. The programme first introduces the letters, teaching their names and how to form them. It then introduces phoneme picture charts, which show the different graphemes associated with different phonemes, with separate charts for vowels and consonant sounds. Above each is a picture of a keyword to which it applies – for instance, the different graphemes associated with pronouncing the letter “a” (as [eɪ]) are shown thus: *a* as in baby, *ai* as in snail, *a_e* as in tape and *ay* as in tray (see Figure 1a). An asterisk means there may be other graphemes that are not represented on the chart, such as *ei*gh as in weigh, or *ey* as in whey, perhaps. Children are taught to “blend, read and spell the keywords using the Phoneme-Grapheme Book” and then to “visualise and spell the one-hundred-and-twenty keygraphemes on the class Graphemechart”, as well as to associate with each grapheme its keyword and picture. They can then find the graphemes and keywords and read the 500 English basewords in books (www.thrass.co.uk).

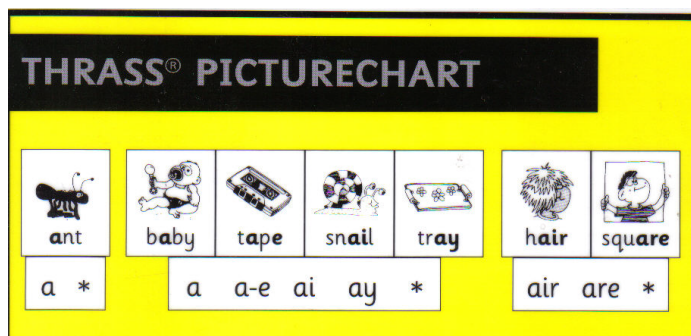


Figure 1a. Part of THRASS Picturechart, Davies and Ritchie, 1998.

The Picturechart, part of which is shown in Figure 1a above, also provides spelling choices, but quite how children are supposed to make the choice, between for instance “-air” and “are”, in their own writing is not obvious, since the program does not develop vocabulary awareness beyond these base words. “THRASS is fundamentally a programme that is for decoding graphemes and phonemes” (Condy et al., 2009) but does not directly teach *encoding*. The graphemes and phoneme charts are useful tools and can be incorporated into other reading instruction, as they try to show *all* of the options that can be used to represent particular phonemes, as opposed to the more common “one letter makes one sound” approach. But there are gaps and misdirections, an example of which was pointed out during discussion at the RASA Conference 2009: the THRASS chart shows the options for spelling the sound at the beginning of the word “jam” (Figure 1b) and includes the option “cage”, identifying “ge” as [dʒ], whereas it is actually made only by the “g”, as the “a_e” comes under the choices for [eɪ] as in “tape” (Figure 1a).

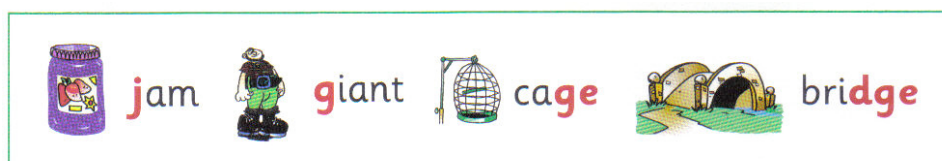


Figure 1b. “jam” (THRASS® Information brochure, <http://www.thrass.com.au>).

The THRASS approach to teaching phonics, developed in the UK in 1989 by Alan Davies, is used widely in the UK and Australia and is being increasingly used in South African schools and introduced in Zimbabwe and Botswana (<http://www.thrass.co.uk/africanchild.htm>). The children in this study already receive THRASS training as the phonological arm of their reading instruction. Davies (2000, 2003) points out that teachers should be trained in the accurate articulation of phonemes in order to be able to teach phonemic awareness to

children. If teachers have difficulty identifying the graphemes and articulating the phonemes in words, how can they efficiently teach them to children? This is particularly salient in the Southern African context, where many primary school teachers teach English as a first language though it is neither their nor their pupils' home language. However, there is as yet not much research evidence available showing its efficacy or otherwise in the South African context. One study, undertaken by Condry and her colleagues at the Cape Peninsula University of Technology (2009), found that teachers trained in THRASS felt prepared to teach reading, but not spelling or creative writing. In addition, many second-language speakers had difficulty with their *own* phonemic awareness in English and thus found themselves at a disadvantage when trying to teach children, either first or second-language speakers of English.

2.3 Whole Language

The proponents of the whole language movement in teaching reading believe that children learn to read by reading "real texts", such as children's literature stories, not worksheets or sentences, and that in reading they learn other areas of language (Cullinan, 1992, p.426), such as writing and spelling. Phonemic segmentation is often taught as part of a writing class to help the children work out how to spell words they might be able to read but not spell. In the whole language classroom, phonics skills such as specific letter-sound patterns are taught incidentally as the teacher observes the necessity for explanation when a child has difficulty reading a particular word and finding its meaning. However, as Horn says, this "incidental learning should be supplemented by direct, systematic teaching, especially in the case of difficult words" (cited by Groff, 1979, p.272), since this approach does not help in the reading or writing of irregularly spelt words, despite the fact that 85% of English words follow phonetic rules.

Cullinan (1992) reports on a study that found that children taught with a strong synthetic phonics programme wrote only small words, consistent with the sound and word patterns they had been taught, whereas those who were encouraged to read "interesting language of expository and narrative literature" were more adventurous and inventive in what they wrote. Thus, the study found that children did acquire new

vocabulary through their reading. Whole language forms the basis of Clay's Integrated Reading Writing intervention programme (Traweek and Berninger, 1997) in which the emphasis is on meaning and reading whole texts. The classes concentrate on reading, story-telling and writing as a whole literacy approach to acquiring language and spelling through natural, real-life activities rather than synthetic, imposed teaching structures.

Traweek and Berninger (1997) compared two of the mainstream approaches to teaching: Marie Clay's integrated reading-writing whole language approach, which concentrates on continuous text and word and letter sounds in context, and a phonics-based system called DISTAR which is "instructionally explicit about letter-sound correspondence and sound blending" (p.162). Reading achievement gain was not significantly different between the programmes and the reading ability of children in both programmes improved significantly. Their conclusion: "Despite the immense variability in teaching approach across classrooms, most children learn to read!" (Traweek and Berninger, 1997, p.166). However, they did also recommend a longitudinal study to see whether direct phonics teaching would benefit children's reading ability in later stages, since children who make phonological-orthographic connections between both whole and sub-words are better readers and spellers. Stuart (2004), in her follow-up study of children taught early phoneme awareness and phonics, found lasting positive influences on phoneme awareness, grapheme-phoneme correspondence knowledge, word reading and spelling. Fielding-Barnsley, Hay and Ashman (2005) point out that there "are still many unanswered questions and much debate about which teaching method or methods best match the diverse needs of children" as all children learn differently. Most children appear to develop stronger reading skills when provided with explicit decoding instruction in combination with meaningful reading activities (Connor, Morrison and Katch, 2004, p.306). If they can relate the stories they are reading to their own experience, the vocabulary becomes more meaningful and so scaffolds the acquisition of further, more complex vocabulary.

There are several different ranges of reading books, called "basal reading series", which use different criteria for their progressive difficulty. The earliest of these series were developed in the eighteenth century. One of these was the "McGuffey Readers", where the "first and second grade books were specially written to include

stories that emphasized the sounds of letters in words, but the readers for older students were anthologies of stories drawn from a variety of sources” (Reyhner, 2008). Some series rely on increasing vocabulary, others on the size of the words included. There is a movement in whole language against using these basal texts, which use controlled vocabulary, making the language less natural and more predictable than “real books” or children’s literature written in “natural, uncontrolled language” (Tunnell and Jacobs, 1989, p.474). However, the use of controlled vocabulary in early reading books better scaffolds the vocabulary acquisition of new readers and, in turn, their fluency and comprehension. The RAVE-O program, for instance, includes “Minute Stories” which become progressively more complex as the program introduces more complex morphological, semantic and syntactic components. “Real books” can then be read to the children by care-givers, since this involvement with texts is also an important scaffolding mechanism for reading and vocabulary acquisition.

In their study of phonics teaching in whole language classrooms, Dahl et al. found that the “foundation concepts of phonological awareness, phonemic awareness, and phonemic segmentation constituted more than a third” (1999, p.324) of the teaching time, although whole language advocates view phonics as just “one of the cueing systems that children use, along with syntactic, semantic, and pragmatic information” in reading (Dahl et al, 1999, p.312), but do not expressly teach these linguistic processes. At the core of the whole language approach is “the belief that decision making must be placed in the hands of teachers and learners” (Goodman, 1989, p.122). Children are actively involved in their own learning and the teacher has to decide what kinds of activities “are real and functional and purposeful for the learner” (Goodman, 1989 p.125; Cullinan, 1992). That the children’s needs are paramount is also at the core of the RAVE-O philosophy, but the program differs from whole language teaching in that, where whole language teaches whole-to-part, from text to ad hoc phonics, RAVE-O teaches part to whole, starting with semantic meanings, then breaking words into their phonemes and working up to syntactic processes through the POSSuM approach (see Section 2.5.1). Where the program offers comprehensive guidelines for a multidimensional program attacking all areas of learning to read, the pace and complexity are guided by individual children’s learning needs and the program must be adapted by the teacher to meet these needs. This

case study examines the ways the teacher used the concepts and materials in the RAVE-O program and how she adapted them to the individual children's needs.

2.4 Vocabulary Acquisition

While phonological awareness is an important tool and meaningful texts are essential to capture children's interest, sometimes neither of these strategies works; only recently has more attention been given to the importance of vocabulary acquisition. "One of the keys to becoming a skilled reader is to acquire a large vocabulary of words that can be recognized fluently and accurately in text" (Torgesen, 2002, p.11). Although research has shown that the richer a child's vocabulary, the more readily they will comprehend what they read and the more likely they are to understand and learn *new* words (Wagner, Muse and Tannenbaum, 2007; Neugebauer and Currie-Rubin, 2009), vocabulary enrichment teaching is not concentrated on in many schools (Neuman and Dwyer, 2009). Stanovich (1986) called this "rich-get-richer" effect of reading on vocabulary acquisition the "Matthew effect in reading", following the coining of this term in relation to other cognitive fields "where early achievement spawns faster rates of subsequent achievement" (Stanovich, 1986, p.381). This is true not only for first-language English speakers, but also for second-language learners, both of English and other languages (Neugebauer and Currie-Rubin, 2009; Wagner, Muse and Tannenbaum, 2007). Difficulties in comprehension during reading affect fluency and, in a vicious cycle, this in turn affects comprehension. Children who struggle to read, doing so with little comprehension due to lack of vocabulary, lose the motivation to read, which in turn affects the acquisition of new vocabulary.

The ability to read new words is also facilitated by both phonological and morphological awareness, since the latter enables children to expand their phonological awareness to letter patterns, chunking words into syllables. This recognition of morphological units of words enables them to work out the meaning, which Ehri refers to as the fourth, "consolidated alphabetic" phase of reading acquisition² (Roman et al., 2009, p.107) and which is strongly related to phonetic

² The first is the pre-alphabetic phase; the second the partial alphabetic and the third, the full alphabetic phase (see Roman et al, 2009, p.97).

spelling ability (Ehri, 1989). Morphological awareness and RAN are both strongly related to reading ability (Roman et al., 2009), but “good general language comprehension and good word reading skills are the most critical skills required for effective comprehension of written material” (Torgesen, 2002, p.9). All of these facets of reading are taken into account in a multidimensional program such as RAVE-O and, more importantly, fMRI studies have shown that training in these different areas does indeed stimulate the brain to learn (Pugh et al., 2000; Aylward et al., 2003; Shaywitz and Shaywitz, 2005; Richards et al., 2006). It is this attention to scientific evidence that makes the RAVE-O program interesting: it teaches children to read via a natural progression, building words from their smallest morphological components and linking them semantically and syntactically.

2.5 RAVE-O

Research in cognitive neuroscience using fMRI studies shows the development of novice readers into experts as a process of streamlining, using fewer brain areas with more efficiency as fluency and comprehension improve (Pugh et al., 2000; Aylward et al., 2003; Shaywitz and Shaywitz, 2005). These studies, together with behavioural and educational data, underline the importance of time and practice, as well as the necessity of addressing *each* area of potential problems in reading with interventions designed to scaffold the development of fluent and comprehending readers (Wolf et al., 2009). As Lyon and Moats (1997, p.579) note, “in all of the NICHD intervention studies to date, improvements in decoding and word-reading accuracy have been far easier to obtain than improvements in reading fluency and automaticity. ... [T]here is much to learn about the development of componential reading skills” and of well-defined intervention methods.”

Other teaching approaches are aimed at teaching reading and learner outcomes and are not really influenced by scientific studies – they do not take cognisance of how the brain learns to read – whereas the theoretical rationale for the RAVE-O intervention is grounded in the work of the Centre for Reading and Language Research at Tufts University, which deals with the science of the reading brain (Wolf, 2007). New research in the neurosciences can make a really valuable contribution to our understanding of the way the brain learns to read. The primary purpose of the

Centre is to use cutting-edge research, with particular emphasis on the cognitive neurosciences, to further the understanding of how children with reading disabilities differ from those who readily learn to read. From this work sprang the seeds of the RAVE-O reading intervention to help children with learning disabilities. In a longitudinal study involving struggling readers identified by their teachers in schools in Boston, Toronto and Atlanta, RAVE-O was compared with another multidimensional reading treatment and showed positive effects on word-reading and decoding skills, as well as comprehension and accuracy in reading connected text (FCRR, 2008). The multidimensionality of the studies produced rounded, understanding readers, with improved phonological awareness, fluency and comprehension.

The RAVE-O reading intervention programme grew directly from this group's work in understanding naming-speed deficits in severely impaired readers. Its main purpose is to achieve fluency of reading and automaticity of letter and word recognition, which improves comprehension of what is read (Wolf, Miller and Donnelly, 2000). It was developed in an attempt to address "the needs of children who do not completely respond to phonological-based treatment" (Wolf and Katzir-Cohen, 2001, p.212) methods of teaching reading. These children develop resistance to learning to read as it becomes more difficult and this affects their ability to learn, in a vicious cycle. RAVE-O's whimsical approach tries to make learning fun, altering this affect and making children *want* to learn to read.

The RAVE-O programme is designed to be used in conjunction with a phonemic awareness programme, since such programmes, particularly those that include letter-sound teaching, have been found to be beneficial for reading and spelling development, even in learners of English as a second language (Stuart, 1999). RAVE-O incorporates this awareness with RAN by using a game format (Speed Wizards) to teach "rapid recognition and practice of the most frequent orthographic patterns in English" (Wolf and Katzir-Cohen, 2001, p.231) to address the speed and fluency aspect of reading. In addition, RAVE-O addresses semantic and morphological aspects by introducing a word and examining its different meanings and possible forms – increasing vocabulary, comprehension, and lexical retrieval skills – using "Word-webs". The game format here encourages children's engagement with the language. One of the goals of the programme is to re-motivate

learning in children who may have become discouraged by reading difficulties, by making learning fun and meaningful, helping to cultivate a love of language while developing the ability to use it (Wolf, 2006).

2.5.1 POSSuM

The programme uses components that were selected to simulate what the brain does when it reads either a single word or that word in connected text. According to Katzir et al. (2006, p.54), reading fluency involves the “successful integration of information from the phonological, orthographic, semantic, syntactic and morphological processes”. The developers refer to these linguistic components of the multidimensional program as POSSuM:

Phonology deals with sounds and how they are manipulated to make words – like /f/ /a/ /n/ to make “fan”. The P also stands for the “pragmatic” usage of words, developing the child’s ability “to perceive and use the socio-cultural rules of language in its natural contexts” (Wolf, 2006, p.7).

Orthography deals with the written form of words, linking the sounds to their written representations.

Semantics talks about the different meanings of words, while

Syntax shows how they are used in different ways to make sentences – making *sense* of words, and developing the child’s grammatical awareness.

Morphology breaks up words into their smallest meaningful components, or morphemes, and teaches recognition of common visual orthographic patterns.

The programme has been successfully applied in three centres involved in a longitudinal study in Boston, Atlanta and Toronto (Wolf et al., 2009; Wolf, Gottwald and Orkin, 2009). In addition, it has been used by the organisation Reading for the Blind and Dyslexic (RFB&D):

Two studies have investigated the effectiveness of using RFB&D's AudioPlus text with the RAVE-O reading program. Following a four-week program, students showed significant increases in standard scores for listening comprehension, phonological analysis and blending, rapid naming and reading comprehension (Recording for the Blind and Dyslexic, 2006a). In a subsequent study, children listened to RAVE-O stories using RFB&D's AudioPlus text at a slightly faster rate than their normal reading rate and followed along with the text. Students with poor phonological and naming skills showed significant gains in phonological skills, listening comprehension and reading comprehension.

(<http://www.learningthroughlistening.org/Listening-A-Powerful-Skill/The-Science-of-Listening/Learning-Through-Listening-in-the-Digital-World/How-New-Technologies-are-Changing-What-a-Literacy-Program-Should-Be/148/>,

12 July 2008)

All of the research in RAVE-O so far has been confined to North America, and the program was developed within a Western epistemological framework for children whose home language is English. In South Africa, the culture is different and many children learn in English as a second language. One of the aims of the present case study was to see how RAVE-O helped improve these skills in one South African group of struggling readers.

2.6 Other Reading Interventions

Teachers have long recognized that children with reading difficulties need to be scaffolded with additional interventions as well as direct phonological and decoding instruction. In his booklet, "The Savvy Teacher's Guide: Reading Interventions That Work", Jim Wright (2001) suggests different ways teachers can help readers with diverse learning needs. The methods he describes are based on reading research, although not with the scientific background of the RAVE-O intervention. However, they are cited as effective in the National Reading Panel (USA) report of 2000 and include direct instruction in skills and strategies, vocabulary instruction and error correction. Most intervention programmes, such as Assisted Reading, Early Steps,

Reading Recovery or the Orton-Gillingham method, tend to include many of the skills cited by Wright.

Reading Recovery was developed in New Zealand by Clay (1985) out of the whole language movement to help children who had not made satisfactory progress in the first year of school, despite being exposed to an “educational environment that immerses children in reading extended text and writing stories and messages” (Pinnell, 1989, p.165). It is a child-specific acceleration programme: the teacher must be able to pinpoint a child’s abilities so that the intervention starts at the right level and does not “waste precious learning time”; the first ten days are spent with the child reading and writing with the teacher with no explicit teaching intervention, “Roaming around the Known” to find what the child knows and can self-correct (Pinnell, 1989, p.167). Santa and Høien (1999) point out, however, that the program does not include explicit instruction in phonological analysis and neither, apparently, does it include any vocabulary instruction, apart from that which comes up incidentally. Having its basis in the whole language approach, Reading Recovery assumes children acquire skills in word recognition and comprehension incidentally through reading connected text and through writing, not through explicit teaching of discrete skills which are then incorporated into reading.

Early Steps was developed by Darrell Morris using a similar philosophy to Reading Recovery, but incorporating more phonological skills and daily writing exercises, since “reading and writing are reciprocal processes, and when used together they advance the child’s literacy development” (Santa and Høien, 1999, p.57). It was intended to be a more balanced approach than either a phonologically based or a whole language programme. Santa and Høien (1999) found that the programme was most effective with the children at the highest risk of not learning to read in the four Montana, USA, schools they included in their study, concluding that it is particularly strong in teaching children phonological processing skills.

Assisted Reading is a programme that involves children listening to a taped passage, reading along while the teacher reads the passage and then reading it independently. Gilbert, Williams and McLaughlin (1996) found it to be an efficient and effective intervention when used with basal texts and teacher-produced tapes. Shany and Biemiller (1995) suggested that additional gains in comprehension and enjoyment of

reading would be generated with increased assisted reading practice, i.e. with more time spent reading and more exposure to text. In their study, they found that children's reading speed and comprehension and listening comprehension improved with daily assisted reading. They also noted that the children who only listened and read along to tapes, but without reading aloud, read more text in the same time, but made similar gains to those with teacher assistance. Gains in listening comprehension increased reading comprehension, showing that oral skills play an important role in reading. Increased reading experience also led to increased competence of reading words, but only in context, which is in line with whole language expectations of reading teaching. Context thus plays an important role in the decoding and identification of new words, as does increased exposure to books children choose to read in their own time (Tunell and Jacobs, 1989).

The Orton-Gillingham method is one that includes a phonetic arm and is based on research by a committee established by the National Academy of Sciences to investigate the prevention of reading difficulties. It was developed in the USA by Dr Samuel T. Orton and educator Anna Gillingham. The programme "utilizes phonetics and emphasizes visual, auditory and kinaesthetic learning styles. Instruction begins by focusing on the structure of language and gradually moves towards reading" (<http://www.ortongillingham.com/orton-gillingham2.asp>). The programme uses a predictable sequence that integrates reading, writing and spelling by teaching alphabetic principles, speech sounds and sight words, with the goal of reading fluency and comprehension. It is also used in several South African contexts.

The RAVE-O program adheres to these principles, teaching first word and then language structure using different learning styles, but goes beyond this to actively build children's vocabulary, as it strives to engage not only the learner but the teacher in a love of language (Wolf, 2006).

2.6 Reading Difficulties and Neuroscience

The RAVE-O intervention programme has been developed specifically for children with learning difficulties or disabilities, based on scientific research into "how the brain reads in typical development and fails to read in children with learning disabilities"

(Wolf, 2006, p.3). In this section, I will therefore look into the definitions of reading disability and the neuroscience underpinning the development of the program.

According to the United States Office of Education:

“Specific learning disability” means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems, which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural or economic disadvantage.

(United States Office of Education, 1977, p.65–83,
as cited by Lyon, 1996 and Elkins, 2002)

Elkins (2002) suggests restricting the term to “learning difficulties”, as this would include learners with and without discrepancies between their ability and achievement levels as established by benchmark testing. Children with learning disabilities generally have “verbal rather than non-verbal deficits” (Tyler and Elliott, 1988, p.494), meaning that most learning difficulties are related to language and reading problems. Children with attention-deficit/hyperactivity disorder (ADHD), however, have varying problems, which include reading disorder (RD), “math disorder” (MD) and the combination of RD and MD (RD+MD) (Klorman et al., 2002). Since this is a study of a reading intervention, I shall concentrate on reading disabilities, since, although several of the children in the RAVE-O group had ADD or ADHD as well, they all presented with varying degrees of reading difficulty. Reading disabilities have been referred to as Developmental Reading Disorder and Dyslexia (LDRC, 2002).

Dyslexia is defined as unusual difficulty in learning to read and spell, “a specific reading disability that cannot be explained by low intelligence or inadequate instruction ... and is characterized by specific difficulties in spelling and word recognition as well as in reading fluency” (Igo et al., 2006, p.15). It can involve deficits in phoneme awareness, phonological processing, RAN and lexical-level

orthographic coding (word recognition). Studies of dyslexic brains donated to medical science have shown that there are structural differences in both the cerebral cortex and the thalamus and, because dyslexia has been found to run in families, it is suspected that there is a genetic reason for this (Sherman, 2002). There is a large body of scientific evidence supporting a genetic component of dyslexia, but its heritability pattern is complex and relates to several different chromosome loci (Igo et al., 2006; Byrne et al., 2006; Shaywitz and Shaywitz, 2005; Grigorenko, 2001). However, “[w]hether the differences in the genetic loci represent polygenic inheritance, different cognitive paths to the same phenotype or different types of dyslexia is not clear” (Shaywitz and Shaywitz, 2005).

Scientists at the National Institute of Mental Health (NIMH) found using positron emission tomography (PET) brain scans that dyslexics rely more on right-hemisphere regions than left to overcome their reading difficulties (Marshall, 2003). Research by Berninger and colleagues, in a family genetics study of dyslexia, suggests that while developmental dyslexia involves phonological, orthographic and morphological word forms, adult dyslexics appear to create mapping relationships within the areas of the brain “among these *three word forms* and their *parts*” (Richards et al., 2006, p.57, emphasis in original), as shown on fMRI scans showing brain activity. The participants in both Berninger’s study and the present case study had high verbal IQs, but unexpectedly low reading and spelling achievement levels.

The researchers then studied the complex relationship that develops between the areas of the brain used to process the different aspects of words, their forms and their parts, in response to specific spelling instruction, in the changing brain patterns of dyslexic children in Grades 4–6. Many children by this stage have mastered the phonological stage of spelling, but it is more difficult for dyslexics. The networks within the brain areas involved in reading and spelling link morphological word forms easily in the ordinary reading brain and less readily in the dyslexic brain. The brain activation patterns of dyslexic children were mapped using imaging for morphological, phonological and orthographic word forms, before and after spelling instruction, and showed a marked improvement. After treatment, the dyslexic brain patterns in the two brain areas involved, particularly with orthographic forms, showed no difference from those of good spellers and readers. However, benefits of morphological treatment could not be detected; the researchers suggest that

proficiency is first needed in the phonological encoding and orthographic spelling stages and that more research is needed into the “optimal developmental sequence and mix of the phonological, orthographic, and morphological instructional components for both dyslexics and normally developing spellers” (Richards et al., 2006, p.82). This is the main reason the RAVE-O program is interesting: it tries to simulate what the brain does as it learns to read. Shaywitz and others (Marshall, 2003) found from their brain imaging studies that teaching methods that work well for many children may actually be harmful to dyslexic children. For instance, *intensive* drilling in phonemic awareness or phonetic decoding emphasises strategies that are as likely to diminish reading ability for dyslexic children as they are to improve it, increasing their levels both of frustration and of dyslexic impairment. While RAVE-O does introduce phonemic awareness, it does not use “drilling” methods, but repeats the concepts in different ways, using different modalities so that the repetition does not become rote learning and cause the children to become bored.

A number of studies in reading disabilities in young school-age children and adolescents show that the inability to separate words into their phonological elements or to “recognise and manipulate specific speech sounds” (Wise et al., 2007) is the main problem in reading disability. This is referred to as a phonological deficit, where letter-sound patterns are not readily processed and children have problems translating between oral and written forms (Torgesen, 1998). They fail to develop “an awareness that words—both written and spoken—can be broken down into smaller units of sounds” (Katzir et al., 2008, p.48). In order to overcome this problem, “the most successful and evidence-based interventions designed to improve reading ... include five critical elements: phonemic awareness; phonics; fluency; vocabulary and comprehension” (Shaywitz and Shaywitz, 2005), without serving up a reading diet that is too phonics-heavy. RAVE-O does include phonological awareness, but the emphasis is on vocabulary elaboration, fluency and comprehension rather than decoding.

Wolf and her colleagues have extended this phonological deficit view of dyslexia to incorporate a deficit in naming-speed processes as another core reading disability (Wolf and Bowers, 2000). Naming-speed deficit is defined as occurring where “children with slow performance on a Rapid Automated Naming (RAN) task, process individual letters in a word too slowly to enable associations to form between

letters” (Conrad and Levy, 2007, p.201). Wolf and Bowers proposed a third alternative conception of dyslexia, the double-deficit hypothesis, where disabled readers can be classified as “one of two single-deficit subtypes that are relatively independent of each other (i.e. phonological-deficit reader; rate-deficit reader) or one combined subtype (i.e. the double-deficit reader), which is composed of children who are typically the most severely impaired readers across all aspects of reading performance” (Wolf et al., 2002; Wolf and Bowers, 2000; Wolf, Bowers and Biddle, 2000).

However, in their literature review of studies of the double-deficit hypothesis of dyslexia, Vukovic and Siegel (2006) could not find evidence to support the identification of a naming-speed only deficit, nor did they find that naming speeds were targeted for intervention. They attribute this to the fact that “the lack of an agreed-upon operational definition makes it difficult to evaluate both the diagnostic specificity of RAN tasks and effective intervention for readers with a naming speed deficit” (p.26). They further found that both fast and slow namers benefited from phonological interventions and conclude that further research is needed into what effects a reading intervention targeting naming speed would have. This study examines the effects of the RAVE-O intervention, which was designed by Wolf et al. to address the problems of rapid recognition and naming speed (Wolf, Miller and Donnelly, 2000) in relation to fluency and comprehension in reading.

On the other hand, both Curtin, Manis and Seidenberg (2001) and David et al. (2006) agree with Wolf and her colleagues that there is evidence to support the existence of two separate reading deficiencies and David et al add that “naming speed and phonological awareness measure different constructs as both uniquely predict and contribute to reading ability” (p.170). Functional magnetic resonance imaging has shown that both phonological awareness and naming speed activate neurological networks in the brain that are related to reading and yet different from each other (Misra, Katzir, Wolf and Poldrack, 2004). In response to the review by Vukovic and Siegel (2006), Katzir et al. (2008, p.48–49) claim that a growing body of work supports the evidence for two discrete core deficits, but admit that the reviewers have uncovered a gap in the research comparing the fluency of children with reading disabilities segregated according to the three subtypes outlined in the double-deficit hypothesis. They therefore tested a subgroup of participants from a larger,

longitudinal study, based on these three classifications, to answer the research questions:

1. Do children classified by the DDH differ on fluency at the letter, word, and connected text levels?
2. Do children identified by either low-achievement or ability–achievement discrepancy criteria show similar patterns of differences when classified by the DDH?

(Katzir et al., 2008, p.50)

Their findings support results of previous studies, but they conclude that more research is needed into the independent components of difficulties leading to reading dysfluency in order to “devise better assessment and intervention tools” (p.64). This case study does not go into great detail about the components of learning difficulties, but it links up the different difficulties and individual responses to the intervention materials experienced by the children in the experimental group receiving RAVE-O instruction. Some of these difficulties may even be linked to their different styles of learning, which are perhaps not catered to in a mainstream school setting.

2.7 Learning Styles

The resources in the RAVE-O program are designed to accommodate a variety of learning styles to enable children with learning difficulties to engage with the language in different ways. In this section I will examine the literature around the different learning styles that are evident in the classroom.

“Definitions of learning styles vary almost as much as those related to dyslexia” (Smith, 1988, p.86) and an individual’s learning style preferences or characteristics may change over time as well as being situation-specific. Learning style is difficult to define, but is “hypothesized to be a combination of cognitive, affective, and psychological characteristics that describe how that individual interacts with his or her environment” (Krätzig and Arbuthnott, 2006, p.238). Individual learning style does not remain constant, but develops as a person grows and most people practise a mixture of learning styles, adapting to different contexts (Silver, Strong and Perini, 1997). The term “learning styles” has been used to cover many different models (Felder and

Brent, 2005). Some of these are:

- MBTI (Myers-Briggs Type Indicator) based on Jung's personality types built on four basic psychological functions: Extroversion vs. Introversion, Sensation vs. Intuition, Thinking vs. Feeling and Judging vs. Perceiving;
- Kolb's model based on preferences for concrete experience or abstract conceptualization, which parallels the models based on modality preferences for either hands-on tactile and kinaesthetic experience or verbal abstractions;
- Felder and Silverman's engineering-based model depending on answers to four questions as to how students prefer to perceive information (concrete or abstract); what type of sensory information is most effectively perceived (visual or verbal); how students process information (actively or reflectively) and how they "progress toward understanding" (Felder and Brent, 2005, p.60): sequentially or globally.

However, in the RAVE-O intervention and in the school in this study, the model that is referred to is that of modality preference in relation to instruction, or sensory-based perceptual learning style (Krätzig and Arbuthnott, 2006). Children learn more easily if material is presented in a particular modality, be it visual, auditory, tactile or kinaesthetic. Visual learners tend to need more visual input, in the form of pictures and body language; auditory learners learn best through verbal discussion and tactile or kinaesthetic learners need to move, touch and do things with their own hands.

Interestingly, in their review of learning styles research, Dunn, Beaudry and Klavas (2002) found in studies that compared "hemispheric" (p.78) with other learning styles, that left-hemispheric pupils preferred a more formal, structured class setting and visual input, while right-hemisphere children disliked structure. The dyslexic brain tends to rely on right-brain areas used in visual perception and non-verbal and analytical thought processes to help reading (Marshall, 2003; Shaywitz and Shaywitz, 2005). However, as Krätzig and Arbuthnott (2006) point out, most people are more likely to learn multimodally, depending on the context and the material to be learned, so a variety of modalities would be advantageous to all learners.

Some of the children in the reading group in this study have been diagnosed as having ADHD (Attention Deficit Hyperactivity Disorder), but, according to Linksman (2009), children are often diagnosed as ADHD when they are simply kinaesthetic learners and, given the opportunity to learn through their preferred modality, their ADHD-like behaviour disappears.

The variety of modalities of the materials included in the RAVE-O kit is designed to appeal to the affective-motivational system involved in learning, and is thus part of the engagement with language, the E of RAVE-O (Wolf et al., 2009). The intervention not only tries to simulate how the brain learns to read, but does it through different modalities so that it reaches children with learning difficulties by allowing them to learn through their different styles. In the following chapter, I detail the methods used to see how the children in one particular reading group interacted with the RAVE-O intervention, and how they reacted to the different modalities presented in the materials, as well as examining how RAVE-O helps to improve reading fluency and comprehension.

Chapter 3

Methodology

This chapter details the research site and participants, as well as the research design and methods used for data collection. The methods used were chosen as being those that would best answer the research questions:

- How do two teachers in a school for children with learning disabilities apply the principles and practices of RAVE-O in a Grade 2 reading group?
- How do the children interact with the RAVE-O materials and how do they respond to the teaching?
- Are the approaches used effective in improving reading fluency and comprehension?

3.1 Research Site

The research was carried out at an independent preparatory school in Johannesburg, established by parents of children with learning problems and an educational psychologist, for

“children with learning potential who are experiencing specific or generalised learning difficulties ... [They are] provided with appropriate help from sympathetic, enthusiastic and professionally trained teachers, therapists and the school principal, who work interdependently with the parents and children” (School website).

There are approximately 180 pupils from Grade 0 to Grade 7.

Reading disabilities affect other areas of learning and hence research into successful approaches to teaching reading is necessary. The teacher of the RAVE-O group and

the educational psychologist both attended the RAVE-O training program in Boston, and are working in close collaboration with Maryanne Wolf and her colleagues as well as with Wits University on this research.

3.2 Research Participants

There are two sets of participants: the teachers and the children.

3.2.1 Teachers

The school chose the teachers included in the study: the school's educational psychologist, Val, who is the director of the Assessment Unit at the school, and the teacher of the weakest group of readers, Fran. They were both involved with this pilot implementation of the RAVE-O intervention and thus form part of the sample. The two teachers, of the RAVE-O and of the "control" reading groups, and the psychologist have taught at the school for several years and are very experienced in teaching children with learning difficulties.

Val taught mainly in the Junior Primary phase but also as guidance instructor, assessment co-ordinator and acting principal in four private schools, for 20 years before becoming an educational psychologist. She took over the directorship of this school's assessment unit in 2006 and is also a private consultant psychologist.

Fran has over 20 years' experience as a Primary and Pre-primary teacher and also as a remedial therapist and lecturer in specialised education. She is head of the remedial department and responsible for all assessments in the school.

Val and Fran chose the two groups of children to be studied, on the basis of their reading ability and need for further intervention, as established by results of previous tests conducted at the school. The RAVE-O group consisted of the weakest Grade 2 reading group of seven children, who received training in RAVE-O in addition to the basic reading teaching programme in the school, which includes THRASS, Guided Reading and Phonological Awareness Training. The second weakest group of seven

was the control group, and did not have RAVE-O training. All children underwent assessment testing before and after the intervention period.

3.2.2 Children

There were seven children in the RAVE-O group, four of whom were being treated for Attention Deficit Hyperactivity Disorder or Attention Deficit Disorder (ADHD/ADD).

1. George³

George had neurofibromatosis with concomitant learning disabilities, according to the psychologist's profile notes in the school archives. He displayed a short attention span, and was being treated for ADD. He often substituted words with the same initial phoneme if he was unsure when reading, as was evident during RAVE-O lessons and also showed in his test results. When writing, he would leave out some of the sounds in words. He needed help with blending in both reading and writing.

2. Jane

Jane was also being treated for ADD, and got quite anxious about taking her medication (which was dispensed at 11a.m.) She was kept back in Grade 2 at the end of 2008, as she was not progressing well at school. In reading, she needed help with decoding, often sounding out familiar words and using pictorial clues, which also helped her comprehension. She was unsure of some phonemes, particularly digraphs, and had difficulty recalling learnt phonic sounds and high frequency words. In writing, she often reversed letters, which was particularly noticeable in the "J" of her name when she wrote it on her classwork.

3. Susan

Susan was being treated for ADD/ADHD. She had problems numerically and with reading, according to her archived report. She refused to read passages with slightly difficult words, and tended to substitute words with the same initial letter, guessing at the word rather than analysing and blending. She would write simple sentences that

³ All students' names are pseudonyms, to preserve their anonymity. These notes were taken from the school's archived reports on each child, to which I was given access, and subsequently confirmed by my participant observation.

made sense and then lose interest. She displayed anxiety in a test situation and gave up easily, and also had a fear of clowns and of fancy dress. Her moods were variable.

4. Neil

There was a family history of ADHD and learning disability and Neil was being treated for ADD/ADHD, but was then weaned off the medication, and this seemed to improve his attention in class. However, he had problems with word recognition, particularly for high-frequency and sight words, and with number and letter reversals. He had difficulty with visual memory and with blending in multisyllabic words.

5. Richard

Richard and Neil were often together. Richard worked very slowly both in numeracy and in reading, where he often guessed at words, rather than analysing and blending. Although he had good auditory analysis, and could identify sounds, he showed limited ability with synthesis. He concentrated well over short periods but became fatigued easily. The report in his file said that he had limited rhyme and alliterative awareness and difficulty with verbal comprehension, but this seemed to be improving.

6. Chris

Chris was a very quiet boy, as apparently were his twin brother and his father, and was easily distracted. He had made slow but steady progress in numeracy. His writing was slow and he reversed letters and often substituted d for th or left it out, for instance in "birday". In reading, he displayed weak rhyming and auditory discrimination.

7. Chloe

Chloe had a limited concentration span and displayed postural weakness. She read at a slow pace, at instructional level. She sounded out words, finding sight words more difficult, and had difficulty with words in isolation, as she looked for contextual clues. She could work out the initial consonant but found the words more difficult to remember. In writing, she often used a letter that did not correspond to the sound, e.g. y for w or "brey" for "brother".

3.3 Research Design and Data Collection Procedures

The research took the form of a case study, researching “a social unit, for example, a group, a place or activity, or some combination of those units...(which) becomes a case of *something*, of some phenomenon” (Haas Dyson and Genishi, 2005). The case here was one small reading group in a Grade 2 class in a private preparatory school in South Africa, which specialises in educating children with special needs. The phenomenon being studied was the RAVE-O reading intervention.

The advantage of using the case study method is that it allows the use of multiple methods of collecting “evidence”, both qualitative and quantitative, to be interpreted or “made sense of” (Gillham 2000, p.2). Qualitative methods allow one to “explore complexities that are beyond the scope of more ‘controlled’ approaches” and to study the “informal reality” of what is really happening in a social setting, such as a classroom (Gillham, 2000, p.11). Qualitative methods thus give a general overview of what is happening at “grassroots” level, using observation, description and interpretation, while quantitative methods give the scope for quantifying a qualitative assessment, giving a more scientific reasoning to the conclusions reached. For instance, instead of just stating, “there was a distinct improvement in comprehension, as shown by these examples” as is done in Chapter 4, one can show improved test results which can be “counted”, which are presented in Chapter 5. The use of varied methods allows triangulation of observations, by showing a phenomenon from different points of view. Thus, I observed the interactions of the children with the materials – activities and resources – of the program, asked them which “bits” they liked best during an informal focus group at the end of the programme and then discussed these observations and interpretations with the teacher, gathering her point of view, and also used the “hard evidence” of numbers to justify the conclusions reached.

In this study, the quantitative data were obtained from results of reading tests administered before and after the intervention to both the RAVE-O and control groups. The qualitative data consisted of field notes and video footage taken during classroom observation of some of the RAVE-O intervention sessions, as well as post-intervention interviews with the research participants, and artefacts produced by the children during RAVE-O lessons.

3.3.1 Quantitative Data

The quantitative data are comprised of the results of reading tests administered to the two groups of seven Grade 2 children with reading disabilities. Reading fluency and comprehension tests, spelling tests and vocabulary tests were administered and the results before the intervention are compared with the post-teaching results of both groups, as a way of assessing the improvement, or lack thereof, in children's fluency and comprehension.

The following tests, which are standard commercially available resources regularly used for assessments by the school, were administered to both groups of children before and after the intervention:

1. British Picture Vocabulary Scale (BPVS) shows the extent of a child's English vocabulary acquisition. It measures "vocabulary understood, as opposed to vocabulary used" (Dunn and Dunn, 1981). This method of assessment does not require any reading, speaking or writing – the child simply points to the picture cards. It was developed originally in the US as the Peabody Picture Vocabulary Test, and adapted by the authors for a British context (Turner and Townend, 2002).

The test consists of 150 plates containing four pictures each. The pictures on any one plate represent objects, activities, or states of being. The test is administered by presenting the subject with a stimulus word for each plate, and credit is earned by a correct indication of which of the four pictures best illustrates the meaning of the stimulus word. The pictures are arranged in an ascending order of difficulty and subjects are tested from a basal of eight consecutive correct answers to a ceiling which consists of six errors on eight consecutive responses. The procedure used for establishing a ceiling, and thus stopping the test, assumes that the subject would not answer additional items correctly if the test were to be continued beyond the ceiling item. (Renzulli and Paulus, 1969).

2. Neale Analysis of Reading Ability (NARA) measures the accuracy, comprehension and rate of reading in children. In addition, the children are tested in their Phonological Awareness by their ability to read NON-words (nonsense words)

by analysing the sounds. “The NARA Reading comprehension scale is known to be a valid test of comprehension as well as word recognition” (Savage and Frederickson, 2005, p.155).

The administration of the NARA requires the child to read a set of stories aloud and to answer questions after each one. Testing stops when a prescribed number of word reading errors are made. A word reading accuracy score is derived from the total number of word reading errors, a reading comprehension score from the number of questions answered correctly and a reading rate value is calculated by recording the time taken to read each story. (Cain and Oakhill, 2006).

3. Comprehensive Test of Phonological Processing (CTOPP) assesses phonological awareness, phonological memory, and rapid naming. Children with deficits in one or more of these kinds of phonological processing abilities may have more difficulty learning to read than those who do not.

The CTOPP has four principal uses: (a) to identify individuals who are significantly below their peers in important phonological abilities, (b) to determine strengths and weaknesses among developed phonological processes, (c) to document an individual’s progress in phonological processing as a consequence of special intervention programs, and (d) to serve as a measurement device in research studies investigating phonological processing.

(<http://ags.pearsonassessments.com/Group.asp?nGroupInfoID=a9660>)

4. The British Ability Scales (BAS) is a battery of psychometric tests which measure cognitive functioning, deriving a general conceptual ability score (GCA). Evaluation of predicted against actual achievement in reading, spelling and numeracy is then possible. The major aim of the BAS is to provide diagnostic information on cognitive strengths and weaknesses, although it is possible, in addition, to calculate intelligence quotients. It can thus assist professionals in assessing children’s learning and developmental abilities and disabilities. The content includes scales based on theories of child development and cognitive theory, linked to the work of Piaget, Kohlberg, and Olver and Hornsby (Elliott, 1982). The main tool used in this study from the BAS group was the word-reading test.

This battery of tests is part of a regular set used by the school. The Neale analysis includes two different forms: Form 1 was used pre-intervention, and Form 2, post-intervention. I analysed results in consultation with the teacher and excluded from the comparative analysis any tests whose schedule of use forbids their application within the time constraints of the intervention.

In addition to these external tests, the RAVE-O program includes RAN (Rapid Automatic Naming) tests each week, which test the children's speed of reading words learnt during the program.

3.3.2 Qualitative Data

The primary means of qualitative data collection in this study was participant observation, during several teaching periods, as I wished to observe and record a social activity "in a 'naturally occurring' context" (Silverman, 1993, p.11), namely the teaching practice of the teacher and its observable effect on the children in her class. Observation gives a different perspective on quantitative data. Clay (1985) observed that educators have placed too much reliance on testing, as there is "a seductive efficiency about final assessment scores. Yet a funny thing happens on the way to those final assessments: day to day learning takes place...in education, evaluation needs to pay more attention to the systematic observation of learners who are on the way to those final assessments" (p.1). In observing children, it is particularly difficult to be a non-participant, as young children tend to want to include one in their activities. For, as Cohen and Manion put it, "[i]f the researcher does not participate, there is little to explain his presence, as he is very obvious to the actual participants... Most studies in a natural setting are unstructured participant observation studies." (1989, p.127). In addition, the teacher was for the most part alone in the classroom and often used me as her assistant, necessitating my participation.

RAVE-O classes took place during the Guided Reading sessions in the normal school timetable for the two groups. While the Control group had Guided Reading, Fran's group had RAVE-O lessons. There was a one-hour timetable slot on Mondays

and a half-hour on the other days every week allocated for Guided Reading during the first quarter. The timetable changed in the second quarter, with half-hour RAVE-O lessons on Tuesdays, Wednesdays and Fridays and a full hour on a Thursday. At other times during the day, the children were taught THRASS by their class teachers, as usual. This was used as the phonemic awareness arm of the intervention, but was not linked to the phonemes of the RAVE-O lessons. RAVE-O was only introduced in the third term of 2008, and then only in the first half, as the teacher (Fran) and psychologist (Val) were both involved with assessments of the whole school after half-term. The RAVE-O classes were continued with the same group in the next teaching year, despite the fact that one of the children had been kept back in Grade 2, while the others were promoted to Grade 3.

I observed almost all the RAVE-O lessons, recording my observations in field notes, and, once the children had become accustomed to my presence in the classroom, making some video recordings during these periods. Video can record more than one can observe in field notes, having a wider focus and also allowing one to go back and re-observe what happens in the classroom (Pirie, 1996). Field notes allow one to comment on and interpret one's observations, so using both methods gives a more balanced perspective and more insight into what actually happens during the lessons. Video was only used when the teacher was actively teaching and interacting with the students, as these interactions were the main focus of my observations. When the teacher commented that my recording her teaching using video was putting her off, I stopped.

While qualitative research might arguably be seen as being subjective, in that it relies on interpretation, Patton (quoted by Hoepfl, 1997) prefers to avoid the terms objectivity and subjectivity, and strives for "empathic neutrality". He says that "empathy is a stance toward the people one encounters, while neutrality is a stance toward the findings". A researcher who is neutral tries to be non-judgmental, and strives to report what is found in a balanced way." (Hoepfl, 1997, p.17). For this reason, Swann suggests using a two-column method of taking field notes: the left-hand column is used for actual observed happenings in context, while the right-hand side is reserved for comments and thoughts on these observations, encouraging the researcher to think about what is being observed and "to try out different

interpretations” (1994, p.31). This was the approach I adopted. I rewrote my notes each day, adding reflections on what happened in the classroom.

I scheduled semi-structured interviews with the teachers and children after the intervention, which I tape-recorded and transcribed, so integrating the voices of the participants (Cole, 2006). The questions for these interviews mainly arose out of my participant observation of the lessons and from the answers given to the outline questions (in Appendix A). This also allowed me to check my interpretation of my notes and observations against the teachers’ points of view. Semi-structured interviews take on the dimension more of a conversation, a “linguistic event in which the meanings of questions and responses are contextually grounded and jointly constructed by interviewer and respondent” (Schwandt, 1997, p.79, cited in Fontana and Frey, 2000).

The children’s “interviews” took the form of a short, informal focus group, as I thought the children would feel more comfortable talking to me in their group, and perhaps be more forthcoming in their answers. During the session I asked them simple questions like whether they enjoyed the lessons, if they felt they had been helped by the new material, and which lessons they liked best.

I also collected the children’s writing and drawings produced during the RAVE-O lessons, as artefacts resulting from the intervention, to see how they related to the children’s reading, vocabulary and orthographic development, and how this triangulated with their development as evidenced by the results of their post-intervention tests. “Artefacts such as student-produced texts, drawings...add useful contextual dimensions to other collected data” (Knobel and Lankshear, 1999).

3.3.3 Data Analysis

I used content analysis to look for themes in my field notes with reference to the program structure and components, interview data and children’s artefacts, which illustrated how the children engaged with the materials to increase their vocabulary and comprehension, and how the teacher adapted the materials to suit the children. I viewed the children’s reactions and quantitative results through the lens of their

profiles in the school's archived file material, in order to triangulate my qualitative observations with the quantitative test results.

I analysed the test results for each individual child by comparing their pre-and post-intervention test results directly, and then averaged out results for each group in order to identify the strengths or otherwise found in the RAVE-O group as compared with the group of initially stronger readers who had Guided Reading lessons in place of RAVE-O.

3.3.4 Ethical considerations

I prepared letters for the school principal, the teachers, parents and children, explaining what the intervention entails and why I was involved, and asking for their consent to my presence, note-taking and recording activities, as well as access to the children's files and test results, promising anonymity. This research was approved by the Ethics committee (protocol number 2008ECE67).

The following two chapters detail the research and data analysis.

Chapter 4

Qualitative Data

The next two chapters comprise the data analysis. Chapter 5 presents the quantitative results of tests administered before and after the RAVE-O intervention. In this chapter I introduce the qualitative classroom observation data gathered over the year of RAVE-O, to show the learning process that happened on the way to these results (Clay, 1985). In my analysis of the data I look for patterns that answer my research questions:

- How do two teachers in a school for children with learning disabilities apply the principles and practices of RAVE-O in a Grade 2 reading group?
- How do the children interact with the RAVE-O materials and how do they respond to the teaching?

First, it is necessary to describe the RAVE-O kit and give an outline of the program, which is followed by a discussion of how the teacher used the materials and the children's responses to them.

4.1 RAVE-O

RAVE-O is a 16-week program for developing fluency and comprehension in reading, and provides a script to cover 70 days. It is designed as an intensive reading intervention, and functions as a pull-out program for small groups of children with reading disabilities.

4.1.1 The Resources

The RAVE-O teaching kit consists of a Manual, a Tool-Box, a Ring Binder, a Speed Wizards computer program and two Minute Stories anthologies. The RAVE-O Manual (Wolf, 2006) is comprehensive, if somewhat prescriptive, in that it provides an actual script for the teacher to follow (see Figure 2). The script aims to ensure consistent application of the program, giving in bold letters what the teacher should say, introducing the materials and some theoretical underpinning and inserting alternative activities like stage directions between the “actor’s lines”.

However, this scripted approach is leavened by the introduction, in which the authors say “it is neither possible nor wise to administer RAVE-O in a prescriptive, cookbook fashion” (Wolf, 2006, p.31), rather that the teacher should use her own discretion in structuring the activities to each child’s advantage since a steady pace is necessary but “children’s needs trump everything.” (Wolf, 2006, p.31).

Very good. Listen closely to the two words I say. If they sound the same at the middle and at the end, say, "Yes, they rhyme." If they don't sound the same, say, "No, they don't rhyme." Examples:

hat-bat Sam-Pam ram-sat hat-ham

That last one was tricky because the beginning and middle sounds were the same, but the end sounds were different. So they...(have children join in) don't rhyme. "Hat" rhymes with [Elicit –at rhyming words]. "Ham" rhymes with [Elicit –am rhyming words].

Very good, Word Wizards! Your ears are warming up to the Rhyme-Time Trick.

Introduce jam and ram (10 minutes)

Core Word Cards: jam, ram
Treasure Chest with Core Words
Jam Jar with Image Cards "jammed" inside
Props

jam

Let's get started on our first Core Words of the Week. Who will take out our first word of the week from the WORD TREASURE CHEST? Here is our first RAVE-O Core Word from last week. It's the word "jam." Jam is a word we already know! Pull out the Jam Jar from under the scarf, showing the label. Hold up the Core Word Card with "jam" on it,

Section A: Many Interesting Meanings of jam

The following segment is the first use of the *Many Interesting Meanings Trick* as multiple definitions for a core word. Therefore, the presentation is written out as a script, for this word only.

Our Many Interesting Meanings Trick can do another **VERY POWERFUL** thing. It tells us that **SOME WORDS ARE** extra special **MIM WORDS**. **WE CALL THEM MIM WORDS FOR SHORT BECAUSE THE FIRST "M" IN MIM STANDS FOR MANY, THE "I" FOR INTERESTING, AND THE LAST "M" FOR MEANING.** Add the "multiple definition MIM" visual to the Multiple Meaning Visual. **THESE MIM WORDS HAVE MORE THAN ONE MEANING and more than one web inside our heads. One web for each meaning. THEY CAN HAVE MANY, MANY INTERESTING MEANINGS.** Say it fast: MIM!! [Say this word super fast and full of fun: "mim." Let them try to say it so fast their lips barely move.] See if you can say it as fast as me: "mim"! **WE WILL BE LOOKING FOR MIMS – MANY INTERESTING MEANINGS – FOR OUR CORE WORDS.**

Let's try it out for our first word, jam. What does "jam" mean? (Elicit.) Yes, it means "jelly." A sweet, syrupy, spread you put on bread. (Put the image

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card for "jelly" definition in the pocket chart.) But can it mean something else that's interesting?

OR SHOULD I SAY "WHAT IS ANOTHER MIM FOR JAM?"

These cards will help us find even more MIMs. Open the jar and appear to have difficulty removing the cards. Well, I think these cards are all **jammed** in this jar. Oh! Did you hear that? I just used our word. 'The cards are **jammed** in the jar.' What does that mean? Yes, that they are pushed in tightly together and I am having trouble getting them out of the jar. Unpack the image card for the "jammed" meaning and put on the chart. If you have props, you could ask a student to jam two pieces of clay together, or use the "traffic jam" card. **When cars are jammed together on a street and can't move, that is a...** (elicit "traffic jam")

I think there is another meaning, too. Do you have another idea of what jam can mean? (Elicit. If they do not offer another idea, continue.) **When a group of musicians are playing together, they are _____.** Place Image Card on the pocket chart.

So "jam" has at least three different meanings. (Optional: Review meanings.) **WOW! OUR MANY INTERESTING MEANINGS TRICK** has a lot of **POWER!** What is it? Every word is connected to a web of words in our heads. That's right. And, **MANY WORDS ARE** extra special **MIM WORDS**. **THEY HAVE MANY, MANY INTERESTING MEANINGS,** and have more than one web. From now on, start looking for more than one meaning when you come across words. You'll be surprised by how many there are.

Figure 2: RAVE-O script.

The program is designed to address all the linguistic components of reading, referred to as POSSuM (Figure 3), which stands for phonology, orthography, semantics, syntax “and” morphology; as well as cognitive factors such as attention, memory and automaticity, on the premise that the more that is known about any word, the better and faster it is read and understood (Wolf, Gottwald and Orkin, 2009; Wolf, 2006; Wolf and Katzir-Cohen, 2001). It asserts the intention of eliciting and harnessing what children know about oral language to help teach them what they don’t yet know about written language (Wolf, 2006).



Figure 3: POSSuM (Wolf, 2006)

The Tool-Box is a durable plastic ArtBin (Figure 4), which has many compartments to hold the various manipulative materials, and an envelope containing the Speed Wizards computer program CD-ROM, which is attached to the inside of the lid.



Figure 4: ArtBin

The learning and teaching materials provided in the Tool-Box try to provide for a range of learning styles, visual, verbal and kinaesthetic: there are wooden dice, with onset letters and rime patterns, coloured spelling pattern cards and “sound-slider” cards with the same letters and rime groups (like “j” and “am”), for building words from letter chunks; magnifying glasses with which to closely examine word structure; image cards and word cards, and the Speed Wizards computer game to promote RAN.

A separate loose-leaf 3-Ring Binder holds Resource Sheets with definitions of the MIMs (Many Interesting Meanings) of the core words, suggestions for extension activities and reproducible materials for the teacher to copy images, lists of words or sentences for cutting up and distributing, or worksheets to fill in, RAN (Rapid Automated Naming) test sheets of twelve core words each week and Bingo cards with words to be covered. The Manual calls for onset letters and rime cards, like the spelling pattern cards included in the Tool-Box, to be made by the teacher for the Jam Slamming exercise, where children are taught to blend (Slam) the central vowel with the final consonant, as in “-am”, and then Jam these together with onset consonants to form words like “jam” or “ham”, which the teacher demonstrates with the cards provided in the kit.

4.1.2 Glossary of RAVE-O Terms

RAVE-O uses its own terminology, so for ease of reference, I will briefly explain the concepts and tools used in the program:

Word Wizard: In order to make the children feel special, the program uses whimsy and magic to make learning fun, teaching the children “Magic Tricks”, the meta-cognitive strategies used for vocabulary development. As Wolf, Miller and Donnelly (2000, p.378) put it: “[b]y calling children ‘word magicians’ or ‘speed wizards,’ we place them more in control of their own ‘bag of tricks.’”

Core Words: several words with the same rime pattern are introduced each week, e.g. *jam, ram, ham*.

Word Wall: Red “bricks” – cards with core words on – build the wall week by week, so the children can see how their vocabulary is growing.

MIMs: Many interesting Meanings of words.

Word Web: A spider’s web mapping the relationship between the many meanings of a particular core word and other words associated with these meanings.

Image Cards: Picture cards with black and white drawings illustrating MIMs of words.

Jam Slamming: Blending common onset letters and rime patterns together to make words, which are then glued onto pages.

Rhyme Time: The teacher elicits words that have the same rime pattern as the core word that has been introduced, producing rhyming words.

Speed Wizards: A computer game designed to improve rapid automatic recognition of the various morphemes introduced, at the word level.

Minute Stories: Vocabulary-controlled stories that contain the many meanings of the core words, getting more complex each week, to help move from accurate to fluent

decoding at the connected text level. They provide a “vehicle for ‘repeated reading’ practice, which is one of the oldest, most used techniques for developing fluency” (Wolf, 2006, p.27).

Think Thrice: During reading, this comprehension trick is taught, to increase prediction (Think Ahead), comprehension-monitoring (Think Back) and analytical and inferential skills (Think For Myself).

Sound Sliders and Dice: These tools show how words are divided into Onset and Rime letter patterns.

Ender Benders: Suffixes – the name reminds children that adding a suffix “bends” the meaning of the word.

Double Trouble: A rule to help children remember to double the consonant after a short vowel before adding an Ender Bender

Harder Starters: Blended onset sounds of more than one consonant.

RAN: Rapid Automatized Naming tests to train speedy recognition of words each week. The core words, and later review of previous core words, are laid out in a grid of twelve words. Reading these words is timed, and children try to improve their time each week.

4.1.3 RAVE-O Lesson Plan

The program manual (Wolf, 2006) gives an outline each week of the structure of the week's lessons (Figure 5) with guidelines for lessons four days a week, which can be extended to fill five days a week, with a RAN test on the last day of each week. The RAN tests the speed of recognising and reading individual words. The first week this consists of the children's names. The program introduces several phonemically patterned core words each week; these are used in RAN charts to test the children's reading speeds. Each week the children try to improve on their speeds from the previous week.

RAVE-O uses "Magic Tricks" like Rhyme Time and MIMs as memory aids in introducing children to phonology and semantics, and Jam-Slamming – blending common letter patterns to increase orthographic knowledge, automatic recognition and reading speed (see Ehri and Wilce, 1987; Juel and Minden-Cupp, 2000). These are introduced in the first week. Having fun, using "playful and appealing activities" (Yopp and Yopp, 2000, p.130), is half the learning and teaching of RAVE-O, and the teaching evolves with the help of the script and preparation of the lesson materials beforehand. The introduction in the Manual (Wolf, 2006) gives an outline of the pattern of each day's activities, which applies throughout the weeks, allowing both teacher and children to learn the rhythm of RAVE-O.

WEEK 2 AT A GLANCE

DAY	RAVE-O ACTIVITY	TIME	MATERIALS
1	Welcome or Program Introduction	2	
	Warm-up: Listening for Rhyme	4	
	Introduce jam and ram	10	Core Word Cards: jam, ram Treasure Chest for Core Words jam jar and props Image Cards: jam, ram index cards Rime Card: am Starters: j, r
	Examine Rime Patterns in jam and ram and Introduce the Jam-Slam Trick	3	Core Word Cards: jam, ram TM * tactile rime cards: am (magnifying glass) (detective hat)
	Creating jam and ram	5	Rime Card: am Starters: j, r
	Word Web: jam	10	Word Web Image Cards: jam sticky notes and marker props
	Ticket out the Door		TM * Core Words on "tickets": jam, ram jam jar
DAY	RAVE-O ACTIVITY	TIME	MATERIALS
2	Welcome	2	
	Warm-Up	4	Rime Card: am Starters: j, r, p, s
	Introduce lap and tap	13	Core Word Cards: lap, tap Image Cards: lap, tap index cards props
	Examine Rime Patterns in lap and tap		Core Word Cards: lap, tap TM * tactile rime cards: ap (magnifying glass) (detective hat)
	Create lap and tap	5	Rime Card: ap Starters: l, t
	Reading a New Minute Story	10	Tap the Jam
	Ticket out the Door		Tap the Jam
DAY	RAVE-O ACTIVITY	TIME	MATERIALS
3	Welcome	2	
	Warm-Up: Review Core Words of the Week by Rime Family	4	Rime Cards: (2) am, (2) ap Starters: l, r, j, t
	Expanding Rime Families	6	Rime Cards: (2) am, (2) ap Starters: l, r, j, t, s, p Rime Family Recording Sheets pencils
	Introduction of Speed Wizard Computer Game	8	Speed Wizard headphones

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	Reading a New Minute Story	5	The Ram and the Jam
	Ticket out the Door	2	TM * cards with images of multiple meanings jam jar
DAY	RAVE-O ACTIVITY	TIME	MATERIALS
4	Welcome	2	
	Warm-Up: Writing the Core Words	5	TM * cards with images of multiple meanings
	Word Wall	5	Word Wall "bricks": jam, ram, lap, tap Word Wall
	Pair/ Individual Work: RAN charts, Rereading Minute Stories, and Speed Wizard	10	RAN chart for Week 2 sand timers stopwatch Tap the Jam Speed Wizard
	(Bread and Jam for Frances)		(Bread and Jam for Frances*)
	Ticket out the Door	2	TM * "tickets" that read: Tap the tap, Ram the ram, Jam the jam jam jar

* TM: Teacher-made

Figure 5: Outline of a RAVE-O Week

A typical week of RAVE-O starts with the introduction of 2-3 Core words, exploring their multiple meanings and associations using the Image Cards provided with the kit, to illustrate the MIMs trick. The teacher makes a Word Web for one of these words, which helps the children visualise the connections between these meanings and associations. This forms the Semantic Component of the teaching, which is followed by the Phonological, Orthographic and Morphological Components where the grapheme-phoneme correspondence and structure of the word are clarified. The Jam Slam and Rhyme Time tricks examine the letter patterns, often with the help of a magnifying glass (Katzir et al., 2008). New words are built for each rime pattern using the Sound Sliders. Each day starts with a review of previously learnt words, to help develop familiarity with the patterns and compare patterns across rime families. The Core Words are then introduced in connected text by way of the Minute Stories and written exercises. The Minute Stories have been specially written to incorporate Core Words using their multiple meanings and different syntactic contexts, introducing the Syntactic component of the program, and repeated readings help to familiarise them as well as aiding reading speed and comprehension. The Speed Wizards program should be used by each child at least three times a week to practise quick and flexible word recognition. Reading speed is tested each week using Minute Stories and RAN tests. Almost every week there is also a Bingo activity which helps with RAN practice and pattern recognition, as well as adding to the fun aspect, since many of the activities are similarly game-like.

4.2 Observations: RAVE-O in the classroom

This section discusses how the teacher used the activities and resources of RAVE-O and how the children interacted with the material. She kept fairly closely to the basic structure of the program, first introducing Core Words and then eliciting MIMs and going over the phonological and orthographic components of the words, although she did not use all the resources in the RAVE-O kit as laid out in the script, but made use of those resources she felt would be most appropriate and useful for these particular children. She also used additional resources, such as finger-painting, since she felt they needed more kinaesthetic and tactile activities (Interview: Monday 03/11). The teacher found that she could not use the timing as set out in the script, but equally felt that she hadn't "missed anything out" (Field notes: Week 9 – 20/03) – she used the

basic concepts more than the actual script, rather than applying it in “cookbook fashion” (Wolf, 2006, p.31).

Several important themes came through in these data, and I will unpack them in the following sections.

4.2.1 Magic for Learning

The Manual talks about “*setting the stage* for an adventure” in learning to read (Wolf, 2006, Week 1). In this Johannesburg school setting, the program was introduced by the teacher, Fran, dressed up as a Word Wizard, complete with cape and pointy hat, wielding a magic wand which sang as she sprinkled the children with word magic.



Figure 6: Word Wizard.

The children’s initial reaction was to look at each other in disbelief as if to say “These teachers are crazy!” The teachers’ craziness made the children “shy”, as one of them explained their lack of response to the question “What are we doing?” Fran and Val

then explained that they were “RAVE-ing about words”, getting excited and trying to access all “the words and meanings locked away in our brains” (Field notes: Week 1 Day 1 – 08/09). The children’s shyness soon dissipated, and they became eager, sometimes rather rowdy, participants in the lessons, enjoying themselves while extending their vocabulary.

The RAVE-O program uses whimsy and magic to help children with reading difficulties gain control of the puzzle that is reading, since many of them believe “there is some magic to learning to read that they will never know” (Wolf, Miller and Donnelly, 2000, p.378). The Word Wizard concept became an important part of the lessons very quickly, and Jane in particular asked, “Where’s the wizard?” on more than one occasion. This often resulted in all the children (even Susan, who was afraid of fancy dress and clowns) demanding that Fran dress up while they closed their eyes and waited for the sound of the wand sprinkling them with word magic. In one lesson, Fran introduced a chant for the children to call the teachers in: “Word Wizards, Word Wizards, where are you? We want RAVE-O, 1, 2, 3!” Another time, when Val was teaching and Fran was at a conference, George commented that “Fran would make it more wizarding!” At the end of the program, we had a small prize-giving ceremony in assembly, and presented each child with a certificate of achievement and a “Word Wizard hat”. When they came to the reading lesson that day, some of them wore their hats, while one boy explained that his friend had borrowed his hat to wear as the friend felt it “made him more clever” – he wanted to borrow the magic!

The magic worked for these children, because they “bought into” the concept – they were all raised in similar, middle-class, Western-oriented literary environments, where magic and wizardry are associated with Harry Potter, so they enjoyed having their own powerful “magic tricks” to help them with reading. Fran’s playful teaching style also created an environment where this whimsy and magic worked (see Yopp and Yopp, 2002). This affective engagement with language is the “secret ingredient” to empowering “linguistically disenfranchised” children (Wolf et al, 2009, p.89). However, different cultures have different concepts of magic and the emphasis on magic might not seem appropriate in other cultures where it is seen as a Dark Art, associated with the occult and evil rather than the whimsical, light-hearted realm of the imagination. In homes where access to print is limited to the Bible and local

newspapers and where there is a high level of adult illiteracy, which is common in the poorer areas of South Africa (Dixon, Place and Kholowa, 2008), whimsy and magic might also be foreign concepts – children raised in such environments play differently and may well never have heard of Harry Potter.

4.2.2 The Importance of Environment

RAVE-O is conceptualised as an intensive small group approach in a trusted environment where children can try out new skills and learn at their own pace. This environment was already in place, as their teacher, Fran, was experienced enough to make the children at ease and created a safe space for them to play and learn in. Also, the children had become used to each other in their Guided Reading group, where they interacted as friends.

The game-like activities like the charades included in the program always produced much hilarity and were a source of delight and inspiration for children's sentences, such as Richard's "My big fat frog is on my queen of clubs" in Week 12. Another activity that proved very popular with the children was the weekly Bingo game, which tended to get quite raucous, and competitive as the children covered first the words, then analysed the multisyllabic words, covering each syllable with a counter. Fran introduced other tactile activities, such as digging in a bucket of sand, or fishing for words with a fishing rod with a magnet as hook and paper clips on the image cards, which added to the children's enjoyment of the lessons as well as adding important visual and tactile elements to their learning (Dunn, 1983). In Week 8, when "u" rimes were introduced, they went totally "nuts" about the basket of nuts in their shells that Fran produced, getting sidetracked while generating MIMs:

Fran produces a basket of mixed nuts in their shells and asks the children to describe them:

Richard: hard...bumpy

George: makes a sound when you shake it...you need a nutcracker to open it...Fran, can you lift up your chair a bit and then sit down on it?

Fran complies, thinking this an intelligent idea for cracking a nut.

Neil and Richard jump on theirs to break them, prompting Fran to ask: Is it edible? It makes a big mess on the carpet! (since it has been broken into bits mixed with shell and dirt)

Neil: Tastes like coconut (he has an almond)

Susan: It's in a nutshell (Fran: Good girl!)

They spend the rest of the lesson trying to break nuts in various ways: in the doorjamb, under the table leg, stomping on them. Really enjoying themselves. Fran is fascinated by their delight and enthusiasm.

She reminds them of the vowel sound /ʌ/. However, when she asks for rhymes, they generate different kinds of nut, after Chloe says: Hut – and hazelnut

George: monkeynuts (Yes, says Fran, those are also called peanuts)

Chris gets “walnut” after I ask “what kind of nut is this?” holding one against the wall.

Neil: Coconut

Fran asks if that’s a real nut, and a discussion ensues:

George: it’s so large, it’s got hair on it and you have to use a hammer and a nail to open it – and you also get a oaknut

Fran: Yes, but what’s it called?

Neil: Acorn!

Field notes: Week 8 Day 1 – Tuesday 03/03

This lesson was very unstructured, because the children became so involved in the activity and Fran let them, since the discussions that ensued during the activity were producing evidence of vocabulary learning and lateral thinking, as they tried to think of ways to break the nuts, in the absence of an appropriate tool. This extract shows particularly clearly how the teacher allowed the children to dictate both the shape and pace of lessons, occasionally guiding the discussion to extract more meaning from the activity. The following lesson was much more structured, and the children remembered much of what they learnt this way: MIMs as well as synonyms for “nuts”, showing that the game-like activities were helping them to learn (Yopp, 1992; Yopp and Yopp, 2000).

The children felt free to “do their own thing”, as for instance in the “nut” lesson above, when George asked Fran: “Can you lift up your chair a bit and then sit down on it?” so he could crack his nut. Another instance of this is from the second week of the program, when the group was working on Rhyme Time, finding words that rhymed with “tap”. The children each pulled image cards from the treasure chest of words and acted out the meaning they had selected, which the others had to guess. Even Richard and Chris, the quietest children, became animatedly involved in this activity, crouching as if holding a steering wheel, acting out driving around a “lap” of a racing circuit. Chris also guessed that Chloe was being a “cat”, although Susan explained that she “lapped” the water. George suggested “crap” which caused Fran some surprise, but she said: “You’re right, it does rhyme, but that’s not a nice word, so we

won't write it. I know you only said it because it rhymes." The children were at ease with the teacher and each other, which gave them the scope to express themselves freely in movement and guessed responses, without fear of "getting it wrong", and even, in George's case, to take a chance with a naughty word!

The teacher and children thus made up the safe physical environment but, equally, the classroom space allowed them to create their own learning environment. The classroom in this case was large, and laid out so that the children had room to move around and work in. There were two big tables for more formal work and carpet space in front of the whiteboard. This need for space makes the program in its present format suitable only for small groups, and not readily transferable to the large classes with limited space that appear in most South African schools.

4.2.3 Learning Styles

Since several of the children had been diagnosed as ADHD, Fran allowed them the space and freedom to move around, having them sit on the carpet where they could be "wiggly worms" while still giving her their full attention. She also had them act out many of the words that were introduced, creating an environment filled with exploratory and pleasurable learning, where they physically engaged with the language, rather than confining them to the more unnatural upright posture required by being seated at desks (Dixon, 2007) and enabling them to learn kinaesthetically. According to Linksman (2009), children are often diagnosed as ADHD when they are simply kinaesthetic learners and, given the opportunity to learn through their preferred modality, their ADHD-like behaviour disappears. In Week 4, for instance, Fran introduced *can*:

Neil, *sitting back on his heels*: Can you do the can-can?

Fran *points at him*: Can you do the can-can? What's the can-can? How do they do the can-can?

...Who can show us how to do the can-can?

...

Neil: I know how to!

Fran: Show us, Neil – how d'you do the can-can?

He jumps up and demonstrates, kicking his legs forward and singing. Everyone laughs.

Fran: Neil was dancing the can-can! (*He turns round to grin at me*) That's the name of a dance. And when you dance the can-can he kicks his legs up.

Video transcription: Week 4 Day 2 – 7/10

Neil had been prescribed ADHD medication and his behaviour and attention improved when he was weaned off the medications.

And when Fran elicited rhymes for “tap”, Jane, who was sitting on the carpet, said “Sap!” and when Fran asked what it meant slowly stood up, weaving her arms in front of her, saying “In a tree!” and went on to explain that it was like the tree’s blood. Jane loved the acting out, and her spoken vocabulary improved so much that I had glowing reports of her development from other teachers (notably from her therapist at the SAALED Conference, 13/09). This was supported by her scores on the BPVS (picture vocabulary scale) which improved to within a year of her chronological age.

In addition to the charades and acting activities, Fran used extra kinaesthetic activities, such as finger-painting on a large billboard to give the children space to move and tactile activities to facilitate their learning. Val said in her interview (Monday 03/11): “They engage better if they can manipulate the materials themselves.” Rather than the teacher just demonstrating the actions, showing how phonemes can be blended either physically or by writing on the board, the children are given “manipulatives” to work with themselves, such as cards with initial letters and rime groups to Jam Slam, making words. Fran, agreed with Val, saying that the children needed a lot of tactile activities, so that they could feel the letters and the shape of the words, which helped the kinaesthetic learners with remembering them (Interview data, Monday 03/11). Such alternative strategies, like modelling words with clay, have been shown to build the important right brain connections used by students with dyslexia (Marshall, 2003), and also help to develop the “normal” left-brain connections essential for fluent and comprehending reading (Aylward et al., 2003; Richards et al., 2006). In addition, research into learning styles has shown that children with low reading achievement prefer a more informal environment with teacher-initiated activities motivating them to learn and also learn better through tactile and kinaesthetic senses (Dunn, 1983), demonstrated above by the “nut” lesson. The teacher in this class exploited the adaptability of the program to include different learning styles, providing space for the children to explore their growing vocabulary.

4.2.4 RAVE-O activities and resources

The RAVE-O program has enough flexibility to allow for selective usage of the most important resources and concepts, as well as scope for adding incidental materials, relying on the teacher's discretion. The program thus requires a dedicated, effective teacher, experienced enough to be able to adapt the program to suit the needs of the individual children, rather than following it exactly.

The main resource, used every day, was the Word Wall (Figure 7), built of the red word card “bricks” which are included in the Tool Box, fixed using adhesive magnets to a whiteboard which rested on the floor, accessible to the children, so they could rearrange the words according to starter, middle or end phoneme (see Figure 9). This use of manipulatives allows the children to further engage with the words and discover the orthographic patterns for themselves, giving another dimension to their learning, and helping the visual and tactile learners (Dunn, 1983).

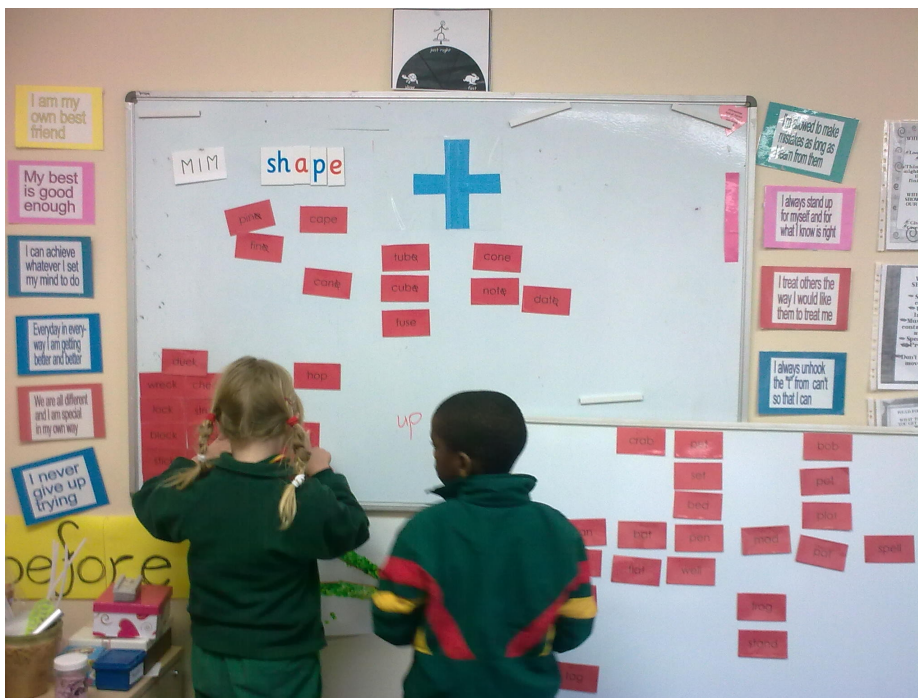


Figure 7: Children arrange the words on the Word Wall

The teacher introduced one word at a time, first eliciting MIMs to “ensure that children know the meaning of a word BEFORE they decode it” (Wolf, 2006, p.16), and then reviewing its phonological, morphological and orthographic patterns using magnetic

phoneme cards and writing on the whiteboard, and then comparing it to the next Core Word. Occasionally, the children were given the magnifying glasses included in the ToolBox to closely examine the structure of words, giving a further visual, investigative and sleuthing dimension to the learning, although they tended to get side-tracked and investigate the whole classroom (Fran commented that “We seem to have a few OCDs in this class!” – Field notes Week 3 Day 1 – Monday 29/09).

Fran did not use the Speed Wizards program, designed to help with rapid naming and recognition of both phonological and orthographic forms of words introduced in the program as we experienced technical difficulties with its implementation. Instead, she used the flexibility inherent in the program and devised a game using the Word Wall: the children rearranged words into groups with similar orthography, and took turns in reading the lists thus generated as fast and accurately as they could. This activity was timed, like the RAN tests, to encourage rapid recognition of the core words. As she said: “We’ve invented our own version of Speed Wizards” (Field notes: Week 12 – Friday 22/05).

The words were arranged in rime groups with common central vowels to help the children to use them for decoding other words by morphological analogy. These core words were used as the basis for review, by eliciting MIMs each day, for the semantic component; rhymes to compare orthographic patterns, which were then physically produced using the Jam Slamming activity. The main resources used for building words were the letter-pattern cards for Jam Slamming to make words. Only occasionally did Fran introduce the Dice and Sound Sliders to build other words.

Minute Stories were read to incorporate the different meanings and forms of the words into connected text for the syntactic component. Thus all linguistic components of the words were addressed each day in the program.

4.2.4.1 Core Words and MIMs

Vocabulary acquisition is a major factor in reading comprehension (Torgesen, 2002), yet “little exists right now that is helpful to teachers who want to do a better job of providing explicit instruction in vocabulary to young children.” (Neuman and Dwyer,

2009, p.391). The more children know about words, the easier it is for them to acquire new ones, and this cumulative effect persists over time: children's early vocabulary size is a strong predictor of their later reading ability (Neuman and Dwyer, 2009). RAVE-O uses the concept of MIMs to build children's vocabulary. The resources in the Tool Kit provided for MIMs are the Word Web and Image Cards.

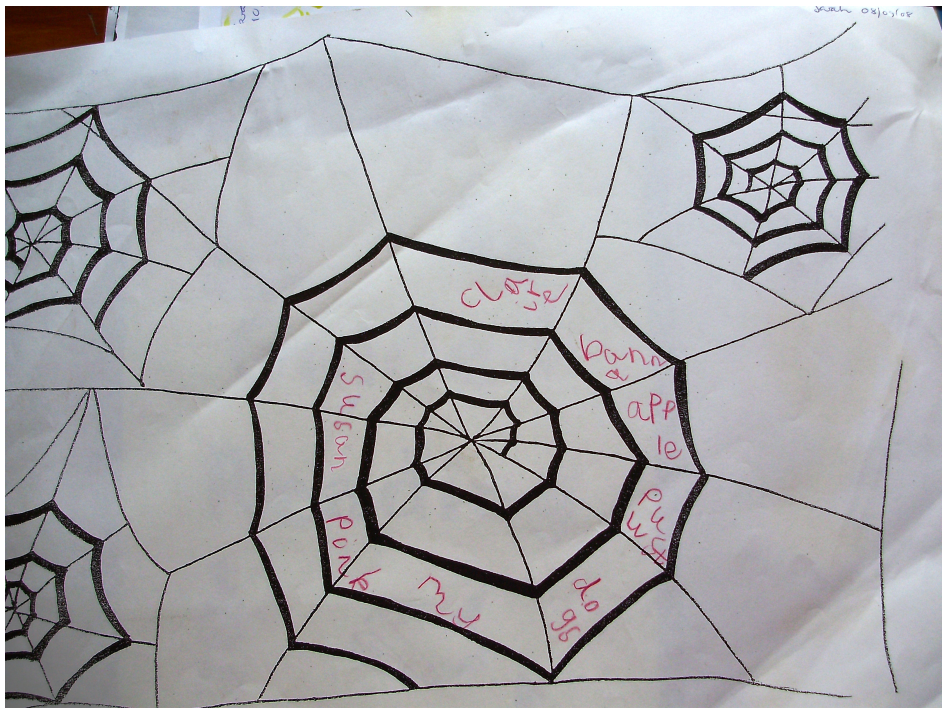


Figure 8: Susan's Name web.

web. She was also a very “literal” child, so did not understand or relate well to the concept of the web with its central meaning and words attached by a network of threads to different words. The words on her name-web (shown in Figure 8), for instance, were written strictly along the spiral lines of the web, as if they were in a straight line, with the lines radiating from the centre used as divisions between her written words. The spaces thus made were too small for her writing, so her words tended to be unusually divided to fit in the spaces.

These name webs were later used to create Word Webs: the Image Card for the main meaning of the core word was placed in the central web, and the other meaning images in the smaller, connected webs. For instance, for “jam”, the jam jar was placed in the central web, while the images for traffic jam, “jam session” (musicians playing) and “jamming” (pushing or stuffing things into a crowded space) were placed in the peripheral webs, and the radiating strands held associated meanings, like “sticky” or even “tea” or “toast”. The tag-line for the Word Webs, introduced during Week 1, is: “Every word is connected to many other words in a web in our heads.” (RAVE-O Manual, Wolf, 2006).

The Word Webs were not referred to as often as called for in the Manual, because of spatial perceptual difficulties, as the web format hindered, rather than helped the children’s grasp of MIMs, as they did not make the connections between the words and the visual of the web. This was an interesting development, since Word Webs are like Mind Maps and encourage right-brain ways of thinking, using different associations and memory in a visual format to firm up a concept or idea. The dyslexic brain ends to rely on right-brain areas to use other perceptual skills to help reading (Shaywitz and Shaywitz, 2005), where normal readers use left-brain pathways (Shaywitz et al., 2002; Aylward et al., 2003; Richards et al., 2006). One would therefore expect the web format to help these children grasp the MIMs concepts, but their spatial perceptual difficulties interfered with their ability to make use of the webs.

Initially, the teachers found it quite difficult to elicit MIMs from the children, as they had not grasped the concept and what was expected of them:

Fran: What about another kind of jam that’s not the jam you eat?...like when you’re in the car...

Neil: Traffic jam (Fran: Good, Neil!)

All are now beginning to show interest, shout out meanings, moving around, no longer sitting at tables

Val has stuck the Word Web to the board and explains, “we’re learning about words we’ve thought of”, as she writes *jam* on a Post-it which she sticks in the middle, and each associated word on a strand of the web

Neil: Like a gearbox jam

Fran: Yes! What happens when the gearbox gets jammed? It gets...

George: Stopped! It’s all like...stuck

Val: Yes – stuck. OK, now...what gets stuck if Jeanette (*school secretary*) has a problem with the photocopier?

Kids: the photocopier...the picture...(other suggestions)...paper (Val: a paper jam!)

This starts the kids discussing jammed things, and the teachers wonder whether to introduce “jam session”, but decide against it, as they want the kids to produce the meanings.

Field notes: Week 1 Day 1 – Monday 08/09

In this extract, the teachers had to ask many probing questions to try to draw answers from the children. In contrast, by the sixth week of RAVE-O, the children were eager to participate, calling out rhymes and MIMs, and even providing their own definitions, without the teachers having to elicit them – it had become much less teacher-intensive, as is evidenced by the lack of teacher-talk in the following extract:

Neil: I dig chocolate ice-cream

Chloe: I know what that means – that you like it!

George explains that it’s more than just like – “it’s like I love it!”

Neil also says “you have to dig to put a house in the ground”

Fran: For the foundations! Good, Neil!

Field notes: Week 6 Day 1 – Tuesday 04/02

Here, Fran summarised Neil’s contribution and praised him, rather than having to elicit responses. The children also volunteered multiple meanings in other classes (Field notes: Week 11).

Fran used the Image Cards included in the RAVE-O kit to elicit MIMs, showing the pictures to the children and eliciting the meanings, but found the pictures were not always helpful, so she excluded many of them from her lessons for various reasons. There were times when she herself didn’t know the concept illustrated on the card, as for instance, one of the cards for Images for “tap” was a picture of a bugler. Since “taps” is an American army concept, this particular image had no meaning for her. Some were deemed inappropriate, like the illustration of a toilet for “can”, another

American concept, or the extensive use of baseball imagery and language in reference to the word “bat”; and others were just too complex to identify the main concept being illustrated, like a crab on a bed of lettuce and a very complicated array of crudités and dip. Several of them were also unappealing and rather crudely drawn in black and white. One teacher who looked in on a lesson commented that she expected the pictures to be more magical (and colourful), given the emphasis on magic in the program. We all felt that more appealing images, apposite to the South African context, would make more of the words accessible to these children.

Although the program introduces groups of words with the same rime pattern, the MIMs formula and emphasis on Engagement allows for a certain flexibility, Fran found that some things dictated their own order, encouraging active learning and engagement with language. For example, the introduction of “pig” led to a digression into a discussion of “hog”, which broadened the concept of MIMs to include synonyms, even though “o” rimes had not yet been introduced, expanding the children’s ability to apply their vocabulary learning to their own environment and experiences:

Fran introduces “pig” and the children all come up with ideas. Chloe remembers “ham” and George says “I eat ham on Friday night”, to Fran’s surprise – “For Shabbat?”

Fran explains about a mummy pig being a sow and a daddy pig being a boar. She elicits that wild pigs are warthogs and explains that “hog” is another name for pig.

Richard then thinks of MIMs for hog: like hogs the road...and I used to hog all the popcorn!

Fran asks Chris to explain what it means, trying to draw him in to participating but Richard is now excited and says that it means “you don’t share and keep it all to yourself” before Chris has a chance to think.

Fran asks what it means if you are behaving like a pig, and Jane explains that it means behaving “badly, with no manners”

Fran points out the Ender Bender and Double Trouble in “Richard was hogging all the popcorn”.

Field notes: Tuesday 03/02 – Week 6 Day 1

In the previous extract from Week 6, Chloe remembered this earlier discussion (in Week 3) about ham being pork, which comes from a pig, and is therefore not kosher:

Fran: Let’s read the three rhyming words (*all are now looking at the board*) – Susan...?

All together: jam, ram, ham

Fran *looks at them with an exaggerated puzzled expression*: What does ham...what is ham?

Children: You eat...Food...Like you eat it...

Fran: Food – what kind of food is it? (*Looks at Jane*) It's meat...Do Jewish people eat ham?
 George and Richard: No
 Fran looks at George: Why don't Jewish people // eat ham?
 Neil: // It's not kosher – cos they don't...cos meat isn't kosher
 Fran *looks at Neil*: No, you do get kosher meat. They don't eat ham because it comes from a special animal – which animal would...?
 Jane: Pig
 Fran: Yes...and meat from a pig would be called...?
 Jane: Pork
 Children: Pork
 Fran: Pork Yes
 Neil: And you're not allowed eating pork // cos it's ...not kosher
 Fran: That's right // and ham is pork.

Week 3 Day 2 - 2/10 – video transcript

Brainstorming MIMs raised other interesting points of Jewish tradition as well as kosher practices, like the Kiddush blessing of wine that is used for the Shabbat meal, which arose from the discussion around “kid”. A conversation about Tu BiShvat, or Arbour Day, the New Year for trees in the Hebrew calendar, ensued from Richard's contribution to the MIMs of “dig”: “We also dig to plant flowers.” Jane explained that it was “the birthday party for the tree.” These contributions broadened the syntactic and semantic dimensions of the words, not only for the other children, but for me as well. Once children started producing MIMs, their brains appeared to “ignite”, as in the first extract above, where Richard was so excited by his understanding of a different word and its many meanings that he jumped up and interrupted when Fran asked Chris for input. In the second extract, where Neil slowly repeated what Fran had just told him, processing the meaning of “kosher”, there is palpable evidence of his semantic learning, connecting the different brain areas which hold morpheme, phoneme and meaning (Wolf et al., 2009; Aylward et al., 2005; Marshall, 2003). The semantic discussions went well beyond just MIMs and rhymes of the core words, introducing synonyms as well as multiple meanings, contrasting the uses of different words with similar meanings and igniting the children's interest in discussions. They enjoyed these discussions so much that they would spontaneously volunteer MIMs in other classes – they were becoming meaning-makers (Luke and Freebody, 1999).

A further dimension was added using a charade approach to MIMs; Fran often got the children to guess the next core word by acting it out. For instance, in Week 10:

Fran acts out *slip*, by pretending to lose her footing, and Richard guesses it. She then asks the children for other kinds of *slip*. Richard volunteers: A slip that's paper.

Fran then sticks the word *stick* to a dowel stick she is holding, and points this out in a sentence: I stick 'stick' to the stick! What other kinds of stick are there?

Richard: Ooh! I know! A sticker!

They all go over the MIMs using the Image Pages, and each child acts out a word.

Chris plays hockey with a "hockey stick"

Richard guesses it and acts "trapped" in one place – "stuck"

Field notes: Week 10 – Wednesday 01/04

Here, the teacher visually and verbally showed three different ways of using the word "stick" in one sentence, which gave Richard an idea for using the word with an Ender Bender. Where at the start of the program I had noted that he was a very quiet boy, by the end he was contributing as much as the others. In fact, at times he even "hogged" the limelight, as he did with the popcorn. This meant that Chris was often over-shadowed because he was so quiet, although he did begin to contribute more in class. His test results showed that, despite his quietness, he had learnt and gained a great deal from the program, in his phonological awareness, rapid naming ability, speed of reading and comprehension, all of which are important goals of the RAVE-O program. The children engaged with the materials in different ways, yet all made gains and improved their reading fluency and comprehension. The teacher made use of the different resources provided in the program to introduce concepts using different modalities, appealing to a range of learning styles.

4.2.5 Phonology and Spelling

While they enjoyed MIMs and Rhyme Time, including Jam Slamming activities, engaging with the language and improving their verbal production, comprehension and vocabulary, this did not transfer to paper, as Fran commented: "verbally they are fine, but their written output is so bad" (Field notes: Week 4 – 14/10/08). The children were reluctant to write sentences and when asked to write produced very short ones, like "I run 100m" or else got their syntax and spelling very confused:

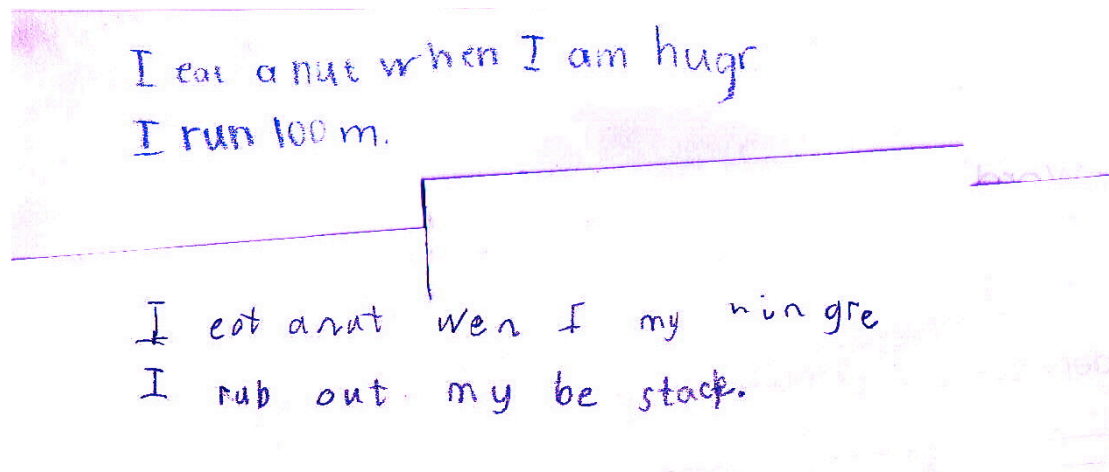


Figure 9a: I eat a nut...

Richard's "I am hugr" is a common phonetic developmental spelling mistake, where the /ng/ sound is represented by only the "g" and the "ry" represented by the "r" (Gentry, 1978; Groff, 1979). The second contribution is Chris's. He always had a blocked nose, so would say "bis-take" for "mistake", which could account for the spelling in his second sentence, and perhaps he has extrapolated the /ng/ sound from the Ender Bender "-ing" to form his spelling of "hingre", without noticing the /ʌ/ vowel sound.

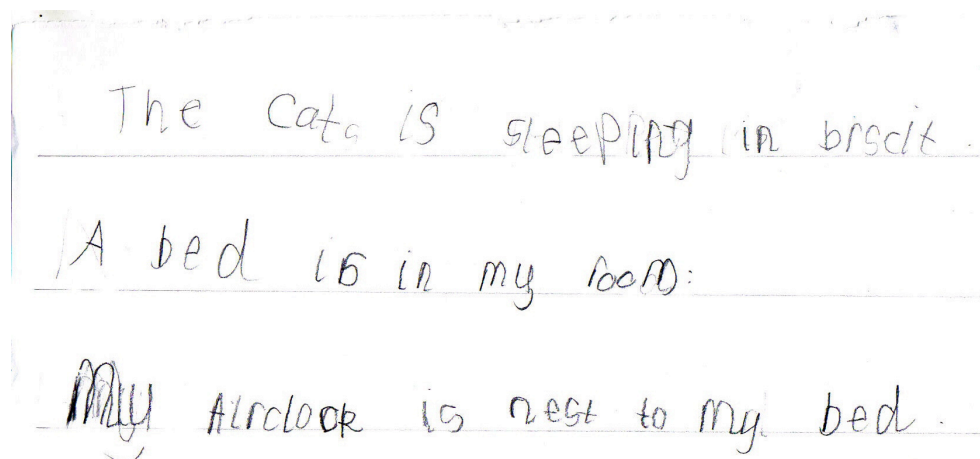


Figure 9b: Jane's sentences

In Figure 9b, Jane wrote the plural "cats" but kept the singular form of the verb. She also spelt "basket" as "brscit", using the "r" to give the long /ɑ:/ sound, "c" for /k/ and "i" for /ə/ (Hayes, Treiman and Kessler, 2006), and in classic dyslexic fashion failed to hear or write the soft sounds of "m" in "alarm clock" – which she wrote as one word, as she heard it – or the /ks/ in "next" (Peer, 2009), replacing them with "r" for "ar",

using the consonant alone to spell the vowel/consonant phoneme, and “s” instead of “x”, using invented phonetic spellings (Ehri, 1989, p.360). She could be classified as a “surface dyslexic”, according to the definitions of Curtin, Manis and Seidenberg (2001) compensating for “visual-orthographic deficits by relying on phonetic spelling”, and in doing so making “orthographically illegal spelling errors” (p.521). Although she often referred to the THRASS phoneme/grapheme chart when she recognized the written form of a phoneme, Jane could not decide which form to use in her own writing context – and neither could Chris differentiate between the long [ei] option of “ake” required for “mistake” and the short [æ] form, “ack”, that he used. However, his mistake was in changing a key sound, violating the “sound-spelling correspondence” (Curtin, Manis and Seidenberg, 2001, p.520), making him a phonological dyslexic, according to this hypothesis. His lack of phonological awareness was also evident in his inability to grasp the Double Trouble rule when adding the Ender Bender “ing”: Fran made him put his hand under his chin to feel the two “t”s in “batting”, and he nodded his head saying he could feel it, but still ended up triumphantly writing “batingi” (see Figure 12) in finger-paint on a billboard – an extra tactile activity Fran introduced to help the tactile and kinaesthetic learners (Dunn, 1983).



Figure 10: Chris writes “*batingi*”

The teacher was more interested in their output than correct spelling in these sentences, and allowed them this freedom to “get it wrong”, preferring them to be more adventurous and attempt more complex vocabulary, emphasising meaning over accuracy, in a similar approach to that of whole language practitioners (Cullinan, 1992; Traweek and Berninger, 1997). When the children were asked to do the formal worksheets included in the program, the teacher helped them with the correct spelling, trying to get them to see the patterns, particularly when adding Ender Benders.

The children had THRASS during their regular classes, taught by their class teacher but without alignment with the RAVE-O lessons. It would possibly have been more helpful if the THRASS lessons had introduced the phonemes before the RAVE-O lessons.

4.2.7 Time as a Factor

Struggling readers process information differently, particularly in terms of time (Wolf, 2006, p.15). Time in this study was a significant factor on several different levels. At the lowest level, the teacher felt that the program started very slowly, requiring a lot of repetition, which she felt might become boring although at the same time acknowledging that “these kids...need the practice, practice, practice” (Interview, 03/11). Because of this need for extra repetition, she found she could not use the timing of the program as set out in the script, but also, since there were different activities rather than drill or rote learning, the repetition had enough variety in the modalities used (Krätzig and Arbuthnott, 2006) that the children were more engrossed than bored, and commented: “Oh! Is it time to go already? That went so quickly!” (Field notes Week 6 – 04/02). They enjoyed and became involved in the lessons, engaging with the material and the repetition meant they eventually “got it”, proving that the repetition is necessary to help to “hard-wire” more efficient reading pathways, making the novel connections required for reading between the different parts of the brain that are used for visual, auditory, linguistic and cognitive activities (Wolf, 2007; Wolf et al., 2009). This necessity was demonstrated in the fMRI studies of Aylward et al. (2003) which showed that the “practice, practice, practice” element led to *less* brain activity, as less *effort* is required to read a word with fluency and

comprehension. As Wolf (2006, p.4) put it: “the more that is known about a word, the better and faster it is read and understood.” Both vocabulary elaboration and repetition are needed for this rapid comprehension.

Unfortunately, the reiteration of basic concepts at the beginning of the program, while helping to improve the children’s rapid word recognition, meant that towards the end the general program speed was affected and we felt it became too complex too quickly (Field notes Week 15 – 09/07). On analysis, I found that approximately the same number of concepts were introduced week by week. It only felt crowded at the end because concepts like Ender Benders needed to be reviewed when the “Magic E” was introduced, which meant reviewing the Double Trouble rule with short central vowels and contrasting it with dropping the final “e” before adding the Ender Bender to Magic E words. Despite the fact that Magic E had been learnt in THRASS lessons (as “a-split-e”) and the children all knew the rule that “the e makes the middle vowel say its name” but “doesn’t talk” itself, they did not always notice the “e” at the end of the word when reading, and Chloe in particular tended to read “hop” for “hope”, especially in RAN tests.

On the level of time spent on lessons, the fact that there were no bells in the school to signal the end of a lesson also contributed to the time factor, as often the children would arrive late, if the previous teacher had forgotten to look at the clock or for some other reason failed to dismiss them on time. Since the RAVE-O lessons took the place of Guided Reading, the children wanted to change their home readers before we started, which also took time. This meant that often the lessons were only about 20 minutes long. Because they took the place of the regular Guided Reading classes in the school timetable, the RAVE-O lessons were often usurped by other school activities, such as plays or sports days. This meant that, although the program took almost a year to finish, on analysis I found we had only spent 48 hours in total teaching time compared to the 70 hours recommended in the Manual (Wolf, 2006), which meant that more time could have been spent on individual concepts, but despite this lack, the children’s comprehension and fluency did improve.

Another issue with time was the simple fact of the South African school year. The school ran a three-term schedule, each term being twelve weeks long, which gave two month-long breaks during the year and a break of six or seven weeks at the end

of the year. A month is a very long time between classes for any child, but particularly so for children with learning difficulties. This meant that much of the first week back each term had to be spent in reviewing “everything they have forgotten during the holidays”, as Val put it at the beginning of the second quarter, (which was, in this case, the next year). This meant that the 16-week intervention actually ended up being a year-long program. It should ideally have its own allotted space in the school timetable as a regular feature for groups of struggling readers, which would also give teachers more space for adequate coverage of all the concepts.

Time is also important within the program itself, as there is an emphasis on speed and automaticity, which is tested using RAN charts provided with the reproducible materials; each child’s reading of these grids of twelve core words was timed each week. The Speed Wizards computer game is also designed towards the end of improving reading speed and accurate automatic naming, but we did not have computer access, so could not use the game.

4.2.8 Reading

RAVE-O is essentially about learning to read, so naturally the kit includes reading books. The two Minute Story anthologies contain two or three very short stories for each week that are vocabulary-controlled to the core words and common sight words, and give students practice with connected text and contextual application of different meanings and forms of words, such as those with added Ender Benders forming participles or the past tense. The stories increase in complexity each week, so that the children had a feeling of accomplishment when they reached the last story. George commented excitedly when he noticed that they were “on the second-last story!”



Figure 11: Minute Story

These stories were read and re-read each week, although we did not time the re-reading. Questions from the Think Thrice Trick were used, without the trick being explained. The Think Ahead, Think Back and Think for Myself concepts had already been introduced in the Guided Reading groups, so the children were quite used to being asked “Why do all these words start with capital letters?” or “What do you think will happen?” – to Think Ahead before reading a story; Think Back-type questions after reading, such as “What happened when...?”, as well as “What do you think that means?” or “Why do you think he did that?” – to Think for Myself. Chris and George showed this deductive reasoning:

George reads “R-I-P!” as “Rip” – explains that the boy feels embarrassed about his ripped shorts. Val congratulates him on using such a good word.

Chris suggests that the boy would have carried his bag at his side to hide the rip.

Field notes Week 5 – 27/01

The videos taken at the beginning of the program clearly showed the children reading slowly and haltingly, and the teacher had to point to the words as the children read them:

Susan (*in a monotone*): A - ram – can ram – the – ram – are...

Jane *leans over*:... /sss/

Fran (*leans over, points to the page in front of Susan*): The rams, remember the Ender-Bender?

Susan: are ramming

Video transcript Week 3 Day 2 - 2/10

In the latter part of the program, as the stories in the Minute Stories anthologies became more complex (and interesting), my field notes show that the children were reading noticeably more fluently, often with expression and evident understanding, even if not very quickly:

[Changing their reading books before class, I notice a comment from his mother in Neil's book: Neil read well with expression. So I say N needs a star for reading.]

Fran asks the children to bring their RAVE-O readers to the carpet. Each then chooses a story to read.

George reads "Hip Hop" very fluently.

Richard reads "Nick at Bat" clearly.

Chris reads "Zapman Fan" clearly – his voice is much louder today. (While he was changing his reader, he told me his parents had said that it was too easy for him.)

...

Neil reads "The Big Fish" – a bit haltingly, but clearly, and as if he understands what he's reading.

Susan... then reads "Can Can" – the shortest story in the book – and so does Jane, very slowly.

Chloe reads "Dan Can" well.

Field notes Week 8 – Thursday 12/03

During the third week, Fran had commented that she had been thinking about the program, and realised it hadn't really been designed for "these kids", who are generally ADHD and all have severe reading difficulties. Their Neale reading tests showed they all had a very low reading age. However, Wolf, Gottwald and Orkin (2009), in a three-city randomised treatment-controlled study of "the most impaired readers in Grades 2 and 3" (n.p.) found that "impaired reading children could make significant gains in reading regardless of initial SES, race, or IQ factors" (Wolf, Gottwald and Orkin, 2009, n.p.)

Despite the fact that they were the weakest reading group, by the end of the RAVE-O program they had, on average, improved more than the control group in tests of rapid naming, phonological awareness and comprehension. George seemed to be the child who benefitted the most from the program, as it suited his learning style. Most of

the children improved their comprehension and certainly their vocabulary, although this was not as evident in the test results as it was in their spoken vocabulary. As the developers say, no program can entirely meet the needs of all children, but their results over ten years certainly indicate that RAVE-O does a better job than most, and our results indicate that all the children benefitted in some way, although some more than others.

Chapter 5

Quantitative Data

In the previous chapter I showed how the teacher applied the principles and practices of the RAVE-O program and how the children responded to these approaches; in this chapter I present and analyse the results of the tests performed before and after the 16-week intervention, to answer my third research question:

- Are the approaches used effective in improving reading fluency and comprehension?

5.1 What the test results show

Before the start of the RAVE-O program of lessons and at the end of the 16-week intervention we carried out a battery of tests on the two reading groups. The results of the BAS, BPVS and Neale Analysis of Reading Ability tests were given in age equivalents. In order to compare these, the age equivalent was subtracted from the child's actual age at the time of testing, and this result (difference in months) placed in the Composite Score column of the tables presented on the following pages. The CTOPP scores were given as composite scores of Elision and Blending for Phonological Awareness, Memory for Digits and Non-word Repetition for Phoneme Memory and Rapid Naming of Digits and Letters. These results were compared directly. The children completed the SPAR (spelling and reading test) assessment of silent reading age only at the end of the program, to give a further indication of their reading comprehension. RAN tests of word lists were carried out at the end of each week of RAVE-O teaching. Each child varied from week to week within individual limits, and none of them made much progress relative to their starting rates.

Unfortunately, unlike Wolf et al. (2009), I cannot state unequivocally that the children in the RAVE-O group performed better than the Non RAVE-O group across the board on this battery of tests, although when averaged out, the group's results showed that they did, in fact, make more of an improvement on phonemic awareness, reading comprehension and rapid naming. What these results tell me, taken in conjunction

with my qualitative observations and the teacher's assessment, is that RAVE-O helped these children extend and elaborate their language use and vocabulary, and gave them the confidence to use a wider vocabulary when speaking. This extended vocabulary also helped with their reading comprehension, which improved slightly more overall than the comprehension of the Non RAVE-O group.

5.1.1 Children's test results

The tests and their results were analysed individually for each child and this analysis compared with their original profiles (See Section 3.2.2).

Where test results are given in age equivalents, I have calculated the difference between this and the child's chronological age at the time of testing. The final score is the difference between the pre- and post-intervention scores thus obtained, and I have recorded this change from baseline as either positive (an improvement – an up arrow), negative (a down arrow) or no change.

The following glossary of terms used in the tests is provided for quick reference.

Test Glossary:

BAS = British Ability Scales – word reading

BPVS = British Picture Vocabulary Scales – receptive vocabulary age equivalent

NARA = Neale Analysis of Reading Ability:

Accuracy: [Most children made errors of substitution
– guesses, usually words with the same initial letter]

Comprehension

Rate: (words per minute → age equivalent in years and months)

CTOPP = Comprehensive Test of Phonological Processing

PA = Phonological Awareness Quotient

made up of: EL = Elision

BW = Blending Words

PM = Phonological Memory Quotient

made up of: MD = Memory for Digits

NR = Nonword Repetition

RN = Rapid Naming Quotient

made up of: RD = Rapid Digit Naming

RL = Rapid Letter Naming

SPAR = Spelling and Reading test

RAVE-O RAN tests – reading 12 Core Words each week

Range of results over the year, given in seconds

Jane

RAVE-O Group			July '08 8y6m		July '09 9y6m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
Jane	8.6	BAS	5.11	- 31mo	6.0	-42 (-11 ↓)
5/1/2000		BPVS	6	-30	8.4	-14 (+16 ↑)
		NARA: Acc.	<6	- 32	5.1	-43mo (-11 ↓)
		Comp.	<6	- 32	6.6	-36mo (-4 ↓)
		Rate	<6			-
		CTOPP: PA		82		100 (+12 ↑)
		PM		91		97 (+6 ↑)
		RN		76		70 (-6 ↓)
		EL	6.9	-21	6.9	-33
		BW	6.9	-21	7.4	-26
		MD	7.6	-12	7.6	-24
		NR	6.6	-24	8.9	-9
		RD	6.3	-27	6.6	-36
		RL	6.6	-24	6.6	-36
		SPAR			6.9	
		RAN Range				20 – 61 sec

Table 1: Jane's test results

The remarkable increase in Jane's BPVS score, from 30 months behind her chronological age to just over a year behind, a 16-month improvement over the year, showed development in her vocabulary awareness that was evident in her contributions in class. Her results showed her general reading ability to be at least three years behind her chronological age, as reflected in the SPAR test of reading ability, without much change from before the intervention, although her comprehension improved steadily but slowly. Her initial test showed her comprehension to be less than that of a six-year-old and this improved to a more measurable six and a half over the year. Her RAN tests were typically much slower than those of her classmates, as she tended to get distracted very easily, since she was ADD, and this distractibility is reflected in the wide range of times recorded for

RAN. Her inaccuracy in reading these was also reflected in her BAS word-reading test results, where she often made phonologically inappropriate choices (Curtin, Manis and Seidenberg, 2001). This is consistent with her phonological awareness, which, although it improved, was made up of elision and blending scores well below her chronological age. It was also evidenced in her spelling, as discussed in the previous chapter. However, her therapist commented that she had noticed a big improvement in her reading as well as in her confidence and maturity, since she had been kept back in Grade 2 (personal communication, 12/09).

Neil

RAVE-O Group			July '08 8y0m		July '09 9y1m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
Neil	8.0	BAS	6.11	- 13	7.11	-14 (-1 ↓)
21/6/2000		BPVS	9.0	+12	9.10	+9 (-3 ↓)
		NARA: Acc.	6.5	- 19	6.9	-27 (-8 ↓)
		Comp.	6.7	- 17	8.11	-2 (+15 ↑)
		Rate	<6		5.2	-
		CTOPP: PA		118		121 (+3 ↑)
		PM		97		109 (+12 ↑)
		RN		94		88 (-6 ↓)
		EL	9.9	+21	10.6	+17
		BW	>14.9		>14.9	
		MD	7.6	-6	7.6	-19
		NR	6.6	-18	>14.9	+68
		RD	7.3	-9	8.9	-2
		RL	7.6	-6	7.6	-19
		SPAR			8.0	
		RAN Range				12 – 30 sec

Table 2: Neil's test results

Neil's BPVS score, although it went down by three months, showed his vocabulary to be nine months higher than his chronological age. His BAS word-reading score was essentially unchanged, reflecting his RAN test results, which showed a small improvement, as did his phonemic awareness. However, the mistakes he made were in substituting orthographically and phonologically inappropriate letters, with elements of the target word, such as reading "pat" for "tap" (a common reversal, suggesting a spatial perception problem) or "lag" for "tag", making him a lexically reliant "surface dyslexic" as hypothesised by Curtin, Manis and Seidenberg (2001, p.519). His blending ability for most multisyllabic words improved, although he did have a problem with the exercise where he was asked to add "-ful" to the end of various words, putting it at the beginning instead, for instance when the teacher tried to elicit "cupful", he replied "full cup". Yet blending letters to make words and reading non-words presented him with no problem, so Fran suggested this was evidence of a spatial perception problem (Field notes Week 13 – 04/06). However, his vocabulary in class definitely improved, as he was very good at providing MIMs and words related to the core words being taught, such as "traffic jam" and "gearbox jam". His comprehension improved enormously and was just below his chronological age, although the SPAR test records his reading age at a year behind, consistent with a surface dyslexic problem at the word rather than PA level.

Chris

RAVE-O Group			July '08 7y10m		July '09 8y11m	
	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
Chris	7.10	BAS	7.1	- 9	7.1	-22 (-13 ↓)
8/8/2000		BPVS	8.1	+3	9.1	+2 (-1 ↓)
		NARA: Acc.	6.4	- 18	6.2	-33 (-15 ↓)
		Comp.	6.5	- 17	8.5	-6 (+11 ↑)
		Rate	<6		6.4	-31
		CTOPP: PA		94		106 (+12 ↑)
		PM		85		79 (-6 ↓)
		RN		88		94 (+6 ↑)
		EL	6.9	-13	7.3	-20 (-7 ↓)
		BW	7.9	-1	>14.9	+70 (+69 ↑↑)
		MD	5.0	-34	5.3	-44 (-10 ↓)
		NR	7.6	-4	6.6	-29 (-25 ↓)
		RD	8.0	+2	10.0	+13 (+ 11 ↑)
		RL	6.0	-22	7.0	-23 (-1 ↓)
		SPAR			7.8	
		RAN Range				9 – 39 sec

Table 3: Chris's test results

Chris was a very quiet, shy boy, but he too ended up making positive contributions in class, albeit not as frequently as his teacher would have liked. His vocabulary as measured by the BPVS remained slightly above his chronological age, while his comprehension steadily improved, from 17 to 6 months behind over the year, an 11-month improvement from baseline, which is borne out by his contributions in class:

George reads "R-I-P!" as "Rip" – explains that the boy feels embarrassed about his ripped shorts. Val congratulates him on using such a good word.

Chris suggests that the boy would have carried his bag at his side to hide the rip.

(Field notes Week 5 – 27/01)

He became more involved in thinking of MIMs as his comprehension developed. Again, this is not reflected in his SPAR test result, which puts him at just over a year behind his chronological age – his expressive vocabulary is evidently higher than his

receptive, reading vocabulary – he knows the meaning of words but still has difficulty reading them fluently enough to identify them (Wise et al, 2007). Yet his phonological awareness improved, which was borne out by his increased involvement in class, contributing rhymes and MIMs (Field notes Week 5 – 27/01) and was largely attributable on the CTOPP measure to a vast improvement in his blending abilities, from a year below his chronological age to >14.9. However, his BAS word-reading, RAN test results and low reading accuracy support my findings in the analysis of his spelling, detailed in the previous chapter. He often made such errors as: *bat* for *bit*; *tap* for *tip*; *bip* for *kick*, which were both phonologically and orthographically unsound choices (Curtin, Manis and Seidenberg, 2001). It is possible that he is a surface dyslexic (Curtin, Manis and Seidenberg, 2001), or perhaps even has a double deficit (Wolf and Bowers, 2000), having an apparent problem with both phonological processing and rapid naming, which would account for both his slow reading rate and low accuracy (Field notes Week 13 – 04/06).

Richard

RAVE-O Group			July '08 7y8m		July '09 8y8m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
Richard	7.8	BAS	6.6	- 14	7.5	-15 (-1 ↓)
3/11/2000		BPVS	7.6	-2	8.2	-6 (-4 ↓)
		NARA: Acc.	<6	- 22	6.5	-27 (-5 ↓)
		Comp.	6.5	- 15	8.8	= (+15 ↑)
		Rate	<6		5.1	-
		CTOPP: PA		85		100 (+15 ↑)
		PM		91		106 (+15 ↑)
		RN		88		100 (+12 ↑)
		EL	6.9	-11	7.6	-14
		BW	6.6	-13	>14.9	+73
		MD	5.3	-29	6.6	-26
		NR	8.9	+13	>14.9	+73
		RD	7.3	-5	9.0	+4
		RL	6.6	-14	8.6	-2
		SPAR			7.7	
		RAN Range				10 – 35 sec

Table 4: Richard's test results

Richard, initially very quiet, came out of his shell and contributed well to the class discussions around words. His spoken vocabulary improved, but this is not reflected in his BPVS score, which decreased very slightly to six months behind his chronological age (possibly because he was unsure what some of the pictures represented), but is probably a factor in his hugely improved reading comprehension, which is now age appropriate, as are his CTOPP scores. Phonological awareness increased dramatically, because his blending abilities went from a year below his chronological age to >14.9, although he still had a problem with elision, as did all of the girls. However, he had good analytical skills, noting changed vowels in lists of words and reading them accurately (Field notes Week 13 – 04/06). His RN of letters improved dramatically, and this was supported by his weekly RAN test results: although the speed varied quite widely, with no real improvement, the words were always accurately read. If he did make a mistake, he self-corrected, although this

ability was still a year behind his chronological age, according to his BAS word-reading test.

George

RAVE-O Group			July '08 7y9m		July '09 8y9m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
George	7.9	BAS	6.11	-10mo	8.2	-7 (+3 ↑)
18/10/2000		BPVS	8.9	+12	9.8	+11 (-1 ↓)
		NARA: Acc.	6.9	- 12	7.5	-16 (-4 ↓)
		Comp.	7.0	- 9	9.5	+8 (+17 ↑)
		Rate	6.2		6.9	-24 (+7 ↑)
		CTOPP: PA		100		121 (+21 ↑)
		PM		94		103 (+9 ↑)
		RN		97		112 (+15 ↑)
	PA	EL	8.6	+9	10.6	+21
		BW	7.0	-9	>14.9	+72
	PM	MD	7.6	-3	8.9	=
		NR	5.3	-30	11.6	+33
	RN	RD	10.0	+27	10.9	+24
		RL	6.3	-18	10.6	+21
		SPAR			7.11	
		RAN Range				6 – 13 sec

Table 5: George's test results

George improved in most fields but reading accuracy. In the Neale Analysis, although George still tended to replace words he couldn't quite decode with ones having the same initial letter, he also looked at the rest of the word, so that the words he substituted had more in common than just the initial phoneme, often having the same number of syllables as well. This has helped his comprehension enormously. His phonological awareness, which is made up of elision and blending; non-word reading, which is part of phoneme memory; and rapid naming, all of which were problematical in his initial assessment, improved remarkably on the CTOPP tests. His writing, too, improved, as he sounded out difficult words while writing them and this

helped him not to leave out syllables. His reading rate, rapid naming and comprehension all improved hugely, as did his phonological awareness, all goals of the RAVE-O program. The program evidently suited his learning style.

Chloe

RAVE-O Group			July '08 8y0m		July '09 9y1m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline)
Chloe	8.0	BAS	6.6	- 18	7.5	-21 (-3 ↓)
21/6/2000		BPVS	7.6	-6	8.8	-5 (+1 ↑)
		NARA: Acc.	<6	- 26	6.10	-27 (-1 ↓)
		Comp.	<6	- 26	7.2	-23 (+3 ↑)
		Rate	<6		6.1	-36 -
		CTOPP: PA		94		91 (-3 ↓)
		PM		85		91 (+6 ↑)
		RN		97		97 -
		EL	6.9	-15	7.3	-22
		BW	7.6	-6	8.6	-7
		MD	5.3	-33	6.6	-31
		NR	5.6	-30	7.6	-19
		RD	7.6	-6	8.9	-2
		RL	7.9	-3	9.9	+8
		SPAR			7.8	
		RAN Range				7 – 30 sec

Table 6: Chloe's test results

Although she apparently enjoyed the lessons, Chloe seems not to have benefited as much as would have been expected – all her test results point to a reading and comprehension age well below her chronological age. Her reading improved very slowly. Although she read the Minute Stories (see Chapter 5) slowly but well, and apparently with comprehension, this was not reflected as much as I expected in her test results. Her comprehension on the Neale test was improved but her abilities still lagged by up to two years behind her chronological age, with the exception of RN of both letters, which improved to eight months above her age, and digits, which was

almost age appropriate. Her reading of non-words improved significantly, but still lagged 19 months behind her chronological age, and her word-blending abilities, while better than her elision, still lagged seven months behind.

She was absent a lot, apparently due to illness, which was often unspecified; this could also have affected her test results.

Susan

RAVE-O Group			July '08 8y11m		July '09 9y11m	
NAME	Start AGE	TEST	AGE Equiv.	Comp. Score	AGE Equiv.	Comp. Score (Change from baseline in months)
Susan	8.11	BAS	7.4	- 19	8.4	-19 -
28/8/1999		BPVS	5.6	- 41	5.4	-56 (-15 ↓)
		NARA: Acc.	6.8	- 27	7.6	-29 (-2 ↓)
		Comp.	6.7	- 28	6.11	-36 (-8 ↓)
		Rate	6.6		7.3	-32 (+9 ↑)
		CTOPP: PA		94		106 (+12 ↑)
		PM		109		106 (-3 ↓)
		RN		88		85 (-3 ↓)
		EL	6.9	-26	7.0	-35
		BW	12.6	+37	>14.9	+68
		MD	>14.9	+70	12.6	+33
		NR	8.9	-2	11.6	+19
		RD	7.6	-17	7.9	-26
		RL	7.3	-20	7.6	-29
		SPAR			7.11	
		RAN Range				11 – 22 sec

Table 7: Susan's test results

Susan's reading rate and phonemic awareness improved. Her increased reading rate in the Neale analysis was evidence of her decreased reluctance to attempt the decoding of more complex words. Where before she refused even to attempt to finish

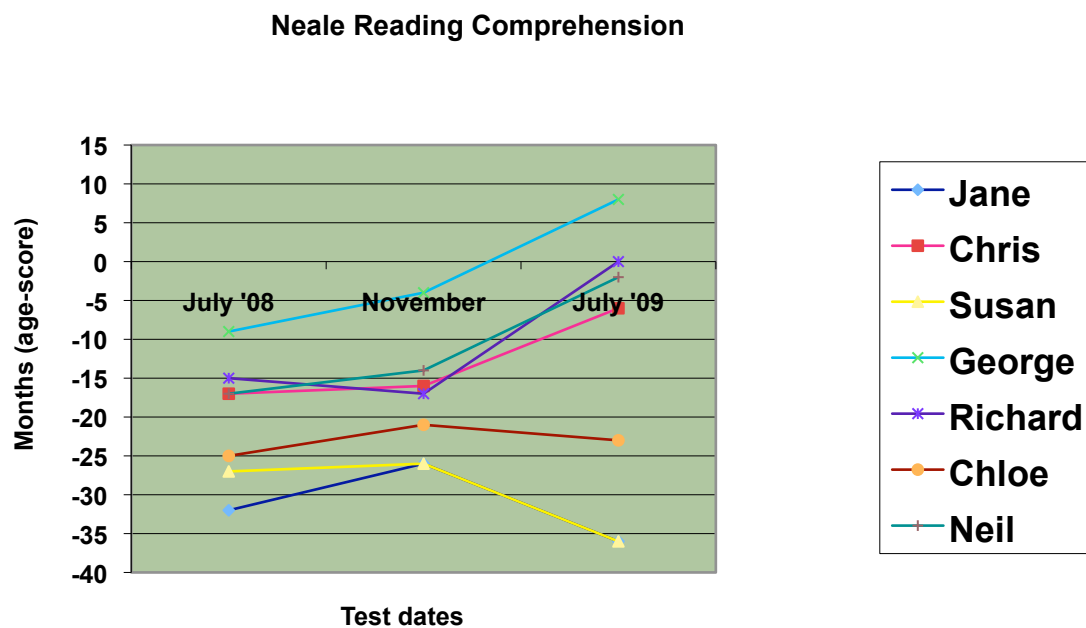
a passage after encountering one complex word, in her final test she struggled through to the end, attempting every word, which improved her reading fluency. In addition, in the initial test, when faced with a word she was unsure of, she would substitute one with the same initial letter, whereas in the post-intervention test she took more cognisance of the shape of the word and attempted to find one with more letters and more syllables that matched, so often managed to read the correct word. This could easily be attributed to the increased confidence in her vocabulary and language use gained in the RAVE-O program, as well as her increased phonemic awareness evidenced in the CTOPP tests. It was not the lack of accuracy that affected her comprehension, however, as much as a lack of concentration, since she shrugged off the answers to questions even on the passages she read accurately, without appearing to think back to find the answers. I would hazard that the same applied to her poor BPVS scores. Her RAN test results were consistently accurate, apart from an occasional misreading where there was a silent 'e', e.g. "pin" for "pine".

5.1.2 Graphing the results

In their three-centre study, which was carried out in Boston, Atlanta and Toronto, Wolf et al. (2009, p.89-90) compared the RAVE-O intervention program with another multidimensional program, PHAST – which combined a phonological analysis and blending program (PHAB) with a word identification strategy program (WIST) – and two control conditions, one where PHAB was taught with a classroom study skills program and the other which included a maths and study skills program. Their results after five years of interventions, using a battery of tests with 279 impaired Grade 2 and 3 readers, showed that children who received the RAVE-O treatment consistently outperformed the control groups after 70 hours of intervention.

Figure 12 depicts the reading comprehension path, as measured by the Neale Analysis of Reading Ability, of each of the children in the present study. I calculated the difference between their chronological age at the time of the tests and the age equivalent from their reading test scores. Five of the seven children in the RAVE-O group improved their comprehension, four of them substantially, to within a year of their chronological age (see their individual results).

RAVE-O Group



Non RAVE-O Group

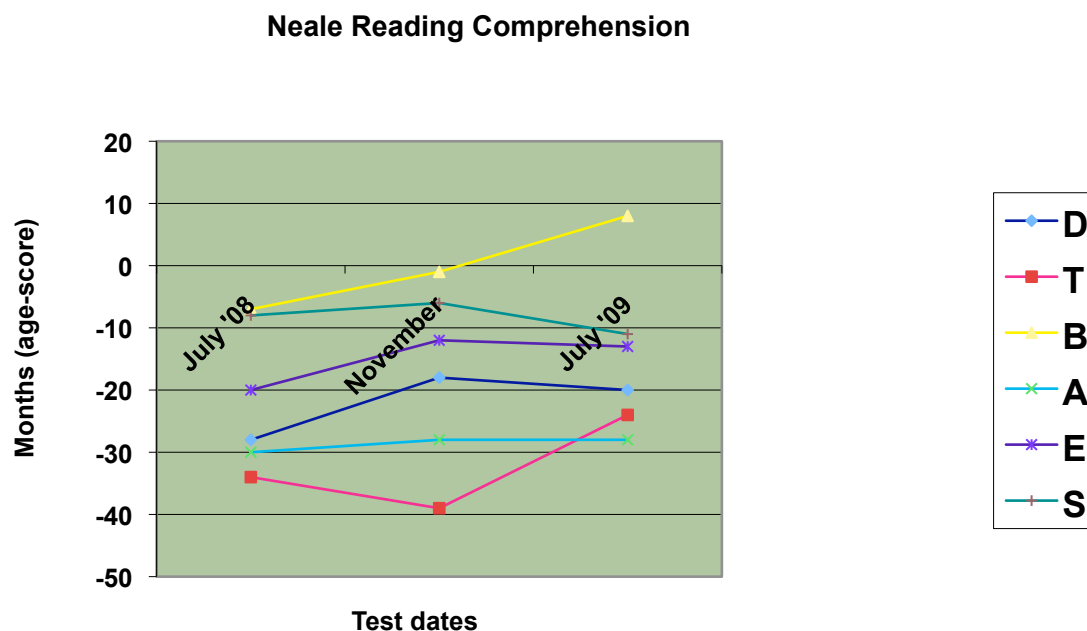


Figure 12: Children's reading comprehension progress charts

The children initially all displayed a reading age well below their chronological age, but most of them improved to within a year of their chronological age, after the

RAVE-O intervention. While the non RAVE-O group's comprehension *did* improve, the group's reading age, on average, was between one and two and a half years behind their chronological age. Interestingly, one boy (B) in the non RAVE-O group achieved a very similar improvement to George's, although most of this group did not improve significantly.

Figure 13 represents the average test results achieved by the RAVE-O group in the present study, who received RAVE-O training alongside THRASS as the phonological arm, plotted against those of the control group who had guided reading and THRASS.

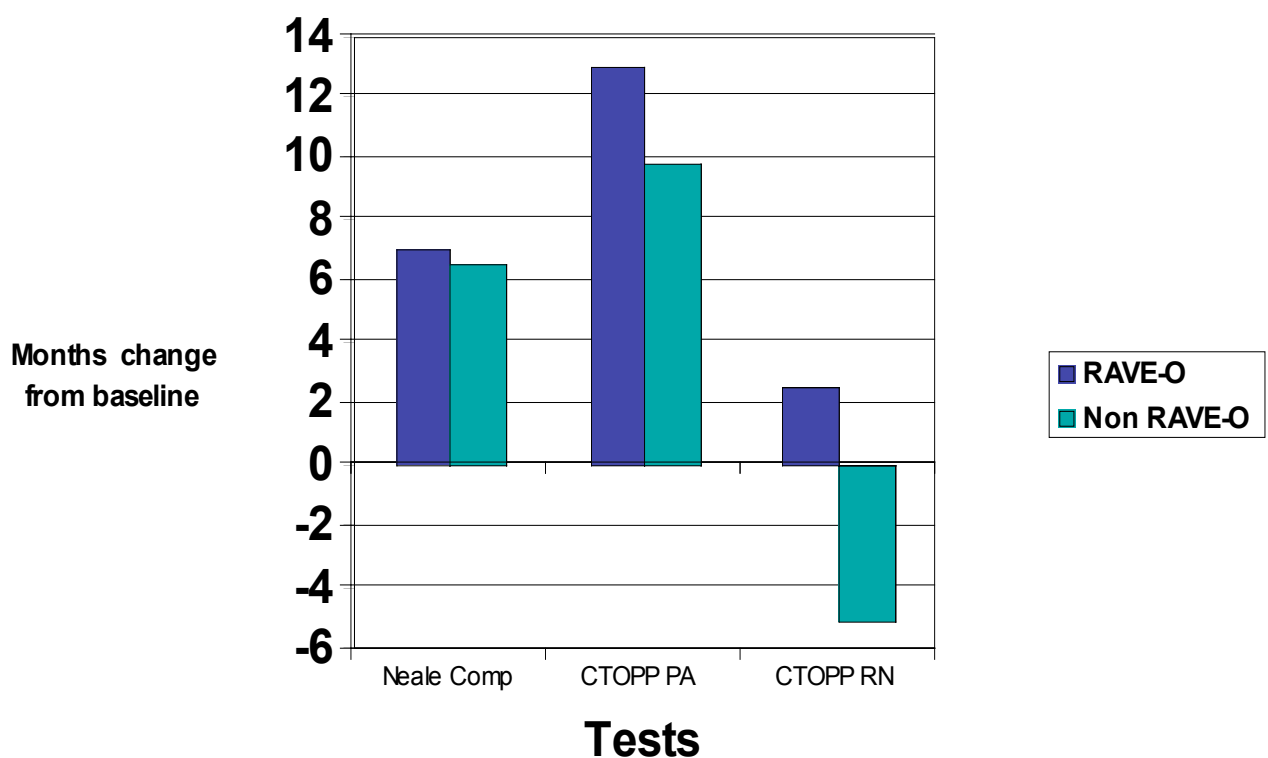


Figure 13: Case study data.

In this graph, using the Neale analysis of reading ability – Comprehension: the RAVE-O group's average improvement was +7 months, compared to the Non RAVE-O group's +6.5 months. In the CTOPP Phonological awareness tests, the RAVE-O group improved by an average of +13 months, compared to the Non RAVE-O group's +9.8 months, and in the CTOPP Rapid naming test, the RAVE-O group's average improvement was +2.5 months, versus the Non RAVE-O group's average difference in scores of -5.1 months.

These results, while not as spectacular as those of Wolf et al. (2009), being from only one group of seven children after 48 hours of RAVE-O, nonetheless show that the RAVE-O children in this study made greater gains in reading comprehension, phonemic awareness and rapid naming, on average, than did the children in the control group. This comparative gain in phonemic awareness suggests that the extra phonological training in the RAVE-O intervention is as important as the vocabulary elaboration, as it helps improve word attack skills, and thus the reading of connected text, which also helps with comprehension. This was particularly evident in Susan's improved word attack and analysis skills in her Neale reading analysis test, despite her refusal to answer many of the comprehension questions.

While we do not have quantitative data, since we did not carry out a multiple definitions test on the children in this study, qualitative feedback from other teachers revealed that the RAVE-O children were noticeably more confident in their vocabulary and use of language, as well as volunteering multiple meanings for words in other classes (Field notes Week 11 – 14/05). The teacher of the RAVE-O group also felt that the MIMs were the most important aspect of the intervention, building children's vocabulary and improving their reading comprehension measurably (Interview data, 03/11).

The difference in the rapid naming test results between the two groups also emphasises the importance of the multidimensional intervention in addressing all aspects of reading difficulty, not just phonological deficits (Wolf, Miller and Donnelly, 2000; Wolf and Katzir-Cohen, 2001; Wolf et al., 2009). This difference was surprising, as there was not much difference in the weekly RAN tests for each child. This raises the question of whether rapid naming would have improved significantly *more* if the children had had access to the Speed Wizards program, which was designed to improve rapid phonological and morphological recognition and naming of words. It would be interesting to be able to include all the steps in a future RAVE-O intervention and document differences from the present study.

Taking into consideration the fact that the children in the RAVE-O group were the weakest readers, with more learning difficulties than the control group, who started with higher baseline reading ability levels, the greater improvements in naming and comprehension made by the RAVE-O group are even more significant.

Wolf, Gottwald and Orkin (2009), in a three-city randomised treatment-controlled study of “the most impaired readers in Grades 2 and 3” (n.p.) found that “impaired reading children could make significant gains in reading regardless of initial SES, race, or IQ factors” (Wolf, Gottwald and Orkin, 2009, n.p.) Assuming the readers in Wolf’s study were all in mainstream schools, however, the best Grade 2 readers in the school in the present case study should perhaps have been chosen as a better sample group, comparable in ability range to the students in the original study.

To summarise these findings: the teacher used the flexibility inherent in the program to structure lessons best suited to the children in the group, utilising her knowledge of learning styles and the needs of the individual children to adapt the resources and materials of the program. She found that the most important concept was that of MIMs, which expanded the children’s vocabulary and stimulated their engagement with the language, although some of the resources supplied to teach MIMs, such as the Word Webs and Image Cards, were not suitable for the South African context. Also, having to tailor the program to individual needs and the South African school timetable meant that time was an important factor, particularly in time available for individual lessons and the repetition necessary for children to grasp essential concepts. This is an important consideration in regard to implementing the program as a regular school feature. Another important issue was that of aligning the phonologies introduced in the phonological program with the units discussed in the RAVE-O program. It would be interesting to see whether aligning the phonological program with the RAVE-O lessons makes a significant difference to the outcomes. The children enjoyed their lessons (Focus groups, 16/10 and 24/07) and engaged with the language, responding well to the teachers which resulted in a general improvement in their reading fluency, comprehension and phonological awareness, as well as RAN.

Chapter 6

Conclusions and Recommendations

This research studied the interaction of the children in the weakest reading group in one Johannesburg school with the RAVE-O intervention program, and also looked at the effect the program had on their reading ability.

My research questions were:

- How do two teachers in a school for children with learning disabilities apply the principles and practices of RAVE-O in a Grade 2 reading group?
- How do the children interact with the RAVE-O materials and how do they respond to the teaching?
- Are the approaches used effective in improving reading fluency and comprehension?

I have addressed these questions in the data chapters. I have shown the journey of RAVE-O over a year in the day-to-day interactions in class in the qualitative observation data and then the quantitative outcomes of the program in Chapter 5. The teachers adapted the materials and concepts of the RAVE-O program to suit the needs of the children in the group, adding activities where they felt more tactile experiences were required. The children reacted with enthusiasm and enjoyment, engaging with the material, with the final result that their vocabulary knowledge, reading comprehension and fluency improved. The data also show how the goals of the RAVE-O program itself were reached during the intervention.

Designed for struggling readers in primary grades, the RAVE-O program has several overarching goals:

- 1) to increase a child's ability to read fluently with comprehension;
- 2) to expand children's knowledge of their language – from vocabulary and grammar to the underlying roots of words; and

3) to engage children and teachers in a love of language in all its variousness.

(Wolf, Miller and Donnelly, 2000)

The children in this case study all faced learning difficulties in several areas apart from reading. Because they were in a nurturing environment aimed at overcoming these difficulties, they were allowed each to learn in their own way. The kinaesthetic learners were allowed to move around and provided with more tactile learning experiences, while the visual and auditory learners were catered for in the teaching materials provided in the kit, as well as by their teacher's style. That they were allowed to move also helped the children with ADHD to concentrate better during class. The teacher adapted the principles and methods, and even the materials of the RAVE-O kit to suit the particular needs of the children in the group, leaving out resources such as the Word Web, which did not work. The children all participated with enthusiasm in the RAVE-O intervention program, enjoying learning different meanings and rhymes for words in game-like activities and also sharing their knowledge in other classes.

When I averaged the test results and compared them with the results of the other group as a whole, the RAVE-O group made greater gains in reading comprehension and vocabulary, phonemic awareness and rapid naming than the children who had Guided Reading lessons. The teacher felt, and this was confirmed by the test results, that the children were beginning to read more fluently, albeit still slowly, and definitely with more comprehension of what they were reading. This increased fluency definitely points to at least the beginning of "successful integration of information from the phonological, orthographic, semantic, syntactic and morphological processes" (Katzir et al, 2006, p.54). Their reading accuracy still needs attention, and should improve further with practice, as this is still a stumbling block to full fluency and comprehension. Wolf and Katzir-Cohen, in their definition of fluency, maintain that "[a]fter it is fully developed, reading fluency refers to a level of accuracy and rate where decoding is relatively effortless; where oral reading is smooth and accurate with correct prosody; and where attention can be allocated to comprehension" (2001, p.219). The children's reading was not yet as smooth and accurate as it could be but they were beginning to read with some attention to punctuation as well as with appropriate expression.

In contrast to her comments halfway through the program, where despite the repetition she felt the children weren't "getting it", Fran commented near the end that she had noticed some transfer of concepts to other reading contexts, as well as an ability to generate MIMs in other classroom settings (Field notes Week 11). George, in particular, being the most out-spoken in the class, had noticeably expanded his vocabulary and comprehension, which was backed up by his test results. When I arrived early one day towards the end of the term, during a comprehension reading therapy session, he asked Fran: "Do we have to stay for the next lesson?" Fran replied, congratulating him, "Yes, good, George, you have inferred from the fact that Gwyn is here that we have RAVE-O next – that's what we're doing here: learning to infer the answer to the questions from the context!" She also commented that he read much better in context than from lists of decontextualised words (Field notes Week 15 – 13/07), which is essentially the aim of RAVE-O: to read fluently with comprehension across connected text.

The children's vocabulary was definitely extended, and their enjoyment of the program and transfer of this to other learning spheres was evidence of an increased engagement with and enjoyment of language. In fact, in their final focus group, George said "RAVE-O changed my life – I couldn't really read before and now I can" (tape transcription – 24/07). It was the children's engagement with language and the expansion of their vocabulary, as well as increased confidence in using it when speaking, that were most evident. We found that these aspects, the V and E of RAVE-O, were the most important and useful facet of the intervention for these children, since the larger the vocabulary children bring to reading, the more they will understand and learn from their reading (Wagner, Muse and Tannenbaum, 2007; Neugebauer and Currie-Rubin, 2009). Fran said that MIMs was an essential concept that needed to be implemented in other subject areas, particularly those such as geography, where it would be important to "teach the language of the lesson before the lesson", in order for students to fully understand the concepts being put across (SAALED Conference presentation, 13/09/09).

The children's improvement in phonemic awareness points to the importance of phonological training (Juel and Minden-Cupp, 2000; Reading and Van Deuren, 2007). Their increased word attack capabilities and extended vocabulary and fluency

also illustrate the importance of a multidimensional program rather than only phonological intervention, as stressed by Wolf et al (2009) and other researchers (Stuart, 2004; Fielding-Barnsley, Hay and Ashman, 2005; David, Wade-Woolley, Kirby and Smithrim, 2006; Richards et al, 2006) as well as Luke and Freebody (1999).

There were a few negative findings during the intervention. The first and main disadvantage we found during this case study was the time factor, which had nothing to do with the RAVE-O program itself. Although the course essentially took up the greater part of a year, ultimately I found we had spent only 48 actual hours on the teaching of RAVE-O, rather than the 70 hours recommended in the Manual. The time constraints were due mainly to trying to fit the program in with the regular school timetable, in place of the scheduled Guided Reading classes. It did not help that these classes would be curtailed or usurped at a moment's notice by other school activities. The program would function better given a dedicated hour a day, without the random disruptions inherent in a primary school milieu, and in addition to, rather than in place of the Guided Reading groups for children with more complex learning difficulties. It would also improve the structure and fluidity if the THRASS or Jolly Phonics half-hour could be dove-tailed in with the structure of the RAVE-O timetable, as the course was developed not as a stand-alone intervention but to be implemented in parallel with a phonological awareness program. The teacher spoke of "teaching the vocabulary of the lesson before the lesson", which in a way expresses the same idea as introducing the phonemes of the lesson before the lesson in which they will be incorporated into words. Thus, the phonological arm should introduce the phonemes and graphemes to be incorporated into words during the RAVE-O lesson.

A further disadvantage, also to do with time, and one which probably was a major factor affecting the fluency and speed of reading outcome in the program, was the lack of computer access, so the Speed Wizards game could not be played. This lack, combined with the fact that we experienced technical difficulties with running the Speed Wizards program even when we did have computer access, meant that the emphasis was not as much on increasing the speed of reading as it was on fluency and comprehension. We did, however, have our own version of Speed Wizards which used the Word Wall, where the children could rearrange the word bricks into

groups with the same initial, central or final phoneme, and then read the lists thus created as quickly as possible.

The videos taken at the beginning of the program clearly showed the children reading slowly and haltingly. In the latter part of the program, as the stories in the Minute Stories anthologies became more complex (and interesting), the children were reading noticeably more fluently, often with expression and evident understanding, even if not very quickly. However, the main thrust of the program is towards comprehension and fluency. Faster is not necessarily better, although reading too slowly one may lose the gist of the reading, compromising one's understanding of the text – the rate should be such that reading is relatively smooth, making decoding second nature and thus automatic. As the Manual says, the end goal of RAVE-O is “not about how rapidly children read, but about how well they understand and enjoy what they read” (Wolf, 2006, p.27).

We found that the program itself was very time-consuming, requiring detailed daily preparation of the materials to be covered, in consultation with the scripted form of the program and based on the previous days' experience with the children in a particular group. The lesson plans for each day required a lot of careful thought, in order to take into consideration what needed to be repeated and each child's individual needs. The teacher needed to ask which concepts they *did* “get”, which could be quickly dealt with, and which required more emphasis than perhaps they were given in the program script. It therefore takes a very experienced teacher to apply the principles and practices of the program, which has implications for teacher training.

A particular dispute we had with the materials of the intervention concerned the image cards, which were often unclear in what they represented, and also not particularly appealing to the imagination. We thought it would be advantageous to pilot a new set of pictures with particular South African relevance: for instance, we would have used pictures of cricketers rather than baseball players to illustrate the word *bat*, and also ones that were more attractive and “magical”, as one teacher suggested, given the emphasis on engagement with the help of magic and whimsy in the program.

This case study was used as a pilot study by the teacher, who used the feedback as a tool for restructuring the application for the next group of struggling readers and had started RAVE-O with one child, using Jolly Phonics instead of THRASS to introduce the phonological element, aligning it with the RAVE-O lessons. Further, more systematic assessments would be helpful in terms of developing the program to be applied in a South African context and to determine whether aligning the phonological program with RAVE-O would significantly influence the results.

This study has highlighted the necessity for much more detailed and systematic observation, based on a thorough knowledge of what the RAVE-O program looks like in its American application and comparing it with the South African context. Some changes in the materials could be made and the results piloted for a South African application – one which could be locally produced and marketed, under licence if necessary, far more affordably than the American version. The principles and methods, having a very sound scientific base, could also be transferable to the teaching of reading in other languages. This would need careful attention and research. RAVE-O did help these children, who were the weakest readers in a school for children with learning difficulties, so the principles of the intervention could be used to help struggling mainstream readers in South Africa to read more fluently with comprehension. This has implications for teacher training and levels of knowledge of teaching reading, since the program requires dedicated, effective teachers, experienced enough to be able to adapt the materials to suit the needs of the individual children, which is a challenge in the South African education system.

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Appendix A

Questions for semi-structured interview with teacher

1. Have you enjoyed using the RAVE-O programme?
2. Did the children enjoy the lessons?
3. How did they respond to the teaching – was it different from their usual reading lessons?
4. Did you notice more engagement with the materials?
5. Do you think this has contributed to their vocabulary acquisition?
6. ...their fluency in reading?
7. Do you think their reading has improved significantly as a result of using RAVE-O?
8. What about spelling? Is it addressed in the materials, and has the children's spelling improved?

Questions for focus groups with children

1. Have you enjoyed your lessons using RAVE-O? Why/ why not?
2. What did you like best about the lessons?
3. Which was your favourite lesson?
4. Was there anything you didn't like about the lessons?
5. Do you think RAVE-O has helped you to read better?
6. Did you learn new words with RAVE-O? (Which ones?)

Because these interviews were semi-structured, additional questions that arose from the observations and during the interviews were included.