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The Effectiveness of a Phonological Awareness with Decoding Training Programme for  
Three Struggling Readers During Their First Year at School

A thesis presented in partial fulfilment of the requirements for the degree of  
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Susie Zoe Randall

2011

I certify that the thesis entitled The Effectiveness of a Phonological Awareness with Decoding Training Programme for Three Struggling Readers During their First Year at School and submitted as part of the degree of Master of Educational Psychology is the result of my own work, except where otherwise acknowledged, and that this research paper (or part of the same) has not been submitted for any other degree to any other university or institution.

Signed\_\_\_\_\_

Date\_\_\_\_\_

## **Abstract**

The intention of this study was to add to the already substantial body of research regarding the instructional conditions that need to be in place to accelerate reading development in young children who are experiencing early reading failure in New Zealand schools. This study aimed to examine the efficiency of using an empirically validated approach to teach phonological awareness and decoding to struggling readers during their first year of schooling. The study was a single-subject, multiple-baseline across participants design involving three participants who were identified by their class teacher as falling significantly behind the Ministry of Education benchmark for reading acquisition after 6 months of schooling. The intervention programme was a moderated version of Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) which included clearly structured games and activities focused on developing phonological awareness and knowledge of letter-sound patterns. Instructional sessions took place four times a week for 30 minutes over 6 weeks. Ongoing assessments demonstrated the existence of a functional relationship between the intervention and dependent variables of blending and segmenting accuracy, pseudo-word reading, and word recognition accuracy. The latency effect between the introduction of the intervention and the change in dependent variables was examined to determine the process of change. Improvements in these reading-related skills appeared to generalise to accuracy and fluency in reading connected text, assessed by their reading book level. The educational implications and limitations of the study are discussed.

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## **Chapter 1**

### **Introduction**

#### **1.1 Rationale**

The motivation for this research arose from the chasm that appears to exist in New Zealand between reading intervention research and reading intervention practice. This study came about from concern that children in New Zealand primary schools are not receiving appropriate early intervention for reading difficulties. The recent introduction of national standards has increased the pressure on New Zealand primary schools to ensure that their pupils reach the bench marks for early literacy achievement outlined by the Literacy Learning Progressions (Ministry of Education, 2010). However, research has suggested that the New Zealand literacy curriculum, which favours a whole language approach to early literacy instruction, does not adequately respond to the variances in phonological entry level skills of new entrants (Iverson & Tunmer, 1993; Ryder et al., 2008; Tunmer, Chapman, & Prochnow, 2003; Nicholson, 2003). There is a risk that without explicit and intensive instruction in phonological awareness, some students will not reach the Ministry of Education expectations for the rate of early reading acquisition, and the achievement gap between good and poor readers will widen. In fact, research evidence suggests that New Zealand's wide-ranging scores in international studies of literacy achievement can be largely attributable to Matthew effects brought about by reading instruction that fails to respond to phonological differences among first year students (Tunmer & Chapman, 2003). The Matthew effect in reading refers to the phenomenon where early success in reading leads to further success in learning and conversely, early reading failure leads to further learning failure (Stanovich, 1986).

#### **1.2 The Present Study**

This study aimed to examine the effectiveness of using an early intervention programme directly targeting skill deficits in phonological awareness and decoding to

increase the rate of reading acquisition for three children who had not reached the necessary levels in early reading achievement during their initial months of schooling. The literacy instruction used by these students' class teacher did not exclusively follow a whole language approach and instruction incorporated components of 'Jolly Phonics' (Lloyd, 1992) which focuses on teaching children to read and write using a systematic phonics approach. It was felt that the intervention programme would fit well with the class literacy programme and therefore would maximise the benefits of the intervention for participants. The potential educational and social advantages for the young readers participating in an intensive phonological awareness and decoding programme during their first year at school were envisaged to include the prevention of negative Matthew effects, closing the achievement gap between the participants and their peers, and getting closer to the necessary benchmark for the rate of early reading acquisition outlined in the Literacy Learning Progressions (Ministry of Education, 2010).

### **1.3 Research Aims**

A single-subject, multiple-baseline across participants design was used in this study. The aim was to examine the effectiveness of using a modified version of Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) to increase the rate of acquisition of phonological awareness (measured by blending and segmenting accuracy), decoding accuracy (measured by pseudo-word reading), and word recognition accuracy (measured by accuracy in reading context free words) for three children who had been at school for between 7 and 10 months and who were failing to meet the present Ministry Of Education literacy progression requirements. Torgesen and Bryant's programme has been implemented in the United States and has been found to be an effective package of empirically validated instruction in phonological awareness instruction (Santi, Menchetti, & Edwards, 2004). The programme was modified to meet the needs of the children in this

study. The modifications were designed to reflect the alphabetic knowledge, sound, and word level reading and writing skills relevant to the context of their class literacy instruction. In particular, the children's pre-existing letter-sound knowledge was utilised in this modified programme with the aim of developing their decoding skills. The specific modifications to the programme are detailed in the method section.

#### **1.4 Research Questions**

Q<sub>1</sub>: Does Phonological Awareness Training for Reading increase participants' accuracy in blending and segmenting evidenced by an increase in the trend, performance mean and percentage of nonoverlapping data points (PNDs) above baseline?

Q<sub>2</sub>: Does Phonological Awareness Training for Reading increase participants' knowledge of letter-sound patterns, demonstrated by accuracy in decoding pseudo-words evidenced by an increase in the performance mean, trend and PNDs above baseline?

Q<sub>3</sub>: Does Phonological Awareness Training for Reading increase participants' rate of acquisition of word recognition accuracy as evidenced by an increase in the performance mean, trend and PNDs above baseline?



## **Chapter 2**

### **Review of the Literature**

#### **2.1 Introduction**

An important conclusion reached in research about reading difficulties is that they are most commonly caused by weaknesses in the ability to process the phonological features of language (Catts & Kamhi, 2005; Snowling, 2006). Understanding the way in which printed words map onto spoken language lays the foundation for the necessary skills to become effective readers. Children with reading disabilities show word level reading problems from the beginning of reading instruction. However, most reading programmes in whole-language classrooms do not explicitly teach word level skills, as children are assumed to be able to work it out themselves naturally through reading and writing activities (Elley, 1998). Within this constructivist view of literacy instruction, phonics should be taught incidentally, as the need arises (Clay, 1993). This view underpinning whole-language theory contradicts research evidence clearly showing that explicit, systematic instruction in alphabetic coding skills in early reading instruction is necessary for struggling readers (Snow & Juel, 2005). Without effective intervention, children who experience early reading failure are at high risk of developing problems in other areas of learning and behaviour as the specific problem quickly ripples into other areas of learning. Stanovich (1986) referred to this poor-get-poorer process as negative Matthew effects in reading.

##### **2.1.1 The Simple View of Reading**

Phonology plays a crucial role in the development of reading acquisition because, unlike speech, written language is an arbitrary representation of spoken language (Catts & Kamhi, 2005; Frost et al., 2009). According to the Simple View of Reading (Gough & Tunmer, 1986), reading ability can be divided into two necessary parts; word recognition via decoding and oral language comprehension. During the initial stages of learning to read, the

development of accurate word recognition skills is essential because without the ability to recognise words on the page, there is nothing to base meaning on. In the process of reading acquisition children begin by developing basic decoding skills and learn to apply these with greater accuracy and speed before word recognition becomes automatic, allowing readers to focus on comprehension. The development of phonological awareness is fundamental to this early stage of reading acquisition (Catts & Kamhi, 2005; Frost et al., 2009; Hoover & Tunmer, 1993; Griffiths & Stuart, 2011; Snowling, 2006).

### **2.1.2 Definition of Phonological Awareness**

Phonological awareness can be concisely defined as the ability to consciously identify and manipulate sounds in words (Wagner & Torgesen, 1987). It is understood to develop along a continuum of phonological synthesis and analysis skills and includes measurable tasks that represent a range of difficulty at different levels (Adams, 1998). At the first level children develop knowledge of sound patterns in rhymes and songs. The second level requires children to match and contrast sounds in words. The third level of phonological awareness is identified as the ability to blend individual sounds in words, e.g., c/a/t is blended to produce the word *cat*. The fourth level requires children to be able to hear and segment the separate phonemes in words, e.g., the word *cat* can be broken down into three separate phonemes, c/a/t/. The fifth level requires the ability to manipulate phonemes in words which can be demonstrated the ability to isolate individual phonemes in words and delete or add extra phonemes. It is important to note that the levels do not necessarily follow a linear route of progression so there will be variation in how and when children develop these skills (Adams, 1998). However, research has indicated that segmentation ability and phoneme manipulation ability strongly predict beginning reading ability (Adams, 1998; Perfetti, Beck, Bell, & Hughes, 1987).

## **2.2 Phonological Awareness and Reading Acquisition**

The understanding that phonemes exist as distinct and manipulable components of the language is the core of phonological awareness (Adams, 1998). It is this controlled and explicit nature of phonemic awareness that makes it difficult for some children to grasp. While some children readily develop the ability to consciously analyse the sound structure of words, others do not, and will greatly benefit from explicit instruction in phonological awareness. Torgesen, Morgan, and Davis (1992) indicated that exposure to blending and segmenting tasks provide children with strong sensitivity to the phonological structure of words which will prepare them well for the challenge of reading new words.

Results from a carefully designed longitudinal study by Perfetti et al. (1987) suggested that different components of phonemic knowledge carry different relations to reading progress. The results from this study indicated that the skills involved in blending were causally related to emerging word recognition skills. The authors were able to demonstrate that blending “taps an essential but primitive knowledge of segmentation. Success at reading depends on it.”(p. 317). The development of these skills facilitates understanding of the alphabetic principle, which tunes a struggling reader into identifying how letters represent sounds in words, and allows the reader to apply their newly learned skills to partly sounded out words, thus providing him or her with a self-teaching mechanism for reading unfamiliar words (Catts & Kamhi, 2005). Therefore phonological awareness, and in particular the ability to blend and segment provide foundational skills for learning to read (Ehri et al., 2001).

### **2.2.1 The Role of Specific Phonological Awareness Skills**

On the face of it, blending and segmenting tasks appear similar: blending tasks require a child to put together the individual segments of a word to make a word, and segmenting tasks require the child to do the reverse by pulling apart the individual sounds in a word. However, segmentation tasks assess a higher level of sophistication because in blending tasks

the phonemic segments are voiced to the child and the child only has to know that the individual sounds can be squashed together into a word. Segmentation tasks require a child to not only be aware that a word can be pulled apart into individual sounds, but also to know what and how big the phonemes are (Adams, 1998).

A further distinguishing feature of blending is that it taps into a child's ability to remember a string of single utterances. Adams (1998) suggested that the ability to remember phonemes must pivot on a child's phonemic development. For example, if a child has received instruction in the production of phonemes in isolation, he or she is likely to benefit from this familiarity and find blending tasks easier than a child who has not. This point could have important implications for the type of early literacy instruction a child receives at school. A child who receives code-based instruction which includes a strong emphasis on the teaching of individual sounds, such as in 'The Jolly Phonics' (Lloyd, 1992) programme which teaches digraphs as well as single letter sounds, is likely to have a strong foundation on which to build their blending skills. However, in New Zealand schools the dominant meaning-orientated approach to reading instruction means that the explicit teaching of phonics is not routinely prioritised.

The purpose of segmenting tasks is to establish whether a child can pull apart a whole word into its component phonemes. Research by Tunmer and Nesdale (1985) indicated that phoneme segmentation skills were strongly linked to decoding skills. Children who performed well on the segmentation task in this study also succeeded in the decoding task and those who failed the segmentation task, also performed badly on the decoding task. However, there were additional participants who passed the segmentation task but failed the decoding task. The authors' results indicated that while segmentation skills are crucial to being able to decode, they are not by themselves sufficient.

An important finding of Tunmer and Nesdale's (1985) study was that the type of instruction that participants received appeared to be related to their ability to decode and measures of early reading achievement. Children who had received explicit instruction in letter-to-sound correspondences scored significantly higher on the decoding and reading achievement tests than children who had not received explicit instruction in this area. Pseudoword decoding requires both phonemic segmentation ability and grapheme-phoneme correspondence knowledge because it does not allow for sight reading as a possible strategy. Tunmer and Nesdale's findings suggested that children who are able to segment and who have a good knowledge of letter-sound-correspondences will perform better on pseudoword decoding tasks than those who are able to segment but have a poor knowledge of letter-sound-correspondences.

### **2.2.2 Research Evidence**

The evidence causally linking the development of phonological awareness and reading acquisition is unequivocal (Adams, 1998; Bus & IJzendoorn, 1999; Castle, Riach, & Nicholson, 1994; Ehri, Nunes, Willows et al., 2001; Gough & Tunmer, 1986; Hoover & Tunmer, 1993; Stanovich, 1986; Torgesen et al., 1992; Vellutino et al., 1996; Vellutino, Fletcher, Snowling, & Scalton, 2004). International studies have indicated that pre-schoolers who have strong phonological awareness skills are likely to make good progress once formal reading instruction has begun (Hecht, Burgess, Torgesen, Wagner, & Rashotte, 2000). Conversely, research has demonstrated that children who begin formal schooling with weak phonological skills are likely to show early signs of reading failure (Iversen & Tunmer, 1993). Without effective intervention, children who start off as poor readers typically continue to struggle through school and beyond. Stanovich referred to this phenomenon as negative Matthew effects: a problem that starts off as specific (e.g., a phonological processing deficit) can rapidly morph into a much larger difficulty which can negatively affect a child's

learning, self-concept, and behaviour. Therefore, instruction must ensure that children are given timely and effective instruction to enable them to catch up with their peers as soon as possible before these negative Matthew effects take hold.

### **2.2.3 Letter Knowledge and Phonological Awareness**

Letter-name knowledge is one of the strongest predictors of young children's future success in learning to read (Cordoso-Martins, Mesquita, & Ehri, 2011). It is essential for children to develop strong alphabet knowledge as early as possible because the letter names and their sounds represent two different sets of knowledge, both of which young children need to grasp to learn to read and write, and each of them predict reading achievement (Wagner, Torgesen, & Rashotte, 1994). Research has shown that letter-knowledge combined with phonemic awareness, accounts for much of the word-reading success of first Grade students (Carroll et al., 2011; Ehri et al., 2001; Lervåg, Bråten, & Hulme, 2009; Muter, Hulme, Snowling, & Stevenson, 2004; Wagner et al., 1994). Therefore, it can be concluded that children who have well-developed alphabet knowledge will learn to read more easily, and at a quicker rate, than those who do not.

### **2.2.4 Entry Level Literacy Skills and Reading Acquisition**

The years preceding school provide a foundation for developing the necessary linguistic and cognitive skills for success at school. National and international research has shown that reading-related factors at school entry are an extension of activities in the home that support early literacy development (Tunmer & Chapman, 2008). Factors include exposure to story-book reading, oral language development, alphabet familiarity, and playing language games. Children who have had rich pre-school literacy experiences are far more likely to start school with the skills necessary for reading acquisition. An important finding from research is that much of the variance in reading related skills at school entry is strongly related to the development of their phonological skills. For example, results from a study by

Iverson and Tunmer (1993) indicated that children selected for Reading Recovery were particularly deficient in phonological processing skills, and that their progress in Reading Recovery was strongly related to the development of these skills. This finding is supported by decades of research on reading which has reached consensus about the role of phonological processes in understanding individual differences in reading skill acquisition (Carroll et al., 2011; Torgesen et al., 1992; Snowling, 2006). Therefore, the amount of explicit training in phonological skills needed to facilitate reading acquisition varies substantially across beginning readers.

Results from a study by Juel and Minden-Cupp (2000) support the interaction between school entry level reading related skills and the method of literacy instruction. The authors found that children who lacked literacy skills when they entered first grade benefitted from “a heavy dose of phonics” (p. 484) whereas those with relatively high levels of literacy skills benefitted from a whole language approach to literacy instruction with a focus on trade books and writing of text. An important finding from this study was that the classroom with the highest success rate for all learners was the one that differentiated instruction to meet the needs of its pupils. This finding suggests that a ‘one-size-fits-all’ approach to literacy instruction cannot cater for the diverse needs of young children learning to read. In the context of New Zealand, results from this study suggest that a purely whole language approach to teaching reading will advantage the most able children whilst disadvantaging those who are most in need of effective instruction in reading related skills. A study by Castle et al. (1994) was able to show evidence of the benefits of phonemic awareness instruction for children as part of a regular whole-language programme.

### **2.2.5 Early Intervention and Phonological Awareness**

Results of a meta-analysis of phonological awareness programmes (Bus & van IJzendoorn, 1999) on reading and phonological awareness suggested that the effectiveness of

phonological training programmes depend on the school level and age of the children. For example, for phonological awareness the effect sizes were lower in primary school than in kindergarten and preschool. This finding indicated that young children profited the most from phonological training programmes. A recent study by Koutsoftas, Harmon, and Gray (2009) demonstrated that pre-schoolers with low levels of phonemic awareness skills could be brought up to the level of their peers in a relatively short amount of time with the introduction of an explicit programme in phonemic awareness. Furthermore, evidence from neurophysiological studies supports the provision of early intervention for pupils with reading problems since imaging studies have indicated that human brains are most amenable to change and development in early childhood (Frost et al., 2009; Papanicolaou et al., 2003).

The efficacy of early intervention is further supported by research indicating that as individuals with reading difficulties mature, their propensity for suboptimal processing of reading increases (Shaywitz, 2003). Intervention studies provide strong evidence to suggest that many at risk children who are given intensive training in phonological awareness skills subsequently demonstrate improvement in reading performance (Ball & Blachman, 1991; Lundberg et al. 1988; Inverson & Tunmer, 1993; Torgesen et al. 1992). The results of these studies strongly suggest that not only is phonological awareness important for success in learning to read, but that it is a teachable aspect of reading acquisition which can halt the course of development of problems for young children at risk of reading failure.

#### **2.2.6 Expectations for the Rate of Acquisition of Early Literacy Skills in New Zealand**

In New Zealand, the expectations for levels of students' literacy skills are outlined by Ministry of Education (MOE) publication, *The Literacy learning Progressions* (2010).

Although it is acknowledged in this publication that students progress at different rates, there are concrete bench marks for all children to reach at different times during the initial years.

With the recent introduction of national standards the pressure is on schools to ensure that



their pupils reach the expected levels for early reading acquisition. Specifically, *The Literacy learning Progressions* (MOE, 2010) states that by the middle of their first year of schooling, children need to be able to “decode simple, regular words” (p. 10) and be reading “at or near Yellow level after six months of instruction” (p. 10). The yellow level refers to a level of the *PM Ready to Read* series of books which is the core instructional reading series used in New Zealand (MOE, 2010). Children are assigned to reading book levels in which they are able to attain a word recognition accuracy rate of 90-94% as assessed by their teachers by way of running records (Clay, 1993).

### **2.2.7 Existing Early Intervention for Struggling Readers in New Zealand**

For children who are struggling in early literacy achievement in New Zealand primary schools, government-funded national programmes available are ‘Reading Recovery’ and ‘Resource Teachers of Literacy.’ Reading Recovery was designed to accelerate the reading and writing achievement of 6 year old children who have failed to make sufficient gains during their first year of effective literacy instruction (Ministry of Education, 2011). It is also used to identify the small number of children who will need additional literacy support, provided by resource teachers of literacy. The Reading Recovery programme involves specially trained teachers tutoring children on a one-to-one basis for 30 minutes daily for between 12 and 20 weeks. Instruction focuses on developing a scaffolding system of reading strategies that involves the use of multiple cues to recognise words while constructing meaning from text (Clay, 1993).

Children who are showing signs of reading difficulties in New Zealand schools are usually identified as eligible for Reading Recovery after their first year of school through the 6 year net tests, administered to every child on or just after their 6<sup>th</sup> birthday. However, places are often limited on the RR programme due to the necessity of using specially trained teachers and individual instruction (Greaney, 2002). National and international research has

highlighted a number of short comings in the programme including the high costs and limited places available, the one dimensional whole-language approach to instruction which fails to account for the differences in entry level skills of participants, and in particular the failure to prioritise explicit instruction in phonological skills (Chapman, Greaney, & Tunmer, 2007; Chapman, Tunmer, & Prochnow, 2001; Reynolds & Wheldall, 2007; Shanahan & Barr, 1995). Fundamentally, despite the availability and enduring popularity of Reading Recovery, the gap in achievement between good and poor readers in New Zealand continues to widen (Tunmer et al., 2008).

### **2.3 Components of Effective Tutoring for Struggling Young Readers**

Wasik and Slavin (1993) identified one-to-one tutoring as existing around the margins of group instruction. For children who do not make the necessary gains in the class setting, tutoring allows struggling readers access to a more intensive layer of instruction. One-to-one tutoring situations yield positive responses from children simply because of the ‘attention - getting-nature’ of the environment (Wasik & Slavin, p. 268), which provides individual, contextualised feedback and opportunities for heightened engagement of the learner. However, for students’ progress to be optimised and maintained over time, features of the programme components and instruction should be carefully considered. Foorman and Torgesen (2001) outlined the essential components of effective early reading tuition as “phonemic awareness and phonemic decoding skills, fluency in word recognition and text processing, construction of meaning, vocabulary, spelling, and writing.”(p. 203). In order for reading tutoring to yield successful and lasting outcomes, it is important that there is inclusion both in the tutoring programme and the child’s reading curriculum of the development of these skills. In the context of a whole-language approach to teaching literacy, the two components of effective instruction that are not emphasised are phonemic

awareness and phonemic decoding skills (Chapman et al., 2007; Iverson & Tunmer, 1993; Ryder et al., 2008).

### **2.3.1 Response-To-Intervention**

Response-to-intervention (RTI) is a multi-tiered approach to identifying students with reading disability and a method of ensuring that all at-risk children receive support to prevent school failure (Fuchs & Fuchs, 2006) that has been adopted in the United States. The standard protocol model of RTI involves a widespread approach to screening children for reading disabilities. The first level of RTI is a safety net of evidence-based instruction to prevent problems emerging in children at-risk of reading failure. Teachers are expected to deliver a differentiated programme to meet the needs of all students, including those at-risk, in mastering the relationship between phonemic awareness and reading and spelling (Catts & Kamhi, 2005). The children who do not show progress, despite explicit and systematic instruction by the class teacher are identified as those who remain in need of more intensive and targeted interventions at further levels in which instruction is increasingly more frequent and intensive.

An important aspect of RTI is that it seems to prevent the risk of false positives (identifying a child as reading disabled when he or she is not) and false negatives (failure to identify a child who has a reading disability). For example, in a pioneering study by Vellutino et al. (1996), the authors were able to reduce the 9% of children identified as reading disabled to 1.5% through intensive and targeted instruction focusing on phonemic awareness, decoding, word recognition, and comprehension strategies. The authors were able to conclude that the majority of students were “instructionally” disabled, whilst the minority were “difficult to remediate.”

In New Zealand, Reading Recovery was envisaged as a “second wave” of effective literacy teaching (Clay, 1993), and it has been viewed by some as a model that is aligned with

RTI (Schwartz, Hobsbaum, Briggs, & Scull, 2009). However, Reading Recovery is not embedded in a system of early literacy instruction that follows an empirically validated approach to teaching phonological processing skills. Therefore, the whole language orientation of classroom instruction could lead to a number of false positives, where children are selected for the programme due to poor instruction rather than underlying linguistic deficiencies.

### **2.3.2 Components of Effective Phonological Awareness Training Programmes**

Research evidence indicates that the strongest gains in phonological awareness skills are observed when no more than one to two skills, rather than multiple ones, are taught at any one time (Ehri et al., 2001), emphasising phoneme segmenting and blending sounds in spoken words as foundational literacy skills. Research has demonstrated that to maximise effectiveness, instruction in phonological awareness should be delivered explicitly and should focus on a limited set of skills, and move from larger linguistic units to individual phonemes (Torgesen, Otaiba, & Grek, 2005). An empirically validated training programme by Torgesen and Bryant (1993) focuses on training children to blend, segment, and identify individual sounds in words. The programme follows a repetitive format of modelling by the instructor, guided practice, and immediate corrective feedback, which provides support to struggling readers by scaffolding their learning. The sequence of instruction in this programme moves from easy to difficult. For example, onset-rime blending is taught before blending of individual phonemes, and blending skills are taught before the more difficult segmenting. The sequence of instruction focuses on words with increasing numbers of phonemes as children advance.

The duration and frequency of intervention sessions should be relevant to the age of participants. For instance, Torgesen et al. (2005) recommended a 15 minute daily programme for young children. A maximum time of 30 minutes has been recommended for

5 and 6 year olds (Griffiths & Stuart, 2011). However the type of tasks and variation in activities should also be considered when planning the duration of sessions because they will affect a child's ability to sustain concentration and performance. The length of the intervention will vary depending on the severity of a child's reading difficulties (Torgesen et al., 2005). However, a surprising finding from Ehri et al.'s (2001) meta-analysis was that effect sizes were larger when intervention was between 5 and 18 hours rather than shorter or longer.

Studies incorporating reading and spelling activities have shown the largest gains by directly illustrating to children the relevance of oral training activities in phonological awareness (Bus & van IJzendoorn, 1999; Ehri et al., 2001; Frost & Peterson, 1988; Lundberg et al., 1988; Snowling, 2006). It is important that a child's level of letter, sound, and word knowledge is taken into account in the delivery of the programme. A programme designed primarily for pre-school aged children, such as Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) which focuses on oral phonological awareness training would need to be adapted to meet the skill levels and needs of children who have already begun formal reading instruction. In the New Zealand context, The Curriculum Reading and Writing Standards for Years 1-8 details the expectations for the average student throughout their initial years of schooling (Ministry of Education, 2009). Upon entry to school at 5 years of age, one of the literacy expectations for students is to be able to identify the first letter in their name, followed by naming the entire alphabet after 6 months. Therefore, a phonological awareness programme targeting New Zealand school children which includes a strong letter component would be relevant to their skill levels in this area.

### **2.3.3 Generalisation**

An essential outcome of any reading intervention focusing on isolated word study is for children to be able to apply newly acquired decoding strategies to unfamiliar words while

reading connected text (Snow & Juel, 2005; Snowling, 2006; Torgesen et al., 2005). In the New Zealand school context, for a phonological awareness programme to demonstrate success, a young reader should be able to generalise his or her newly acquired skills to increase accuracy and fluency in reading class trade books, measured by teacher conducted running records.

### **2.3.4 Studies Using Phonological Awareness Training for Reading**

The effectiveness of two types of phonological awareness training on kindergarten children was assessed by Torgesen et al. (1992) to examine whether training in both analytic skills (sensitivity to the identity and location of individual phonemes in words) and synthetic skills (ability to blend individually presented sounds to form words) was necessary to have an impact on the reading skills of kindergarten children. Results from this study showed that groups that had been trained in both types of skills outperformed the groups that had been trained only in blending skills on word reading measures. As a result of these findings, the revised Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) focuses on both analytic and synthetic skills. The effectiveness of this programme on 60 kindergarten children was examined by Torgesen and Davis (1996). The children were trained in small groups, four times a week for a 20-minute session. Results showed that the training group were significantly ahead of the control group on measures of phonological awareness following intervention, and the gains were maintained when the children began school. Although studies conducted using this programme have been conducted on kindergarten children in the US, the authors suggest that this programme can be used to supplement regular reading instruction for struggling readers in the early elementary grades (Torgesen & Bryant, 1993).

In a review of eight phonological awareness instructional programmes, Santi et al. (2004) concluded that Torgesen and Bryant's (1994) programme was easy to use and

incorporated empirically validated features of phonological awareness instruction, including modelling, task sequence from easy to difficult, and the inclusion of blending and segmenting instruction. A recent single-subject design study examined the effectiveness of using this programme to improve the early reading skills of three preschool children at-risk for reading disabilities (Yi-Wei, 2007). The findings indicated that this programme was highly effective in improving participants' phoneme-blending, phoneme-segmentation, and word reading skills.

## **2.4 Summary**

The unmistakable message from over three decades of research is that phonological awareness is essential for learning to read. While some children may start school with enough prerequisite skills to learn to read without direct instruction in the alphabetic code, others will struggle. Snow and Juel (2005) succinctly summed up the value of explicit instruction in alphabetic coding skills as “helpful for all children, harmful for none, and crucial for some” (p. 518). Phonological awareness and decoding are teachable aspects of learning to read and studies have shown empirically validated programmes such as Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) to be effective in halting the development of reading difficulties in young children. To maximise the benefits of reading intervention, programmes should ideally be an extension of, rather than separate from the regular classroom programme for at-risk students, as in the research based RTI model. However, this is unlikely to occur in the context of whole language classrooms where phonological awareness is taught incidentally, rather than explicitly. It seems that policy makers need further convincing of the need for empirically validated instructional practices to prevent reading difficulties from developing in young children in New Zealand.

Despite the recommendation by the Literacy Experts Group (Ministry of Education, 1999, cited in Tunmer & Chapman, 2003) that reading intervention instruction should place

greater emphasis on explicit instruction in phonological awareness and letter-sound patterns in identifying unfamiliar words in text, the Reading Recovery programme has not been modified to reflect these findings (Tunmer & Chapman, 2003), and remains the accepted intervention for young children at risk of reading failure in New Zealand schools. The gap between research and practice in early literacy intervention in New Zealand remains unbridged, despite national and international studies demonstrating that instruction in phonological awareness and decoding can be relatively cost effective and easy to deliver. With the recent introduction of national standards, it would seem prudent and fair for teachers to be offered additional ways to help their struggling readers to reach the necessary benchmarks for early reading acquisition during their first year of schooling.

## **2.5 Research Context for Present Study**

### **2.5.1 Single-Subject Design**

Within special education, single-subject research has been used to examine phonological awareness intervention strategies. For example, Kennedy and Flynn (2003) examined the efficacy of using a phonological awareness based intervention with three children with Down syndrome using a multiple baseline design across three participants. They were able to demonstrate a functional relationship between the phonological awareness training and improvement in phonological awareness skills targeted in the intervention although the improvements did not generalise to skills beyond those explicitly taught in the programme. In a recent study, Koutoftas et al. (2009) used a multiple baseline across participants design to evaluate the effectiveness of a RTI Tier 2 intervention for increasing beginning sound awareness in low-income pre-schoolers who were not progressing at the same level as their peers on this skill. They found that an explicit 6-week programme targeting early phonemic awareness significantly improved the skills for 71% of participants. The present study aimed to examine the effectiveness of using an explicit 6-week programme



in phonological awareness and decoding skills to improve the early literacy skills of school aged children.

A recent multiple-baseline design across groups study by Pullen et al (2005) examined the effectiveness of using explicit components of beginning reading instruction (letter-sound manipulation, decoding and repeated readings) to increase first graders' decoding skills, measured by performance in rate of accurate pseudoword reading. In this study, the independent variable included a package of explicit instruction of letter-sound patterns, and repeated readings. The authors were able to demonstrate a functional relationship between the independent variable and the rate of accurate pseudoword reading. The results of Pullen et al.'s (2005) study indicated a gradual increase in the decoding skills of participants.

The present study aimed to examine the effects of a phonological awareness and decoding programme on the decoding accuracy and blending, segmenting, and real word recognition accuracy of similar aged children in their first year of schooling in a New Zealand Primary setting. Unlike the Pullen et al. study which examined the effectiveness of an entire package of instruction which included reading connected text, this study focused on instruction in phonological awareness with decoding using context free words. The independent variable in this study was not intended to represent a comprehensive package of empirically validated instruction, but rather two specific components of such a package.

Many previous reading intervention studies in New Zealand have used control group designs (e.g., Iverson, Tunmer, & Chapman, 2005; Ryder, Tunmer, & Greaney, 1997; Ryder, Tunmer, & Greaney, 2008) which have produced conclusions about the generality of effects of interventions as they relate to group means, not as they relate to specific individuals. The aim of this study was to build on previous literature on phonological awareness training in New Zealand by using single-subject research with a multiple baseline design across

participants to allow targeted analysis at the individual level. A single-subject design with a multiple baseline across participants is particularly suited to the current study because it focuses on the individual and allows detailed analysis of participants who may respond favourably to the intervention and those who may not.

It was conjectured that by repeatedly monitoring students' progress over time, the latency effects of the training on each dependent variable could be examined. The use of ongoing assessments which are intrinsic to this type of design are also advantageous because they provide information about the specific problem/s a child may have or be at risk of developing, and the level, intensity, and duration of treatment needed to remediate or prevent the problem/s. This detailed analysis is particularly important in reading intervention research because it can advance knowledge about intervention adaptations needed to produce intended outcomes for children who may demonstrate difficulty to remediate reading problems.

### **2.5.2 Research Aims**

The aims of this study were to:

- Examine the effectiveness of using a phonological awareness and decoding training programme to increase participants' accuracy in blending and segmenting.
- Examine the effectiveness of using a phonological awareness and decoding training programme to increase participants' knowledge of letter-sound patterns.
- Examine the effectiveness of using a phonological awareness and decoding training programme to increase participants' rate of acquisition of word recognition accuracy.
- Examine the generalisability of effects of the intervention on participants' word recognition during the reading of connected text.

### **2.5.3 General Predictions**

Based on analysis of the research literature reviewed for this study, it was expected that a general increase in blending and segmenting accuracy would be observed throughout the programme. Previous research has indicated that phonological analysis skills are more difficult for children to learn than phonological synthesis skills (Torgesen et al., 1992; Perfetti et al., 1989), and in the phonological awareness programme used in this study, blending skills are taught before the more challenging segmenting skills. It was therefore predicted that improvement in participants' performance on blending tasks would be observed before improvement in segmenting tasks or letter-sound pattern tasks. It was also expected that progress in segmenting, pseudoword reading, and word recognition accuracy variables would be influenced by participants' pre-existing knowledge of letter sounds, measured by the letter-identification pre-test.

Research has suggested that the relationship between phonological awareness and learning to read is reciprocal (Ehri, 1984; Perfetti et al., 1987). For instance, in their longitudinal study, Perfetti et al. (1989) concluded that phonemic awareness knowledge and reading acquisition develop with mutual support. With this in mind, it was expected that an increase in participants' word recognition accuracy would be observed at the same time as an improvement on measures of phonological awareness. Reading intervention works best when it is specific to the needs of the child (Catts & Kamhi, 2005; Snowling, 2006; Torgesen et al., 2005). Therefore, to avoid generating hypotheses based on assumptions about a child's level of skill, baseline assessments of each participant's reading skills and deficits were analysed *before* specific hypotheses for each participant were developed.

## **Chapter 3**

### **Method**

#### **3.1 Setting**

The study took place with three participants from the same year 1 class in a small, decile 7 primary school in North Auckland with a roll of 243 students. The school followed the guidelines for expectations for levels of students' literacy achievements set out in The New Zealand curriculum Reading and Writing Standards (Ministry of Education, 2009). The principal emphasised the importance of aiming for the benchmarks for early literacy acquisition outlined in the publication within the context of the recent introduction of national standards. Although it is stated that after 6 months of schooling, pupils should be able to “decode simple, regular words by using their knowledge of grapheme-phoneme relationships” (Ministry of Education, 2010, p. 10), explicit and systematic instruction in phonics is not a requirement of the New Zealand Curriculum. However, the class teacher in this study chose to use a phonics programme as part of her approach to teaching children to read. The ‘*Jolly Phonics*’ Programme (Lloyd, 1992) was incorporated into her literacy instruction and her pupils were explicitly taught letter sounds on a daily basis, using the Jolly Phonics sound books, actions and worksheets. This was in addition to the reading of trade books and story writing. The classroom was well lit and on the walls the pupils' art work was displayed along with an alphabet chart and some high frequency words. The teacher's classroom management techniques included behaviour specific praise and token reinforcement, such as awarding house points for desirable behaviour.

#### **3.2 Ethics**

The study was approved by the Massey University Human Ethics Committee in June 2011. Participants were not approached until informed and signed consent from parents/whanau has been obtained. A particular consideration was the potential effects of children

receiving differential treatment. However, it was usual practice in the junior classrooms at this school to have parents come in and listen to either small groups or individual students read in an area within the classroom or outside the class in the foyer. It was also not unusual for resource teachers or other specialists to work with individuals outside of the class. Within this environmental context, it was established that neither the participants nor their peers would feel unnecessarily differentiated. Pseudonyms were used for participants and all information was considered strictly confidential in accordance with the code of ethics.

### **3.3 Selection Process**

Children who had demonstrated the strongest deficits in reading related skills during their first 6 months at school were considered for the study. Potential participants were initially identified by the class teacher and the school principal because they were failing to make necessary progress in early reading skills and were behind the Ministry of Education bench mark of reading at the Yellow level of the PM series of books. Only children with English as a first language and children without underlying cognitive, hearing, or sight difficulties were included in the pool of potential participants. Once the potential participants were identified, the class teacher verbally informed their parent/s about the nature of the study and gave them a printed information sheet and consent form. The information sheet provided details about the study, what inclusion in the programme would mean for them and their child (including the right to withdraw their child from the programme before or during the intervention phase), and an invitation for their child to participate. Once signed consent from parent/s for their child to participate in the study was obtained, the programme was explained to individual participants and each child was verbally invited to participate. Given the young age of the children, verbal consent from the participants was obtained in the presence of the class teacher in a quiet area of the child's classroom to ensure that: a) each

child understood the nature of the programme and b) each child felt happy and comfortable to be included.

Data were collected to provide background information regarding each child's reading related behaviour and to evaluate the social validity of the programme aims. These included a short background interview with each child, his or her teacher and parent to gain information about each child's home literacy environment and experiences, each child's attitude toward reading, and concerns about the child's reading achievement and progress. A short observation of each participant reading their group reading book was also included to gain an understanding of each participant's abilities, difficulties and attitude towards reading connected text within the context of their group reading book.

Participants' letter identification knowledge was tested prior to intervention using the letter identification task in the Observation Survey (Clay, 2002). Children were required to give the name or the sound of 26 uppercase and 28 lowercase letters, two of which appeared in different fonts. The number of letters correctly identified by name or sound was recorded. The reliability estimate for this scale was .97. The data that this test would yield was useful for two reasons. Firstly, for predictive value: research has indicated a link between a child's letter-sound knowledge and ability to segment and decode words (Adams, 1998; Tunmer & Nesdale, 1985). A child scoring highly on this test would be hypothesised to progress at a faster rate on measures of segmenting, pseudo-word reading, and word recognition accuracy than a child with a low score. Secondly, this test could be repeated post-intervention to obtain information about whether there was an improvement in scores on this test following participation in the programme.

However, it is important to note that information gained from the letter identification pre- and post-test measure would not be sufficient to demonstrate a functional relationship between letter identification scores and the phonological awareness programme because it

was expected that improvements in this variable would occur as a result of class teaching and natural progress over time. Therefore, letter-identification was not included as a dependent variable in this study. In order to accurately examine the relationship between the four dependent variables of blending accuracy, segmenting accuracy, pseudo-word reading, and word recognition accuracy and the independent variable, the dependent variables were measured repeatedly over time throughout each phase of the study.

### **3.4 Dependent Variables**

Dependent variable 1 was accuracy of blending measured by performance in blending individual sounds in words, e.g., c/a/t is blended to produce the word *cat*. Data for accuracy of blending were collected at the beginning of every session for each participant during baseline, and intervention, and once a week in the follow-up phase of the study. The probes were administered at the start at each session to prevent performance being influenced by practice during the immediately preceding session. The researcher used a bank of 20 regularly spelt words. The words were presented on 12 lists of five words randomly ordered with each word in two lists (see Appendix C). Each group of five words included an equal number of words of varying length. No words were included that were taught in the programme. A list of regularly spelt words was presented orally to the child. For the purpose of this study, accurate blending was operationally defined as: after the instructor orally presents a string of individual phonemes with a second pause between each phoneme in a quiet room with no noise distractions, the participant will blend the sounds together to voice an exact replication of the target word within 10 seconds of the presentation of the phonemes. The task was introduced to the participant by saying “*I am going to say each sound in a word like a robot. You tell me what the word is.*” The researcher gave the child two practice items with corrective feedback prior to data collection. A correct score was recorded if the entire word was accurately voiced by the child.

Dependent variable 2 was accuracy in segmenting measured by performance in segmenting separate phonemes in words, e.g., the word *cat* is broken down into three separate phonemes, c/a/t/. Data for accuracy of segmenting were collected at the beginning of every session for each participant during baseline and intervention. The researcher used a bank of 20 regularly spelt words for children to segment. The words were presented as 12 lists of five words randomly ordered (see Appendix C). Each group of 5 words included an equal number of words of varying length. No words were included that were taught in the programme. For the purpose of this study, accurate segmenting was operationally defined as: after the instructor orally presents a word in a quiet room with no noise distractions, the participant will segment the word into all the individual phonemes within 10 seconds of the presentation of the phonemes. The task was introduced to the participant by saying *“I am going to say a word and you are going to break the word apart. Do this by telling me each sound in the word.”* The researcher gave the child two practice items with corrective feedback prior to data collection. A correct score was recorded if each phoneme was individually voiced by the child.

Dependent variable 3 was decoding accuracy measured by performance in decoding simple pseudowords consisting of single consonant C/V/C words. This variable was chosen because research has demonstrated pseudoword reading to be a reliable predictor of reading achievement (Pullen et al., 2005; Tunmer & Nesdale, 1985; Snowling, 2006). Data for decoding accuracy were collected every at the beginning of every session for each participant during baseline and intervention. The researcher selected 10 pseudowords (adapted from Gillon, 2000) which followed regular single consonant C/V/C spelling patterns. The words were presented in seven lists of the 10 words randomly ordered (see Appendix C). The size and type of font used in the lists (14 comic sans) was similar to the size and type of font used in the yellow level books. For the purpose of this study, decoding accuracy was operationally



defined as: when visually presented with a vertical list of regularly spelt CVC pseudowords (in size 14, comic sans font in black ink on A4 card) and orally instructed to read each word in a quiet room with no noise distractions, the participant will voice the whole word accurately, with 10 seconds. The task was introduced to the child as: *“There are some funny sounding names of children who come from another planet. Here are 10 funny sounding names for you to read to me. Start with the top name and read each name on the list.”* The researcher gave the child two practice words which were not scored. If the child did not read the word within 10 seconds, the researcher moved him/her on to the next one by saying *“OK...let’s try this one.”* No corrective feedback was given for any of the test items.

Dependant variable 4 was rate of acquisition of word recognition accuracy measured by performance in oral reading of context free regularly spelt words from the yellow level of *PM Readers* book series. Data for rate of acquisition of word recognition accuracy were collected every session for each participant during baseline and intervention. The researcher used a bank of 40 regularly spelt words selected from 15 books from the yellow level *PM Ready to Read series of books*. The words were presented as 12 lists of eight words randomly ordered (see Appendix C). The size and type of font used in the lists (14 comic sans) was similar to the size and type of font used in the yellow level books. Each list of words included words that were matched on number of phonemes, type of phoneme (e.g. digraph and non-digraph words) and long or short vowel sound. No words that were used in the programme were included. At the end of each week a different list was presented orally to the child. For the purpose of this study, word recognition accuracy was operationally defined as: when visually presented with a vertical list of regularly spelt words (in size 14, comic sans font in black ink on A4 card) and orally instructed to read each word in a quiet room with no noise distractions, the participant will voice the whole word accurately, with 10 seconds. The task was introduced to the child as *“Here are eight words for you to read to me. Start with*

*the top word and read each word on the list.*” The researcher gave the child one practice word which was not scored. If the child did not read the word within 10 seconds, the researcher moved him/her on to the next one by saying “*OK...let’s try this one.*” No corrective feedback was given for any of the test items.

In addition to praise for participation, a sticker for token reinforcement in was provided to participants each session, contingent on completion of the probes each. This was intended to encourage students to try hard on these unpreferred activities which were repeated each session and for which no corrective feedback or praise for accuracy could be given.

### **3.4.1 Inter-Observer Agreement**

To ensure the reliability of the data, a second observer (a teacher-aide) was used for 25% of data collection for all three measures of the dependent variable, across baseline and intervention stages. Inter-observer agreement was 100%.

### **3.5 Participants**

The three participants in the study were in the same year 1 class. The relevant characteristics of children are shown in Table 1.

**Table 1: Participants’ Characteristics Before Intervention**

<b>Name</b>	<b>Date of Birth</b>	<b>Gender</b>	<b>Cultural Identity</b>	<b>Age in Months</b>	<b>Class Reading Bool Level</b>	<b>Letter Identification Score</b>
<b>Cara</b>	5/01/06	f	Pakeha	5.7	Red Level 2	49/54 (90%)
<b>Belinda</b>	27/10/05	f	Pakeha	5.9	Red Level 1	39/54 (72%)
<b>Logan</b>	5/09/05	m	Maori	5.11	Red Level 1	50/54 (92%)

Although Logan was the oldest participant, the class teacher reported that he had been in the lowest of four class reading groups in the class for two terms and was reading at the

emergent reading level (Red 1). Belinda had also remained in the emergent reading group since the start of the year, and Cara had progressed to the Red level 2 group at the beginning of term 2. The teacher reported that all three students were behind their class peers in letter-sound knowledge, word recognition, and reading fluency. She reported that during the past two terms she had observed some improvement in all the participants' letter identification and letter-sound knowledge, but that her main concern was that they appeared to be progressing at a slower rate than most of their peers in the acquisition of reading. All three participants reported that they had books at home and were sometimes read to by a parent. The parents reported that they read stories with their children at least once a week and that they listened to their child read their class book to them at least twice a week. This information indicated that none of the participants were being disadvantaged by a lack of access or exposure to books at home.

An observation of each participant reading their class book provided further insight into their attitudes to reading. Information yielded from this source should be considered with caution because the task involved reading to an unfamiliar adult (the researcher) which may have been disconcerting for these children. Furthermore, detailed analysis of the reading was not taken (e.g., using a running record), so interpretations drawn from it are from the subjective point of view of the researcher. Cara presented as being comfortable with reading her Red Level 2 book to the researcher. Her performance suggested that while she seemed to read known words, such as 'I' and 'the' automatically, she guessed unfamiliar words in text based on the initial letter of the word. Logan appeared to rely heavily on the pictures accompanying the text in his Red Level 1 book and appeared reluctant to attempt unfamiliar words by saying "don't know" or "can't do that one". Belinda chose not to read her book to the researcher, suggesting that she did not feel comfortable with the task.

### **3.6 Independent Variable**

The independent variable was a programme of instruction in phonological awareness with decoding described below. It was based on Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) with extra components in decoding added to meet the letter and word skills and needs of the participants in this study within the context of the New Zealand literacy curriculum. Although Torgesen and Bryant's programme was designed to be used with small groups of children, for the purposes of experimental control the intervention for this study was delivered individually to each participant. While this programme was an isolated word study, the children were continuing to receive practice in story writing and reading connected text in their regular class reading programme.

Individual participants met with the researcher for 30-minute sessions four times a week for a total of five and a half weeks (22 sessions, 660 minutes in total for each child). The sessions were scheduled for Mondays through to Thursdays. To allow for the possibility of child absences, if a participant or the researcher was absent, sessions could be re-scheduled for Fridays, and although the intervention was due to be completed at the end of the penultimate week in the term, extra time was available in the final week of term to ensure that all participants would be able to receive 22 sessions of instruction.

The researcher was a New Zealand registered teacher who had experience in teaching primary aged children with learning difficulties. The training sessions occurred in the afternoons of term 3 for the first 4 weeks and the mornings for the second 4 weeks. These times were selected to fit in with the school programme and to ensure that children would not be disadvantaged by missing the same part of the class timetable throughout the 6 weeks of the programme. The 90 minutes was divided into three 30 minute slots and the participants rotated the times of training throughout the week so that they did not continually miss out on the same part of the afternoon or morning activities. It also meant that individual participants' progress was not continually affected by the same possible confounding

variables caused by the timing of the sessions, such as participants in the last slot being tired (as it was just before the end of the school day).

Training sessions took place in a quiet well lit room with an even temperature, next to the participants' classroom. The researcher used behaviour specific praise in the sessions as a natural way to encourage and support children's learning (Alberto & Troutman, 2009). This approach also matched the reinforcement technique practiced by the participants' class teacher which minimised the risk of the study being compromised by a potentially confounding independent variable.

The training sessions divided sets of warm-up, blending, segmenting, decoding, and spelling activities which advanced in difficulty level as the programme progressed. The phonological skills were taught and practiced using a sequence of word sets. The aim was for participants to become familiar with a small set of sounds by working within word sets which contained a restricted number of different phonemes. Each word set introduced three new consonant phonemes. Letter-sound correspondences were also practiced by the children when working with each word set. All the words in the programme consisted of CVC digraph and non-digraph words (see Appendix D).

**Materials.** Pictures of rhyming words (words listed in Appendix D), an A3 size magnetic white board, fine-tipped white board marker, three coloured cards (4cm diameter), word set picture cards, word set word cards, Rocky the Robot board, Jungle Sound Game, plastic letters, lion and tiger puppets, three A5 sized CVC word bingo cards and words, two game boards with CVC words and pictures, sets of pairs of CVC words presented on cards.

The first session was a warm-up session which focused on onset/rime activities which were the easiest level of phonological awareness skill. The aim was to establish rapport with participants and gradually move from easy to the challenging tasks sound blending, sound segmenting, and reading and writing activities. The initial warm-up session was introduced

by the researcher by telling participants that the purpose was to help them to learn about sounds in words. Rhyming words were defined to the child as words that sound alike at the end and an orally spoken example of a rhyming couplet was given and the child was asked to identify the rhyming words: I saw a pretty yellow **bee**,/Sitting on a flowering **tree**. The researcher presented the child with three picture examples of rhyming pairs (e.g., dog-log, big-pig, shell-bell) and the child repeated the rhyming pairs. The researcher repeated the process with three picture examples of words that did not rhyme. The researcher then gave five picture cards to the child to correctly identify and spread out on the table, picture-up and facing him/her. The researcher spread out the five corresponding rhyme pictures in front of herself, with the pictures facing the child. Once the child had correctly identified all 10 pictures, the researcher picked a picture card, said the word and asked the child to find the corresponding rhyming picture from his/her cards. The child said the words and the researcher responded with “yes, those two words rhyme because they sound alike” or “No, those two words sound different at the end so they do not rhyme, try again”. This process was completed until all five pairs of rhyming words were identified and voiced by the child.

The researcher then put the magnetic white board on the table and placed one picture on the board with the corresponding plastic letters under the picture (e.g., a picture of a dog is placed on the white board with the letters d/o/g/ under it) and asked the child to read the word. The researcher then placed the corresponding rhyming picture on the board and repeated the process (e.g., a picture of a log is placed on the white board with the letters l/o/g/). The researcher focused the child’s attention on the part of the words which sound the same (ending) and the part which is different (first letter). The process was repeated for two more rhyming pairs. In the final part of the session the researcher wrote the ending of the rhyming pairs on the white board, next to the corresponding picture and asked the child to

write the correct letter in the space (e.g., \_\_ an and \_\_an is written next to the pictures of man and fan and the child attempted to write in the initial letter to complete the words).

Following the warm-up, each week's sessions included five different activities of ascending difficulty which were repeated throughout the week. There was a degree of flexibility in the amount of time spent on each activity to allow researcher judgement about the individual needs of each participant. For example, if a child was struggling on activities 1a) and 1b) which involved onset-rime blending, more time would be spent on these activities before moving onto the more difficult reading task in 1c). In general, the researcher would wait until a child was performing at over 75% on a task before moving on to the next. However, in instances where the child appeared frustrated or unmotivated by a particular activity, the researcher changed to a different activity before returning to the former one.

Week one's sessions focused on onset-rime blending. In activity 1a) the cards in the word set were introduced to the child for him/her to accurately name. Corrective feedback was given for errors and these pictures were placed in a different pile until all pictures are named correctly. Rocky the Robot board was placed on the table in front of the child. The researcher explained that *"this is Rocky the Robot and he needs your help. Rocky talks funny because he is a robot and he can't put the sounds in the words together. You have to put the sounds together for him and figure out what he wants to say. If he says /d/ -og he means dog. If he says m/-an he means man."* Three pictures from word set 1 were placed in front of the child and the researcher said *"Let's see if you can figure out which of these pictures Rocky wants. You will need to listen carefully and put the sounds together to figure out which picture he wants."* The process was repeated for all the words in the word set using a three-picture choice format. The child was encouraged to say the word before choosing the picture. If the child did not identify the word, the researcher presented the word with a shorter interval between the C-VC. If the child responded correctly, the correct response was reinforced by

saying: “That’s right, p/-ig is pig.” When the child correctly identified a picture the child was instructed to place it next to the picture of Rocky on the board. If the child performed with less than 75% accuracy, a two picture format was used.

In activity 1b) the researcher explained to the child that he/she was going to help Rocky get to the finish on the *Jungle Sounds* Board. All the pictures from the wordset were placed in front of the child and he/she was asked to identify the picture that Rocky said in C-VC format by saying the correct word and placing it on the Jungle sounds board. If the child gave an incorrect response, corrective feedback was given: “*that’s not quite right. Listen again* (word presented with a shorter interval between phonemes) *What is \_\_\_\_\_?*”

For activity 1c) plastic letters were used to represent the phonemes in words. The child was asked to “sound out” and read words from the word set. The researcher placed plastic letters on the whiteboard to spell a word from the word set, pronouncing the onset and rime as she put it down. The child was instructed to read the word. Corrective feedback was given. The researcher then changed the initial letter and asked the child to read the word (e.g., m/ap was changed to t/ap/). In activity 1d) plastic letters for a word from the word set were handed to the child in the order in which the word is spelt. The child was instructed to say each sound then blend the phonemes together to say a word: “*As I give you a letter, tell me the sound it makes. Now, put the sounds together on the white board and read the word*”. Immediate, corrective verbal feedback was given. In 1e) The child was presented with a picture card and asked to sound out the word and have a go at spelling it using the white board marker on the white board. Immediate corrective, verbal feedback was given. 1f) The CVC bingo game was played by placing the CVC words face down on the table. The researcher modelled the desired reading behaviour by turning a CVC card over and sounding out the word before placing it on the bingo board. When it was the participant’s turn, immediate corrective feedback was given in the sounding out of CVC words.



In week two word set 2 was introduced, following the same procedure for correct identification of pictures used with word sets 1 and 2. The sessions in week 2 focused on individual phonemes in words. Activity 2a) was conducted in the same format as 1a) but with wordset 2 cards. The researcher told the child that Rocky would say the words in even smaller parts, one sound at a time. Coloured cards were introduced to represent each phoneme in the words. 2b) and 2c) Also followed the same procedure as 1b) but with word set 2 the individual phonemes instead of onset/rime format. 2d) and 2 e) followed the same instructional format but with word set 2.2f) a bingo game was played using same format as 1f) but with a different set of CVC words.

In week three, the focus moved to segmenting words into phonemes. Activity 3a) taught the child to listen for the first sound in words from word set 2. The researcher held up a picture of a bike and asked the child to listen carefully as she slowly said the word bike three times and told the child that the first sound in bike is /b/. The child was asked to repeat the /b/ sound and the child's attention was focused on the "feel" of a /b/ sound (e.g., *"cover your ears and say the sound /b/...is it a loud sound or a quiet sound?"*). The researcher placed the picture of the bike on the table facing the child along with a picture of a bun and two pictures which do not start with /b/. The researcher said (as pointing to each picture) *"Which of these words, bun, \_\_\_\_\_, or \_\_\_\_\_ begins with the same sound as bike?"* If the child gave a correct response, the researcher reinforced this by repeating the words as b-b-b-b-bike and b-b-b-b-bun. If an incorrect response was given, feedback was provided as *"No, \_\_\_\_\_ and bike do not begin with the same sound. \_\_\_\_\_ begins with /\_\_\_/ and bike begins with /b/. listen and say b-b-b-b-bike"* The researcher repeated the task using the two remaining pictures. Once the child reached 75% accuracy in matching /b/ words, the researcher repeated the process with different initial letters.

In activity 3b) the lion and tiger puppets were introduced and the child was told he/she needed to help them find the odd picture out. Four picture cards were placed in front of the child and the dog “said” the words (e.g., bike/bun/ball/sock). The child was asked to identify the word that started with a different letter from the others. The child then placed the correct picture on the Jungle Sounds board and the process was repeated until he/she reached the finish square on the board. Corrective feedback was given as in 3a). Activities for 3c), d), and e) followed the same format as 2 c), d), and e). In week four wordset 3 pictures were introduced following the same procedure for correct identification of pictures used with previous sets. During week 4, the sessions followed the same format as week three but with the instructional focus extending to identifying final and middle sounds in words. 3f) An A4 sized board game with dice and counters was presented to the participant and the instructions were to take turns with the researcher to throw the dice and move around the board, sounding out the words landed on, to get to the finish.

In week five wordset 4 pictures were introduced following the same procedure for correct identification of pictures used with previous sets. Activity 5a) followed the same procedure as 2a) blending practice but this time instead of using coloured cards to represent the phonemes in words, letters were used. The researcher told the child *“Now that you have taught Rocky to say the words really well, now you are going to help him to say and spell the words. You write down the sounds on the whiteboard as Rocky says them, then we can show him how to spell the word.”* Immediate corrective feedback was given to the child and the process was repeated for five word cards. For digraph words such as shop and feet, the digraphs were presented as sounds using the plastic letters. In activity 5b) the researcher explained to the child that he/she was going to help Rocky get to the finish on the Jungle Sounds Board. Rocky was going to say a word and the child needed to put the sounds down on the table then blend them to make the word. The researcher put six plastic letters in front

of the child to choose from (which included the three correct phonemes) Corrective feedback was given: “*that’s not quite right. Listen again. Rocky says \_\_\_\_\_ Say the sound \_\_\_\_\_ What letter/s do you need for the \_\_\_\_\_ sound?*” Activities in 5c), d), and e) were the same as those in 3c), d), and e) but with wordset 4. 5f) was a game of pairs with CVC picture cards and corresponding word cards: the cards were spread out, face down, on the table and the participant was instructed to take turns with the researcher to turn over one picture card and one word card. The participant was instructed to read the word by sounding it out. If the word matched the picture, they kept the pair and had another turn. In the final week, word set 5 was introduced, following the same procedure for correct identification of pictures used with previous sets. The activity format in week six was the same as in week five.

### **3.7 Experimental Design**

A single-subject, multiple-baseline across participants design was used for this study. To demonstrate internal validity in this type of design, performance within the same participant is compared before and during the intervention. It is assumed that baseline performance predicts future performance without intervention (Alberto & Troutman, 2009). The start of the intervention was staggered across the three participants to allow demonstration that the treatment rather than extraneous variables caused behaviour change. While the dependent variables of the targeted participant/s increased, dependent variables of participant/s in the control phase (baseline) should remain stable, allowing the conclusion that the intervention produced the effects on the targeted participants. A difference of three sessions between each intervention phase was chosen to ensure the intervention could be completed for all participants before the end of the school term.

During the baseline phase participants were given tasks to measure blending, segmenting, decoding, and word recognition accuracy. Data were collected by the researcher in a quiet room next to the classroom, with a second observer present for 25 % of the data

collection sessions. Participants' were advised that the researcher would not tell them whether their responses were correct or not. Praise for participation in the tasks was used by the researcher during data collection and a sticker was given contingent on the completion of the probes each session. During the intervention phase data collection continued following the same procedure as during the baseline condition with data being collected at the beginning of every instructional session.

### **3.8 Social Validity**

Pre and post intervention interviews were conducted with participants, parents, and class teacher to evaluate the acceptability of the programme to its consumers. The class teacher reported she felt that the programme could be beneficial to the individual participants' because the instructional components fitted well with the 'Jolly Phonics' programme she was using with the class. She reported that she felt that the intervention would match her teaching style and philosophy. The teacher's view indicated that she felt that the programme was both socially acceptable and educationally relevant. Further support for the programme was expressed by the participants' parents who all reported that they felt that the aim of the programme, to accelerate the rate of reading acquisition, was worthwhile and relevant.

Nicholson's (2005) 'Assessment of reading attitude' was used to gather information about how participants felt about different aspects of reading and writing and to evaluate the social and educational relevance of the programme for each child. All three participants selected the 'very happy puppy' or 'happy puppy' to describe their attitude to almost all aspects of reading which could have been partly due to the children simply telling the researcher what they thought she wanted to hear. Nevertheless, the positive attitudes reported by the children suggested that this was a programme that was socially acceptable to them because they did not have an aversion to reading or writing tasks.

The exception to the positive attitudes reported by the children at the start of the programme, was Belinda who reported that the ‘very sad puppy’ described how she felt towards spelling unknown words. This attitude suggested that an intervention that focused on teaching letter-sound patterns in words would be educationally relevant for Belinda by providing her with strategies for attempting to spell unfamiliar words. All parents reported that prior to intervention their child seemed to find reading difficult and as a result was reluctant to read at home. It was felt that a social benefit of an intervention which aimed to facilitate reading acquisition for the participants and their parent/s could be to make the process of daily reading easier and more enjoyable.

### **3.9 Hypotheses**

Specific hypotheses were developed based on each participant’s baseline scores on measures of the dependent variables, the level of difficulty of the tasks (i.e., blending is easier than segmenting (Adams, 1990; Torgesen et al., 1992)), and the instructional components in the programme. For example, blending and segmenting skills were explicitly taught and extensively practised in the programme so a larger increase in accuracy of these variables compared to pseudoword decoding and word recognition accuracy was predicted.

#### **Cara**

Cara’s letter-identification score at the start of the programme was 49/54. At baseline Cara’s average scores were: blending accuracy 1.6/5 (32%); segmenting accuracy 0.4 (8%); word recognition accuracy 1.6/8 (20%); pseudoword decoding 0/10 (0%). Hypothesis 1: Cara will exhibit an increase in word recognition accuracy from 20% (baseline score) to 63% after participation in the Phonological Awareness Training Programme, measured by performance in oral reading of context free regularly spelt words from the yellow level of pm readers book series. Hypothesis 2: Cara will exhibit an increase in pseudoword decoding accuracy from 0% (baseline score) to 60% after participation in the Phonological Awareness

Training Programme, measured by performance in decoding simple pseudo-words consisting of C/V/C words. Hypothesis 3: Cara will exhibit an increase in blending accuracy from 32% (baseline score) to 100 % after participation in the Phonological Awareness Training Programme, measured by performance in blending individual sounds in words. Hypothesis 4: Cara will exhibit an increase in segmenting accuracy from 8% (baseline score) to 60% after participation in the Phonological Awareness Training Programme, measured by performance in segmentation tasks.

### **Belinda**

Belinda's letter-identification score at the start of the programme was 39/54. At baseline Belinda's average scores were: blending accuracy, 2.6/5 (52%); segmenting accuracy 0.8/5 (17%); word recognition accuracy, 0.8/8 (10%); pseudoword decoding 0.5/10 (5%). Hypothesis 1: Belinda will exhibit an increase in word recognition accuracy from 10% (baseline score) to 50% after participation in the Phonological Awareness Training Programme, measured by performance in oral reading of context free regularly spelt words from the yellow level of pm readers book series. Hypothesis 2: Belinda will exhibit an increase in pseudoword decoding accuracy from 5% (baseline score) to 50% after participation in the Phonological Awareness Training Programme, measured by performance in decoding simple pseudo-words consisting of C/V/C words. Hypothesis 3: Belinda will exhibit an increase in blending accuracy from 52% (baseline score) to 100 after participation in the Phonological Awareness Training Programme, measured by performance in blending individual sounds in words. Hypothesis 4: Belinda will exhibit an increase in segmenting accuracy from 17% (baseline score) to 80% after participation in the Phonological Awareness Training Programme, measured by performance in segmenting separate phonemes in words.

### **Logan**

Logan's letter-identification score at the start of the programme was 50 /54. At baseline Logan's average scores were significantly higher than the other participants' scores. They were: blending accuracy, 3.9/5 (77%); segmenting accuracy, 1.9/5 (37%); word recognition accuracy, 2.9/8 (36%); pseudoword decoding 4.6/10 (46%). Hypothesis 1: Logan will exhibit an increase in word recognition accuracy from 36% (baseline score) to 75% after participation in the Phonological Awareness Training Programme, measured by performance in oral reading of context free regularly spelt words from the yellow level of pm readers book series. Hypothesis 2: Logan will exhibit an increase in pseudoword decoding accuracy from 46% (baseline score) to 90% after participation in the Phonological Awareness Training Programme, measured by performance in decoding simple pseudo-words consisting of CVC words. Hypothesis 3: Logan will exhibit an increase in blending accuracy from 77% (baseline score) to 100 % after participation in the Phonological Awareness Training Programme, measured by performance in blending individual sounds in words. Hypothesis 4: Logan will exhibit an increase in segmenting accuracy from 37% (baseline score) to 80% after participation in the Phonological Awareness Training Programme, measured by performance in segmenting separate phonemes in words.

## **Chapter 4**

### **Results**

The purpose of this study was to examine the effectiveness of using a modified version of Phonological Awareness Training for Reading (Torgesen & Bryant, 1993) to increase the rate of acquisition of phonological awareness, decoding accuracy, and word recognition accuracy for three young children were failing to meet the present Ministry Of Education literacy progression requirements. A single-subject, multiple-baseline across participants design was used to examine the effects of the intervention over time and to determine if a functional relationship existed between the independent and dependent variables. During the baseline and intervention phase participants were given tasks to measure blending, segmenting, decoding, and word recognition accuracy. The results for each of the four dependent variables during the baseline and intervention phases are presented below. The results indicate the existence of a functional relationship between the modified version of Phonological Awareness Training for Reading and each of the four dependent variables.

#### **4.1 Blending Accuracy**

As shown in Figure 1, all three participants dramatically improved accuracy in blending with the introduction of the independent variable and reached ceiling levels on this task in a relatively short amount of time. The amount of time required for each participant to reach ceiling level appeared to relate to their baseline level of accuracy on this task. As can be seen in table 3, Logan, who had a mean baseline score of 77% reached ceiling level after four sessions (mean score during intervention 96%); for Belinda, who had a baseline mean of 52 %, it took six sessions (mean score during intervention 92%); and for Cara who scored an average of 32% at baseline it took nine instructional sessions (mean score during intervention 86%). Each participant's increase in blending accuracy only occurred once the intervention



phase had begun indicating the existence of a functional relationship between the independent and dependent variable. The short latency between the introduction of the programme and the change in blending accuracy across all participants demonstrates a strong functional relationship between them. The results for this dependent variable match the hypotheses for all participants, with an optimum level of success being reached early on in the programme. The percentage of nonoverlapping data points (PNDs) for Logan was 78%, Cara 94%, and Belinda 92%. These PNDs demonstrate the strong effect of the intervention on blending accuracy for each participant. The two follow-up measures for each participant indicate that the effects were maintained over the course of the intervention.

#### **4.2 Segmenting Accuracy**

Figure 2 confirms that the results for segmenting accuracy met the hypotheses for the three children in this study. Both Logan and Belinda both reached the predicted level of 80% accuracy, while Belinda exceeded the hypothesised improvement by 20%. The latency effect of training was slightly longer for segmenting than for blending, with participants reaching 80% accuracy after 13 sessions for Cara 10 sessions for Belinda, and six sessions for Logan. As can be seen in Figure 2, the performance of participants who remained in the baseline phase without the intervention remained stable, with no improvement on segmenting accuracy. The improvement in participants' segmenting accuracy demonstrates functional relationship between the independent variable and this dependent variable. The mean intervention performance scores for all participants showed significant improvement over baseline, as can be seen in Table 3. The PNDs for Cara (90%), Belinda (100%) and Logan (100%) indicate that the intervention had a powerful effect on the segmenting accuracy of all participants.

### **4.3 Pseudoword Reading**

The results for pseudoword reading are displayed in Figure 3. The latency effects of the intervention on this dependent variable were longer than for blending and segmenting accuracy. The onset of the intervention was accompanied with very small level changes for Cara (0% average over baseline to 3% over first three instructional sessions) and Belinda (3% to 10%). Logan improved at a faster rate than the other two participants after the introduction of the programme with a change in accuracy from 46 % average over baseline to 60% after three sessions and a mean of 84% during the intervention phase. Even though the change occurred gradually after the introduction of the programme, improvement continued steadily for Belinda and Logan, and dramatically for Cara after 13 sessions. Logan reached the hypothesised level of improvement for this dependent variable, reaching 90% after 11 intervention sessions, and he achieved 100% success in the last week of intervention. Belinda reached 50% accuracy after 14 sessions. However, she did not maintain the hypothesised 50% accuracy and performed at an average of 45% accuracy in the final sessions and had a mean of 39% during intervention. Cara exceeded the predicted level of 60% accuracy by performing at 90% accuracy after 18 intervention sessions and had a mean of 40% during intervention. Although small, the improvement in participants' pseudoword accuracy in the intervention phase whilst other participants' performance remained stable demonstrates functional relationship between the independent variable and this dependent variable. Cara's PND was 90%, Belinda's 71%, and Logan's 95%. These PNDs demonstrate the effectiveness of the intervention on pseudoword accuracy for all participants.

### **4.4 Word Recognition Accuracy**

The results for word recognition accuracy are shown in Figure 4. The latency effects seen on this variable were similar to pseudoword reading, with only a slight change for Cara from an average baseline score of 20% accuracy to 25% over the first three instructional

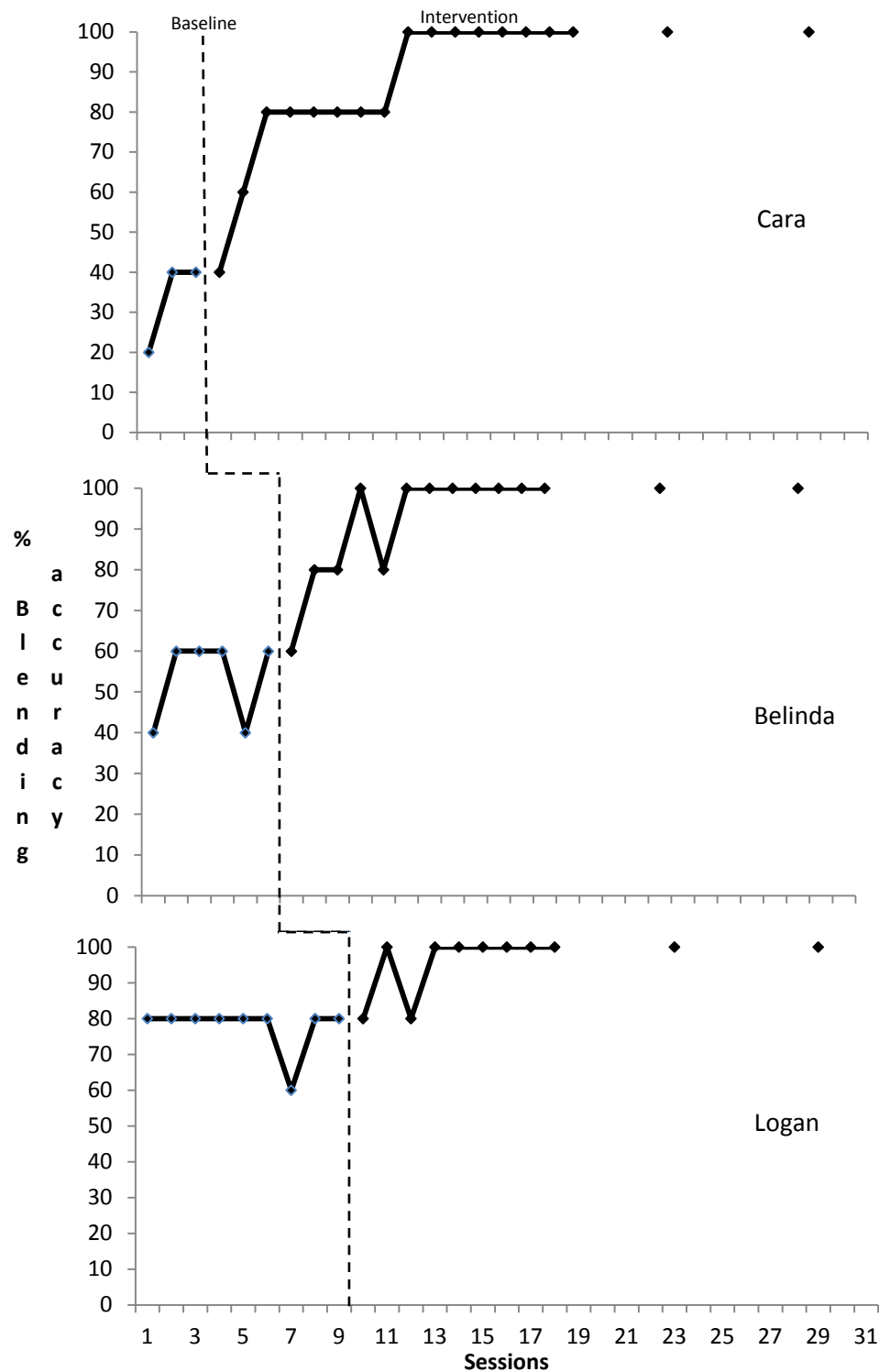
sessions. Belinda increased her average score from 10% accuracy at baseline to 21%, and Logan increased from 36% to 50% over the first three instructional sessions. Logan appeared to progress steadily on this measure with a gradual rise until session 14, when he reached 88% accuracy, exceeding the hypothesised performance. Belinda's progress on this measure was gradual and did not exceed beyond the hypothesised 50% accuracy. Cara's scores on word recognition accuracy remained low during the first half of the intervention with a level of 25% accuracy after 10 sessions. However, by session 14, Cara's scores had risen dramatically to 75% (exceeding the hypothesised 63% accuracy) suggesting that a sudden improvement had occurred after 13 instructional sessions. The mean scores during the intervention phase were 47% for Cara, 39% for Belinda, and 67% for Logan. Although the onset of the intervention programme was accompanied by gradual changes in the rate of word recognition accuracy, the changes only occurred for each participant during the intervention phase, allowing a functional relationship between the independent and dependant variable to be assumed. As shown in Table 3, the PNDs were high for all participants on this measure. This appears to indicate the effectiveness of the programme in improving participants' word recognition accuracy

#### **4.5 Letter Identification**

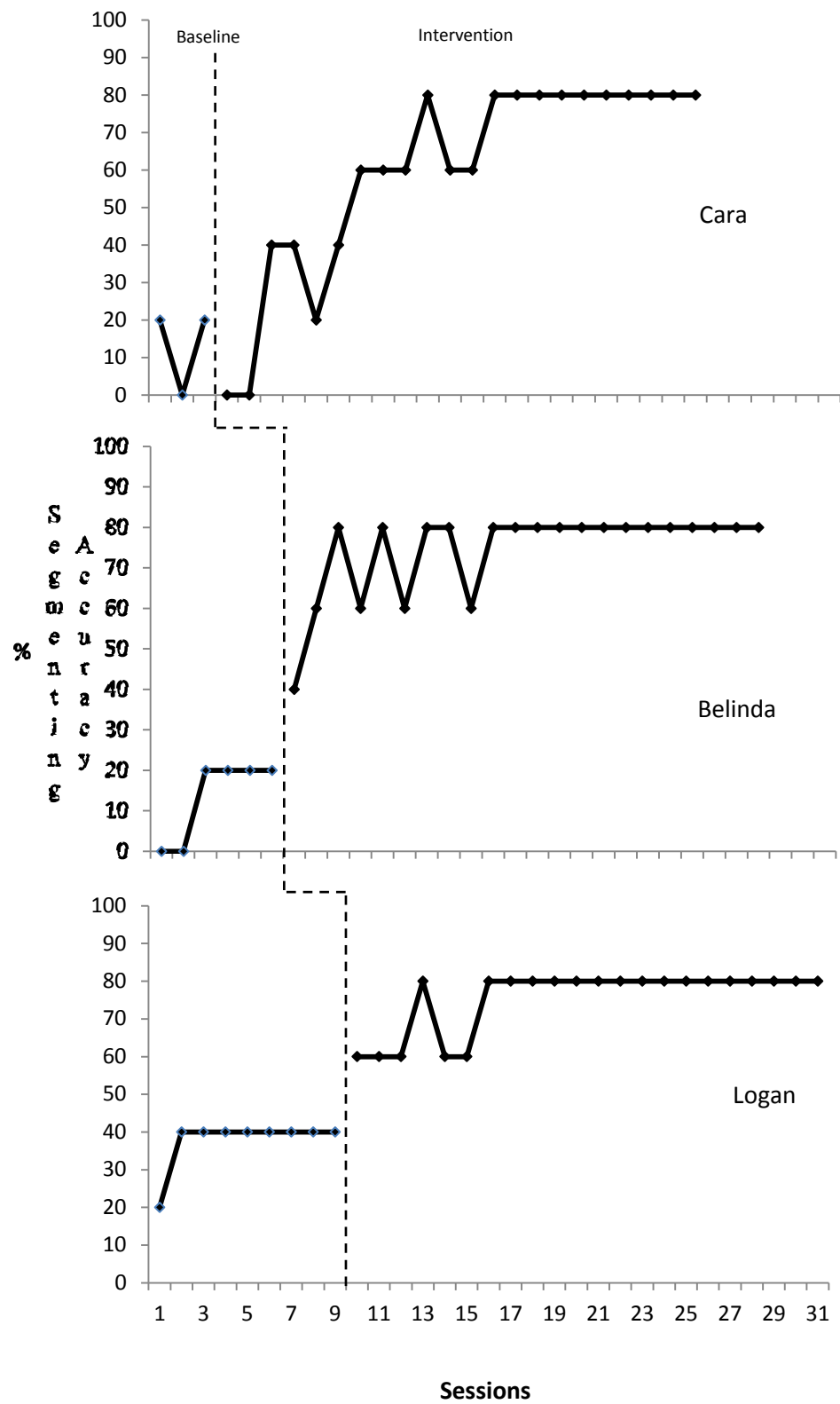
As can be seen in Figure 5, there was an improvement in letter identification scores from pre to post test. Although no functional relationship between the participants' improved performance in letter identification and the phonological awareness training programme can be concluded, it is possible that the programme helped to advance these children's skills in this area. In support of this suggestion, a recent experimental training study by Cardoso-Martins et al. (2011) demonstrated that children who were given phonological awareness training found it easier to learn letter sounds than controls. However, the causal direction should not be assumed in the present study as it is possible that the participants' significant

and rapid improvement in performance of phonological awareness tasks could have been partly attributable to their existing alphabet knowledge at the start of the intervention.

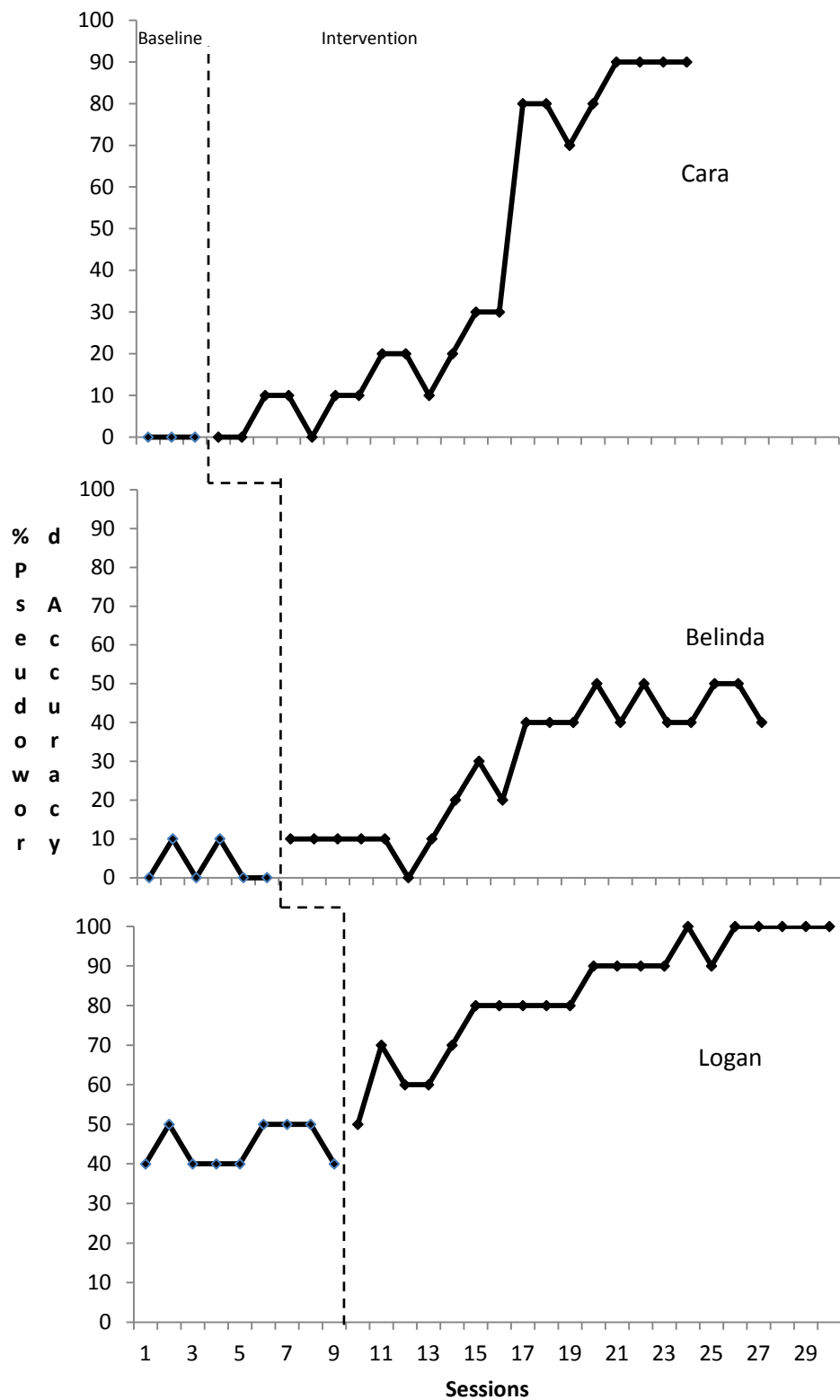
**FIGURE 1: Percentage of blending accuracy across participants.**



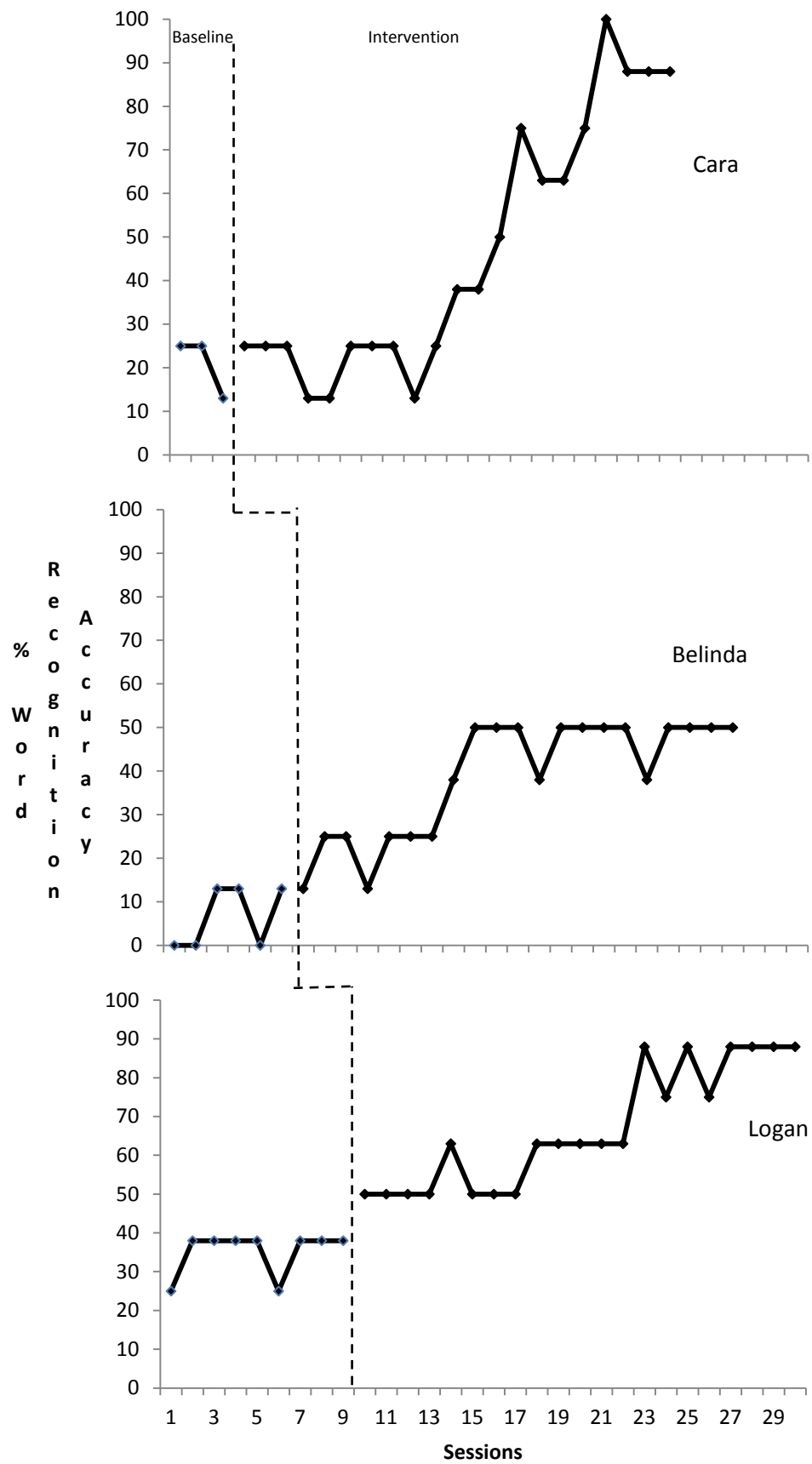
**FIGURE 2: Percentage of segmenting accuracy across participants.**



**Figure 3: Percentage of Pseudo-word accuracy across participants.**



**FIGURE 4: Percentage of word recognition accuracy across participants.**



**Table 2**

*A Sample of Word Recognition Data for Each Participant Taken at Baseline and Different Stages During Intervention.*

	<b>Cara</b>		<b>Belinda</b>		<b>Logan</b>	
	Words read correctly	Words read Incorrectly	Words read correctly	Words read Incorrectly	Words read correctly	Words read Incorrectly
<b>Session 2 baseline</b>	Dad had	shut feel good lid hen sent		shut feel good lid hen sent Dad had	had Dad hen	shut feel good lid sent
<b>Session 6 intervention</b>	Mum she had	this feel lid jump hen	had Mum hen	this feel lid jump she	had lid hen Mum	this feel jump
<b>Session 10 Intervention</b>	be big	get this ran good jump	get ran big sit	jump be this good	get ran sit big jump	this good be
<b>Session 20 Intervention</b>	this for book tin mat he went and		get ran big sit	jump be this good	get ran sit big jump this be	good

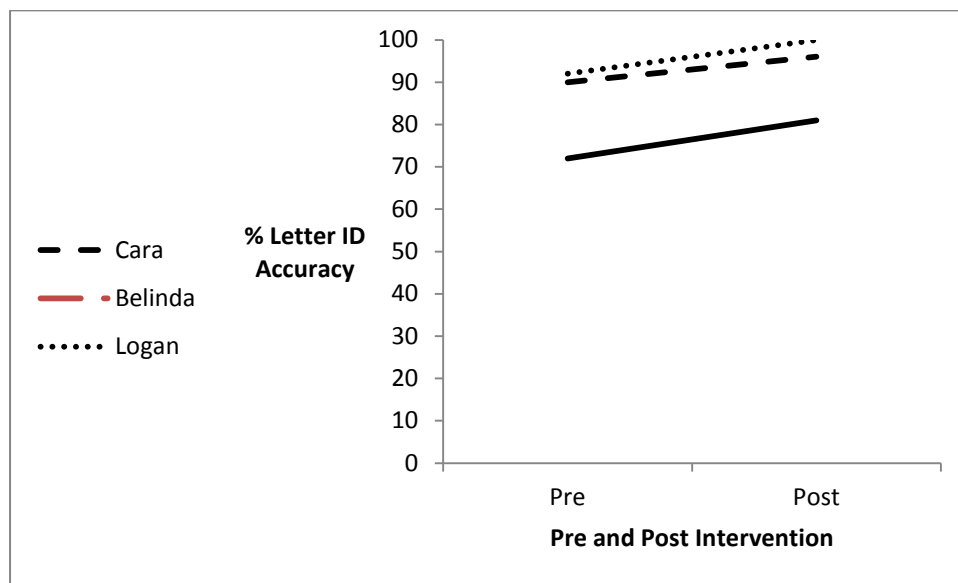
**Table 3:**

*Baseline and Intervention Means and Percentage of Nonoverlapping Data points (PNDs)*

		<b>Mean baseline%</b>	<b>Mean Intervention%</b>	<b>PND %</b>
<b>Blending</b>				
	<b>Cara</b>	<b>32</b>	<b>86</b>	<b>94</b>
	<b>Belinda</b>	<b>52</b>	<b>92</b>	<b>92</b>
	<b>Logan</b>	<b>77</b>	<b>95</b>	<b>78</b>
<b>Segmenting</b>				
	<b>Cara</b>	<b>8</b>	<b>60</b>	<b>90</b>
	<b>Belinda</b>	<b>17</b>	<b>67</b>	<b>100</b>
	<b>Logan</b>	<b>37</b>	<b>75</b>	<b>100</b>
<b>Pseudoword</b>				
	<b>Cara</b>	<b>0</b>	<b>40</b>	<b>90</b>
	<b>Belinda</b>	<b>5</b>	<b>29</b>	<b>71</b>
	<b>Logan</b>	<b>46</b>	<b>84</b>	<b>95</b>
<b>Word Rec</b>				
	<b>Cara</b>	<b>20</b>	<b>47</b>	<b>86</b>
	<b>Belinda</b>	<b>10</b>	<b>39</b>	<b>90</b>
	<b>Logan</b>	<b>36</b>	<b>67</b>	<b>100</b>



**FIGURE 5: Pre and Post Intervention Letter Identification Scores**



#### **4.6 Summary of Results**

The results from this study are consistent with the overwhelming body of reading research which underscores the importance of the relationship between phonological skills and reading acquisition (Adams, 1994; Ehri et al., 2011; Iverson, Tunmer, & Chapman, 1997; Lundberg et al., 1988; Pullen et al., 2005; Ryder et al., 2008; Snowling, 2006; Torgesen et al., 2005; Tunmer & Nesdale, 1985). The major finding of this study was that this phonological awareness training programme based on empirically validated reading research was highly effective for increasing the reading skills of three struggling young readers. The multiple-baseline design enabled a functional relationship between the programme and each of the dependent variables to be evidenced. The baseline scores suggested that the participants' low levels of phonological awareness and knowledge of letter-sound patterns was hindering their rate of early reading acquisition. All three participants were able to make immediate and significant gains in blending and segmenting with the introduction of the programme. The results indicated that an improvement in phonological awareness skills was followed by an increase in decoding accuracy, measured by accuracy in reading pseudowords and real words.

## **Chapter 5**

### **Discussion**

The present study examined the effectiveness of using a phonological awareness and decoding training programme for three children who were not acquiring early reading skills at the same rate as their peers. This type of study using a multiple baseline design which monitors progress over time is helpful in examining not only the product of change (e.g., increased accuracy in blending and word recognition) but also the process of change (e.g., an increase in accuracy in blending occurred almost immediately after the introduction of the independent variable whereas word recognition occurred gradually).

#### **5.1 Blending and Segmenting Performance**

Visual analysis of the results answers the first research question by affirming that this programme has been effective in increasing all participants' blending and segmenting accuracy. This is a promising result for these beginning readers in the light of a compelling body of research indicating that blending and segmenting are strong predictors of future reading success (Adams, 1998; Perfetti et al., 1987). The improvement of the blending accuracy occurred more rapidly than the segmenting accuracy. The results for blending accuracy support the assertion by Adams (1998) and finding by Perfetti et al. (1987) that blending is a relatively simple phonological skill to acquire, and is significantly easier than segmentation and deletion tasks. The results for these participants suggest that blending provides a foundational phonological skill. Once the participants were successful in blending, it appears that they were able to demonstrate improvement in the more difficult skill of segmenting.

None of the participants scored beyond four out of five test items on the measure for segmenting accuracy. However, analysis of the data for this variable suggested that this was not an unexpected finding. Each list of five words to segment included a CCVC word with a

consonant blend at the beginning of the word (e.g., flew, blue). All the students consistently scored incorrectly on this item by counting the consonant cluster as one phoneme instead of two. The intervention programme only included CVC words so the students were not exposed to segmenting more difficult CCVC words. As can be seen in figures 3 and 4, the inability for the participants to extend this newly acquired skill to accurately segmenting more difficult words did not appear to hold them back on improvement in the other variables of accuracy in pseudo-word decoding and word recognition.

## **5.2 Pseudoword Reading Performance**

Analysis of the results for pseudoword decoding accuracy suggests that the answer to the second research question, *Does this phonological awareness and decoding training programme increase participants' knowledge of letter-sound patterns?*, is yes. Pseudoword reading is considered to be a rigorous test of competence in decoding and strongly associated with reading acquisition (Castle et al., 1994; Perfetti et al., 1987; Pullen et al., 2005; Snowling, 2006; Tunmer & Hoover, 1992). By the end of the programme, all participants' were able to show competency in reading pseudowords and their accuracy improved after the introduction of the programme.

Although a dramatic improvement can be seen in Cara's performance in pseudoword reading from baseline (0%) to completion of the programme (90%), the improvement appears to have occurred relatively gradually until session 14 where she excelled from 30% to 80%. The gradual improvement seen in Cara's performance during the first 13 instructional sessions matches the improvement trend for Belinda and Logan. This finding replicated results from Pullen et al.'s (2005) study in which decoding improvement was only seen across all participants after lesson 5. The results indicate that the beneficial effects of the intervention on decoding accuracy appear gradually but then accelerate with continued intervention.

The reason for Cara's sudden increase in pseudoword accuracy after 13 sessions is unknown and could have been due to factors other than the intervention such as practice at home or school. Interestingly, her dramatic improvement on this variable accompanied a steep rise in word recognition accuracy (from 38% in session 12 to 75% in session 14), suggesting that the ability to read pseudowords and real words tap into the same skill. This interpretation is supported by results for Belinda and Logan, which also show a rise in pseudoword reading accuracy accompanied by a rise in word recognition accuracy. Success in one task appears to be equated to success in the other. This interpretation of results fits with research indicating that decoding proficiency is fundamental to word recognition accuracy in early reading (Catts & Kamhi, 2005; Gough & Tunmer, 1986; Hoover & Tunmer, 1993; Snowling, 2006).

Single-subject design studies can be weakened when there is a long latency between the manipulation of the independent variable and change in the dependent variable (Horner et al., 2005). The longer latency on word recognition and pseudoword decoding accuracy compared to blending and segmenting, as shown in Figures 3 and 4, could be interpreted as compromising the demonstration of a functional relationship between these variables. However, closer analysis of Cara and Belinda's progress across time on measures of segmentation and pseudoword decoding appears to support Tunmer and Nesdale's (1985) conclusion that the relation of phonological skills to decoding is non-linear with phonological awareness being a necessary but not sufficient skill for decoding ability.

Visual analysis of the results show that for Cara and Belinda, segmenting accuracy increased before pseudoword decoding accuracy. This suggests that segmenting is an essential skill, but does not lead to success in decoding. Belinda made an immediate gain in segmenting accuracy but not in pseudoword decoding. Similarly, change in Cara's pseudoword decoding accuracy appeared to occur at a slower rate than her segmenting

accuracy, suggesting that accuracy in segmenting ability does not equate to success in decoding. Analysis of Logan's improvement across these two variables appears to show a more linear relation. However, the average baseline score of 46% for Logan on pseudoword decoding indicated that, prior to intervention he had a basic understanding of the alphabetic principle and was able to decode some unfamiliar words. It is possible to determine from the pattern of progress, that for Logan, the programme provided intensive practice to improve the basic skills which he already had, rather than acquisition of new skills.

The pseudoword probe also provided a precise assessment of students' letter-sound identification knowledge. Once the students were able to effectively apply the strategy of sounding out unfamiliar words, demonstrated by their ability to segment, it was possible to pinpoint specific difficulties they were having with particular letter sounds. For example, the errors that Logan repeatedly made on the same words demonstrated his confusion between 'b' and 'd'; and the difficulty Cara experienced with the 'u' sound was shown in her incorrect pronunciation of words with 'u' in as 'y.' Although no corrective feedback could be given on the probes for the purposes of this study, the procedure highlighted the utility for teachers using this type of assessment with their own pupils to monitor progress and success of their instruction.

The pseudoword decoding probe also appeared to track Belinda's progress with her letter-sound identification knowledge. Belinda's pre-test letter identification score was 39/54 which indicated that there was a significant gap in her letter knowledge. Although she made a quick gain in segmenting, Belinda's improvement in pseudoword reading accuracy was much slower. This is not an unexpected finding given that she lacked the information (letter knowledge) necessary for the process (decoding). Therefore, it is likely that Belinda's improvement on pseudoword decoding occurred as a result of her progress in letter-sound identification knowledge as well as her ability to segment. This suggests that as well as the

ability to segment, accurate letter and sound identification is essential to successful decoding. Although a child may be able to apply an effective strategy for decoding, accurate decoding of pseudowords is not possible without the knowledge of the specific letter sounds contained in the word. For example, the word ‘dup’ can only be decoded correctly if each letter-sound correspondence is known. This finding further supports research demonstrating that letter-knowledge and phonemic awareness account for much of the word-reading success of young students (Carroll et al., 2011; Cordoso-Martins et al., 2011; Ehri et al., 2001; Wagner et al., 1987).

### **5.3 Word Recognition Performance**

The final research question was *Does this phonological awareness and decoding programme increase participants’ rate of acquisition of word recognition accuracy?*

The word recognition accuracy measure was thought to be a less reliable measure of decoding accuracy than the pseudoword reading task because it was likely that some of the words were familiar to the children by sight and that they did not need to sound out the words to read them. During the course of the intervention, participants were continuing with their class reading programme so an increase in word recognition accuracy would have been expected even without participation on the programme. However, the pattern of progress in word recognition accuracy was similar to progress in pseudoword reading for all participants, suggesting that the same skill was being measured for both variables.

Analysis of participants’ performance on the test items during the beginning and middle of intervention showed that the words which contained single CVC words were often read correctly, whilst words containing digraphs, such as /shut/ and /that/ were more commonly read incorrectly (see Table 2). A common mistake among students during intervention was to attempt to sound out the words containing digraphs with four sounds instead of three phonemes. For example, instead of sounding shut as sh/ u/ t, the participants

sounded s/h/u/t/. This finding is convergent with Tunmer and Nesdale's (1985) results of a phoneme tapping test on young children which indicated that the children tended to overshoot on segmenting counting of words containing digraphs.

It appeared in this study that when participants were visually presented with a word, they used their developing knowledge of grapheme-phoneme correspondence rules to count each letter as representing a sound. In addition the children had better letter-sound familiarity with non-digraph words because in their class literacy programme of 'Jolly Phonics' they had not yet been taught any digraph phonemes. By the end of the programme, all participants increased their accuracy on test items containing single CVC words in the real word recognition measure as well as on pseudoword decoding. Logan and Cara had also begun to expand their skill to accurately sound out some digraph words. This finding is promising because it suggests that they were able to successfully apply their understanding of the alphabetic principle and newly acquired decoding strategy to increase word recognition accuracy, which is critical early reading acquisition (Catts & Kamhi, 2005; Ehri et al., 2001; Snowling, 2006).

It is an interesting finding that although Cara was a class reading book level above Logan at the start of the programme, her pseudoword and word recognition accuracy scores were significantly lower than Logan's at baseline (0% compared to 46% for pseudo-word reading and 20% compared to 36% for word recognition). It is possible that prior to her participation on this programme, Cara had been relying mainly on pictures cues and the highly repetitive text format used in her class reading books at this level to guess unfamiliar words in text. As using context clues as a strategy for identifying unknown words could not be used when reading words in isolation, Cara struggled to accurately read the words in the word recognition probes during baseline. Cara's improvement on this measure during the course of the intervention appeared to happen in conjunction with an improvement in pseudo

word reading and segmenting, suggesting that she used her newly acquired segmenting and decoding skills to read real and pseudowords. This interpretation of results is supported by research which has shown that providing isolated word study to struggling readers prevents them from relying on ineffective word identification strategies, such as using picture or sentence cues as the primary method for identifying unfamiliar words in text (Ryder et al., 2008).

#### **5.4 Classroom Instructional Factors**

The participants' promising rate of acquisition of blending and segmenting could have been partly attributable to the familiarity that all three participants had with hearing and producing individual sounds in words before the start of the intervention due to the phonics programme used in class by their teacher. It is possible that without the phonics instruction used in class, the participants' may not have progressed as quickly as they did on this variable. This interpretation of the results fits with Adams (1994) suggestion that children who have a comfortable familiarity with the sounds of phonemes will find blending stimuli easier to retain and put together.

The independent variable used in this study fitted well with the 'Jolly Phonics' programme used by the class teacher which focused on teaching children to read and write through an early systematic phonics programme which teaches the main 42 sounds of English. However, programmes such as this are not typically used as part of the early literacy curriculum in New Zealand due to the dominant constructivist, whole language approach to reading instruction (Ryder et al., 2008; Tunmer, Chapman, & Prochnow, 2003). The rapid improvement in blending, and to a lesser extent segmenting, shown across all participants in the present study could be attributable to the match between the whole class programme and the intervention which maximised the benefits of the programme for these children who had



received prior exposure to the concept of sounding out unfamiliar words using their knowledge of letter-sound patterns in their class reading programme.

The effectiveness of incorporating supplementary materials and procedures designed to help children develop phonological awareness and knowledge of letter-sound patterns in whole language classrooms was demonstrated in research by Castle et al. (1994) and Tunmer, Chapman, and Prochnow (2003). The interpretation of results from the present study reinforces the advantage of having a comprehensive curriculum in schools which includes explicit instruction phonological processing skills. Further support for this assertion comes from Foorman and Torgesen's (2001) finding that effective literacy teaching for children at risk of reading failure should be an intensive and explicit extension of the type of empirically validated literacy instruction used with all children. In other words, tutoring programmes will elicit more favourable outcomes if they are considered as an extension of, and not separate from, the structure and content of the class reading curriculum. This view underscores the need for inclusion in the NZ curriculum for the essential components of phonemic awareness and phonemic decoding skills in early literacy instruction for all children, and especially for struggling readers.

### **5.5 Variation in Participants' Response to the Intervention**

Overall, Cara, who was the youngest participant and had started with very low baseline levels on all measured variables responded most favourably to the intervention and her performance on measures of all dependent variables exceeded the hypothesised improvements over the course of 22 sessions. The monitoring of her progress over time demonstrated an easy response to the intervention across all variables. Logan, whose baseline scores suggested that he had a basic grasp of the alphabetic system and was able to successfully decode some words also responded favourably to the intervention and made gradual but steady progress in word recognition accuracy.

Belinda appeared harder to remediate than the other two participants. Her scores on blending and segmenting increased immediately after the introduction of the programme, but her pseudo-word reading and word recognition accuracy remained relatively low. This was likely to be attributable to her relatively low level of letter-identification knowledge. The results for Belinda are in accordance with evidence from Cordoso-Martins et al. (2011) finding that learning letter–sound correspondences in the absence of letter identification knowledge or phonological awareness is a problematic task for young children. The difference in participants’ response to the intervention underscores the necessity of having differentiated instruction available to students to target their specific needs. For example, the data indicated that Logan’s problems presented as mainly performance related; he had the knowledge to sound out words and had an adequate letter identification knowledge at the start of the intervention, but needed ongoing practice to increase accuracy and facilitate automaticity in word recognition. In contrast, Belinda’s problem appeared to be acquisition based; she did not have sufficient letter identification knowledge to be able to reach a proficient level of decoding accuracy during the relatively short course of the intervention.

These findings reflect research findings showing that students will require a different amount and intensity of intervention depending on the type and severity of their problem and that reading difficulties come about from an interplay of cognitive, linguistic, and environmental factors (Torgesen et al., 2005; Snowling, 2006). This study has been able to demonstrate the benefits of using ongoing assessments to inform teachers of the specific topography of reading problems, and for identifying children who will need more intensive and targeted intervention.

## 5.6 Generalisation

An important measure of any intervention should be how well it generalises to contexts outside the specific research setting (Alberto & Troutman, 2009). There would be little value to the participants if improvements measured during the study did not help them with the reading difficulties they were experiencing in class, so it was important to examine participants' general progress beyond the specific context of the study. Adams (1998) summed up the importance of children being able to apply phonological skills in context when she stated "Like arithmetic without application, phonics without connected reading amounts to useless mechanics" (Adams, 1998, p. 286). Unlike Pullen et al.'s (2005) study, the instruction in this programme did not include the reading of connected text. Therefore, an important concern was whether the gains made in context free word recognition would generalise to the reading of connected text in the context of the regular reading curriculum. Fundamentally, the question following participation in the programme was whether the students were any closer to reaching the MOE expectations for the rate of early reading acquisition indicated by *PM* reading book level.

The class teacher had tested each participant's class reading level 2 weeks prior to the intervention, using a running record. She then tested each participant 4 weeks into the intervention and reported that she was able to move all three of them up a reading group level. Logan and Belinda moved up to Red level 2 and Cara moved onto Yellow level 1. However, it is important not to assume that the participants' progression to a higher reading group was due to the programme because this study does not demonstrate functional relationship between these two variables. The students' progress could have been attributable to factors such as the class reading programme, a combination of the class reading programme and the intervention, reading practice at home, or the maturation of the students. However, the fact that all three participants, who had remained in the same reading group

level for two and a half terms, moved up a level after 4 weeks of the intervention suggests that the intervention was educationally relevant to their rate of progress. During and following participation in the programme these students accelerated their reading progress, measured by class reading book level, to bring their skill levels closer to the Ministry of Education bench marks for children during their first year at school.

### **5.7 Social Validation**

The post intervention interview with Logan's mother indicated that his reading attitude at home had changed. She reported that he since his participation in the programme he was willing to read his school book to her and that he appeared happier about reading. Logan's mother also reported that she had seen a positive change in his reading performance at home and that he used the strategy of sounding out unfamiliar words that he came across in his class reading books. Cara's mother reported that during the time of the intervention her daughter's attitude and approach changed. She reported that rather than seeming to rely on memory of what she had read in class or asking her mother to tell her the word (which her mother reported she had engaged in prior to participation in the programme). Cara was attempting words she didn't know by sounding them out and appeared to enjoy reading to her mother. After the intervention, Belinda reported that the 'happy puppy' best described how she felt towards spelling words she didn't know. This was an improvement on the 'very sad puppy' she chose to describe her feeling towards this task before the intervention. She reported that she felt better about it because she could sound it out. The changes in all the participants' reading related behaviour strongly suggested that the intervention was educationally and socially beneficial.

### **5.8 Summary of Findings**

The multiple-baseline design was able to demonstrate the existence of a functional relationship between the independent variable and each of the four dependent variables. The

findings from this study suggest that the problems in early reading acquisition for these children can be attributed to a result of poor phonological awareness and difficulties with understanding letter-sound patterns. These children were able to make significant gains in decoding skills necessary for accuracy in word recognition when given direct, explicit, and intensive instruction in phonological awareness and decoding. The results indicated that the participants' improvement in phonological skills led to increased accuracy in decoding. This was moderated by participants' letter and sound identification knowledge. Increased accuracy in reading pseudo-words was accompanied with increased accuracy in real word recognition, suggesting that sounding out unknown words was an effective strategy for participants. The social validity of the programme was high for all consumers, with social and educational benefits for the participants, their parents, and their teacher.

In general, the results of this study replicate findings from a large body of national and international research on reading intervention showing that empirically validated instruction in phonological awareness and decoding skills benefits struggling readers (Adams, 1998; Carroll et al., 2011; Lundberg, Frost & Peterson, 1988; Iverson, Tunmer, & Chapman, 1997; Kennedy & Flynn, 2002; Lundberg et al., 1988; Pullen et al., 2005; Ryder et al., 2008; Snowling, 2006; Torgesen et al., 2005; Tunmer & Nesdale, 1985). Recent research has suggested that processes of learning to read vary considerably across children (Ehri et al., 2011; Ryder et al., 2008; Nicholson, 2003) and children with low entry levels of reading related skills will benefit from explicit and systematic instruction phonemic awareness and alphabetic coding skills. The results for the participants in this study appear to support this suggestion because in addition to showing substantial improvement in the phonological skills of blending and segmenting, all three students made positive gains in reading achievement, measured by accuracy in context free pseudo and real word reading.

## **Chapter 6**

### **Conclusions**

It was predicted from this study that a phonological awareness with decoding programme could improve the phonological awareness and decoding skills of three struggling readers during their first year of schooling. It was hypothesised that improvements in these reading related skills would increase participants' rate of reading acquisition and bring them closer to the Ministry of Education's after-6-months-at-school benchmark for early reading acquisition.

The study had four aims posed in Chapter 3 and the following conclusions were drawn:

- This phonological awareness and decoding training programme was highly effective in increasing participants' accuracy in the essential phonological skills, increasing their knowledge of letter-sound patterns, and increasing their word recognition accuracy.
- The positive effects of the programme appeared to generalise to participants' reading of connected text, demonstrated by an increase in reading book level.

Based on the performance of all participants, the following inference was made:

- The benefits of the intervention programme were maximised due to a good fit with the class programme which included direct instruction in phonics.

The study used a single-subject multiple baseline design to examine the effects on different variables over time. The following conclusions were drawn:

- Blending is an easier skill to learn than segmenting for these participants.
- Improvements in decoding occur more gradually than blending and segmenting.
- Phonological awareness is a necessary but not sufficient skill for decoding ability.
- Accurate letter and sound identification and segmenting proficiency are necessary for decoding.
- Decoding proficiency is necessary for accurate word recognition.

## **6.1 Educational Implications**

All participants were identified by their teacher in lagging behind their peers in early reading acquisition. It is clear from the baseline data that these children were, to varying degrees, deficient in the essential phonological awareness skills of blending and segmenting. The indication from baseline data was that these children lacked awareness of how speech maps on to print, despite having received direct instruction in phonics in their class literacy programme. It is also clear that when identified early, i.e., during their first year of schooling, and given intensive intervention in phonological awareness and decoding, these children have a good chance of catching up with their peers before the difficulties stabilise and negative Matthew effects take hold. A number of wider educational implications with regards to literacy support and classroom instruction have arisen from this study.

### **6.1.1 Implications for Literacy Support**

The national standards have put increased pressure on principals and teachers to ensure that their pupils are on track to reach the necessary benchmarks for early reading acquisition outlined by the Ministry of Education (2010). However, teachers need to be supported with a range of intervention options for struggling readers which can be implemented during the children's first year of schooling, rather than having to wait for identification on the 6-year-net-tests followed by possible entry into the Reading Recovery programme. Further, although the Reading Recovery programme has shown to be effective for some students, others may benefit from a programme specifically targeting phonemic awareness and letter-sound correspondences. It seems fair and sensible for a range of evidence based strategies to support reading to be available for teachers to enable them to adequately support all their pupils.

### **6.1.2 Implications for School Administration**

This study demonstrated the possibility of using a phonological awareness and decoding programme to yield educational benefits which could extend beyond the advantages for individual children participating in the programme. Firstly, it could be used as a means to prevent false positives, where easy to remediate children may be selected for Reading Recovery due to instructional deficits relating to the whole language orientation of the New Zealand literacy curriculum which does not prioritise the explicit teaching of phonemic awareness and phonemic decoding skills. With the added component of instruction in these essential skills it is likely that some students will be able to catch up with their peers without needing to enter into the Reading Recovery programme after their first year of schooling. This, in turn, would free up places for those children who require further remediation on the Reading Recovery programme. Secondly, children's success on the Reading Recovery programme has been shown to have a positive correlation with phonological awareness skills (Chapman et al., 2001; Iverson & Tunmer, 1993). Therefore, this type of intervention could support harder to remediate children who may later be selected for Reading Recovery by providing them with a first layer of research based instruction in essential phonological skills.

A phonological awareness with decoding training programme, such as the one used in the present study could be used with small groups of children as well as individually. Ryder et al. (2008) demonstrated the efficiency of using a programme of explicit instruction in phonological awareness and decoding for groups comprised of three children in a whole language instructional environment. An important factor in Ryder et al.'s study was that the intervention, which demonstrated a positive impact on children's reading achievement, was carried out by a carefully trained teacher aide. Although the researcher who conducted the intervention in the present study was a trained teacher, the lesson plans in this type of programme could be easily scripted due to the repetitive format of the tasks and activities.



Thus, the lessons would be relatively simple to deliver for a carefully trained non-teacher which would yield significant cost and time benefits for schools.

### **6.1.3 Implications for Classroom Instruction**

Phonological and whole-language approaches are not incompatible. The classroom instruction used by the teacher in this study demonstrated how systematic instruction in phonics can be incorporated into literacy programmes without disrupting the whole-language orientation of the instruction. The teacher in this study successfully combined the ‘Jolly Phonics’ (Lloyd, 1992) programme with the reading of trade books and story writing. It is laudable that the teacher in this study was able to use her knowledge and experience and take the initiative to incorporate phonics into her class reading curriculum. However, all teachers in junior classes need to be given the opportunity to incorporate the direct teaching of phonological awareness in their classes to give all students the opportunity to grasp the alphabetic principle as soon as possible. Teacher training should include the knowledge and understanding necessary to implement research-based practices. The combination of effective classroom instruction in phonological awareness and letter-sound correspondences and an intervention providing more explicit and intensive instruction in these skills would bring New Zealand closer in alignment to a response to intervention (RTI) model of intervention for children at risk of reading failure.

### **6.1.4 Final Comment**

The unmistakable message coming from research conducted over the last three and a half decades is that explicit instruction in phonological awareness and letter-sound correspondences are crucial elements of an effective reading curriculum for preventing at-risk children from developing chronic reading difficulties. However, it appears that educational policymakers in New Zealand have time and again failed to decode this message. Surely now, with the burden of schools being held accountable for their pupils’ literacy achievement

in order to fulfil the requirements of national standards, in a country where a gulf exists between good and poor readers, policymakers must look up and read the writing on the wall.

## **6.2 Limitations to Study**

Although the data reveal positive changes in participants' skills in all the measured variables, these finding should be viewed cautiously for a number of reasons. Treatment fidelity was not monitored in this study due to the limited availability of school staff. To ensure the consistency of the intervention was maintained, implementation of the programme should have been assessed by a second observer using an observer checklist on occasions throughout the intervention. This is an important consideration in the light of Ehri et al.'s (2001) meta-analysis of phonological awareness instruction which revealed statistically smaller effect sizes in studies which reported treatment fidelity. However, the design of the independent variable in this study was structured in a highly repetitive and semi-scripted format which helped to ensure consistency in the delivery of the programme over time.

An important concern in single-subject is the extent to which effects demonstrated in a particular study have relevance for other participants, locations, and behaviours beyond those described in the study (Horner et al., 2005). At least three participants are recommended to ensure a minimal level of external validity. The external validity in the present study could have been broadened with a higher number of participants. While the majority of schools in New Zealand follow a predominantly whole language philosophy of early reading instruction which downplays the role of phonics instruction (Castle et al., 1994) this study took place in a literacy environment where phonics instruction was prioritised by the teacher and welcomed by the Principal. In this sense, the sample was not representative of New Zealand primary school children and therefore could be viewed as lacking external validity.

The promising results shown in this study would not necessarily generalise to other settings where social validity may be lower because a phonics approach to instruction may

not be socially acceptable or educationally relevant to teachers who have a strong constructivist approach to literacy instruction. In addition, a phonological awareness training programme which teaches children how to sound out unfamiliar words could be at odds with instruction in whole language classes where this strategy is not prioritised (Tunmer et al., 2003). Therefore, with a lack of practice in participants' newly acquired decoding skills, the positive effects may not be maintained. As with any single-subject design, replications are needed before results can be generalised to other children.

Due to the time constraints of this study, the long term effects of the programme cannot be examined. Further monitoring of participants' progress over time is necessary to demonstrate possible long term maintenance effects of the intervention.

The present study measured the accuracy of pseudoword reading and real word recognition, but did not examine the rate at which the children could read the words. Therefore, whilst conclusions about children's word recognition accuracy in reading regularly spelt words were drawn from the results, there was no measure of the effects of the intervention on participants' reading fluency. It is fundamental that struggling readers are taught to read fluently as well as accurately to enable them to recognise printed words with little or no attention, thus allowing them to turn their attention to essential comprehension skills (Samuels, 1997; Gough & Tunmer, 1986). Research has indicated that children who were effectively remediated in their word recognition accuracy, remained less fluent than chronologically age matched readers (Torgesen et al., 2005). However, the development of effective word recognition skills which facilitate mastery in word recognition accuracy provide the essential first step in reading proficiency by providing a foundation on which fluency can be built (Gough & Tunmer, 1986). Therefore, a programme such as the one used in this study should not be considered as an end in itself, but as an essential component for helping struggling readers to become effective readers.

### **6.3 Directions for Future Research**

- To replicate the findings in this study, it would be necessary to conduct a similar study in different school settings with a greater number of participants.
- It would be interesting to compare the progress of participants on this type of intervention programme from a purely whole-language classroom environment with those from a classroom which incorporates phonics into the class programme.

## References

- Adams, M. J. (1998). Beginning to read: *Thinking and learning about print* (11<sup>th</sup> ed.). Cambridge, Massachusetts: Massachusetts Institute of Technology.
- Alberto, P.A., & Troutman, A.C. (2009) *Applied behaviour analysis for teachers* (8<sup>th</sup> ed.). Upper Saddle River: Pearson
- Ball, E. W., & Blachman, B.A. (1991). Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly*, 26, 49-66.
- Bus, A. G., & van IJzendoorn, M. H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology*, 91(3), 403-414.
- Carroll, J. M., Bowyer-Crane, C., Duff, F. J., Snowling, M. J. (2011). *Developing language and literacy: Effective intervention in the early years*. Chichester, UK: John Wiley and Sons.
- Castle, J. M., Riach, J., & Nicholson, T. (1994). Getting off to a better start in reading and spelling: The effects of phonemic awareness instruction within a whole language program. *Journal of Educational psychology*, 86(3), 350-359.
- Catts, H. W., & Kamhi, A. G. (2005). *Language and reading disabilities*. Boston, MA: Pearson.
- Chapman, J. E., Greaney, K. T., & Tunmer, W. E. (2007). How well is Reading Recovery really working in New Zealand? *New Zealand journal of Educational Studies*, 42, 17-29.
- Chapman, J. W., Tunmer, W. E., & Prochnow, J. E. (2001). Does success on the reading recovery programme depend on developing proficiency in phonological-processing

- skills? A longitudinal study in a whole language instructional context. *Scientific Studies of Reading*, 5, 141-176.
- Clay, M. (1993). *Reading Recovery*. Auckland, NZ: Heinemann.
- Clay, M. (2002). *An Observation Survey (2<sup>nd</sup> ed.)*. Auckland, NZ: Heinemann.
- Cordoso-Martins, C., Mesquita, T. C. L., Ehri, L. (2011). Letter names and phonological awareness help children to learn letter-sound relations. *Journal of Experimental Child Psychology*, 109, 25-38.
- Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B. V., Yaghoub-Zadeh, Z., Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly*, 36, 250-287.
- Elley, W. (1998). A perspective on New Zealand reading programmes. *Teachers and Curriculum*, 2, 35-40.
- Foorman, B., & Torgesen, J. K. (2001). Critical elements of classroom and small group instruction to promote reading success in all children. *Learning Disabilities Research & Practice*, 16(4), 203-212.
- Frost, S. J., Landi, N., Menci, E., Sandak, R., Fulbright, R. K., Tejada, E. T., Jacobsen, L., Grigorenko, E. L., Constable, R. T., & Pugh, K. R. (2009). Phonological awareness predicts activation patterns for speech and print. *Annals of dyslexia*, 59 (1), 78-97.
- Fuchs, D., & Fuchs, L. S. (2006). Introduction to response to intervention: what, why, and how valid is it? *Reading Research Quarterly*, 41, 93-99.
- Gillon, G. T. (2000). The efficacy of phonological awareness intervention for children with spoken language impairment. *Language, Speech, and Hearing Services in Schools*, 31, 126-141.

- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading and reading disability. *Remedial and Special Education, 7*, 461-502.
- Greaney, K. (2002). School remedial reading programmes: Supporting children with reading difficulties. In P. Adams and H. Ryan (Eds.), *Learning to read in Aotearoa/New Zealand* (pp. 273-286). Palmerston North, New Zealand: Dunmore Press.
- Griffiths, Y. & Stuart, M. (2011). Reviewing evidence-based practice for pupils with dyslexia and literacy difficulties. *Journal of Research in Reading, 34*(2), 1-21.
- Hecht, S.A., Burgess, S. R., Torgesen, J. K., Wagner, R. K., & Rashotte, C. K. (2000). Explaining social class differences in growth of reading skills from beginning kindergarten through fourth-grade: The role of phonological awareness, rate of access, and print knowledge. *Reading and Writing, 12*, 99-128.
- Hoover, W. A., & Tunmer, W. E. (1993). The components of reading. In G. B. Thompson, W.E. Tunmer, and T. Nicholson (Eds.), *Reading acquisition processes* (pp.1-19). Clevedon, UK: Multilingual Matters.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*(2), 165-179.
- Iverson, S., & Tunmer, W. E. (1993). Phonological processing skills and the Reading Recovery programme. *Journal of Educational Psychology, 85*, 112-126.
- Iverson, S., Tunmer, W. E., & Chapman, J. W. (1997). The effects of varying group size on the Reading Recovery approach to preventive early intervention. *Journal of Learning Disabilities, 38*, 456-472.
- Juel, C., & Minden-Cupp, C. (2000). Learning to read works: Linguistic units and instructional strategies. *Reading Research Quarterly, 35*, 458-492.

- Kennedy, E. J. & Flynn, M. C. (2002). Training phonological awareness in children with Down Syndrome (2003). *Research in Developmental Disabilities*, 24, 44-59.
- Koutsoftas, A. D., Harmon, M. T., & Gray, S. (2009). The effect of 2 Tier intervention for phonemic awareness in a response-to-intervention model in low-income preschool classrooms. *Language, Speech, & Hearing Services in Schools*, 40, 116-130.
- Lervåg, A., Bråten, I., & Hulme, C. (2009). The cognitive and linguistic foundations of early reading development: A Norwegian latent variable longitudinal study. *Developmental Psychology*, 45, 764-781.
- Lloyd, S. (1992). *Jolly Phonics*. Essex, UK: Jolly Learning.
- Lundberg, I., Frost, J., & Peterson, O. (1988). Effects of an extensive programme for stimulating phonological awareness in pre-school children. *Reading Research Quarterly*, 23, 263-284.
- Muter, V., Hulme, C., Snowling, M., & Stevenson, J. (2004). Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: Evidence from a longitudinal study. *Developmental Psychology*, 40, 665–681.
- New Zealand Ministry of Education. (2009). *The New Zealand curriculum reading and writing standards for years 1-8*. Wellington: Learning Media.
- New Zealand Ministry of Education (2010). *The literacy learning progressions*. Wellington, NZ: Learning Media.
- New Zealand Ministry of Education (2011). Reading Recovery. Retrieved from <http://literacyonline.tki.org.nz>
- Nicholson, T. (2005). *Phonics handbook*. Chichester, UK: Wiley and Sons.
- Nicholson, T. (2003). Risk factors in learning to read. In B.R. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp.121-165). Timonium, MD: York Press.



- Papanicolaou, A. C., Simos, P. G., Fletcher, J. M., Francis, D. J., Foorman, B., Castillo, E. M., & Sarkari, S. (2003). Development of plasticity of neurophysiological processes involved in reading. In B. Foorman (Ed.). *Preventing and remediating reading difficulties: Bringing science to scale* (pp. 3-21). Timonium, MD: York Press
- Perfetti, C. A., Beck, I., Bell, L., & Hughs, C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merrill-Palmer Quarterly*, 33, 283-319.
- Pullen, P. C., Lane, H. B., Lloyd, J.W., Nowak, R., & Ryals, J. (2005). Effects of explicit instruction on decoding of struggling first grade students: A data-based study. *Education and Treatment of children*, 28, 63-76.
- Reynolds, M. & Wheldall, K. (2007). Reading Recovery 20 years down the track: Looking forward, looking back. *International Journal of Disability, Development, and Education*, 54, 199-223.
- Ryder, J. F., Tunmer, W. E., & Greaney, K. T.(2008). Explicit instruction in phonemic awareness and phonemically-based decoding skills as an intervention strategy for struggling readers in whole language classrooms. *Reading and Writing*, 21, 349-369.
- Samuels, S.J. (1997). The method of repeated readings. *The Reading Teacher*, 50(5), 376-381.
- Santi, K. L., Menchetti, B. M., & Edwards, B.J. (2004). A comparison of eight kindergarten phonemic awareness programs based on empirically validated instructional principles. *Remedial and Special Education*, 25(3), 189-196.
- Shanahan, T., & Barr, R. (1995). Reading Recovery: An independent evaluation of the effects of an early instructional intervention for at-risk readers. *Reading Research Quarterly*, 30, 958-996.
- Shaywitz, S. E. (2003). *Overcoming dyslexia*. New York: Alfred A. Knopf.

- Schwartz, R. M., Hobsbaum, A., Briggs, C & Scull, J. (2009). Reading Recovery and evidence-based practice: A response to Reynolds and Wheldall (2007). *International Journal of Disability, Development, and Education*, 56(1), 5-15.
- Snow, C. E., & Juel, C. (2005). Teaching children to read: What do we know about how to do it? In M.J. Snowling & C. Hulme (Eds.), *The science of reading: A handbook* (pp. 501-520).
- Snowling, M. (2006). *Dyslexia* (2<sup>nd</sup> ed.). Oxford, UK: Blackwell.
- Stanovich, K. E. (1986). Matthew Effects in Reading: some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360-406.
- Torgesen, J. K., & Bryant B. (1993). *Phonological awareness training for reading*. Austin, TX: Pro-Ed.
- Torgesen, J. K., & Davis, C. (1996). Individual difference variables that predict response to training phonological awareness. *Journal of Experimental Child Psychology*, 63 (1), 1-21.
- Torgesen, J. K., Otaiba, S. A., & Grek, M. L. (2005). Assessment and instruction for phonemic awareness and word recognition skills. H. W. Catts and A. G. Kamhi (Eds.). *Language and reading disabilities*. Boston, MA: Pearson.
- Torgesen, J. K., Morgan, S., & Davis, C. (1992). The effects of two types of phonological awareness training on word learning in kindergarten children. *Journal of educational psychology*, 84, 364-370.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities*, 27, 276-286.
- Tunmer, W. E., & Chapman, J. W. (2003). The Reading Recovery approach to preventive early intervention: As good as it gets? *Reading Psychology*, 24, 337-360.

- Tunmer, W. E., Nicholson, T., Greaney, K. T., Prochnow, J. E., Chapman, J. W., & Arrow, A. W. (2008). PIRLS before swine: A critique of New Zealand's literacy strategy. *New Zealand Journal of Educational Studies*, 43 (2), 105-119.
- Tunmer, W. E., Chapman, J. W., & Prochnow, J. E. (2003). Preventing negative Matthews effects in at-risk readers: a retrospective study. In B. R. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp.121-165). Timonium,MD: York Press.
- Tunmer, W. E., & Hoover, W. A. Cognitive and linguistic factors in learning to read (1992). In P. B Gough, L. C Ehri, and R. Treiman (Eds.). *Reading Acquisition* (pp175-214). Hillsdale, UK: Lawrence Erlbaum Associates.
- Tunmer, W. E., & Nesdale, A. R. (1985). Phonemic segmentation skill and beginning reading. *Journal of Educational Psychology*, 77, 417-427.
- Vellutino, F. R., Scalon, D. M., Siphay, E., Small, S., Pratt., A., Chen, R., & Denckla, M. (1996). Cognitive profiles of difficult-to-remediate and readily remediated poor readers: early intervention as a vehicle for distinguishing between cognitive and experimental deficits as basic causes of reading disability. *Journal of Educational Psychology*, 88, 601-638.
- Vellutino, F. R., Fletcher, J. M., Snowling, M, & Scalon, D. M. (2004). Specific reading disability (dyslexia): What have we learned in the last four decades? *Journal of Child Psychology and Psychiatry*, 45, 2-40.
- Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin*, 101(2), 192-212.
- Wasik, B., & Slavin, R. (1993). Preventing early reading failure with one-to-one tutoring: A review of five programmes. *Reading Research Quarterly*, 28, 179-200.

Yi-Wei, H. (2007). *Effects of phonological awareness instruction on pre-reading skills of preschool children at-risk for reading disabilities* (Unpublished doctoral dissertation).  
Ohio State University, Ohio, US.

Appendix A  
Consent Forms

School of Education at Albany  
Master of Educational Psychology Programme  
Albany Campus  
Private Bag 102 904  
North Shore Mail Centre

Supervisor: Dr Steven Little

Email: [s.little@massey.ac.nz](mailto:s.little@massey.ac.nz)

Telephone: 09 414 0800ext 9653

April 2011

**Information: Principal**

Dear \_\_\_\_\_

My name is Susie Randall and I am completing the final stage of my post graduate training to become an educational psychologist (Master of Education Psychology). I outline my post graduate degree qualifications below:

Postgraduate Certificate in Education (1999) – Oxford University

Postgraduate Diploma in Education (Educational Psychology) (2010) – Massey University

Master of Educational Psychology (present date) – Massey University

My research thesis is focused on developing and improving the early literacy skills for children who are experiencing difficulties in reading related skills during their first year at school. I am particularly interested in examining the effectiveness of a programme which focuses on the sounds in words and the spoken language skills which are important for the development of early reading skills.

In consultation with, and signed consent from teachers, parents/whanau, I will be inviting individual children who are experiencing early difficulties in learning to read to participate in this study. No child will be approached to participate in the programme without informed consent from their parent/s and teacher. The study will involve 4 students who will be selected by their teacher, based on their class reading level and abilities in reading related skills. For the purpose of methodological validity, this study will only include students whose first language is English. A short interview with each participant and his or her teacher and parent/s will be required to provide an overall picture of each child's reading ability prior to intervention.

Children who participate in this programme will be given individual training in spoken language skills. The programme involves a variety of spoken language activities and games and includes some writing and spelling activities. Each child will receive 20 minutes of instruction, 4 times a week for 8 weeks. The sessions will take place during class reading time, to ensure participants are fully included in the school and class curriculum. I will be carefully monitoring each child's progress each week. The programme is designed to improve the children's reading related skills in a fun and interesting way by using games and activities which are suitable for children in their first year of schooling.

All information gathered will be treated as strictly confidential. It will be used for the purpose of my thesis and will not be used for any other purpose without the explicit consent of parents/ whanau. Participants and their parents/whanau will be given access to the findings of the study when it has finished.

When the research is written up, identifying information (i.e. real name, date of birth, school) will be changed in order to preserve confidentiality. All participants, parent/s/ whanau, and teachers will have the opportunity to ask questions and receive answers to these before, during and after the study. At any time during the study, and for whatever reason, a child may withdraw or be withdrawn along with any information that has been provided.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application \_\_\_/\_\_\_ (*insert application number*). If you have any concerns about the conduct of this research, please contact Dr Ralph Bathurst, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 9570, email [humanethicsnorth@massey.ac.nz](mailto:humanethicsnorth@massey.ac.nz).

If you require any further information please contact me:

Susie Randall

Email: [szusieb@gmail.com](mailto:szusieb@gmail.com)

Telephone: 02102482643

Alternatively, my supervisor, Dr. Steven Little can be reached using the contact details at the top of this letter.

School of Education at Albany  
Master of Educational Psychology Programme  
Albany Campus  
Private Bag 102 904  
North Shore Mail Centre

Supervisor: Dr Steven Little

Email: [s.little@massey.ac.nz](mailto:s.little@massey.ac.nz)

Telephone: 09 414 0800ext 9653

April 2011

**Information: Teachers**

Dear \_\_\_\_\_

My name is Susie Randall and I am conducting a research project at Verran Primary School as part of the Master of Educational Psychology degree programme at Massey University. I am also a fully qualified and registered teacher. My research thesis is focused on developing and improving the early literacy skills for children who are experiencing difficulties in reading related skills during their first year at school. The programme involves 4 participants who will be given individual training in reading related spoken

language skills. I set out below what this project will involve for you and for potential participants and their parents.

**Before the programme starts:**

- You will be given the opportunity to meet with me to discuss the programme in detail and to ask any questions or address any concerns you may have
- You will need to sign a consent form to agree to participate in the study
- You will be asked to identify potential candidates for the programme from your class based on their performance in reading related class assessments and activities and their present class reading book level. The ideal participants would be the 4 children from either year one class who are displaying the most significant difficulties in reading.
- The parents of potential candidates will be given a relevant information sheet by the researcher with an invitation for their child to participate
- The parent of each participant will need to return the signed consent form *before* any information or data about their child are gathered
- You will need to have a short interview with me about the reading related behaviour of each participant before the programme starts
- You will need to allow me to explain the programme to individual participants in a quiet area of your classroom and be present when I invite him/her to participate in the programme
- I will ask you if you are satisfied that the child has understood the nature of the programme and is happy to participate before I confirm his/her participation in the programme
- I will need to conduct three short observations of each participant's reading behaviour before the programme starts which will involve each child reading their class reading book to me in a quiet area of your class for approximately three minutes
- I will need to conduct four short pre-intervention assessments of each child's reading related skills and abilities (the assessments will take a maximum of 30 minutes in total and will need to be conducted in a quiet area with no distractions, such as the library)

**During the programme:**

- Each participant will receive 20 minutes of individual instruction with the researcher in a suitable area outside the classroom, 4 times a week for 8 weeks during class reading time
- Each participant will need to bring his/her class reading book to each session
- Parents will be able to withdraw their child at any time during the programme along with any information gathered about him/her

**After the programme:**

- I will need to conduct four short post-intervention assessments of each child's reading related skills and abilities following completion of the programme (the assessments will take a maximum of 30 minutes in total and will need to be conducted in a quiet area with no distractions, such as the library)
- You will need to have a second short interview with me about your student's reading experiences after he/she has finished the programme
- Parents will be given a written summary of the findings of the programme
- All the information about each child will be confidential and real names and identifying information will be changed when the project is written
- Parents will be able to talk to me about any of the general findings of the project relating to all participants and detailed information about their own child
- If parents would like any of the specific findings about their child to be shared with his/her teacher or any other school staff, they will need to sign a consent form to allow this to happen

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application \_\_/\_\_ (*insert application number*). If you have any concerns about the conduct of this research, please contact Dr Ralph Bathurst, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 9570, email [humanethicsnorth@massey.ac.nz](mailto:humanethicsnorth@massey.ac.nz).



If you require any further information please contact me:

Susie Randall

Email: [szusieb@gmail.com](mailto:szusieb@gmail.com)

Telephone: 02102482643

Alternatively, my supervisor, Dr. Steven Little can be reached using the contact details at the top of this letter.

School of Education at Albany

Master of Educational Psychology Programme

Albany Campus

Private Bag 102 904

North Shore Mail Centre

Supervisor: Dr Steven Little

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Telephone: 09 414 0800ext 9653

May 2011

**Phonological Awareness Training Research Programme**

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

I agree that no information about potential participants will be disclosed before signed consent from parents has been obtained.

I agree to the researcher being present in my class for the sole purpose of observing each participant's reading related behaviour.

I agree to be interviewed twice about my student's reading related behaviour: once before the start of the project and once after the project has finished.

**Signature:**

**Date:**

**Full Name - printed**



School of Education at Albany  
Master of Educational Psychology Programme  
Albany Campus  
Private Bag 102 904  
North Shore Mail Centre

Supervisor: Dr Steven Little

Email: [s.little@massey.ac.nz](mailto:s.little@massey.ac.nz)

Telephone: 09 414 0800ext 9653

June 2011

**Information: Parents**

Dear \_\_\_\_\_

My name is Susie Randall and I am conducting a research project at Verran Primary School as part of my Master of Educational Psychology degree programme. I am also a fully qualified and experienced teacher. I would like to invite (child's name) to participate in the project because he/she has been showing early difficulties in learning to read and this project is aimed at helping her/him with reading. The programme involves lots of spoken language games and includes some writing and spelling activities. Your child will receive

20 minutes of individual instruction, 4 times a week for 8 weeks. The programme will take place during the class reading time, to ensure that (child's name) does not miss out on the school curriculum.

This information will tell you what this programme will require you to do if you choose to allow (child's name) to participate.

### **What this mean for you**

#### **1. Before the programme starts**

- You will need to sign a consent form to allow me to gather information about your child's reading experiences from his/her teacher, talk to your child about his/her reading, and to allow your child to take part in the programme.
- You will need to have a short interview with me about your child's reading experiences
- You will be able to ask me any questions or concerns you may have about the programme
- You will be able to withdraw your child from the programme along with any information gathered about him/her for any reason before the programme starts

#### **2. During the programme**

- You will be able to contact me with any questions or concerns you have about your child's participation in the programme (my contact details are at the bottom of this letter)
- You will be able to withdraw your child at any time during the programme along with any information gathered about him/her

#### **3. After the programme**

- You will need to have a second short interview with me about your child's reading experiences after he/she has finished the programme
- After the final interview you will not be able to withdraw your child from the study
- You will be given a written summary of the findings of the programme
- All the information about your child will be confidential and real names and identifying information will be changed when the project is written
- You will be able to talk to me about any of the general findings of the project relating to all participants and detailed information about your own child
- If you would like me to share any of the information relating to specific findings about your child with his/her teacher or any other school staff, you will need to sign a consent form to allow this to happen

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application \_\_/\_\_ (*insert application number*). If you have any concerns about the conduct of this research, please contact Dr Ralph Bathurst, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 9570, email [humanethicsnorth@massey.ac.nz](mailto:humanethicsnorth@massey.ac.nz).

If you would like any further information please contact me:

Susie Randall

Email: [szusieb@gmail.com](mailto:szusieb@gmail.com) Telephone: 02102482643. Alternatively, my supervisor, Dr. Steven Little can be reached using the contact details at the top of this letter.

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Email: [s.little@massey.ac.nz](mailto:s.little@massey.ac.nz)

Telephone: 09 414 0800ext 9653

June 2011

**Phonological Awareness Training Research Programme**

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to allow \_(Child's full name)\_\_\_\_\_ to participate in this study under the conditions set out in the Information Sheet.

I agree to being interviewed twice about my child's reading related behavior: once before the start of the project and once after the project has finished.

I understand that no detailed findings about my child's participation in the programme will be shared with the teacher or anyone else without my consent.

**Signature:**

**Date:**

**Full Name – printed**

**Relationship to the child**

School of Education at Albany  
Master of Educational Psychology Programme  
Albany Campus  
Private Bag 102 904  
North Shore Mail Centre

Supervisor: Dr Steven Little

Email: [s.little@massey.ac.nz](mailto:s.little@massey.ac.nz)

Telephone: 09 414 0800ext 9653

June 2011

### **Consent for Disclosure of Information**

I have seen the results of the project which relate to my child's reading performance and where necessary have had the results explained to me by the researcher.

I agree to allow the results of the project, relating to\_(Child's full name)\_\_\_\_\_ to be disclosed to and discussed with \_(Teacher's full name)\_\_\_\_\_

**Signature:**

**Date:**

**Full Name – printed**

**Relationship to the  
child**

**Information for Participants – to be told to each participant by researcher with teacher present.**

**(Due to the difficulties the potential participants are experiencing with reading and their age, the information sheet is to be read aloud to the children)**

*Props required: 'rocky the robot' character from programme, sample picture cards from programme, plastic letters.*

Hi, (Child's name). My name is Susie and I am here at Verran Primary School to help some children with reading by giving some special reading practice. I want to tell you about the things I will be doing and then after that, I will ask you if you would like to join in. If you do not want to join in, then you can either let me know, or tell (teacher's name).

The special reading practice would help you to improve your reading. The reading practice with me would take place during literacy lessons, after fitness and before morning tea (example time) on Mondays, Tuesdays, Wednesdays, and Thursdays (example days). They would happen for 8 weeks, which is nearly a whole term (show the child a calendar). The special reading practice would be with me in the library (sample place).

We will be learning lots and lots about the different sounds in words and we will be practicing these sounds in words with the help of 'rocky the robot' (show child rocky the robot ' prop and demonstrate how he 'talks in a funny way'). We will be learning lots about sounds in different words with the help of picture cards (show sample picture card to child). Sometimes I will ask you to write words and sounds, I will also ask you to read your class book to me each time we meet. Some things we'll do in the special reading practice you might find easy, but some things you could find a bit

harder, so you will need to try your best. All of the things we would do in reading practice would make you a better reader.

If you start doing reading practice with me but you decide you don't want to do it anymore, then it's okay to tell me or your teacher that you want to stop doing it.

**Concept questions for understanding:**

(Child's name), can you remember why you are being asked to join in the special reading practice? (if not, remind child that the sessions are to help them to improve their reading)

Can you remember where and when the sessions will be? (if not, remind child of place and time, days, weeks)

Can you remember what you need to do if you want to stop doing the special reading practice? (if not, remind child that he/she needs to tell Susie or his/her teacher that he or she would like to stop)

(Child's name) Do you feel happy about joining in the special reading practice? Would you like to ask me any questions? Thanks for talking to me.

## **Appendix B**

### **Interview Questions**

Proposed Functional Behavioural Assessment Interview Questions- Child Interview Questions

Hi, \_\_\_\_\_, I want to talk to you about how you are getting on with your learning at school. When you don't understand a question that I ask, please say "I don't understand" then I can ask it in a better way. OK?

What do like about school?

What don't you like about school?

What are your favourite things to do in class?

What things do you find easy?

What things do you find hard?

Do you like reading at home? Tell me about that.

Do you have a favourite book?

Do you like reading at school? Tell me about that.

Are there things about reading that you find easy?

Are there things about reading that you find hard?



### **Social Validity**

Do you like reading? Why? Why not?

If no, do you think you would like reading more if it was easier for you?

Do you think that doing lots of games and activities that could help you to read better would be a good idea for you?

Do you have any questions that you would like to ask me about the special reading sessions we are going to be doing?

### **Social Validity – post intervention**

Do you like reading at school? Tell me about that.

Are there things about reading that you find easy?

Are there things about reading that you find hard?

Did you enjoy the reading programme that you did?

Do you think that the reading programme has helped you with you reading?

Do you have any questions that you would like to ask me about the special reading programme that you did?

#### Proposed Functional Behavioural Assessment Interview Questions- Parent Interview Questions

Hi, \_\_\_\_\_, further to our introduction and I wanted to ask you some questions about (child's name) to gain a full picture of how he/she is getting on at school and the difficulties he/she may be having with reading.

What does (child's name) enjoy doing at home? (i.e. activities, sports etc)

What do you feel are (child's name) strengths? ....things he/she finds difficult?

How do you think (Child's name) feels about school....which part/s of school does he/she like.....dislike?

Can you remember how old (child's name) was when he/she started talking? Did you have any concerns about his/her early development ....in language.....vision.....hearing.....motor skills.....other?

#### **Reading**

Do you and/ or other members of your family/whanau read to (child's name)? .....what type of books?.....how often?

Does (child's name) seem to like or dislike being read to? (How does he/she show this?)

Does your child bring books home from school to read? If yes, how often?

How do you think (child's name) feels about reading to you/ others? (How does he/she show this?)

Does your child enjoy reading or looking at books in his/ her spare time?

Does your child visit the library a) at school b) public library ....does he/she enjoy choosing books?

What do you think are (child's name) strengths in reading and knowing about books?

What do you think (child's name) finds particularly difficult with reading?

### **Social Validity**

You have told me about the difficulties that (child's name) has with reading. What (if any) are you concerns about your child having these problems....for now....in the future?

Do you have any suggestions about what could be done to help your child?

You have some information about the programme that (child's name) will start soon. Do you think that a programme of this type could be helpful for (child's name)?

Do you feel happy about (child's name) taking part in this programme? Do you have any concerns?

What improvements in reading and/or other areas of (child's name) learning would you hope to see after he/she has completed the programme? Do you have any questions about the programme that you would like to ask me?

Thank you for your time.

### **Social Validity**

Before (child's name) began the programme you told me about the difficulties that you felt he/she had with reading. Do you think that (child's name) still has these difficulties. What (if any) are your concerns about your child's reading now that he/she has finished the programme ....for now....in the future?

Do you think that this programme was helpful for (child's name)?

Did you feel happy about (child's name) while he/she was taking part in this programme?

What improvements (if any) in reading and/or other areas of (child's name) learning have you seen since he/she has completed the programme?

Do you have any questions about the programme that you would like to ask me?

Thank you for your time.

### Proposed Functional Behavioural Assessment Interview Questions- Teacher Interview Questions

Hi, \_\_\_\_\_, further to our introduction and I wanted to ask you some questions about (child's name) to gain a full picture of his/her reading difficulties that you have identified.

Before we talk about (child's name) I'd like to ask you some questions about how he/she functions in some general learning areas. Does (child's name) have any auditory problems that you have noticed? Does he/she have any problems in the visual area.....the motor area.....with speech.....with attention and/or concentration.....oral language area....in getting along with other children....in getting along with you and other teachers?

How about (child's name) motivation in class.....organisation skills.....school attendance.....general wellbeing and mood in class and at school?

What do you feel are (child's name) strengths?.....areas of learning which are most difficult for him/her?

### **Reading Difficulties**

Why have you identified (child's name) as having early reading difficulties.....how do these difficulties present?

How would you describe (child's name) attitude and feelings toward reading...in a whole class.....small group ..... 1:1 situation?

Which area/s of reading does the child present as having problems with? ....oral reading.....reading comprehension.....accuracy.....fluency.....listening?

How accurately does (child's name) seem to hear sounds in words?

What is his/her level of letter and sound identification? Do you have any records of this?

What reading group level is (child's name) on? How long has he or she been in this group?  
What improvements have you seen?

### **Social Validity**

What specific concerns do you have about (child's name) present reading abilities/ difficulties?

What do you think could be done to help (child's name) to overcome the reading difficulties?

I have given you some background information about the 'phonological awareness programme'. Do you think that this programme could be beneficial to (Child's name)?

As (child's name) teacher, do you feel happy for me to carry out this intervention with him/her? (if yes, why?...if no, why? Any concerns?)

What improvements in reading related skills and/ or other areas would you hope to see following his/her participation in the programme? Thank you for your time in answering these questions. Do you have any questions for me?

### **Social Validity – post intervention**

Before (child's name) participated in this programme, you outlined the specific concerns you had about his/her present reading abilities/ difficulties. These were: (state concerns outlined by teacher prior to intervention). Do you still have these concerns or any other concerns now that (child's name) has completed the programme?

Do you think that this programme has been beneficial to (Child's name)? Please explain

As (child's name) teacher, did you feel happy for me to carry out this intervention with him/her? (if yes, why?...if no, why? Any concerns?)

What improvements or changes (if any) in reading related skills and/ or other areas have you seen following his/her participation in the programme? Thank you for your time in answering these questions. Do you have any questions for me?

**Appendix C**  
**Tests and Probes**



Pre and Post Intervention Letter  
Identification Test

8

A	F	K	P	W	Z
B	H	O	J	U	
C	Y	L	Q	M	
D	N	S	X	I	
E	G	R	V	T	
a	f	k	p	w	z
b	h	o	j	u	a
c	y	l	q	m	
d	n	s	x	i	
e	g	r	v	t	g



## Attitudes to Reading Questionnaire

Date of assessment \_\_\_\_\_

Name of student \_\_\_\_\_

Name of tutor \_\_\_\_\_

### Directions

Ask the student to draw a circle or else underline the puppy that best fits the answer to the question. Only circle one puppy. Write down the response to the question.

1. How do you feel when someone reads you a story at home?



Why is that? \_\_\_\_\_

2. How do you feel when your teacher reads a story to the class?



Why is that? \_\_\_\_\_

3. How do you feel when it is your turn to read out loud to the teacher?



Why is that? \_\_\_\_\_

4. How do you feel when you come to a new word while reading?



Why is that? \_\_\_\_\_

5. How do you think your teacher feels when you read?



Why is that? \_\_\_\_\_

Figure 10.1 Assessment of reading attitude.



6. How do you feel about writing a story for the teacher?



Why is that? \_\_\_\_\_

7. How do you feel when you have to spell a new word that you don't know how to spell yet?



Why is that? \_\_\_\_\_

8. How do you feel about getting a book for a present?



Why is that? \_\_\_\_\_

9. How do you feel about going to school?



Why is that? \_\_\_\_\_

10. How do you think you will feel about reading next year?



Why is that? \_\_\_\_\_

Figure 10.1 (continued).

Pseudowords

vab

kos

sim

dup

tov

tob

zug

hud

tiz

sep

Blending Lists

List 1	List 2	List 3	List 4
s/a/t	p/e/t	a/t	z/i/p
b/y	m/i/ce	s/a/t	t/o
m/i/ce	s/a/t	t/r/ee	p/e/t
a/t	a/t	z/i/p	d/o
z/i/p	z/oo	t/o	th/r/ee
List 5	List 6	List 7	List 8
t/o/p	a/ce	o/n	s/i/t
t/o	s/i/t	t/o/p	o/n
th/r/ee	t/o/p	s/i/t	d/o
a/ce	d/o	a/ce	a/n/d
s/i/t	th/r/ee	a/n/d	r/a/ce
List 9	List 10	List 11	List 12
i/ce	i/t	b/y	t/o/p
a/n/d	o/n	p/e/t	i/n
o/n	a/n/d	i/t	a/n/d
m/y	i/ce	z/i/p	z/oo
r/a/ce	i/n	th/r/ee	m/i/ce

Segmenting Lists
------------------

List 1	List 2	List 3	List 4
Tog Heap Knee Blow tan	Knee Tog Seat Tan blow	Hug Tog Seat Me blow	Bog Seat Me Flew hug
List 5	List 6	List 7	List 8
Pin Feed Me Flew bog	Bog He Feed Flew pin	He Tag Feed Grew pin	Grew Been He Tag lit
List 9	List 10	List 11	List 12
Tag Been Lit We grew	Peg Been We Blue lit	We Heap Tan Blue peg	Heap Knee Hug Blue peg



Word Recognition Lists

List 1:

this

for

book

tin

mat

he

went

and

List 2:

shut

can

good

bed

sit

be

swim

mat

List 3:

that

for

look

big

Mum

Me

went

sit

List 4:

that

can

book

run

got

he

swim

big



List 5:

them

but

good

tin

got

be

sent

red

List 6:

them

ran

feel

bed

Mum

see

jump

get



List 7:

teeth

but

boat

lid

Dad

me

sent

hen

List 8:

teeth

had

look

run

and

see

skip

get

List 9:

shut

ran

boat

sit

Dad

she

skip

red

List 10:

this

had

feel

lid

Mum

she

jump

hen



List 11:

get  
this  
ran  
good  
sit  
big  
be  
jump

List 12:

shut  
had  
feel  
good  
lid  
Dad  
hen  
sent

## **Appendix D**

### **Wordlists**

# Rhyming Words

Fan	Man
Jar	Car
Egg	Leg
Coat	Boat
Hat	Cat
Book	Hook
Bear	Chair
Light	Kite
Sign	Nine
Bowl	Pole
Fire	Tyre
Pie	Tie
Sun	Gun
House	Mouse
Sock	Lock
Shell	Bell
Arm	Farm
Chick	Sick
Drum	Gum
Key	See
Cake	Rake
Log	Dog

## Wordsets

Wordset 1	Wordset 2	Wordset 3	Wordset 4	Wordset 5
pan	back	dial	hat	one
peek	bat	dig	head	wall
pen	bike	dime	heel	web
pet	boat	dog	hen	well
pig	bone	doll	hill	wet
pipe	bun	dot	hit	wipe
pop	can	duck	hole	sheep
pot	cap	game	hug	shell
man	cat	gate	hut	shine
map	coat	goal	fan	ship
mat	cake	goat	fat	shop
mom	cone	gum	feet	shot
moon	cup	gun	fill	shut
mop	cut	lake	fin	seal
mouse	kite	lawn	rag	seat
tail	nap	lick	rat	sick
tape	net	light	read	sign
tire	nine	limb	run	sit
tool	note	line	road	sock
tub	nut	lock	roll	sun
		log	rug	

