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Effects of letterland on phonemic awareness and retrieval of phonological information from long term memory

Dianne Hodgson
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**Effects of Letterland on phonemic awareness and retrieval
of phonological information from long term memory.**

By

Dianne Hodgson

**A thesis submitted in partial fulfilment of the requirements of the
award of**

Bachelor of Education (Special Education) with Honours

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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

Abstract

This study examined whether a pictorial mnemonic based program called *Letterland*, with and without fluency training, improved accuracy and fluency of decoding letter-sounds for children experiencing difficulties learning to read. A single-subject experimental ABCDA research design was used with four Year 1 students experiencing difficulties with reading. After baseline (A), the first intervention (B) taught seven *Letterland* characters and letter-sounds without fluency training over 6 sessions, the second intervention (C) taught seven new letters using *Letterland* and including fluency training, and the third intervention (D) reviewed all 14 letters with fluency training. Testing involved CVC real words and pseudowords. Results indicated that in some children *Letterland* with fluency training increased accuracy and fluency with letter-sounds in isolation. Results must be attributed to not only *Letterland*, but also to one-to-one instruction, repeated exposure to the letters, frequent opportunities to practice with feedback and emphasis on letter-sound correspondences.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

- (i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;
- (ii) contain any material previously published or written by another person except where due reference is made in the text;
- (iii) contain any defamatory material.

Signature_

Date 17-01-00

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Chapter 1

Introduction

Background

Children learn to talk through listening and imitating. Feedback is immediate and ongoing throughout the speech acquisition process. No conscious cognitive effort is required. Learning to decode a written text, however, requires a huge cognitive step forward to be taken (Ehri, 1995; Foorman, Fletcher, Francis, Schatschneider & Mehta, 1998). The child is required to learn that speech is made up of words, words of sounds, and that sounds can be represented by symbols. Whereas learning to communicate orally engages only oral and auditory skills, learning to read is a more demanding task requiring a higher level of cognitive achievement. The learner must not only have an awareness of what constitutes oral language, he or she must also acquire the ability to correlate sounds with symbols and translate the sounds with which he or she has become familiar into symbols and conventions with which he or she is totally unfamiliar. The task of recognising, correlating and recalling these relationships is a daunting one. It is not surprising that a great deal of research has therefore focussed on how children learn to read and why some children encounter difficulties. A number of factors may cause reading difficulties, including auditory or visual problems, attention or memory problems, neurological problems or poor phonological skills.

When beginning to learn to read, children need exposure to a print-rich environment that provides a wide range of reading opportunities to stimulate their natural curiosity. As children move through early childhood, they are exposed to a variety of print as part of their daily routine ranging from labels on clothing to titles

and credits on television programs to signs when they go shopping or for a walk to the park. "What does that say, Mummy?" indicates that the child is already beginning to associate symbols to speech. Many young children first encounter formal reading when their parents start to read books to them. They soon begin to recognise familiar images and may even pretend to read the story back to the parent using the visual images as cues. The child's curiosity is aroused by the mysterious black squiggles that appear on the pages of the book. This curiosity nurtures the child's desire to learn more about these black squiggles on the page. As children begin to read they can practise their reading skills through a variety of mediums including environmental print, magazines, books, television and computers.

When learning to read, the beginning reader confronts three structural units of language: letters, words and sentences. Children may identify the word by sight, by sounding out and blending its letters, by relating it to a known word, by identifying common spelling patterns or by using contextual cues. Until a child recognises that words are made up of sounds and that those sounds are represented by letters, he or she will be unable to generalise the symbol-sound association when encountering words not seen before. This can have serious repercussions as the child is likely to fall further behind in his or her learning.

Those children experiencing difficulties with learning to read will need explicit instruction in possibly all stages of reading but especially in the beginning stages of learning the letter-sound relationship. One strategy that is used to assist with learning this letter-sound relationship is the use of mnemonics. Mnemonics is a system for converting difficult to remember information into more easily remembered information (Fulk, Lohman & Belfiore, 1997). A number of studies have researched the

effectiveness of mnemonics to assist the beginning reader learn letter-sound associations (Ehri, Deffner & Wilce, 1984, Fulk et al., 1997)

A popular literacy program that makes use of pictorial mnemonics is a program known as *Letterland*. Wendon developed the program after observing the difficulties encountered by failing readers (Wendon, 1993a). According to Wendon (1993a), it provides a “unique teaching model which blends a structured phonics approach with whole language teaching” (p.11). The *Letterland* program is based on a fantasy place with fictional characters that assist the learner to remember letter sounds in a fun way. The *Letterland* characters are incorporated into the letter shape to assist with remembering the letter sound and name.

Significance

Numerous programs are being used in primary schools to assist with developing phonemic awareness and beginning reading, including *Thrass* and *Letterland*. The *Letterland* program is for use in lower primary classes. To implement the program in a school each classroom requires a teacher’s guide, a set of picture code cards, a wall frieze, song cassettes and workbooks plus teacher in-service instruction. A number of other materials including storybooks are also recommended. The cost involved in setting up the program is immense, especially for schools with several classes each in Pre-Primary and Years 1 and 2. However, there is lack of empirical research on *Letterland*. The literature that exists has been written in order to promote the product, not to test the effectiveness of *Letterland*. Therefore, it is important to test the effectiveness of the *Letterland* program, especially with children experiencing reading difficulties.

The idea for this study evolved from observation of a Year 1 class using *Letterland*. A number of students experienced reading difficulties, despite intensive

teaching of *Letterland* across the curriculum. Children experiencing difficulties with learning to read find it difficult to make the association between what is spoken and what is written.

From a theoretical point of view, *Letterland* has a number of useful features including the emphasis on teaching letter-sound correspondences and the use of integrated pictures into the letter shapes. But success depends not only on the program but the way it is taught, together with feedback, revision and fluency training. Feedback needs to be immediate and positive with all attempts acknowledged. When incorrect responses are given, they should be corrected immediately to avoid confusion to the reader. Numerous opportunities should be provided for the reader to review and practise newly acquired skills. White and Haring (1980) suggest these opportunities should be relatively short and provided several times throughout the day. Once accuracy has been achieved, it is important to develop fluency to enable the reader to learn more highly evolved skills and to be able them to generalise the information into other contexts. The present study incorporated these principles of learning into the use of *Letterland* in order to maximise the chances of students benefiting from *Letterland* instruction.

Purpose of the study

This study is designed to determine whether the program *Letterland* assists children experiencing reading difficulties to develop letter-sound knowledge to decode both real words and nonsense words. Specifically, it examines if *Letterland* assists with developing accuracy and fluency in decoding letters.

Definitions

A number of terms will be used in the Literature Review and the rest of the thesis which need to be clearly understood in order to interpret the thesis accurately. These include:

Print awareness

Print awareness is described by Adams (1990, p. 333) as “the conscious awareness of the nature of print.” It is an awareness that the visual patterns of print are different to other varieties of visual designs in the environment.

Alphabetic principle

The alphabetic principle involves an understanding that letters represent sounds and that words consist of individual sounds and sound patterns.

Graphemes

The written symbols or letters of the alphabet.

Phonemes

A phoneme is the smallest unit of sound (e.g. /d/ in dog, /sh/ and /i/ in ship, and /igh/ in light).

Onset and Rime

Onset and rime are the component parts of syllables. Onset refers to the initial consonant or consonant cluster and the rime is the vowel and any consonant that comes after it (e.g. in the word “bat”, the “b” is the onset and “at” is the rime; in the word “thing”, “th” is the onset and “ing” is the rime).

Decoding

The translation of individual letters and/or groups of letters into sounds to access the pronunciation of a word.

Phonological processing

Phonological processing refers to the use of phonology or sounds of language to process verbal information in oral or written form in short and long term memory.

Phonemic awareness

“Phonemic awareness refers to the metalinguistic ability that allows children to reflect on features of spoken language. The children are able to recognise that words can rhyme, can begin or end with the same sounds, and are composed of phonemes that can be manipulated to create new words.” (Ericson & Juliebo, 1999, p. 4).

Automaticity

Automaticity is learning a behaviour or thinking process so thoroughly it does not require conscious effort, hence the performance becomes automatic.

Mnemonics

Mnemonics are memory-improving strategies. They work by recoding the unfamiliar letter or word to something familiar, relating the information into something meaningful (e.g., a picture) and finally being able to retrieve the information when it is seen.

Pseudowords

Pseudowords are nonwords that can only be read by decoding. They are not recognised as whole words (e.g., fom, stip).

Overview of the Thesis

This thesis is divided into five chapters (including the Introduction) as well as a number of appendices. The next chapter outlines the literature relating to the study. Initially, it outlines literature associated with print awareness and an awareness of

letters of the alphabet. Phonological processing is discussed in relation to phonemic awareness and the role of revision in achieving automaticity. Mnemonics as a strategy to assist beginning readers is analysed, with the focus on *Letterland*. The chapter also outlines the role of pseudowords and the single-subject experimental research. Finally, the present study is outlined and the research questions posed.

The next chapter is about the method used in the study. This outlines the participants, the type of research design and the phases, the instruments and materials, the procedure and the ethical considerations.

Results are then outlined in the following chapter. Each child's results are presented in turn.

The final chapter discusses the findings of the study in relation to the research questions, application to the classroom, limitations and implications for further research.

Chapter 2

Literature Review

Acquiring the skills necessary to begin to read is thought to occur in a series of stages. Frith proposed a three-stage model to describe the stages in acquiring reading mastery (Gough, Ehri & Treiman, 1992; Owen & Pumfrey, 1995; Ruddell, Ruddell & Singer, 1994). The three stages are logographic, alphabetic and orthographic. Logographic refers to the use of graphic cues to assist the child to read words. At this stage there is no association with graphemes and phonemes. When children begin to develop basic grapheme-phoneme knowledge and apply it for reading they move into the alphabetic stage. The final stage, the orthographic stage, refers to using spelling patterns to identify words, not necessarily phonological.

This chapter describes the relevant literature related to the task of learning to read as children work through the stages in Frith's model. It begins with literature relating to print awareness and the importance of knowledge of the alphabet in learning to read. Then phonemic awareness is outlined and the use of mnemonics as a strategy to assist its development. *Letterland*, a program that uses pictorial mnemonics, is then examined. The importance of revision in developing automaticity is investigated as well as the role of pseudowords for testing. Finally, the present study is outlined and the research questions posed.

Print Awareness

The inquisitive nature of young children and their desire to learn about the world around them can be enhanced through print. A variety of print through shop names, product packaging, street advertising, television and books is part of the everyday

environment encountered by children. Many young children focus on a prominent feature of a word to assist them in remembering the word (Gough, Juel & Griffith, 1992; Masonheimer, Drum & Ehri, 1984). This paired association (e.g., the arches in the McDonalds logo) is referred to by Frith as the logographic phase (Badenhop, 1992; Owen et al., 1995; Ruddell et al., 1994). Children look at words as a whole entity rather than a series of symbols (Rohl & Milton, 1993). Frequent viewing is also considered important for the association to be made between the visual cue and the word.

Adams (1990) suggests that there are several things children can learn through print. First of all, children are able to distinguish a difference between print and other visual patterns in the surrounding environment. Secondly, children learn that a variety of mediums are used to convey print including paper, television, signs and walls, and that print can be black and white or coloured, use electronic lights or may appear as three dimensional shapes. Thirdly, children can become aware that print surrounds the child in everything he or she does. Fourthly, children see adults read print in a variety of ways including reading aloud picture books, reading mail or the newspaper to themselves or reading signs. Fifthly, printed materials cover a number of different categories. Children are able to distinguish that the print in their story book is different from the newspaper and that it contains different information. Finally, children learn that anyone can produce print including themselves.

A study by Masonheimer et al. (1984) was conducted to determine the relationship between print in the environment and beginning reading. Initially, 228 children, aged two to five, were asked to identify 21 signs and labels to ascertain a set of commonly known signs or labels. The ten most widely known signs or labels were selected for the study. From the 228 children, 96 were selected and asked to identify

three versions of the label. The first was the original version, the second incorporated standard black and white print with the logo, and the third was the word in the logo typed without the logo itself. Eighty-one percent of the children in the study identified the full version, 67 % the second version and 23 % the typed version. The spelling was then changed by a visually dissimilar letter (e.g., XEPSI for PEPSI). Testing showed that 74% of children “read” the label as if normal. When asked if there was anything wrong with the sign almost all the children did not change their response. Interestingly, the children were able to locate misspelt words when they were shown them in the typed form. Adams (1990) comments that this study replicates earlier findings that minor changes within the context are not considered important enough by children to make comment. It is only when it is presented in black and white that the alteration is noted.

Harste, Burke and Woodward (1994) conducted a three-part study in which the first part was similar to the study by Masonheimer et al. (1984) using three versions of a logo. The difference with the Harste et al. (1994) study was they showed the logo in actual context (e.g., a toothpaste tube with the logo was used). As a result of the study, Harste et al. (1994) identified a number of strategies used by children when reading print. One strategy was when children expected print to be meaningful and to make sense in terms of the context (e.g., a tube of toothpaste does not say “shoe polish”). When a child saw familiar print he or she responded with something that is meaningful in relation to the known world and what the child knew. Another strategy Harste et al. (1994) identified was that children made use of all available communication systems to make sense of the print world. When a child in the study saw the word “Jell-O” and was asked what it said, her reply was, “It should be a telephone number.”

When children are first exposed to books, they examine the pictures for meaningful messages, building up two dimensional images that are then stored in the memory. Clay (1991) refers to this as visual searching. Each time the book is viewed, recall of the image becomes more automatic allowing the child to “read” a book quickly. However, new books contain images that require the reader to visually search for new cues, logograms, for future reference.

Each time new logograms are added to memory, the possibility arises of confusing visually similar images (Rohl et al., 1993; Ruddell et al., 1994). Initially, identifying visual cues for determining words is relatively straightforward. However, as more visual images are added the task becomes increasingly complex especially when a number of visual images refer to the same word or words (e.g., Fish and chip shop signs appear different for each shop). In addition, unknown words need to be identified. Inferences can be made regarding the meaning of the word while still not identifying the word (e.g., When reading the label on a toothpaste packet young children often say it says, “clean teeth”). Children then need to examine other ways of helping them decipher unknown words.

When the child enters school, print awareness plays an important role in beginning to read. The moment the child enters the class, he or she is surrounded by signs. Sometimes, amongst all the unfamiliar print images they are able to identify something familiar, usually their name. Up till a certain point, the child has been able to perceive print in any direction, but then, a set of reading rules is introduced demanding left to right and top to bottom scanning. Clay (1991) suggests that the importance of this task of scanning is vastly under-estimated in relation to success in learning to read. Children with hand-eye coordination difficulties may find this particular aspect of reading perplexing.

Awareness of Letters of the Alphabet

The English alphabet, a Greek adaptation of Phoenician symbols (Adams, 1990), requires the reader to become proficient with more than 40 phonemes from 26 letters, both uppercase and lowercase, as well as all the sound blends. None of the consonants use their alphabetic name in words, the vowel names are used only in specific circumstances (Wendon, 1998). Many lowercase letters have minor differences in appearance (e.g., “n” and “h”) and make it difficult for the learner to distinguish between them. Clay (1991) suggests it is imperative that a child perceives a letter as a separate entity before being able to attach a sound to the letter symbol.

Children’s knowledge of letter names is the best predictor of beginning reading success (Adams, 1990). Beginning readers are less likely to confuse letter names with sounds if they already know the letter names, because only one set of new information needs to be learnt (Adams, 1990; Badenhop, 1992). Automatic letter recognition enables the beginning reader to identify words as patterns of letters thus allowing him or her to use alphabet cues for reading words by sight (Adams, 1990; Ehri, 1992).

Clay (1991) suggests that children need to be able to recognise letters phonetically, alphabetically and visually. Children who are unable to do this will require various strategies to assist with the acquisition of alphabetic knowledge to identify the relationship between the orthographic (symbol) and phonological (sound) systems. Children with reading difficulties find this relationship between the visual symbol and the name or sound even more difficult to decode.

Turner and Lally (1986) conducted a study with 98 prereading kindergarten children. A letter-name test, a Peabody Picture Vocabulary test and a phonemic segmentation test were administered to all the children. Four groups were formed on the basis of their phonemic awareness and letter-name knowledge. These groups

were: (a) low phonemic awareness, low letter-name knowledge, (b) low phonemic awareness, high letter-name knowledge, (c) high phonemic awareness, low letter-name knowledge, and (d) high phonemic awareness, high letter-name knowledge. All four training groups received computer-monitored training sessions in which the children were taught simple grapheme-phoneme correspondences. In the post-test, the children in the high phonemic awareness/high letter-name knowledge performed significantly better in their word-recognition test than any of the other three groups. This suggests that children require both phonemic awareness and letter-name knowledge in order to increase phonological decoding ability.

The study by Turnner et al. (1986) highlights the importance of alphabetic knowledge when beginning to read. Initially, children can use this knowledge to segment sounds into words. As the beginning reader encounters new words, they pronounce them and establish the words as sight words in memory (Ehri, 1995). Byrne (1992) points out children may be able to identify the sounds but not be able to blend them. That is, a child may be able to recognise that *c* represents /c/, *a* represents /a/, and *t* represents /t/ but be unable to read *cat*.

Phonological Processing

A critical element in learning to read and write the alphabetic script is the ability to use the sounds of language. This is known as phonological processing (Vandervelden & Siegel, 1997; Wagner and Torgesen, 1987; Wagner, Torgesen & Rashotte, 1994). Three kinds of phonological processing have been described: phonemic awareness, phonological recoding in lexical access, and phonetic recoding to maintain information in working memory (Urhy & Shepherd, 1997; Wagner et al., 1987, 1994). These three areas are distinct but related. Phonemic awareness is an

awareness of individual sounds, known as phonemes, and sound patterns in speech (Gough et al., 1992; Munro & Munro, 1992). Phonological recoding in lexical access is the ability to process the written symbol (the grapheme) into a spoken representation. Several tasks are associated with assessing phonological recoding for lexical access. These include determining whether a word is a real word or pseudoword, and rapid naming of letters, colours or objects (McBride-Chang & Chang, 1996; Wagner et al., 1987, 1994). Phonetic recoding to maintain information in working memory refers to verbal memory required to recall strings of phonemes (McBride-Chang et al., 1996). Phonetic recoding may play a critical role for beginning readers for decoding a sequence of visually presented letters, storing the sounds of the letters in working memory and blending this stored information to form a word (Wagner et al., 1987; 1994).

Phonemic awareness is covered separately in this literature review while phonological recoding and verbal working memory are covered in the section on automaticity.

Phonemic Awareness

A great deal of research, especially in the last 20 years, has focussed on phonemic awareness and its relationship with the task of learning to read. The beginning reader needs to develop an understanding that spoken words are made up of phonemes which can be manipulated and that these phonemes relate to graphemes (Ball & Blachman, 1991; Gough et al., 1992). Use of the alphabetic principle is essential for the beginning reader to learn to read and spell.

Studies have shown that children who have developed an understanding that words can be broken into phonemes are more proficient readers (Adams, 1990;

Ericson & Juliebo, 1998; Snider, 1997). In fact, phonemic awareness is a good predictor of future reading success (Snider, 1997, Stanovich, 1986). Many studies have shown that phonemic awareness is a more reliable predictor of reading achievement than general intelligence or socioeconomic status (Ball et al., 1991).

Phonemic awareness plays an important role in assisting children to move from matching phonemes with graphemes to the orthographic representations of words. There are two main aspects associated with learning for a beginning reader with phonemic awareness (Ball et al., 1991; Munro et al., 1992; Wagner et al., 1987). First, the beginning reader comes to reading knowing how to say words and what their meanings are (i.e., they are able to make sense of written words by saying them aloud). Second, the orthographic representations are able to be built up progressively by matching the sound properties of words with their written features.

Since the early 1970's researchers established that phonemic awareness was more than breaking up words and covered a range of dimensions and therefore required a number of assessment tasks (Adams, 1990; Goswami & Bryant, 1991; Snider, 1997; Wagner et al., 1994). These assessment tasks can be organised into five levels from easiest to hardest (Adams, 1990; Snider, 1997, Yopp, 1988): a) The ability to recognise rhyming words or produce words that rhyme (e.g., nursery rhymes and rhyming words such as fish - dish). b) Sound oddity tasks which require the student to identify words that are the same or different in terms of the beginning, middle and end sounds (e.g., Which word has the same beginning sound as cat - fish, moon, cow?). c) Blending tasks which require the student to identify a word when each syllable or phoneme is pronounced separately (e.g. /d/, /o/, /g/ - dog). d) Phoneme segmentation tasks which require the student to pronounce each separate phoneme in a one syllable word (e.g., cat - /c/, /a/, /t/). e) Phoneme manipulation tasks which require the student

to identify the word when phonemes are added, deleted or moved (e.g., If you take away the /p/ sound in “pink” then “ink” is left.). The reliability and validity of these assessment tasks were examined by Yopp (1988). Yopp (1988) indicated that a combination of the assessment tasks was more reliable than a single test for determining early reading acquisition.

One of two longitudinal studies conducted by Snider (1997) examined the relationship between phonemic awareness and later reading achievement. Seventy three kindergarten students from a small rural community were tested on five Phonemic Awareness Subtests. The subtests were phoneme segmentation, strip initial consonant, substitute initial consonant, rhyme supply and initial consonant same. Fifty students completed a post-test at the end of second grade. The remaining students had either moved from the area, repeated a year of school or were placed in special education. Results indicated low mean scores and high standard deviations which demonstrated a extensive variability in performance between the students. Snider (1997) indicated that the results of three of the sub-tests — phonemic segmentation, strip initial consonant and substitute initial consonant — were highly predictive of later reading achievement. She also indicated several limitations of the study including lack of a blending task and the number of students from the lower quartile not included in the post-test in second grade.

Words can be broken up in three ways: syllables, intra-syllabic units known as onset and rime, and phonemes (Adams, 1990; Goswami et al., 1991; Treiman, 1992). Onset refers to the consonant sound preceding the vowel whereas rime refers to the vowel sound and any consonants after (e.g., in “dog”, “d” is the onset and “og” is the rime). Syllables are generally the easiest way to break up words (e.g. seesaw - see/saw). However, most beginning readers only encounter monosyllabic words (e.g.

dog). Therefore the beginning reader requires a further way to break up words into units smaller than a syllable but larger than a phoneme (e.g., d-og). These units are known as onset and rime. If children can connect rhyming sounds with reading they are then able to associate distinctive sounds with letter sequences. Phonemes are the smallest unit of sound a word can be divided into (e.g., d-o-g, d-e-s-k). Research has found children achieve an awareness of syllables before phonemes (Goswami et al., 1990; Trieman, 1992).

A number of researchers have investigated the notion that phonemic awareness can be taught to young children. Ball et al. (1991) conducted a study to explore whether children could be taught to segment words into phonemes, the effect of segmentation training, and effects of letter-name and letter-sound training on segmentation skills. Thirty children were randomly selected from each of three separate schools. They were divided into three groups: a) phonemic awareness group, b) language activities group, and c) control group.

The phonemic awareness group were divided into groups of five and met four times a week for 7 weeks. This was in addition to regular class instruction. Each lesson was for 20 minutes and consisted of three components: a) say-it-and-move-it activities, b) other segmentation-related activities, and c) letter-name and letter-sound training (Ball et al., 1991, pp. 55-56). The language activities group were divided into groups of five and met for the same amount of lessons and time. A series of language activities was conducted including listening to stories and semantic categorisation. Identical letter-name and letter-sound training was also given. The control group received no intervention.

Results indicated significant differences between the phonemic awareness group and the other two groups for phoneme segmentation. However, there were no

significant differences between the three groups for letter-name knowledge. Both the phonemic awareness group and language activities group attained significantly higher scores than the control group for letter-sound scores. Ball et al. (1991) concluded that children can be taught to segment words into phonemes. They also found that letter-sound instruction alone did not improve segmentation skills which in turn did not improve early reading skills.

What are the implications for teaching? A thorough knowledge of the phoneme-grapheme associations is essential. Without this skill, a child will be unable to apply the phonemic awareness skill of blending sounds to assist with the task of reading words. This is an important skill because the English language contains many irregularities. Ehri (1992) states that partial use of this phoneme-grapheme association will assist the beginning reader to read unfamiliar words. As children become more reliant on single phoneme-grapheme identification, they need to be taught to break words into onset and rime, making the task of learning to read easier. Felton (1993) states the relationship between reading and spelling needs to be taught. A number of researchers suggest that the beginning reader be exposed to a variety of texts that are appropriate. This enables the child to benefit from his or her emerging phonemic awareness skills (Badenhop, 1992; Bradley & Bryant, 1983). Children who fail to become perceptive to the sounds in words make little sense of the alphabetic principle. Early identification of these children is essential. Children unable to exhibit some level of phonemic awareness fall further behind. These children find the classroom texts too difficult, resulting in lack of motivation to read.

Accuracy and Fluency

Acquisition of a skill requires both accuracy and fluency to enable the skill to be utilised. Accuracy is the ability to complete the skill with no errors (White & Haring, 1980; Wolery, Bailey & Sugai, 1988). White et al. (1980) describes fluency as the speed or effortlessness with which a skill or series of skills are performed. Accuracy alone does not necessarily mean the skill will be utilised. Slow performance or inconsistency can impede the ability to make use of the skill. In a review of research on reading fluency, Mastropieri, Leinart and Scruggs (1999) said, “A reduced reading rate means that students read less text in the same amount of time as more fluent readers and therefore will have processed less text to remember, comprehend, or appreciate” (p. 278). Reading rate refers to the number of words read correctly divided by the total reading time or the number of words or letters read per minute (Mastropieri et al., 1999).

Interventions which can be used to increase reading fluency are repeated reading, peer-mediated reading instruction, computer-guided practice and previewing (Mastropieri et al., 1999). The repeated reading strategy involves the reader repeatedly reading aloud a short passage “at a difficulty level that enables the reader to recognise most of the words” (Lerner, 1997, p.429). A predetermined reading rate is calculated and the student records his or her own progress. Wolery et al. (1988) have published a comprehensive table containing recommended reading rates for students from a variety of sources. The recommended oral reading rate of Kindergarten to Grade 3 age students for isolated sounds, outlined in Wolery et al. (1988), is 36 to 52 sounds with up to 4 errors. A number of researchers (Rashotte and Torgesen, 1985; Sindelar, Monda & O’Shea, 1990) established that the greatest gains in fluency were when a number of passages contained common words. Peer-tutoring provides the

opportunity for increased practice in the classroom because half of the students can be reading when peer-tutoring is used as opposed to whole-class activities where one student is reading or small groups where only a small number of students are reading. The third intervention suggested by Mastropieri et al. (1999) was the use of computer-guided practice. A range of software is available to supplement the reading program in the classroom. These include programs which assist with developing decoding skills. The final intervention suggested by Mastropieri et al. (1999) is previewing which is similar to repeated reading but involves pre-exposure to the vocabulary in the reading passages and may also involve listening to the teacher reading.

Once a skill has become fluent and accurate it provides a basis to learn more advanced skills and enables learners to generalise their skills to a variety of settings. Once this level of mastery has been reached, automaticity occurs. Automaticity is learning a behaviour or thinking process so thoroughly that it does not require effort, hence the performance becomes automatic. (Logan, 1997; Woolfolk, 1995). Both perceptual-motor tasks (e.g., riding a bike) and cognitive tasks (e.g., reading) can become automatic.

The first written reference discussing automaticity and the importance of learned behaviours was by William James in 1890 (Naslund & Smolkin, 1997). Later in the decade, Bryan and Harter studied the effect of expertise on automaticity by comparing novice and expert telegraphers. The study found the more experienced telegraphers were able to decode sentences quicker by decoding whole words rather than individual letters (Logan, 1997; Naslund et al., 1997). In the 1950's Skinner suggested behaviours became habit once they had been practised enough. Both Piaget and Vygotsky suggested that habit formation did not fully explain individual differences (Naslund et al., 1997). In 1974, LaBerge and Samuels developed a theoretical model

called the LaBerge-Samuels Automaticity Model (Samuels, 1987; 1994). The model examined the relationship between automaticity and beginning reading and contained four key elements: attention, visual memory, phonological memory and semantic memory. As a result, other researchers began to investigate this relationship especially in relation to children experiencing reading difficulties.

Attention is described as “the effort or energy required to perform cognitive tasks” (Samuels, 1987, p. 18). LaBerge and Samuels suggested attention had two components: internal and external. External attention is described as focusing behaviour to maximise information output (e.g. a person’s eyes directed to a book). However, a student may exhibit the appropriate behaviour but not be attending to the task. Internal attention is the competence to process and recall auditory information. The learner’s level of arousal and alertness are important characteristics of internal attention which can affect the ability to learn to read and influence both accuracy and fluency. A learner’s ability to sustain effort and energy, or vigilance, over extended periods of time is another characteristic of internal attention. Selective attention, another characteristic of internal attention, is the ability to filter unwanted information or stimulation and focus attention on the necessary elements that enhance learning. When learning something new, the human mind finds it difficult to focus on more than the task at hand. This is referred to by LaBerge and Samuels as limited capacity (Samuels, 1994).

Learning to read requires not only the printed words to be decoded but meaning to be constructed from the written text, both skills requiring attention. Some beginning readers find it difficult decoding and constructing meaning from the text simultaneously. As there is only a limited amount of attention available, the child is faced with the problem of having to use his or her attention to decode the written text

resulting in inadequate attention for the comprehension task. The process required for the beginning reader to comprehend text is very slow. The text is usually read a number of times as the child reads the text first to decode, then to comprehend the text. For the beginning reader this is not only slow and difficult but also frustrating. Extensive demands on memory due to the decoding task consuming too much attention can result in reading difficulties. Samuels (1987) refers to this as lack of automaticity in decoding.

Samuels, Schermer & Reinking (1992) suggest when students begin to learn to read, words need to be broken into parts to reduce the visual length of the unit to be decoded. Continual practice and exposure to the visual unit enables the length of the visual unit to increase. As the task becomes more fluent, the reader is able to read words as whole units and in turn begin to make meaning of the text. When a task can be accomplished with little attention to decoding allowing more attention to be given to higher processes, then automaticity has been achieved.

Research during the 1970's and 1980's focussed on distinguishing between automatic processing and non-automatic processing. Numerous researchers (LaBerge & Samuels, 1974; Logan, 1978, 1980; Shrifin & Schneider, 1977) studied the properties that define these two types of processing. The three main properties outlined in their research were speed, effortlessness and autonomy. Increases in speed usually decrease reaction time. Logan (1997) cited his own earlier work, in which he called the learning curve related to increases in speed the "power law". "The power law states that reaction time decreases as a function of practice until some irreducible limit is reached" (Logan, 1997, p 125). For example, high frequency words are read more quickly than low frequency words due to more practice. Effortlessness relates to

the ability to do more than one thing at a time (e.g. talk while driving). Autonomy is the ability to complete a task without conscious attention.

Numerous researchers (Ackerman & Dykman, 1993; Badian, 1998; Cornwall, 1992; Meyer, Wood, Hart & Felton, 1998; Wolf, 1991) have investigated letter naming speed and reading performance. Denckla and Rudel (1974) examined reading readiness and the child's ability to name visually familiar symbols such as letters, numbers, colours and common objects. As a result of their study, Denckla and Rudel (1974) developed the Rapid Automatized Naming Test (RAN) which requires the reader to rapidly name printed colours, numbers, objects and letters from four different charts.

Meyer et al. (1998), conducted a longitudinal study of rapid naming in disabled and non-disabled readers. Two groups of students were selected and each group was tested in a separate study. The second group were 160 randomly selected students from first grade and longitudinally followed to eighth grade. Students in the second group were divided into three sub-groups based on reading ability. A series of charts from the RAN tests were used in both studies. The students were asked to name the items on the chart as fast as they could and the time was recorded. Results of the first study indicated that children who were able to recite the alphabet almost "perfectly" were able to name the letters approximately 14 seconds faster than the other children in the study. In the second study, the main findings were: a) over time there was a steady improvement of the rate of responding with the greatest gains for all students being from first to third grade, and b) as the students progressed from first to eighth grade, there was a narrowing gap between the students for letter-naming speed (The mean score for students in the top group to name the letters was 18.5 seconds and the low group was 22.8 seconds by eighth grade, whereas in first grade the difference

between the two groups was 17.7 seconds). Meyer et al. (1998) concluded that letter naming speed was related to reading fluency and suggested that fluency training be used in kindergarten with alphabet mastery and individual letter naming.

A study by Cornwall (1992) examined the relationship between phonemic awareness, rapid naming and verbal memory in children with severe reading disabilities. Fifty-four children aged from 7 to 12 years old with a WISC-R Full Scale IQ of 90 or more were selected for the study. Nine different tests were administered including the RAN Test. The conclusions drawn from this study reflect other studies' findings by concluding that phonemic awareness, rapid naming and list learning skills assist students to utilise the alphabetic principle and help determine unfamiliar words. Between the ages of 8 and 10, children move from phonological division of words to rapid naming (Cornwall, 1992). This is critical for the reader to comprehend text.

Research in accuracy and fluency indicates that beginning readers who have a comprehensive letter-knowledge are able to focus their attention on making meaning of the text as opposed to focusing their attention on decoding. Frequent practice enables the beginning reader to increase his or her letter-naming speed. In turn, this enables the reader to increase his or her reading rate. Repeated reading interventions allow the beginning reader to increase fluency and accuracy enabling automaticity to occur.

Use of Pseudowords

Pseudowords, fictitious or nonsense words, are often used to assess phonological recoding because they are visually unfamiliar and as a consequence the reader is required to use phonological knowledge of grapheme-phoneme correspondences (Blackmore & Pratt, 1997; Ehri, 1994; Iversen & Tunmer, 1993;

Rack, Snowling & Olson, 1992). Often, pseudowords are used to test children's accuracy and speed in word recognition especially in the early stages of learning to read.

Elbro, Borstrom & Petersen (1998) conducted a study in Copenhagen investigating the role of phonemic awareness to predict the presence of specific reading difficulties. Ninety-one kindergarten aged children were divided into two groups. The first group contained children who had at least one parent with dyslexia whereas the other group were children with parents of average reading ability. Numerous tests were conducted over a two-year period including print concepts, letter naming, initial-phoneme deletion, phoneme discrimination and reading pseudowords. The pseudoword testing was not administered until the beginning of second grade. Results indicated that there was a correlation between initial-phoneme deletion and reading pseudowords thereby predicting later reading competence. Elbro et al. (1998) stated that phonemic awareness deficits become more evident when pseudowords are used in testing.

Felton (1993) outlines the Bowman Gray Learning Disabilities Project which investigated the effectiveness of phonemic awareness training for children experiencing difficulties with reading. This longitudinal study included 48 children in kindergarten, with an average IQ of 97.6 who were randomly placed in groups of 8 and assigned to regular classrooms. A meaning-emphasis program (Houghton Mifflin Program) was used by four classes while a Code-emphasis program (Lippincott Basic Reading Program) was used in the remaining classrooms. A variety of testing measures were used including decoding pseudowords. Significant group differences between the code-emphasis group and the meaning-emphasis group were recorded for decoding pseudowords, both at the end of first and second grade. Felton (1993) also reported

that all the children in the code emphasis group were able to apply knowledge of the alphabetic code when reading words at the end of second grade.

These studies demonstrate that pseudoword decoding is a sensitive measure of testing phonological knowledge of grapheme-phoneme correspondences as the words are unfamiliar and require phonological recoding.

Mnemonics

A useful strategy to facilitate the task of learning visual-verbal associations is the use of mnemonics. Mnemonics is a technique used to assist improving memory. Numerous studies (Carney, Levin & Levin, 1993; Fulk et al., 1997; Ehri, Deffner and Wilce, 1984) have documented that when students with learning difficulties have mnemonic instruction they demonstrate improved recollection of information both immediately and in later follow-up sessions. Levin suggests mnemonic strategies work by recoding the letter or word into something familiar, then relating the mnemonic to the letter or word and finally using the mnemonic to retrieve the letter or word (Carney et al., 1993).

A study by Ehri et al. (1984) used two experiments to determine whether the use of pictorial mnemonics assisted pre-readers to learn letter-sound associations. In the first experiment 20 children, in first grade, were randomly assigned to either a control group or an experimental group. Segmentation pre-training for one month was conducted followed by phoneme segmentation and letter-sound knowledge pre-tests. Two sets of pictures were created for five of the least known letters. One set integrated each letter into the picture whereas the other was disassociated from the letter. Twenty-minute lessons over six days were conducted in groups by the class teacher. Each lesson reviewed the letter taught the previous day and introduced a new

letter, with the final lesson reviewing all letters. During the lessons, the teacher named the letter and sound, highlighting the letter shape in the drawing. The children traced, then drew the picture freehand. Memory for letter sound, memory for pictures, phonemic segmentation, letter writing and picture drawing post-tests were conducted. Pre and post-testing were conducted individually. The results indicated that the children who were taught the letter-sound association using integrated pictures were able to significantly recall more letters than those that were taught using disassociated pictures.

In the second experiment, 30 children were selected and randomly assigned to three groups. Letter name and sound knowledge tests, a word reading test and the Peabody Picture Vocabulary Test testing were administered. Again, phonemic segmentation pre-training was conducted. Integrated and disassociated pictures were drawn for sixteen consonants. The children were taught five letter-sound associations they were unable to identify in the pre-test. All lessons were conducted on an individual basis. Recall of letter-sound association and letter shape post-tests were administered. The integrated picture group scores differed significantly from the other two groups both during training and post-testing for recall of letter-sounds.

Results from both experiments clearly demonstrated superiority of the integrated picture mnemonics when teaching letter-sound familiarity to pre-readers. Ehri et al. (1984) found that for mnemonics to be effective there must be a link between the visual symbol and the answer to enable the information to be retrieved. The study also demonstrated the importance of the mnemonic being an integral part of the letter.

A study by Fulk et al. (1997) investigated the use of an integrated picture mnemonic strategy on the letter-sound acquisition of students unable to recognise letters despite systematic instruction. Fulk et al. (1997) used the study by Ehri et al.

(1984) as a guide especially when developing the mnemonics. This study used a multiple-baseline-across-students design with three students. Integrated pictures were used that began with the initial sound of the consonant (e.g. A kite was drawn into the letter 'k'). The three students were individually trained and assessed. The intervention was introduced to one student at a time. Once a 45% mastery criterion was reached, the intervention was introduced to the next student. Intervention was discontinued when the students attained 90% accuracy of the phonetic sounds. Follow-up assessments were made at two-week and four-week intervals. Results indicated that the use of integrated pictorial mnemonics was an effective instructional strategy for assisting students acquire letter-sound acquisition. The follow-up sessions indicated maintenance of the high levels of letter-sound knowledge.

Letterland

Letterland (Wendon, 1986; 1990; 1993a; 1997), an English literacy program, uses pictorial mnemonics to introduce a structured phonetic approach to learning to read. It was originally developed by Wendon to assist children who were experiencing difficulties with learning to read. Wendon (1993a; 1997) describes *Letterland* as using letter characters that encompass letter shape and orientation, letter sounds, and letter patterns through the use of pictorial mnemonics and stories. The program is based on an invisible place inhabited by fictitious people and animals within letter shapes.

When developing the program, Wendon investigated problems associated with reversals of letters (e.g., b/d, p/q, s/z). Built in orientation cues have been incorporated into the pictorial mnemonic. Describing letter shapes facing to the right or left can be confusing to young children who have not grasped this concept.

Wendon (1993a, 1997) describes the letter characters either looking, running, hopping “in the reading direction” (e.g., “Bouncy Ben has big brown ears which stick up straight as he bounces along in the Reading Direction.” [Wendon, 1997, p. 109]).

When developing *Letterland*, Wendon (1993a) matched a mnemonic that cued the corresponding letter sound (e.g., “Clever Cat” for “c”, “Sammy Snake” for “s”) to assist with segmenting words, an essential step in learning to read. Wendon is a strong advocate of not teaching alphabet names before teaching letter sounds (Wendon, 1998). She cites a number of reasons for this decision. The first reason is many of the alphabet names have one or more different meanings (e.g., b- be, bee; c- see, sea). Another reason is that consonant names fail to give a clue to their most common sound. The five vowel names incorporate other vowel sounds in their alphabet tags (e.g., a- aee, u- yoo). Finally, 15 of the 21 consonant names begin with other letter sounds (e.g., c, w).

Picture coding is an important element of the *Letterland* program. This involves the children drawing the *Letterland* pictogram into the letter shape (See Appendix E for examples). According to Wendon, when children begin to blend sounds this practice of picture coding greatly assists problems with mixing letter order. Stories have been developed to help children remember the order of letters when blending sounds (e.g., for the sound blend “sh” - Hairy Hat Man hates noise. Whenever he finds himself next to Sammy Snake he turns around and says ‘sh’).

Wendon suggests there are many benefits of *Letterland* (Wendon, 1986). Children develop an active curiosity and interest in letter shapes and sounds. There is an increased spelling accuracy and children become confident with all letter sounds within 3 to 6 months of teaching. The main benefit that is suggested by Wendon is a

measurable decrease in the number of students requiring assistance with reading and spelling (Wendon, 1986).

The only published literature on *Letterland* is written by the founder of *Letterland*, Lyn Wendon, though in a discussion on mnemonics a two line reference was made about *Letterland* being “a popular program to teach letters in British kindergartens” (Ehri, 1995, p. 23). Therefore, there is no evidence for its efficacy other than the general literature on mnemonics cited earlier. Whilst the benefits outlined by Wendon (1986) are conceivable, a possible difficulty lies in the amount of information required to be retained by the student to remember the letter sounds (e.g., When reading the word “cat”, the child who is unfamiliar with the word would need to remember, Clever Cat says “c”, Annie Apple says “a”, and Ticking Tess says “t”. By the time they have remembered and processed all the information they could experience difficulty sounding out the word.) For children experiencing learning difficulties, the amount of information required to be retained could compound their problems.

Single-Subject Experimental Research

“The aim of single-subject experimental research is to clearly establish the effects of an intervention on a single individual” (Neuman & McCormick, 1995, p. 1). Single subject experimental research is used widely in literacy research, especially in remedial programs. There are numerous advantages to using the single-subject approach including the ability to focus on individual performance, to focus on major effects, to avoid ethical and practical problems and to allow for flexibility in design (McBurney, 1994). Data can become distorted when results are averaged over large number of students. Important understandings generated from individualised data analysis can be

used to indicate effective interventions which suit one subject but possibly not another. Single-subject designs allow for the researcher to take account of individual differences between participants (e.g., A participant may not respond to an instruction, so in a single-subject design the researcher can modify the instruction according to the individual's needs).

The class teacher is able to conduct single-subject experimental research within the class setting. This enables the teacher to collect individualised data making use of formal and informal methods of assessment. Teaching procedures can be examined, in a specific context, for suitability for individual students providing insight for future instruction.

Single-subject research generally involves the manipulation of variables to determine the effect of an event. The quality of an experimental design due to manipulation of independent variables is known as internal validity (Salkind, 1997; Neuman et al., 1995). Numerous threats to internal validity include history, testing, instrumentation and observation, and multiple-intervention interference. History relates to other events outside the experiment that may affect the results (e.g., The researcher may be teaching the student several letter sounds and at the same time the parent focuses on letter sounds at home). Increased results due to the participant becoming familiar with repeated testing and changes in motivation levels may also pose a threat to internal validity. Reliable and consistent measurement are essential to ensure internal validity (e.g., When measuring the time taken to read a series of words, the time starts as soon as the words are exposed until the last word is read). Finally, the effect of more than one intervention or combination of interventions in a study may pose a threat to internal validity (e.g., If letter sounds were taught in one intervention

and sight words taught in another, it would be difficult to determine which intervention assisted the participant to read a list of words).

The conditions that determine the effect of the study need to be controlled to reduce variability in the results enabling the study to be repeated with similar results. The more that is learnt about the effects of the study on each individual, the easier it becomes to generalise the results. Demographic factors, (e.g., age and sex) and environmental-subject interactions (e.g., educational histories and year level) are important considerations for generalisation. These two considerations are especially important in relation to research in beginning reading. Reading tests and some testing for phonemic awareness may not be appropriate for children at Pre-Primary or early Year 1 level as they may not have learnt the letter sounds.

The Present Study

As children develop from the logographic phase to the alphabetic phase and finally the orthographic phase research shows that phonemic awareness plays a significant role in the task of learning to read. Knowledge of letter sounds is paramount for the beginning reader to decode unknown words. As previously mentioned, various strategies may be required to assist with decoding words. This literature review outlines one strategy known as pictorial mnemonics which has been used successfully to teach beginning readers letter sounds. Numerous studies have shown this strategy has demonstrated improved recollection of information providing the information was relevant. The present study used a mnemonic based program called *Letterland* to determine if it assists children with learning difficulties in learning their letter sounds and develop phonemic awareness skills. While it has been documented that pictorial mnemonics have been used successfully to teach beginning

readers letter sounds, there is no known research to demonstrate that *Letterland* is also successful.

The present study used a single-subject design with four students in Year 1 experiencing difficulties with letter identification. As outlined in this literature review, single-subject designs enable the data to be interpreted based on each individual's performance. Each of the four students had different problems associated with learning to read that need to be addressed separately. One of the students had difficulty with articulating some letter sounds and working independently. Two of the students in the study had difficulty expressing themselves, and, one of them had extreme difficulty expressing himself when interacting with his peers or adults. The fourth student had little knowledge of the letter names or sounds prior to the study and was the weakest of the students.

In this study, particular attention was taken to follow the *Letterland* format in teaching letter names and sounds outlined in the *Program One Teacher's Guide* (Wendon, 1993a) to enable the findings of the study to be generalised. The *Letterland* materials used were authentic. The correct letter characters and stories were used throughout the study. Picture coding was also included in the study as it is considered an important part of the *Letterland* format.

The role of practice to increase fluency and accuracy to develop mastery to automaticity level was an important consideration of this study. Mastropieri et al. (1999) outline four interventions that can be used to increase reading fluency. In this study, the researcher has used adapted versions of repeated readings and previewing. The students reviewed *Letterland* character names and letter names and sounds before new letters were introduced. Letter sounds were then practised several times every lesson to help increase reading fluency. This format was similar to the study by Ehri et

al. (1984) which reviewed letters taught previously, introduced new letters and contained a final lesson reviewing all letters.

The studies by Elbro et al. (1998) and Felton (1993) both suggested that phonemic awareness deficits become more evident when pseudowords containing letters that were taught are used in testing. For this reason, pseudowords were used in this study during testing to determine if the students were using phonological knowledge of grapheme-phoneme correspondences. Another consideration for this present study was the use of common words for testing. The CVC words were checked for frequency of occurrence in reading materials by referring to Thorndike & Lorge (1972) and comparing each list for similar frequencies of occurrence.

Research Questions

Therefore, the following researched questions have been developed:

1. Does *Letterland* improve accuracy and fluency of decoding of letter sounds in real words and in pseudowords for children experiencing reading difficulties?
2. Does *Letterland* with fluency training improve accuracy and fluency of decoding of letter sounds in real words and in pseudowords for children experiencing reading difficulties?
3. Does revision of *Letterland* characters and letter sounds already taught improve accuracy and fluency of decoding of letter sounds in real words and in pseudowords for children experiencing reading difficulties?
4. Are gains in accuracy and fluency maintained at one-week follow-up?

Chapter 3

Method

This chapter outlines the criteria for selecting students to participate in the study, a brief description of the students, the research design, the instruments and materials used, the procedure and finally the ethical considerations. Incorporated in the procedure is Wendon's (1997) framework for teaching *Letterland*.

Participants

Students from Year 1 were selected for this study from a primary school that did not use *Letterland*. Four students from a mixed Pre-Primary/Year 1 class, who were experiencing difficulty with identification of letter names and sounds, were identified by the class teacher to participate in this study. Identification of lowercase letter names and sounds was tested with the criterion of 20 out of 26 letter sounds or less set for inclusion in the study. Bryce, Chad, Amanda and Charlotte, the students recommended, all identified less than 20 letter sounds. The study commenced at the beginning of November and continued until early December.

Bryce

Bryce was aged 6 years, 3 months at the commencement of the study. He was able to identify 14 lowercase letter names and 12 lowercase letter sounds in the pre-test. For unfamiliar letter names or sounds, he gave the sound "z" during all testing. Although able to pronounce sounds in isolation, Bryce had problems blending sounds together. When interacting with his peers, Bryce was unable to express himself (e.g., when playing with the farm animals in a group activity, Bryce would make a grunting sound and point when he wanted one of the other children to pass the cow).

However, when talking to himself, especially when drawing, he used more expressive language (e.g., when drawing a cow he would say, “draw a big round body with brown spots, head with ears and big horns, legs and feet, whoops don’t forget the tail”). Initially, Bryce guessed every word without sounding out (e.g., for the word “tag” he would say “tiger”). Later, he sounded out the words and guessed the word.

Chad

Chad was aged 6 years, 1 month. In the pre-test, he identified 18 lowercase letter names and 15 lowercase letter sounds. Although *Letterland* had been taught in the Pre-Primary Chad attended, he only remembered the *Letterland* characters *Dippy Duck* and *Munching Mike*. When completing classwork, Chad worked slowly and had difficulty expressing his ideas in the written form but was able to describe his ideas orally. Towards the end of the study, Chad was attempting to sound out words which he was unable to do initially.

Amanda

At the commencement of the study Amanda was aged 6 years, 8 months. She was able to identify 23 lowercase letter names and 18 lowercase letter sounds in the pre-test at the commencement of the study. Amanda experienced difficulty with articulation of the ‘i’ sound when blended with other sounds (e.g., for “ink” she would pronounce it as “ekk”). However, a speech therapist assessment had recommended that speech therapy was not required. Amanda experienced difficulty working independently in the classroom and constantly requested assistance. During testing, Amanda waited for a comment after each answer and, unlike the other children, did not proceed to the next item until her response to the previous one had

been acknowledged. Amanda used visual clues from the environment to assist identifying words beginning with the sound being taught.

Charlotte

Charlotte, aged 5 years 11 months, was the youngest of the four students. At the beginning of the study, Charlotte was able to identify 3 lowercase letter names and 1 lowercase letter sound in the pre-test. During the second intervention, Charlotte was identified as having a mild intellectual disability and placement was granted at the Special Education Centre at the school for the following year. At the beginning of the study she was not prepared to guess letters, and in many instances her reply was “I don’t know that word” or “that letter”. Later, much to her delight, she was able to identify a number of letter sounds as soon as she saw them.

Design

This study used a single-subject experimental ABCDA research design which encompassed five phases. These were A - Baseline, B - Use of *Letterland* to teach seven letters, C - Use of *Letterland* to teach another seven letters plus fluency training, D - Review of the fourteen *Letterland* characters and letters including fluency training, and A - return to Baseline and Follow-up session.

Throughout the study, several dependent variables were measured: (a) number of letters in CVC words read correctly from each of two lists, (b) time taken to read CVC words from the two lists, converted to the reading rate (number of letters read per minute, lpm), (c) number of letters in CVC pseudowords read correctly from two lists, and (d) time taken to read CVC pseudowords from the two lists, converted to the reading rate (lpm). Two separate word lists, List A and List B, were prepared. The

same was done for pseudowords. List A words and pseudowords consisted of letters taught in Phase B. List B words and pseudowords consisted of letters taught in Phase C.

Instruments and Materials

A stop watch was used for all testing sessions during baseline, the three interventions and follow-up.

Pre and Post Tests

The Informal Reading-Thinking Inventory Word Card A - Pre-Primer level (Manzo, Manzo & McKenna, 1995) was used to test each child's reading level (see Appendix C). The Pre-Primer list consisted of 15 words found in readers used in Year 1. The student's level of phonemic awareness was tested using the Test of Phonemic Awareness shown in Appendix D (Snider, 1997). The four areas covered by the test were: (a) phoneme segmentation, (b) strip initial consonant, (c) substitute initial consonant and (d) initial consonant same.

Letterland Materials

Letterland Picture Code Cards (Wendon, 1993b) were used in the pre-testing, lessons and post-testing. These cards include one side with plain lowercase letters and the other side with a *Letterland* character incorporated into the lowercase letter. The *Program One Teacher's Guide* (Wendon, 1997) was used as a guide for teaching *Letterland*. *Letterland* character stories are outlined in this guide. A wall chart with all lowercase *Letterland* characters was displayed throughout the lessons but removed for testing. An A5 sheet with the letter (10cm x 7cm) in bold print was used for picture coding (see Appendix E for examples).

Lists of words and pseudowords

Two lists of words and two lists of pseudowords (See Appendix A) were used for testing sessions. All were CVC. List A words contained one, two or three of the letters “b”, “e”, “f”, “l”, “m”, “t” and “w”, which were taught in phase B with other letters drawn from the remaining 12 letters of the alphabet not taught in any lesson of the study (e.g., in the word “bag”, “b” was taught in phase B but “a” and “g” were not taught in the study). List B words contained one, two or three of the letters “d”, “h”, “i”, “n”, “p”, “r” and “s”, which were taught in Phase C with the remaining letters drawn from the 12 letters not taught in this study. Pseudowords for List A and List B were constructed using the same process.

Each real word was checked for frequency of occurrence in reading materials. Thorndike and Lorge (1972) list the frequency of words as they occur in reading materials. The frequency of each list word was noted and a comparison made between each list to ensure similar frequency of occurrence between words in each list.

Each list consisted of 55 words. Random selection was used for test lists, with the constraint that each word could be selected no more than twice. For each testing session, five words from List A were typed in size 18 font, Arial typeset on A5 size paper (see Appendix A for example). This was repeated for List B, List A pseudowords and List B pseudowords.

Procedure

All lessons and testing for all phases, including pre-testing and post-testing, were conducted with the students individually in a separate classroom. The student and the researcher sat at a desk next to each other.

Pre-testing

Initially, identification of letter names was tested. The *Letterland Picture Code Cards* (Wendon, 1993b), plainside, were arranged in random order and shown to the student. As each letter was shown, the researcher asked the student, "Do you know the name of this letter?" The answer was then recorded on the Letter name/sound record sheet (see Appendix B). When the student had been asked to identify all letter names the procedure was repeated for letter sounds.

The Informal Reading-Thinking Inventory Word Card A (Manzo, Manzo & McKenna, 1995) was then used to determine each child's reading level. The Word Card A - Pre-Primer list (See Appendix C) was shown to the student with all except the first word covered. The student was then asked, "If you know the word, say the word. If you don't know the word try to sound out the word." After each word was attempted the next word on the list was revealed. All answers were recorded on the Word Card A Record Sheet (Appendix C). As no student was able to identify more than 8 out of 15 words on the Pre-Primer list, no further word lists were used.

The following day, the Test of Phonemic Awareness (Appendix D) was administered. In each of the four tests the researcher modelled what the student was required to do (e.g., "I'm going to say a word, and I want you to break the word apart. You are going to tell me each sound in order. If I say cat you say c-a-t. Let's try a few words."). Then the student practised two items before the actual test to ensure he or she understood the task. The answer was then recorded on the Test of Phonemic Awareness Record Sheet (Appendix D). If the student was unable to complete the practice items and the first two test items in each test, that particular test was abandoned.

Baseline - Phase A (2 sessions)

Each testing session required each student to read 5 words randomly selected from list A and 5 words from list B, outlined in Appendix A. The lists of words were shown, one at a time, to the child by the researcher. The student was asked to read each word. If the student experienced any difficulty, the researcher encouraged him or her to sound out the letters within the word. For Charlotte and Bryce, the researcher pointed to each letter to ensure they attempted each sound. This amendment was added to the testing after the first session because Charlotte repeatedly said she didn't know the word and gave no response, and Bryce kept guessing the word by looking at the initial or end sound. Therefore, Bryce and Charlotte only have one testing session in this phase. Each testing session was also timed and the time recorded in seconds. The time taken to read the words was then converted to the reading rate by dividing the number of letters read correctly divided by the total time. This gives the number of letters read per minute.

This process was repeated, testing the set of 5 pseudowords from List A and List B separately. The researcher told the students the pseudowords were "not real words but silly words".

Intervention 1 - Phase B (6 sessions)

Care was taken to follow the framework for teaching *Letterland* that was outlined in the *Program One Teacher's Guide* (Wendon, 1997). This was an important consideration for generalising the findings to the regular classroom. A wall chart, with the lowercase *Letterland* characters, was displayed at a height that the students could reach and the researcher referred to it during each lesson. Wendon

(1997) says that this is important as it enables the students to identify and talk about the letters and characters.

The first intervention involved teaching the lowercase *Letterland* characters and sounds for the letters “b”, “e”, “f”, “l”, “m”, “t” and “w”. Six lessons were used to introduce and review the seven letters and their *Letterland* characters. Table 1 outlines the letters taught or reviewed for each lesson. The first lesson introduced two letters, the second lesson introduced two new letters and reviewed the letters taught in Lesson 1 and in each of Lesson 3, 4 and 5 a new letter was taught while previous letters taught in the intervention were reviewed. The final lesson reviewed all seven letters.

Table 1

Letters taught and reviewed in Phase B

Lesson	Letters Taught	Letters Reviewed
1	b e	
2	f l	b e
3	m	b e f l
4	t	b e f l m
5	w	b e f l m t
6		b e f l m t w

In the first lesson, the researcher showed the student the plain side of the *Letterland Picture Code Card* (Wendon, 1993b), and asked the student if he or she knew the letter name. The researcher then asked the student, “What sound does the letter make?” If the sound was not known or given incorrect, the researcher spoke the correct sound emphasising the mouth and tongue movements. The researcher then

showed the letter character outlining the story behind the character (e.g., for the letter “b” the story is, “Bouncy Ben has big brown ears which stick straight up as he bounces along in the reading direction.” [Wendon, 1997, p. 109]). Emphasis was placed on directional cues incorporated into the letter character (e.g., for the letter “b” the story relating to the directional cue is, “Brush down Ben’s big long ears, go up and round his head so his face appears” [Wendon, 1997, p. 109]). Body parts incorporated into the letter shape give directional cues which Wendon (1997) suggests give students a visual cue to the reading direction. The researcher asked the student, “Can you say a word that begins with the sound _?” When the student gave a correct answer, the researcher said, “Well done. Can you think of another word that starts with the sound _?” When the student gave an incorrect answer (e.g., chair for the letter “b”) the researcher replied, “Good try. Ball begins with “b”, can you hear the “b” sound at the beginning?”

Picture coding or drawing the *Letterland* character into the letter shape, was included because Wendon (1997) says it helps increase student’s awareness of the letter shape and orientation in a fun way. The student was given an A5 piece of paper with the letter shown in bold print. Using the *Letterland Picture Code Card* (Wendon, 1993b) as a guide, the researcher instructed the student to draw the *Letterland* character on the A5 paper. “This is (name of *Letterland* character)”, was written underneath the picture by the researcher. Both the researcher and the student read the sentence. Samples of the students’ drawing can be found in Appendix E.

In lessons 1 and 2 this process was repeated for the second letter. Lessons 2, 3, 4 and 5 included revision of letters taught in previous lessons. The letters were shown twice. After the researcher had taught the new letters, all previous letters taught in the intervention were revised. Wendon (1997) calls this “Quick Dash”. The *Letterland*

Picture Code Cards (Wendon, 1993b) were held up by the researcher and the student was asked to identify the letter sound and letter character. When the student got the letter sound correct, he or she was praised. When the answer was incorrect, the correct *Letterland* characters or letter sounds were given immediately by the researcher. All letters were shown four times.

In lesson 6 all seven letters were reviewed. The researcher showed the student the *Letterland Picture Code Cards* (Wendon, 1993b) and asked the student to identify the letter name, sound and *Letterland* character. The researcher also asked, “Can you say a word beginning with the sound _?” Finally, the letters were shown four times in random order and the students were asked to identify the letter sound.

Each lesson lasted approximately 10 minutes. Bryce and Charlotte required several letter sounds retaught which resulted in 2 minutes being added to their lessons. The lesson plans are outlined in Appendix F.

The testing was administered the same way as at Baseline. This testing followed every lesson.

Intervention 2 -Phase C (6 sessions)

The second intervention involved teaching the lowercase *Letterland* characters and sounds for the letters “d”, “h”, “i”, “n”, “p”, “r” and “s”. Lesson structure was similar to Intervention 1 except that the focus was on fluency in retrieving the phonological information. As each *Letterland Picture Code Card* (Wendon, 1993b) for the letter taught in Intervention 2 was shown, the researcher asked the student to identify the letter sound as quickly as possible (e.g., “When I show you the letter, you need to think of the sound the letter makes as quick as you can, and then say the sound.”). During the “Quick Dash” revision of letters the researcher asked the student to identify the letter sound and *Letterland* character as quickly as possible. Only

letters taught in Intervention 2 were reviewed. The *Letterland Picture Code Cards* (Wendon, 1993b) were shown at a speed that challenged the student without causing difficulty.

Table 2 outlines the teaching format for the letters. Testing after each lesson was the same as Baseline. The lesson plans are also outlined in Appendix F.

Table 2

Letters taught and reviewed in Phase C

Lesson	Letters taught	Letters Reviewed
1	d h	
2	i n	d h
3	p	d h i n
4	r	d h i n p
5	s	d h i n p r
6		d h i n p r s

Intervention 3 - Phase D (6 sessions)

This phase involved six lessons in which all 14 letter sounds and *Letterland* characters, taught in the previous two interventions, were reviewed every lesson. The student's pictures of each *Letterland* character were made into a book. At the beginning of each lesson, the students were shown their book and asked to identify each *Letterland* character. *Letterland* characters were then located and identified on the wall chart. If the student did not know the character or was incorrect the researcher immediately gave the correct answer.

Each *Letterland Picture Code Card* (Wendon, 1993b) was shown to the student by the researcher. The researcher asked the student to identify the sound made by the letter and incorrect answers corrected immediately. If there were any letter difficulties, the letters were retaught.

The researcher showed the *Letterland Picture Code Cards* (Wendon, 1993b) again asking the student to identify a word that began with each sound. Finally, the researcher showed the cards twice and asked the student to identify each letter sound as quickly as possible.

In Charlotte's case, when she was asked to identify all the letters she was only able to identify 6 of the 14 letters in the first lesson in this intervention. The researcher focused on two letters that Charlotte was unable to identify and retaught these letters. This was done to avoid too much information at one time. At the end of the first lesson all the letters were reviewed again. This was repeated for all the subsequent lessons in this intervention.

Testing followed each lesson and was the same format as Baseline.

Follow-up - A (1 session)

One week after the completion of Intervention 3 a testing session was conducted. It involved the same procedure as in Baseline.

Post-testing

Letter name and letter sound identification tests were carried out with results recorded on a separate record sheet. Finally, the four Phonemic Awareness tests were conducted.

Scoring

Scoring for all testing sessions throughout the five phases was the same. Each word was transcribed with exactly what the student had said (e.g., pat or p-a-t). A mark was given for each correct letter sound plus a mark for the correct word with a possible 4 marks per word. If the correct word was given without sounding out the word, 4 marks were given. These marks were recorded on the student record sheet with the transcribed words. Scoring was the same for both real and pseudowords. A record sheet (see Appendix A) was used for each testing session.

A Letter name/sound Record Sheet (Appendix B) was used to record results for letter name and letter sound testing. The symbol “/” was used to indicate correct identification, and “\” was used for incorrect identification. This system was used so the student was unaware of correct or incorrect answers.

A Word Card A Record Sheet was used to record the results for the reading test (see Appendix C). The researcher recorded the exact word or sounds given by the student. Three levels were given for each list: Independent level (0-1 mistakes), Instructional level (2-4 mistakes) or Frustration level (5 or more mistakes).

A Test of Phonemic Awareness Record Sheet was used for the Test of Phonemic Awareness (Appendix D). The exact word was recorded by the researcher and each test scored out of 10.

All testing sessions were timed and the time recorded in seconds. The time began as soon as the words were revealed and ended when the last word was spoken. The reading rate was then calculated and recorded.

Ethical Considerations

Initially, both written and verbal contact was obtained by the researcher from the principal of the primary school. After four students were identified by the class teacher to participate in the study, informed consent from the students' parent/guardian was obtained. Copies of the letter to the principal and parent consent forms are in Appendix G. Pseudonyms are used to protect the identity of the students participating in this study.

Throughout the study, any indication of distress by the student resulted in the lesson being stopped. At the beginning of the study Charlotte was only able to identify the sound, "s". During the second intervention, it became evident that Charlotte was experiencing difficulty retaining all the new information and the lesson stopped when she showed signs of distress (e.g., she would look around the room, say she couldn't remember the sound and ask to go back to class). Generally, the students responded well to the study and expressed their interest by asking the researcher questions such as, "Which *Letterland* character are we going to meet today?", or "I know another word that starts with the letter _ that we learnt yesterday."

Chapter 4

Results

In this chapter the results are summarised in four sections, one section for each participant. Each participant's section is divided into four parts: accuracy of word recognition, fluency and an overall summary of results. To assist with interpreting the results, a series of graphs has been used as well as tables that record the mean score for each phase. These phases are : Phase A - Baseline, Phase B - Intervention 1 which concentrated on accuracy training, Phase C - Intervention 2 which focussed on fluency training, and Phase D - Intervention 3 which reviewed all of the letters taught in Phase B and C and included fluency training. Two lists of words and two lists of pseudowords were used for testing. List A words and List A pseudowords contained CVC words with letters taught in Intervention 1 but not in Intervention 2. List B words and List B pseudowords contained CVC words with letters taught in Intervention 2 but not in Intervention 1.

Bryce

Accuracy

Although Bryce made gains in the number of letters read correctly for all four lists, the clearest gains were made in both pseudoword lists, as indicated by the results shown in both Figure 1 and Figure 2. Most of the gain was made in response to Intervention 1, even for List B pseudowords whose letters were not taught in this phase. In fact, the increase after Intervention 1 was only one to three letters for each word list. This is highlighted in the mean scores shown in Table 3. Figure 1 and

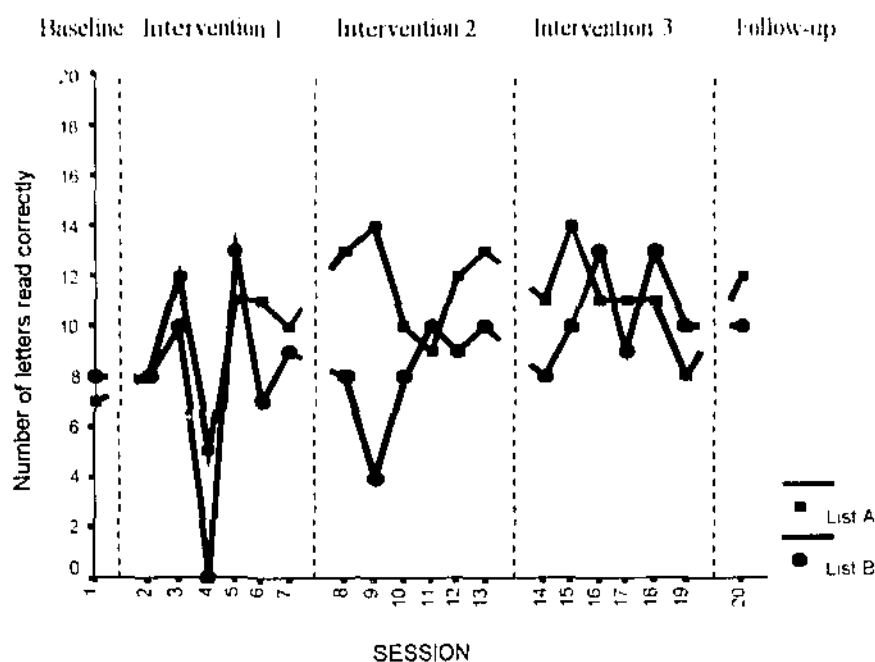


Figure 1. The number of letters read correctly by Bryce for List A and List B real words.

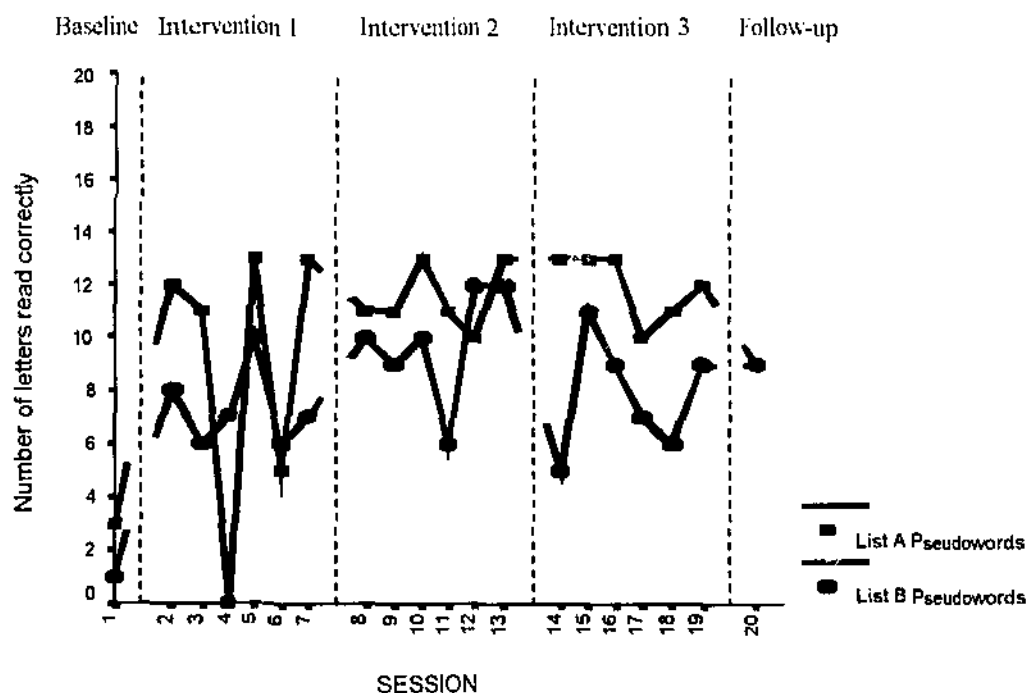


Figure 2. The number of letters read correctly by Bryce for List A and List B pseudowords.

Figure 2 also display a highly erratic pattern between testing sessions within each phase, especially in Intervention 1.

By Intervention 3, Bryce was able to recall all the *Letterland* characters during the teaching sessions but not during the testing sessions. He constantly confused some of the sounds with one another including, /i/, /e/ and /n/. Towards the end of the third intervention, he was using the *Letterland* characters to try to remember the letter sounds (e.g., For the word “nip” Bryce would say, “Naughty Nick” says /n/, “Impy Ink” says /i/, and “Poor Peter” says /p/). However, if he tried to say the letter “i” without saying the *Letterland* character first, he still maintained it was the /e/ sound.

Table 3

Bryce’s mean score for each phase for letters read

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	7.0	8.0	3.0	1.0
Intervention 1	9.5	7.8	9.0	7.3
Intervention 2	11.8	8.2	11.5	9.8
Intervention 3	11.0	10.5	12.0	7.8
Follow-up	12.0	10.0	9.0	9.0

Fluency

Bryce gradually increased his reading rate for all lists from Baseline to the end of Intervention 3, as shown in Figure 3 and Figure 4. However, at Follow-up, only List B pseudowords increased. The reading rate for List A was maintained at Follow-up but decreased for both List B words and List A pseudowords. Like accuracy,

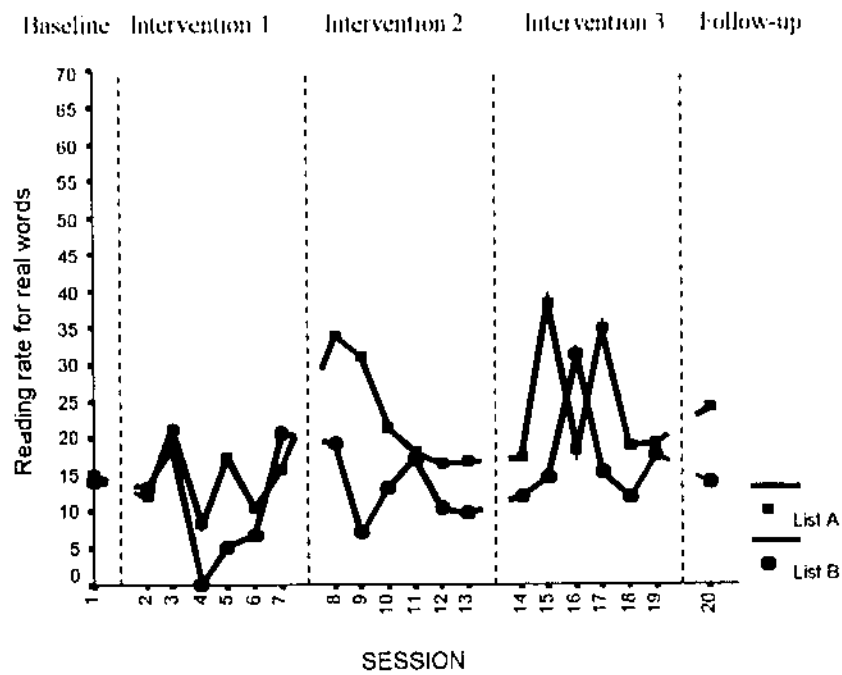


Figure 3. Bryce's reading rate for List A and List B real words.

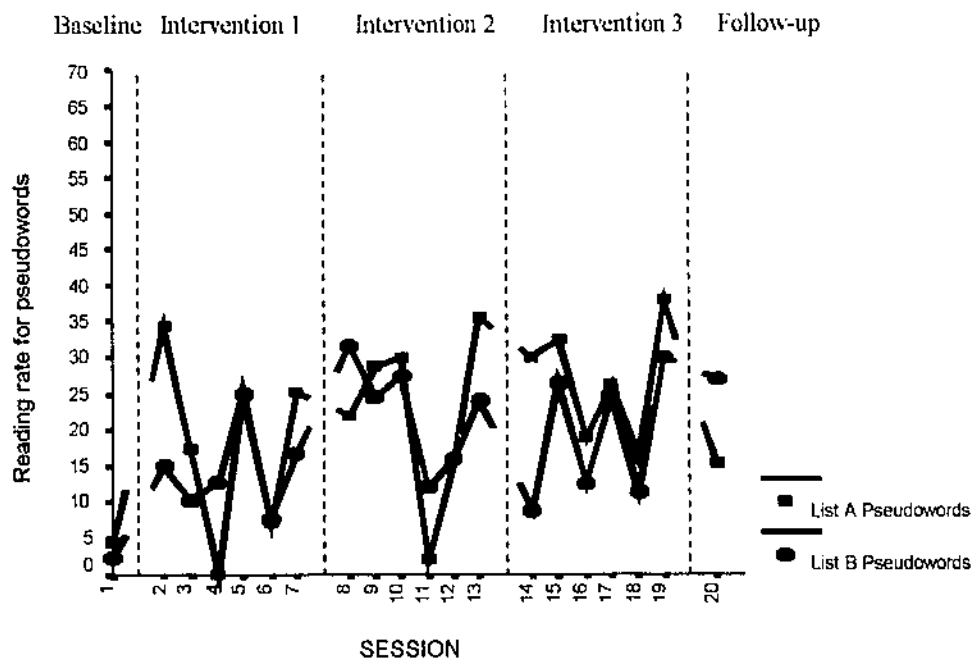


Figure 4. Bryce's reading rate for List A and List B pseudowords

Bryce's fluency results were erratic, as highlighted in Figure 3 and Figure 4. Table 4 clarifies the gradual increases in reading rate by presenting the mean scores for each intervention. Interestingly, the largest gains for List A and List B was during Intervention 2, whereas for both pseudoword lists it was in Intervention 1, as shown in Table 4.

Table 4

Bryce's mean score for each phase for the reading rate

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	15.0	14.1	4.3	2.3
Intervention 1	14.2	7.8	18.2	14.6
Intervention 2	22.9	12.8	25.6	22.6
Intervention 3	24.4	17.1	26.9	18.9
Follow-up	24.0	13.9	15.4	27.0

Summary

Overall, Bryce increased both his accuracy and his fluency for all word lists to the end of Intervention 3 but did not necessarily maintain these results at Follow-up. The largest gains for both accuracy and fluency were in both the pseudoword lists, especially in Intervention 1. For both List A and List B, Intervention 2 resulted in the greatest gains in fluency although there was only a slight increase in accuracy.

Chad

Accuracy

Chad showed a gradual increase in the number of letters read correctly from all word and pseudoword lists from Baseline to Follow-up as can be seen in Table 5 and in Figures 5 and 6. Chad's accuracy levels were either maintained or improved at each phase for all lists, which indicates generalisation; he did not improve only the letters taught in a particular phase. This is demonstrated in Intervention 1 when he improved List B word accuracy despite not being taught these letters. At Follow-up, Chad either maintained or slightly increased his accuracy level for all word lists except List A where there was a slight drop in accuracy. By Lesson 12, Chad was able to identify all the letters taught in the study despite not yet having been taught all of the Intervention 2 sounds.

Table 5

Chad's mean score for each phase for letters read

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	10.0	8.0	11.0	9.0
Intervention 1	12.7	11.0	14.0	10.7
Intervention 2	12.8	13.8	14.0	11.5
Intervention 3	14.5	13.5	14.8	13.7
Follow-up	12.0	16.0	15.0	14.0

After Intervention 2 was completed, Chad asked the researcher how to read the word once he had sounded it out. A number of words not included in the study were used to demonstrate how to blend the sounds to make a word. Although this may

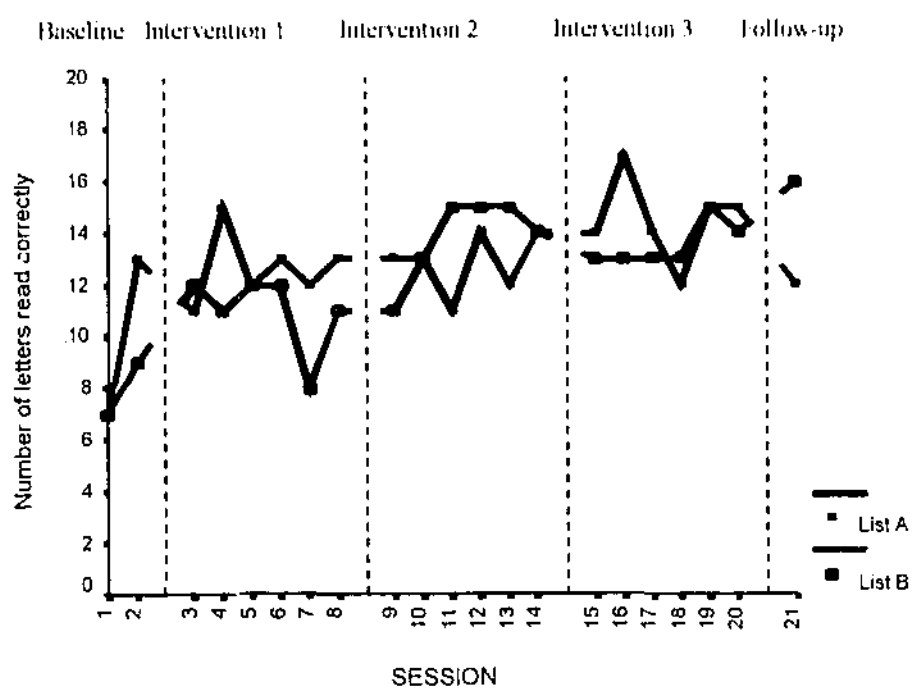


Figure 5. The number of letters read correctly by Chad for List A and List B real words.

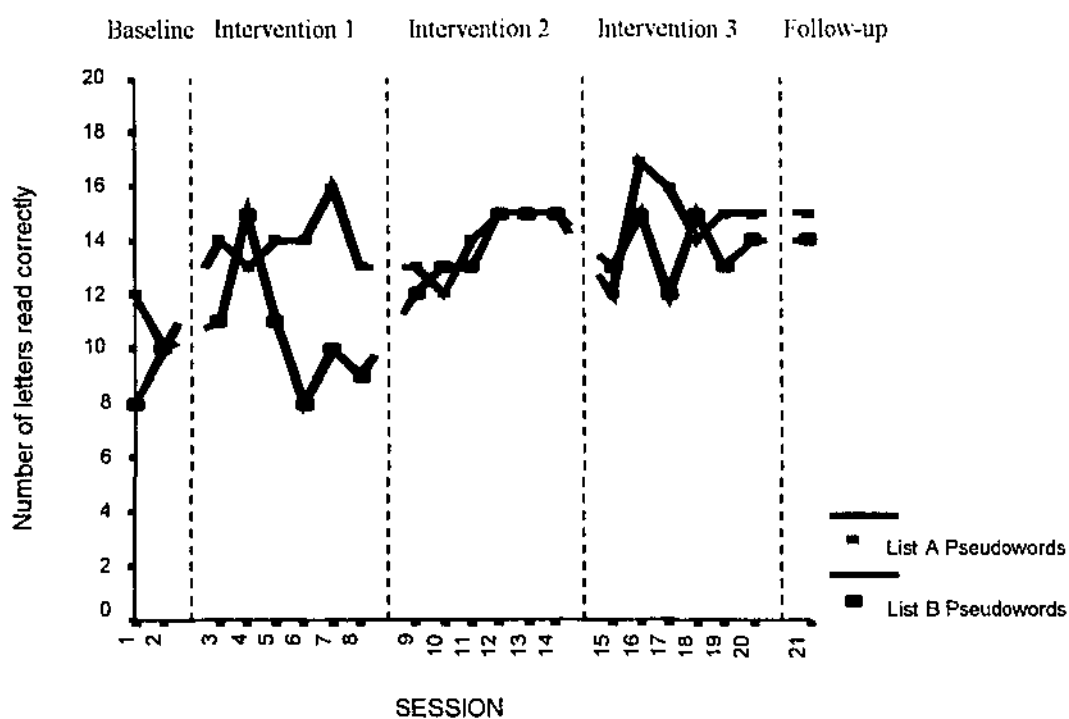


Figure 6. The number of letters read correctly by Chad for List A and List B pseudowords.

have affected the subsequent results, it was felt that Chad's readiness to move to the next stage of reading was more important

Fluency

Chad's reading rate increased steadily from Baseline to Follow-up (See Table 6), although it was very erratic across all phases as can be seen in Figure 7 and Figure 8. Figure 7 and Figure 8 also illustrate an upward trend in all the intervention phases. In fact, examination of Table 6 demonstrates List A words and List A pseudowords increased two-fold from Baseline to Follow-up, and List B words and List B pseudowords increased five-fold.

Table 6

Mean score for each phase for the reading rate

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	16.3	8.2	24.9	8.7
Intervention 1	20.8	20.9	43.6	24.6
Intervention 2	36.9	29.6	39.6	38.9
Intervention 3	37.8	30.2	41.1	40.0
Follow-up	37.9	45.7	42.9	44.2

Summary

Chad increased his accuracy of reading by a few letters and made notable gains in his reading rate for all lists of words. The largest increase in accuracy occurred in Intervention 1 not only for List A words and List A pseudowords but also List B words whose letters were not taught in the Intervention. Intervention 1 also resulted

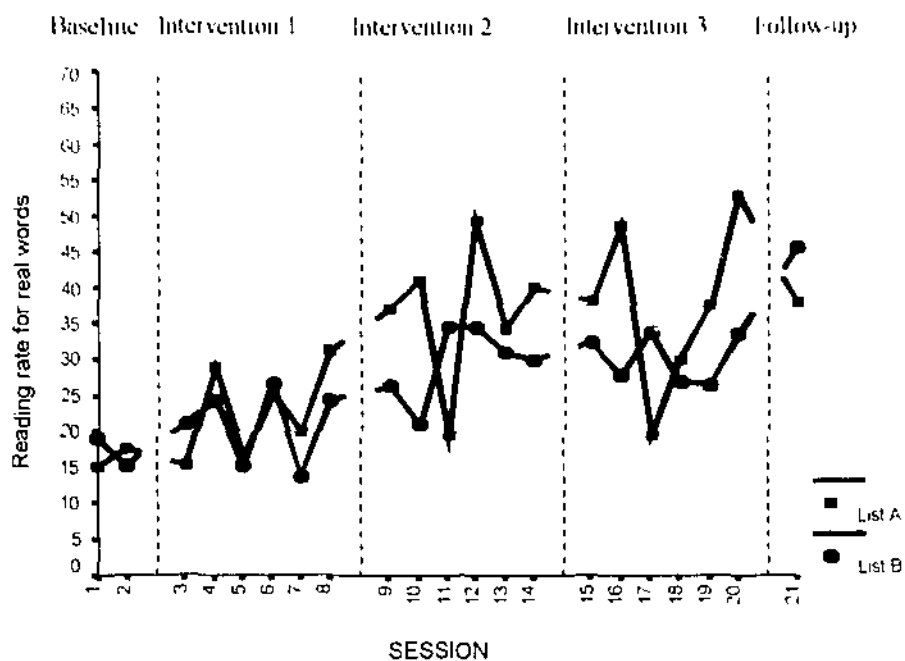


Figure 7. Chad's reading rate for List A and List B real words.

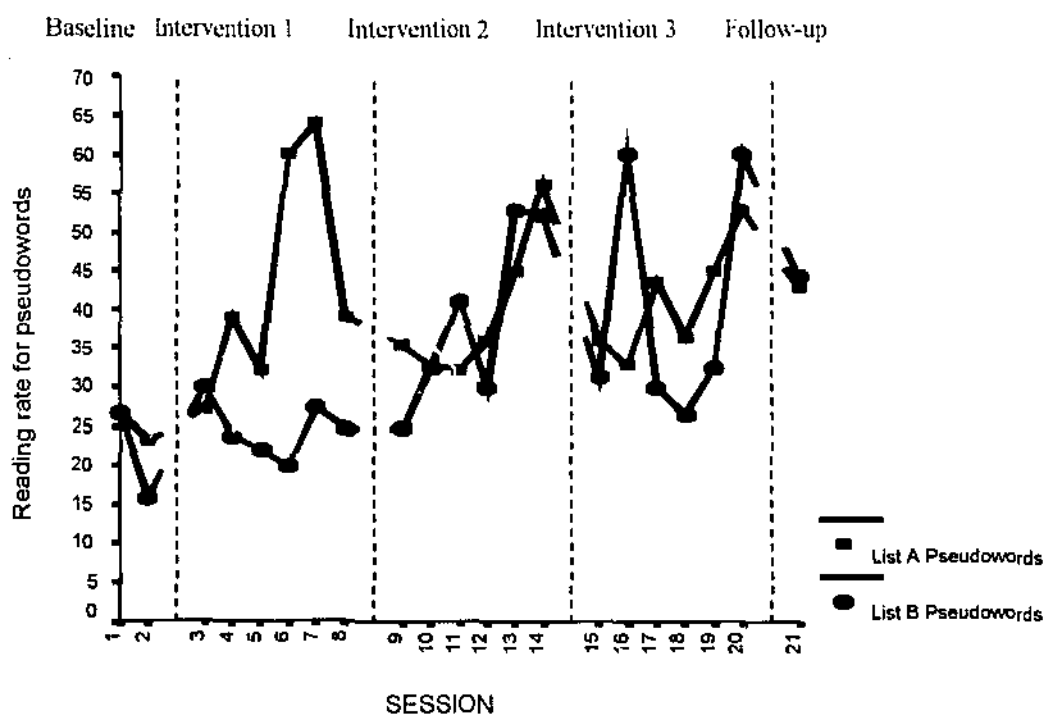


Figure 8. Chad's reading rate for List A and List B pseudowords.

in the largest increase in fluency for all lists except List A where the greatest increase was in Intervention 2. In Intervention 3 where all the letters were revised with fluency training there was no notable increase in either accuracy or fluency although the levels were maintained.

Amanda

Accuracy

Overall, Amanda increased the number of letters read from Baseline to Follow-up from 12.0 to 18.0 for List A words and from 13.5 to 18.0 for List A pseudowords (See Table 7). This is also indicated by the results shown in Figure 9 and Figure 10. It was interesting to note, however, that the mean score for List B words hardly altered from Baseline (15.5) to Follow-up (15.0) and there was an increase in the mean score for List B pseudowords of only 1.0. These results show that Amanda did not respond to Intervention 2 where she was given fluency training. However, she did improve to some extent with Intervention 1 for List A words and List A pseudowords and again with revision with fluency training in Intervention 3.

Table 7

Amanda's Mean score for each phase for letters read

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	12.0	15.5	13.5	14.0
Intervention 1	13.8	14.3	14.8	14.7
Intervention 2	13.3	14.8	14.0	14.2
Intervention 3	15.3	14.7	15.2	15.0
Follow-up	18.0	15.0	18.0	15.0

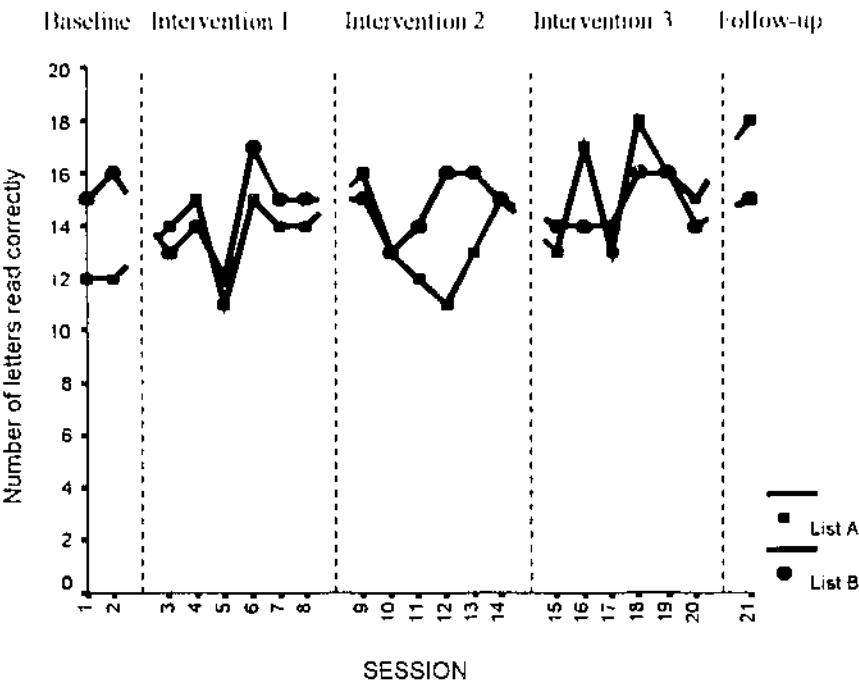


Figure 9. The number of letters read correctly by Amanda for List A and List B real words.

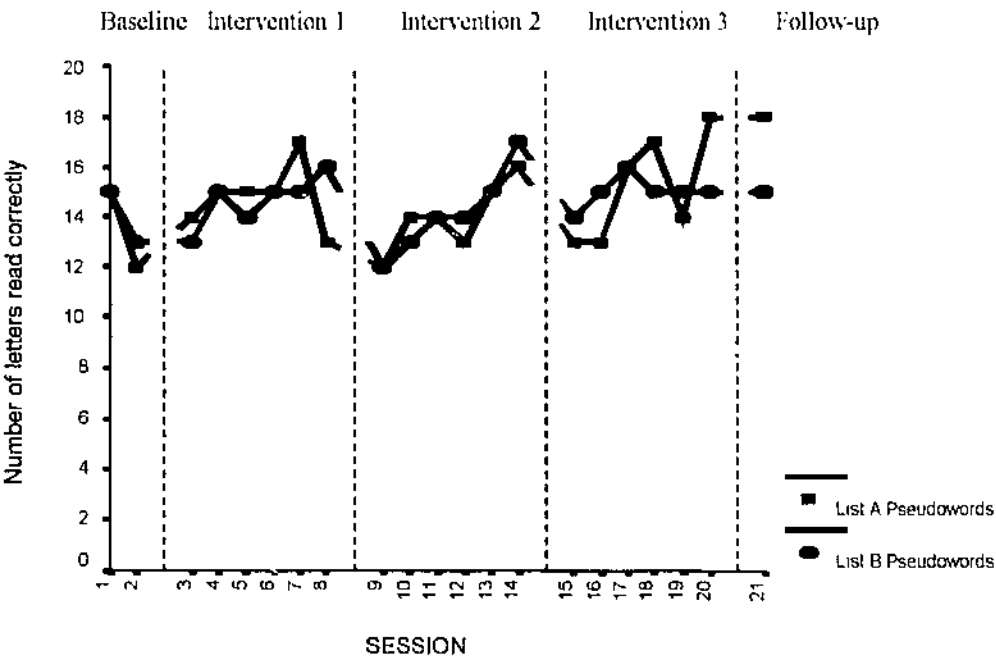


Figure 10. The number of letters read correctly by Amanda for List A and List B pseudowords.

Throughout Baseline, Intervention 1 and Intervention 2, Amanda constantly confused the /e/ and /i/ sounds despite the /e/ sound being taught in Intervention 1 and the /i/ sound being taught in Intervention 2. By the third lesson in Intervention 3, where all the letters are taught together, Amanda was able to identify all the letter names, letter sounds and *Letterland* characters for all the letters taught in the study when presented in isolation. However, whenever a “d” appeared in a word she always said the sound /b/

Fluency

Amanda more than doubled her overall reading rate to 30.9 for List A words from Baseline to Follow-up and increased her reading rate to the same figure for List A pseudowords by a half (See Table 8). However, Figure 11 and Figure 12 emphasise the erratic performance in Amanda’s reading rate across all phases in the study. In fact during Intervention 2, Amanda’s List A reading rate scores ranged from 23 to 60 and similarly List A pseudowords ranged from 26 to 60. There is little increase in reading rate for both List B words and List B pseudowords across the study. The fluency levels for all word lists increased from Baseline to Intervention 1 and then again from Intervention 1 to Intervention 2, but surprisingly fell away during Intervention 3.

The reason for the decrease in fluency after session 13 was that Amanda began not only to sound out the word but to blend the sounds together to try and make a word. This is reflected in Figure 11 and Figure 12 which demonstrate a downward trend from lesson 13 to lesson 14 for all the List words except List A words. The lower reading rate is maintained over four testing sessions for List A and List B words until there is an increase in reading rate towards the end of Intervention 3. There is

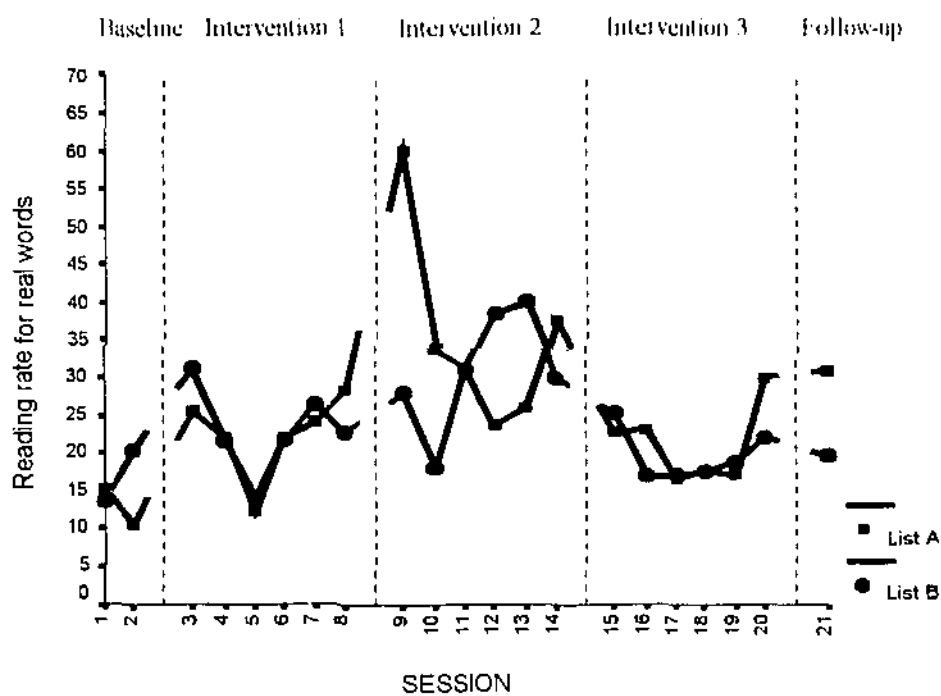


Figure 11. Amanda's reading rate for List A and List B real words.

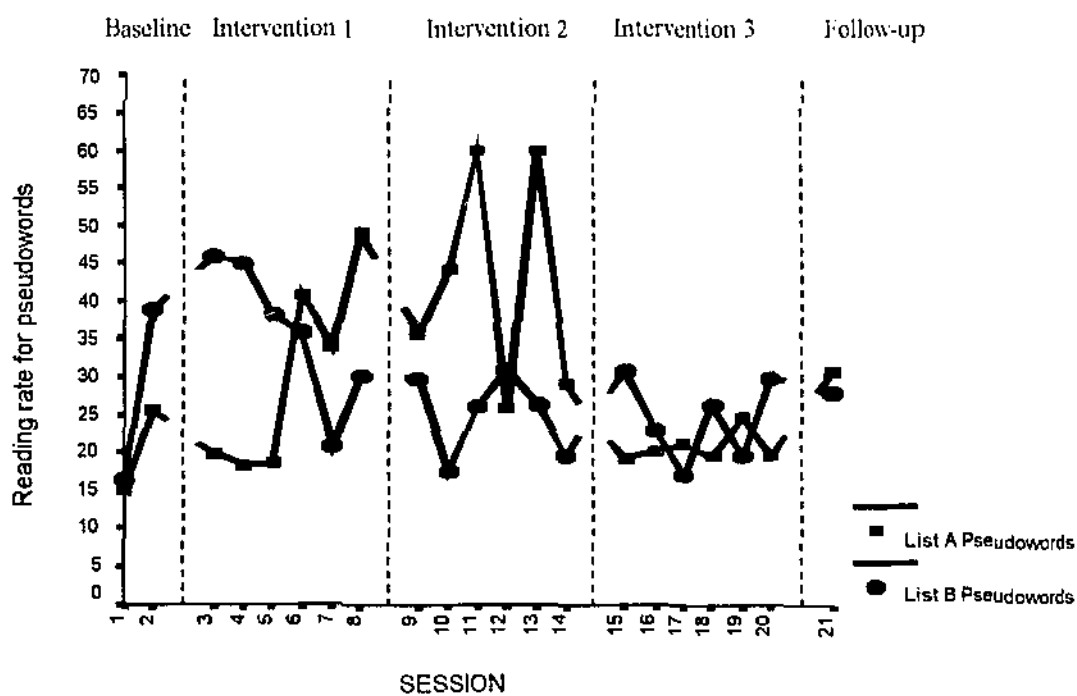


Figure 12. Amanda's reading rate for List A and List B pseudowords.

Table 8

Mean score for each phase for the reading rate

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	13.0	17.0	20.3	27.7
Intervention 1	22.3	22.9	30.1	36.0
Intervention 2	25.4	27.4	42.5	25.2
Intervention 3	21.3	19.7	20.9	24.6
Follow-up	30.9	19.6	30.9	28.1

also less variability in the reading rate for List A pseudowords in Intervention 3 than in Intervention 2.

Summary

Amanda progressively increased both her accuracy and fluency for words from List A and List A pseudowords especially during Intervention 1. In Intervention 2, she increased her fluency levels for both List A and List B words whilst maintaining accuracy levels for all lists. In the first two interventions Amanda's reading rate was very erratic but this steadied during Intervention 3 when the letters were reviewed with fluency training.

Charlotte

Accuracy

Charlotte's accuracy levels were very low throughout the study. However, she made substantial gains over the lessons. This is reflected in Figure 13 and Figure 14.

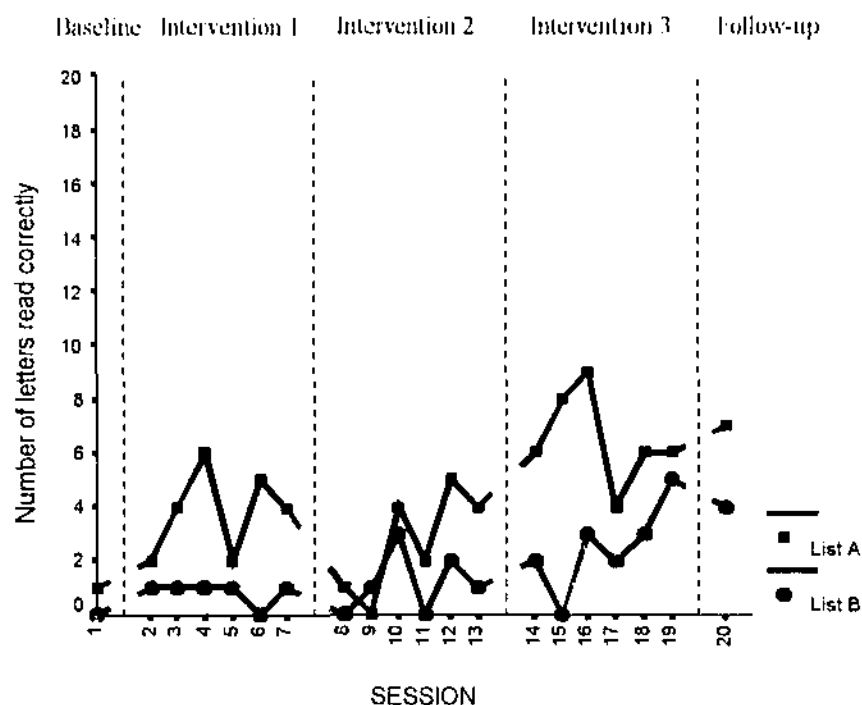


Figure 13. The number of letters read correctly by Charlotte for List A and List B real words.

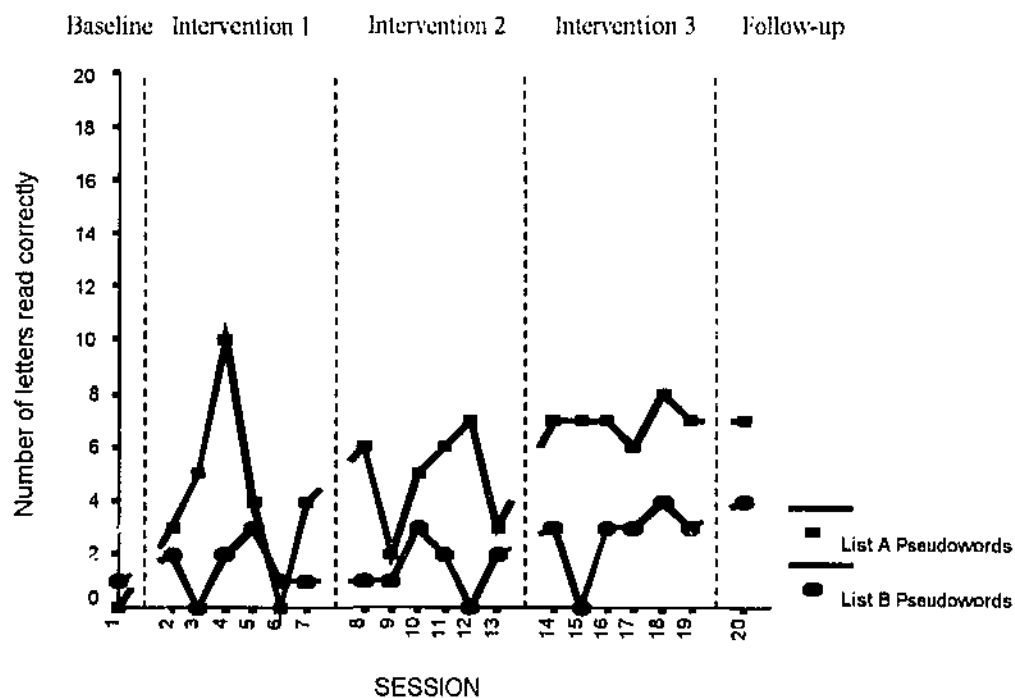


Figure 14. The number of letters read correctly by Charlotte for List A and List B pseudowords.

Figure 13 and Figure 14 also indicate that Intervention 1 produced an increase in the number of List A words and pseudowords she recognised, but less of an increase in List B words. List A stayed steady or dropped off slightly in Intervention 2, but increased again in Intervention 3, where all the List A letters were again being taught (See Table 9). For List B words and pseudowords, most of the increase was during Intervention 3. All the gains were maintained at Follow-up.

Table 9

Charlotte's mean score for each phase for letters read

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	1.0	0.0	0.0	1.0
Intervention 1	3.8	0.8	4.3	1.5
Intervention 2	2.7	1.2	4.8	1.5
Intervention 3	6.5	2.5	7.0	2.7
Follow-up	7.0	4.0	7.0	4.0

During Intervention 1, Charlotte referred to the letter sounds as the *Letterland* characters (e.g., for the letter “b” she said “Ben” and for “e” she said “elephant”). Throughout the study, she constantly confused the sounds /b/ with /m/. On a number of occasions she was easily distracted and became off-task, and this is reflected in her results especially when there was a zero score recorded. This is shown in Figure 13 where the score is zero in session 2, 7, 9, 10, 12 and 16. During the teaching sessions in Intervention 3, Charlotte was able to say the letter sounds if the researcher gave the name of the *Letterland* character first in isolation but was unable to generalise this knowledge when it was presented in a word during the testing session.

Fluency

The increase in reading rate for Charlotte from Baseline to Follow-up for both real word lists and pseudoword lists was very small as indicated in Table 10 as well as Figure 15 and Figure 16. Table 10 allows the reader more easily to detect the small differences between the interventions. The List A pseudowords increased over the phases by 9.0 whereas the other lists decreased in Intervention 1 and 2 and increased again in Intervention 3.

Table 10

Mean score for each phase for the reading rate

Phase	List A	List B	Pseudowords A	Pseudowords B
Baseline	2.1	0.0	0.0	2.5
Intervention 1	3.2	1.2	4.0	2.9
Intervention 2	2.7	1.0	5.7	2.1
Intervention 3	7.8	1.7	8.9	2.9
Follow-up	8.7	3.4	9.8	5.6

Summary

Although Charlotte increased her letter sound knowledge substantially, she was unable to generalise this knowledge when the letters appeared as words. Given low accuracy, it is not surprising that Charlotte's fluency was low.

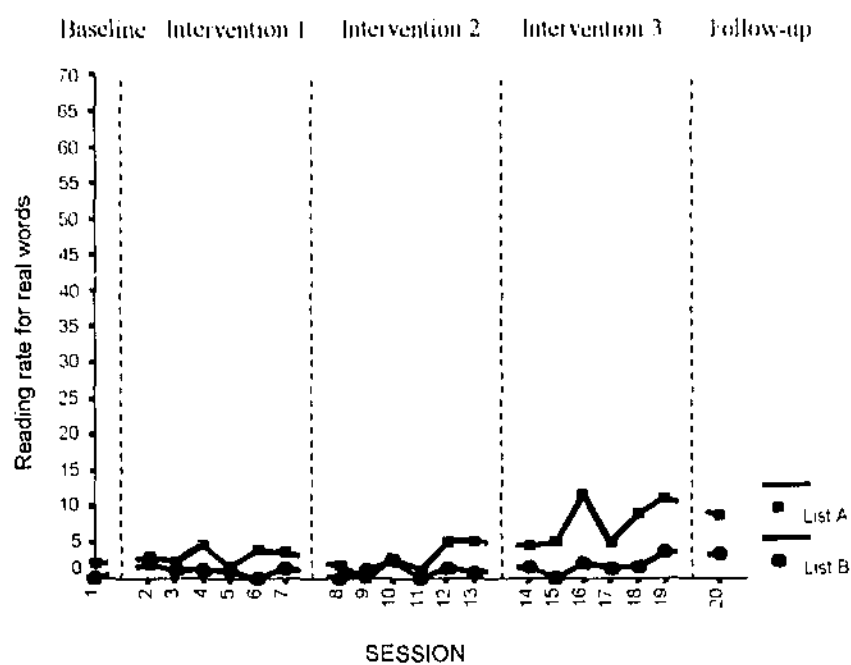


Figure 15. Charlotte's reading rate for List A and List B real words.

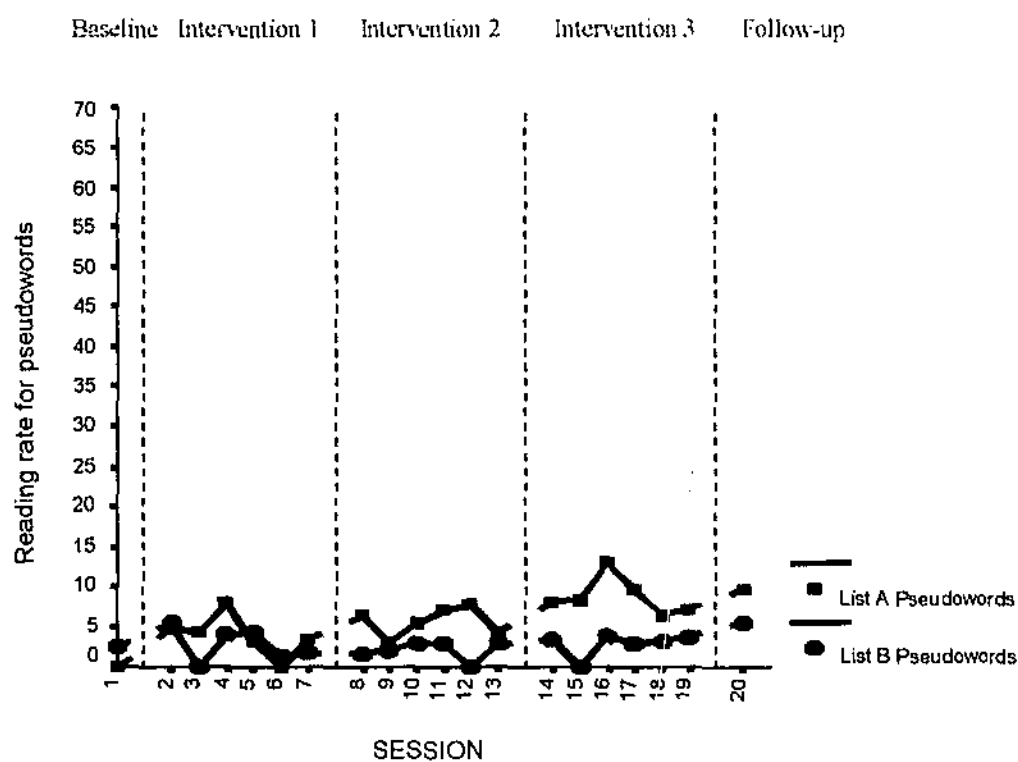


Figure 16. Charlotte's reading rate for List A and List B pseudowords.

Chapter 5

Discussion

This chapter begins by addressing the four research questions. The chapter then discusses a number of other issues relating to the participants and the use of a single-subject research design. The implications for the classroom are then addressed, followed by the limitations of the study and the implications for further research. Finally, the overall conclusions are then outlined.

Accuracy and Fluency Using Letterland

The first research question of this study asked whether *Letterland* improved accuracy and fluency of decoding of letter sounds in real words and in pseudowords for children experiencing reading difficulties. This first research question was investigated by comparing data collected in Baseline to data collected in the first intervention. Results for accuracy indicate that apart from Bryce who increased his accuracy for List A pseudowords by six letters read correctly, there were only small gains in accuracy by the participants for letters taught in the first intervention. Lovett and Steinbach (1997) investigated a series of instructional programs, with children with severe reading difficulties, where letter sounds were taught directly, similar to this study, and suggested that despite the intense training, the students were unable to transfer their new learning during the course of the training due to basic processing problems. It is possible that the participants in this study were experiencing similar processing problems in retrieving phonological information from working memory to break the words up into individual sounds or in processing the letters in the correct order.

An interesting result from this intervention, was that both Bryce and Chad increased their accuracy for some of the letters not taught during this intervention. One possible explanation suggested by McIntyre and Freppon (1994) for the increase in letters not taught, could be the direct teaching of the letters in the intervention caused Chad and Bryce to focus closer attention on the other letters that appeared in List B words and pseudowords. The small increases in accuracy do not correlate with the findings of both the Ehri, Deffner and Wilce (1984) and Fulk, Lohman and Belfiore (1997) studies, who used integrated picture mnemonics, and found that when the picture was integrated into the letter shape, as in *Letterland*, it significantly increased the participant's ability to recall the letter sound.

The fluency results in the first intervention were varied, with Amanda and Chad making the strongest gains in fluency for all lists. This was possibly due to the high letter-sound base that they both began with, enabling them to revise and practise what they already knew and then focus their attention on learning unknown letter sounds. Bryce's results were diverse with increased fluency for both pseudoword lists, unchanged fluency for List A and reduced his fluency for List B. Charlotte either made small gains or merely maintained fluency for all lists. This was clearly due to the small gains she had made with accuracy. In the first Intervention, Charlotte highest mean score for accuracy was 4.3 out of a possible score of 20. By the time Charlotte had tried to read all 15 letters in the five words it would be difficult to increase fluency due to the time she took to identify each letter.

Accuracy and Fluency Using Letterland and Fluency Training

The second research question of the study asked whether *Letterland* with fluency training improved accuracy and fluency of decoding of letter sounds in real

words and in pseudowords for children experiencing reading difficulties. Intervention 2 was used to examine *Letterland* with fluency training. For all four participants, the results indicated that there was either a slight increase in accuracy or their accuracy level was maintained. However, Bryce and Chad made substantial gains in fluency not only for List B words and pseudowords, whose letters were taught in this intervention, but also for List A words. Amanda made small gains in fluency for List B words plus a large gain in List A pseudowords whereas Charlotte maintained her fluency levels. These results would indicate that although *Letterland* with fluency training merely maintained accuracy levels, it actually increased fluency levels for all the participants except Charlotte.

Samuels (1994) suggests that when students are learning a complex task the demands of learning the task use more attention for information processing than is available. This is possibly the case when learning the *Letterland* characters and letter sounds when a great deal of attention is used to remember all the information. The participants were instructed to focus on identifying the letters as quickly as possible. Therefore, their attention was concentrated on fluency rather than accuracy.

A further measure to determine the effectiveness of *Letterland* with fluency training is to consider the participants' reading rates. Wolery, Bailey and Sugai (1988) suggests a reading rate for Year 1 students is 36 -52 isolated sounds per minute and 100-126 words per minute in a list. Chad was the only student who achieved a reading rate of approximately 40 letters per minute, which falls in the range outlined in Wolery et al. (1988) for isolated sounds. However, the testing was completed using CVC words not isolated sounds. Therefore, not even Chad's score would fall within the average range for Year 1 children implying that *Letterland* with fluency training was not useful for increasing decoding skills for reading words.

Revision of Letterland Characters and Letter-sounds

The third research question of this study was to determine whether revision of *Letterland* characters and letter sounds already taught, improved accuracy and fluency of decoding letter sounds in real words and in pseudowords for children experiencing reading difficulties. During the third Intervention, all four participants either maintained or improved their accuracy by no more than three letters read correctly. Bryce and Charlotte increased their fluency by a small margin whilst Chad maintained his levels of fluency. Amanda's fluency levels reduced dramatically for List A pseudowords and by a smaller amount for both real word lists.

The fluency levels may have been affected by the participants using the *Letterland* characters to assist with identifying the letter sounds to read the CVC words. During the study, Bryce continually referred to the *Letterland* characters to remind him of the letter sounds. By the time Bryce had referred to the *Letterland* character and the letter sound for each letter in the CVC word, he had forgotten the sounds to try to blend them together to make a word (e.g., for the word "bet", Bryce would say, "Bouncy Ben" says "b", "Eddy Elephant" says "e", and "Ticking Tess" says "t", "now, what were they again?"). Both Amanda and Chad only used the *Letterland* characters to assist them to remember the sounds they were experiencing difficulties with.

Wolery, Bailey and Sugai (1988) suggest short practice sessions are a primary strategy for improving fluency once the students have learnt to accomplish a behaviour accurately. Due to Amanda's and Chad's higher levels of accuracy as well as higher letter-sound base, they were able to increase their fluency levels. However, although Bryce increased his accuracy level, his letter-sound base was insufficient to increase his fluency level. Therefore, although fluency increased for some of the participants,

Letterland did not assist the participants to increase their accuracy levels sufficiently to increase fluency to any great extent.

Maintenance at Follow-up

The final research question of the study was to determine if the gains made in accuracy and fluency were maintained at a one week follow-up. The results indicated that all the participants maintained their accuracy with some slight increases in some lists or slight falls in other lists. These follow-up results are similar to Fulk et al. (1997) whose participants maintained accuracy levels of letter-sound correspondences in both a two-week and four-week follow-up. As in the other interventions, the fluency levels were varied between the participants. Charlotte was able to maintain her fluency level as did Amanda and Chad for some lists and in other lists increased their fluency by over 10 letters per minute. Bryce was the only participant to reduce his fluency level for all lists apart from List A words where he maintained fluency.

Summary: Effects of Letterland

During this study Amanda and Chad were exposed to 3 hours of one-to-one instruction and Bryce and Charlotte were exposed to 3 hours and 36 minutes of one-to-one instruction. Despite the short instruction time, the participants all increased their accuracy levels by a small amount mainly during the first intervention. Although fluency training was not included in the first intervention, the largest increases in fluency occurred during this intervention, especially for Amanda and Chad who were able to draw on their greater letter-sound base to increase their fluency substantially. Once fluency training was introduced in Intervention 2, the participants' accuracy

levels were maintained, while their fluency levels increased. Charlotte was the only exception to the increase in fluency levels. She in fact did not begin to increase her fluency until later in the third intervention when her accuracy level began to increase, indicating that she needed more practice sessions to build her accuracy before fluency levels could be increased.

The previous sections of the discussion have dealt with the research questions. There are, however, two important issues arising out of this study that require further attention. These are the characteristics of the participants in the study, who were selected for their learning difficulties, and the issue of blending sounds to make words. These are dealt with in the next two sections.

Students with Learning Difficulties

Bryce, Amanda and Chad all had difficulties sustaining attention during teaching and demonstrated perceptual and information-processing problems whilst trying to learn the *Letterland* characters and letter sounds. These characteristics are typical of students with learning difficulties, especially when they are experiencing difficulties with the task of learning to read (Lerner, 1997). Although Charlotte was diagnosed with a mild intellectual disability during the study, she also exhibited these characteristics — which would be expected for children with an intellectual disability (Ashman & Elkins, 1998). Throughout the study, it was difficult to keep the participants' attention when teaching the *Letterland* characters and letter sounds. Wendon (1993a, 1997) initially developed *Letterland* so that it increased children's interest levels in letter shapes and sounds to reduce measurably the number of children requiring extra assistance with learning to read. Mathewson (1994) points out the two motivational areas to focus on when teaching reading are achievement and arousing

curiosity. Initially, the participants were excited about what letter they were going to learn and which *Letterland* character was associated with this letter. However, this excitement had worn off by the end of the first intervention and this motivational factor may account for the fact that the most gains in accuracy occurred during the first intervention. The erratic nature of the results, especially in the first two interventions, would indicate the influence of motivational factors with the students during the lessons. This may have been related to the other motivational area suggested by Mathewson (1994) of achievement. All the participants experienced at least a year of failure and frustration in learning to read. A feeling of success is paramount for children with learning difficulties when learning to read (Lerner, 1997). Lerner (1994) suggests a number of procedures to increase achievement motivation including sequential controlled practice, opportunities for high success, and immediate corrective feedback. All of these procedures were included in this study. However, it was not until Intervention 3 when they had the opportunity to practise the fourteen letters already taught that their accuracy and fluency levels stabilised.

Another problem encountered by students with learning difficulties is the difficulty associated with unlearning incorrect information. All four participants had almost completed Year 1 and had been exposed to on-going instruction on letter names and letter sounds. During pre-testing Amanda, Bryce and Chad, it became evident that they all confused many of the letter sounds. Despite being taught the *Letterland* characters and stories about the letters “e” and “i” in different interventions, both Amanda and Bryce, and to some extent Chad, still confused the letters during the testing. Yates and Chandler (1994) refer to memory interference where existing knowledge can influence new learning. Having made confusions between /e/ and /i/

constantly over previous months, the participants' prior knowledge would have been a source of interference especially when they were focussing on fluency.

Blending Sounds to Read Words

Another interesting aspect of the study was Amanda's and Chad's inability to move to the next stage in the reading process of blending the sounds together to make a word. Both participants were attempting to do this but with little success, as indicated in not attaining scores over 15 or 16 for accuracy. Felton (1993) suggests some children become over-dependent on letter-by-letter decoding. As a result, these children need to be systematically taught to break words into onset and rime so they are able to decode larger chunks of words.

During the third intervention, Amanda was trying to make the transition from reading the letter-sounds in isolation within the word to trying to blend the letter-sounds to read whole words. Initially, she would try to sound out each letter and then go back to the beginning letter-sounds and try to blend it with the next letter-sound (e.g., for the word "meb" she would say /m/, /e/, /b/, and then /me/, /meb/, I don't know that word). She couldn't quite make the transition from blending the sounds into saying the actual word. As a result of trying to blend the sounds Amanda's fluency levels fell dramatically during the third intervention.

At the end of the second intervention, Chad asked the researcher how to make the sounds into a word. Using CVC words not included in the study, the researcher demonstrated how to blend the sounds together. This instruction in blending sounds did not greatly affect the results as Chad was still unable to blend the letter-sounds to form a word to any great extent which is reflected in his results not increasing past 16.

Implications for Teaching

For children with reading difficulties, explicit instruction in letter name and letter sound knowledge is essential. Despite the fact that all four participants had almost completed a full year in a Year One class before commencement in the study, none had achieved full knowledge of the alphabet letter-names and letter-sounds. A number of studies have examined the role of instruction in learning to read (Ball & Blachman, 1991; Felton, 1993; Foorman, Fletcher, Francis, Schatschneider & Mehta, 1998; McIntyre et al., 1994). Felton (1993, p. 587) maintained that for children encountering difficulties with learning to read “direct teaching of the alphabetic code” must be explicit, structured and systematic.

Ehri et al. (1984) suggest that the teacher needs to go further than just teaching the letter-sound correspondences, he or she must also teach the visual forms of the letters. This enables the beginning reader to associate the letter shape with a letter sound making the task of reading easier. The present study incorporated this association between letter shape and letter sounds using *Letterland*, especially when introducing the *Letterland* character stories which encompass the letter shapes into the story and also when using picture coding in the teaching sessions.

This study highlighted the fact that beginning readers need to develop a substantial letter-sound base before fluency increases can be achieved. Amanda and Chad’s results would indicate that this statement is justified. In Charlotte’s case, it was not until later in the third intervention that her accuracy levels began to increase resulting in an increase in fluency. The limited capacity required to learn the new letters, and thereby requiring attention to process the new information, makes it difficult to increase fluency levels (Samuels, 1994).

The results of increased accuracy and fluency in this study were achieved in a series of 10-minute lessons over a 3 to 3 ½ hours. The implications for repeated practice over a longer time frame are decisive. This study used consistent teaching practices that were spaced over a period of time. The participants were initially introduced to a new letter and examined different characteristics of the letter including the letter shape, the *Letterland* character and the reading direction. Before any new letter was introduced, the participants were given repeated practice at identifying previous letter/s with plenty of opportunities to make responses with immediate feedback.

The problems experienced by Amanda and Chad with making the transition from sounding out individual letters to blending the letter-sounds to form words suggest that *Letterland* alone is not sufficient. Children with learning difficulties need explicit teaching on how to blend the sounds into words. They also need instruction on decoding larger chunks of words, such as onset and rime, to make the task of reading more automatic.

Limitations and Implications for Further Research

A limitation of the study was confounding of treatments. Each lesson included *Letterland* characters and stories, one-to-one instruction and letter-sound instruction. These were all included to maximise the participants chances of increasing accuracy and fluency. It was difficult to determine if *Letterland* was essential to the observed improvements in accuracy and fluency. There is good reason to suppose that one-to-one instruction emphasising letter-sound correspondences, plenty of opportunities for the children to respond, immediate feedback and numerous practice opportunities produced the increases in accuracy and fluency that were observed in the study.

Letterland was not necessarily the cause of the improvements in accuracy and fluency. Research has indicated that one-to-one instruction is more effective for children experiencing difficulties with reading (Iversen & Turner, 1993).

Another limitation of this study was the use of a single-subject research design. Due to the individual differences in the results, it makes it difficult to generalise the findings to the regular classroom. Another limitation of this single-subject design was whether the results were due to the interventions or other factors such as what was being taught in the classroom. Observation within the class setting indicated that there was no explicit phonics instruction occurring in the classroom during the month the study was conducted.

The use of an experimental design for this type of study would address these limitations but would also present a number of practical problems. Isolating enough children with learning difficulties with reading who are not already receiving some form of intervention to assist their learning difficulty is extremely difficult. When trying to identify participants for this study, the researcher encountered a number of problems including finding children who had not been exposed to *Letterland*, as well as those not involved in a programs to assist their reading difficulties. To ensure an experimental design was valid a large number of students with reading difficulties would need to be identified to include experimental and control groups.

Further research could be conducted using a multiple-baseline-across-students design as was used in Fulk et al. (1997). A multiple-baseline-across-students design enables the researcher to evaluate the intervention effectiveness by discontinuing the intervention when mastery criteria has been achieved in a specified number of sessions. This would enable sufficient practice sessions to increase accuracy until a mastery level had been achieved thus enabling fluency to increase.

An area that requires further research is the methodology of the *Letterland* program. Despite intense one-to-one instruction on *Letterland* characters and letter-sound knowledge, there was not a substantial increase in letter knowledge. Further research could focus on certain aspects of the *Letterland* program and investigate some of the problems highlighted in this study. One problem was the participants inability to transfer the letter-sound knowledge when reading CVC words. Although the participants were taught the letter-sounds and were able to identify them in isolation, they were unable to transfer the letter-sound knowledge to CVC words when tested. In further research, it would be beneficial to give instruction not only in isolated sounds but within context, such as in words. This could alleviate the problems encountered by Amanda, Chad and Bryce who were able to identify the letters “b” and “d” in isolation but confused them when they appeared in words. The participants also encountered difficulties retaining the large amounts of information to identify a single letter-sound (e.g., for the letter “c” the participant needed to remember “Clever Cat makes the sound /c/”).

Conclusion

Overall, small gains in accuracy were achieved using *Letterland* to assist children experiencing difficulties with learning to read. For two of the participants, once they had achieved a substantial letter-sound base they increased their fluency levels. The other two participants required further exposure to the letters and practice sessions to improve their fluency levels. Although these findings do not indicate that *Letterland* alone assisted children experiencing difficulties with learning to read, they indicate that repeated exposures to the letters, the frequent opportunities to practice

with feedback in a one-to-one instructional situation, and emphasis on letter-sound correspondences using *Letterland*, produces increases in reading accuracy and fluency for Year 1 children with learning difficulties.

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APPENDIX A
LISTS OF WORDS AND PSEUDOWORDS
WITH
RECORD SHEET

The following CVC words and pseudowords
contain the letters “b”, “c”, “f”, “l”, “m”, “t” and “w” (taught in Phase B)
but not the letters “d”, “h”, “i”, “n”, “p”, “r” and “s” (taught in Phase C)

Word List A

bag	bat
bay	beg
bet	bob
bog	bow
box	boy
bug	but
cab	cat
cob	cog
cot	cow
cub	cut
fat	fog
fox	get
got	gum
jab	jam
jet	jot
keg	lag
lap	leg
let	log
lot	low
mat	may
met	mob
mow	mug
mum	tab
tag	tax
tow	toy
tub	tug
wax	way
wet	

Pseudoword List A

baf	bav
beb	bef
bem	bof
bol	bom
caf	cof
cov	cuz
fal	fam
fom	fot
fuz	gak
gaz	jaf
jol	jom
jov	jub
kaf	kal
kob	laz
leb	lem
loz	lub
mab	maf
maz	moz
mul	taf
tal	taz
tob	tof
tol	toz
tuc	tul
tuz	vab
vaf	vam
vob	vof
vot	wab
zat	

The following CVC words and pseudowords
contain the letters “d”, “h”, “i”, “n”, “p”, “r” and “s” (taught in Phase C)
but not the letters “b”, “e”, “f”, “l”, “m”, “t” and “w” (taught in Phase B)

Word List

can	cap
car	cod
cud	cup
dad	day
did	dig
din	dip
dog	dug
gap	gas
god	gun
had	has
hay	hid
hip	his
hug	jar
jig	kin
nag	nap
nip	nod
nun	par
pay	pig
pin	pod
pop	pot
pug	pun
put	rag
ran	rap
ray	rid
rip	rod
rug	run
sad	six
van	

Pseudoword List B

cas	dap
dar	das
dav	han
haz	hin
hon	hup
huv	jad
jap	jaz
jid	jiv
jod	jop
jos	kad
kog	nad
naz	nid
niv	nop
nuz	paf
pid	piv
piz	pok
pog	pon
poz	rav
raz	rin
riv	rog
rop	rud
rup	san
saz	sig
sog	sok
vad	vap
vig	vip
yan	zad
zop	

SAMPLE OF TESTING WORD LIST A**bag****cab****fox****let****mug**

STUDENT _____

DATE _____

BASELINE - A INTERVENTION 1 - B INTERVENTION 2 - C

INTERVENTION 3 - D BACK TO BASELINE / FOLLOW-UP - A

LESSON _____

WORD	WHOLE WORDS	PSEUDO WORDS	COMMENTS
A1			
2			
3			
4			
5			
TOTAL			
B1			
2			
3			
4			
5			
TOTAL			

TIME WORDS LIST A _____ LIST B _____

TIME PSEUDOWORDS LIST A _____ LIST B _____

APPENDIX B
LETTER NAME/SOUND RECORD SHEET

Date _____

Letter	AMANDA		BRYCE		CHAD		CHARLOTTE	
	Name	Sound	Name	Sound	Name	Sound	Name	Sound
A								
B								
C								
D								
E								
F								
G								
H								
I								
J								
K								
L								
M								
N								
O								
P								
Q								
R								
S								
T								
U								
V								
W								
X								
Y								
Z								
TOTAL								

Key - / correct

\ incorrect

APPENDIX C
INFORMAL READING-THINKING INVENTORY WORD
CARD A
WORD CARD A RECORD SHEET

WORD CARD A -Pre-Primer

be

play

a

you

can

he

look

run

said

here

but

did

the

big

man

(Manzo, Manzo & McKenna ,1995 , 71)

WORD CARD A RECORD SHEET - PRE-PRIMER LIST

	AMANDA	BRYCE	CHAD	CHARLOTTE
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
TOTAL				

APPENDIX D

TEST OF PHONEMIC AWARENESS

TEST OF PHONEMIC AWARENESS RECORD SHEET

TEST OF PHONEMIC AWARENESS

Phonemic Segmentation

Model: I'm going to say a word, and I want you to break the word apart. You are going to tell me each sound in order. e.g. If I say cat you say c-a-t. Let's try a few words.

Directions: Say the sounds in _____.

Practice items: to, dog

Test items

- | | | | | |
|--------|--------|--------|--------|----------|
| 1. she | 2. red | 3. sat | 4. lay | 5. ice |
| 6. top | 7. me | 8. job | 9. in | 10. wave |

Strip Initial Consonant

Model: Listen to the word task. If I take away the 't' sound, ask is left. What word is left?

Directions: Listen to the word _____. If you take away the // sound what word is left?

Practice items: ball, pink

Test items:

- | | | | | |
|---------|----------|--------|---------|----------|
| 1. told | 2. hill | 3. man | 4. nice | 5. win |
| 6. bus | 7. pitch | 8. car | 9. hit | 10. pout |

Substitute Initial Consonant

Model: If I say the word go, and then change the first sound to 'n', the new word will be no. What will the new word be?

Directions: Make a new word from _____ by changing the first sound to //.

Practice items: cat 'b', bell 's'

Test items:

- | | | | | |
|------------|-------------|------------|-------------|--------------|
| 1. mop 't' | 2. cake 'm' | 3. pet 'g' | 4. jeep 'k' | 5. big 'f' |
| 6. bar 'j' | 7. hope 'r' | 8. cut 'n' | 9. seal 'd' | 10. pack 's' |

Initial Consonant Same

Model: Listen to the beginning sound in the word Sam. I'm going to decide which of these words has the same beginning sound as Sam. Listen - sun, pig, balloon. Sam and sun both begin with the 's' sound. Now you try.

Directions: Listen _____, _____, _____. Which word has the same beginning sound as _____.

Practice items: cat- fish, moon, cow

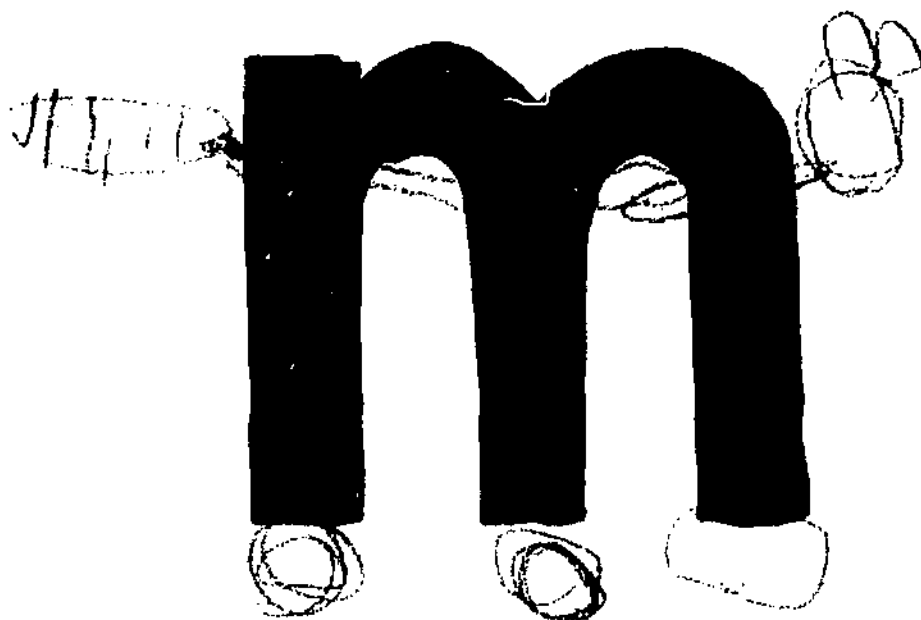
Test items:

- | | |
|-------------------------------------|--------------------------------------|
| 1. milk - rabbit, apple, mushroom | 6. tent - glasses, telephone, pencil |
| 2. pear - milk, bird, pig | 7. leg - flag, snowman, lamp |
| 3. fan - key, fork, hammer | 8. duck- dinosaur, nails, lion |
| 4. bone- bike, clock, net | 9. nest - left, net, cup |
| 5. soap - seal, butterfly, elephant | 10. key - football, kite, flower |

APPENDIX E

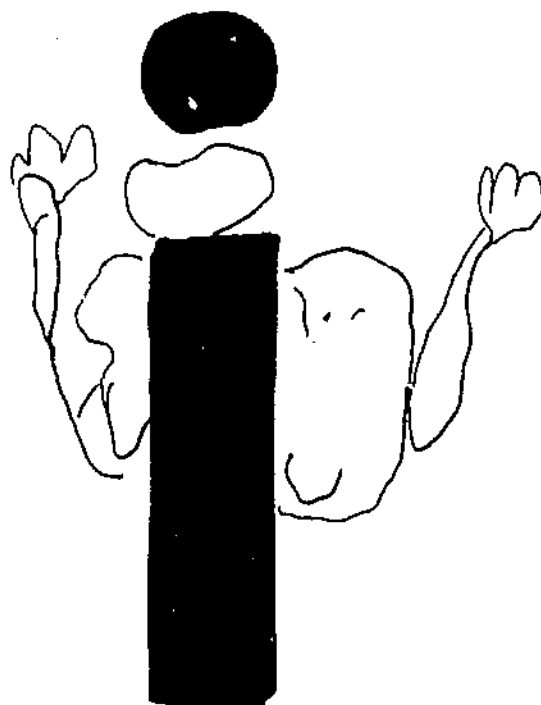
SAMPLES OF STUDENTS' LETTERLAND DRAWINGS

Sample of Bryce's *Letterland* character for the letter "m" taught in Phase B



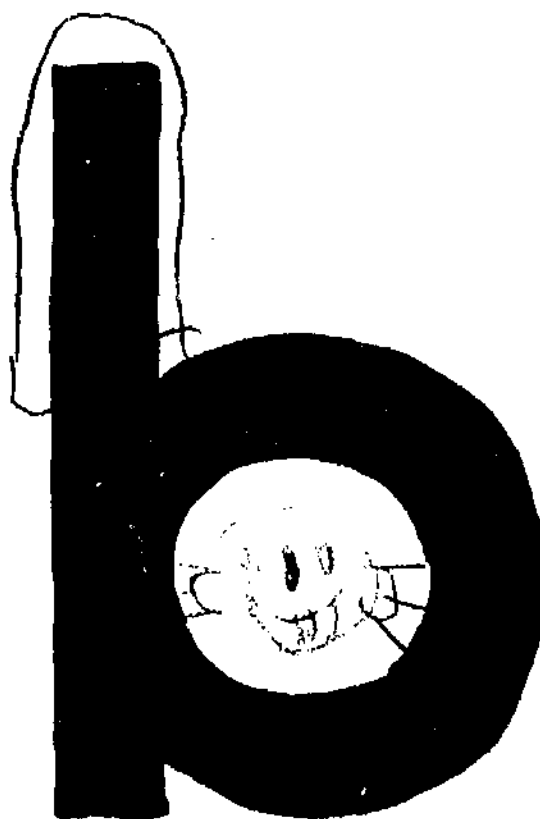
This is Munching Mike.

Sample of Bryce's *Letterland* character for the letter "i" taught in Phase C



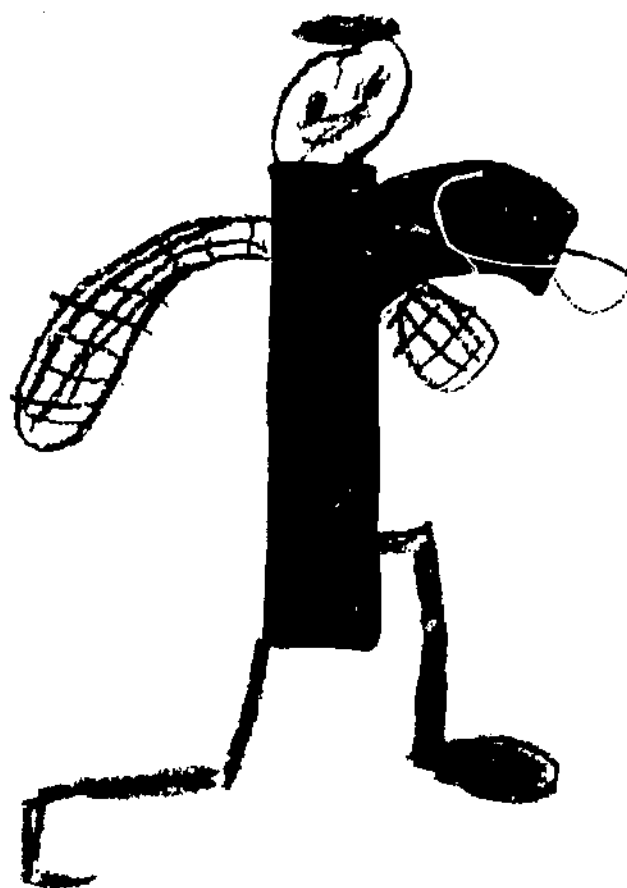
This is Impy Ink.

Sample of Chad's *Letterland* character for the letter "b" taught in Phase B



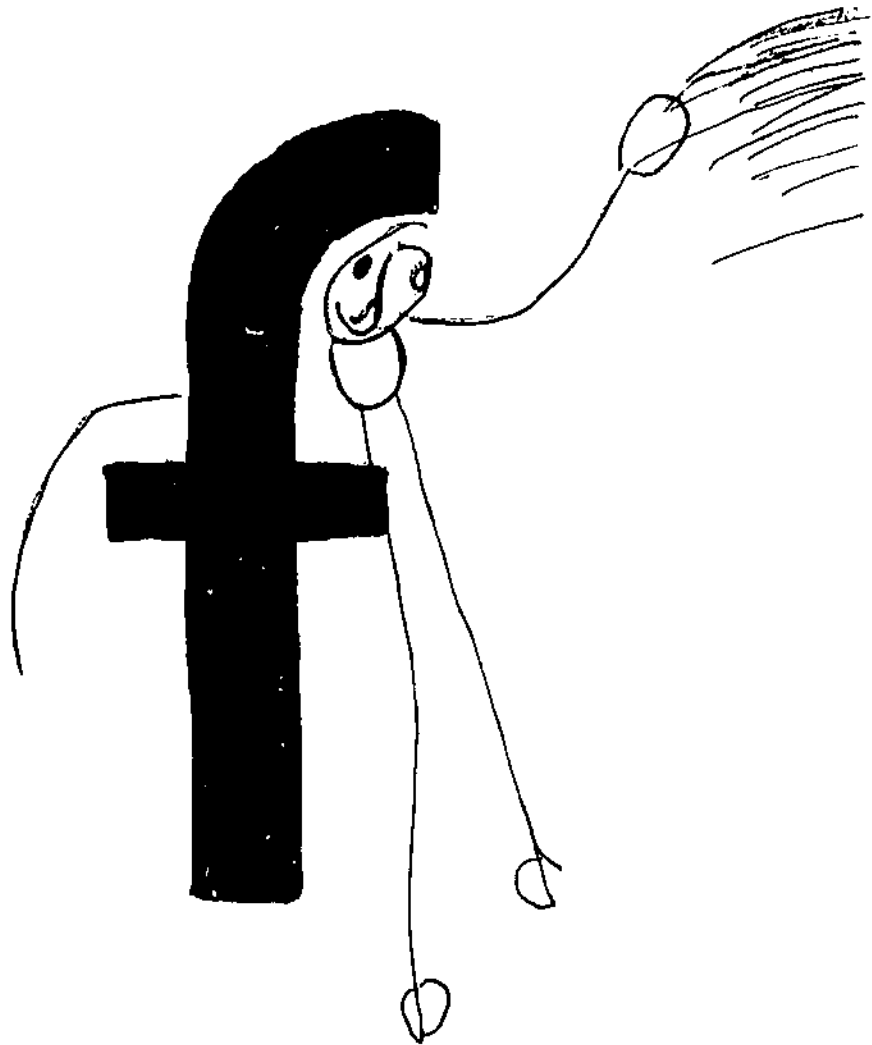
This is Bouncy Ben.

Sample of Chad's Letterland character for the letter "r" taught in Phase C



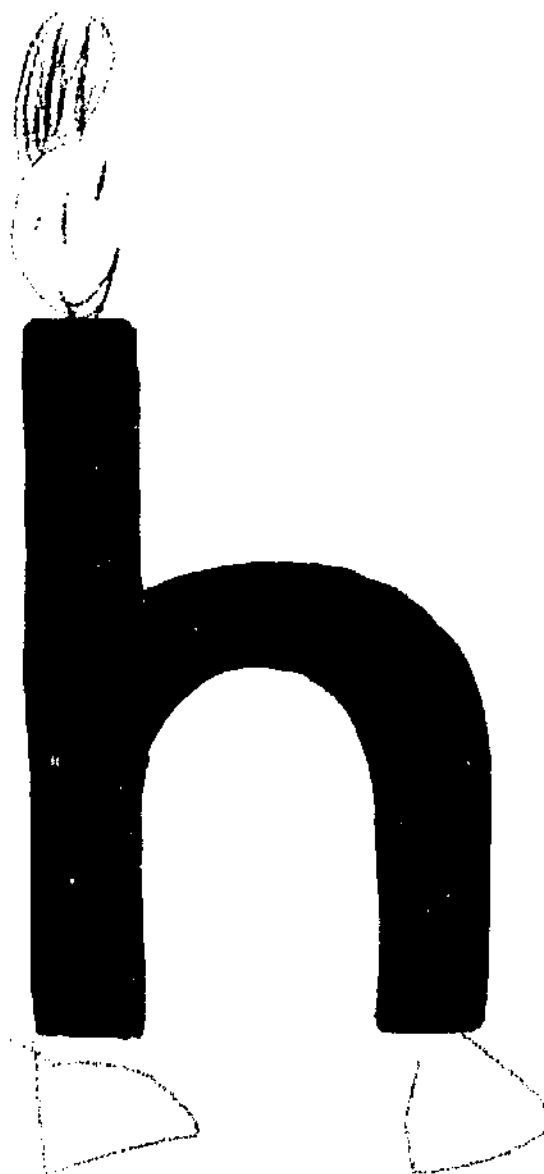
This is Robber Red.

Sample of Amanda's Letterland character for the letter "f" taught in Phase B



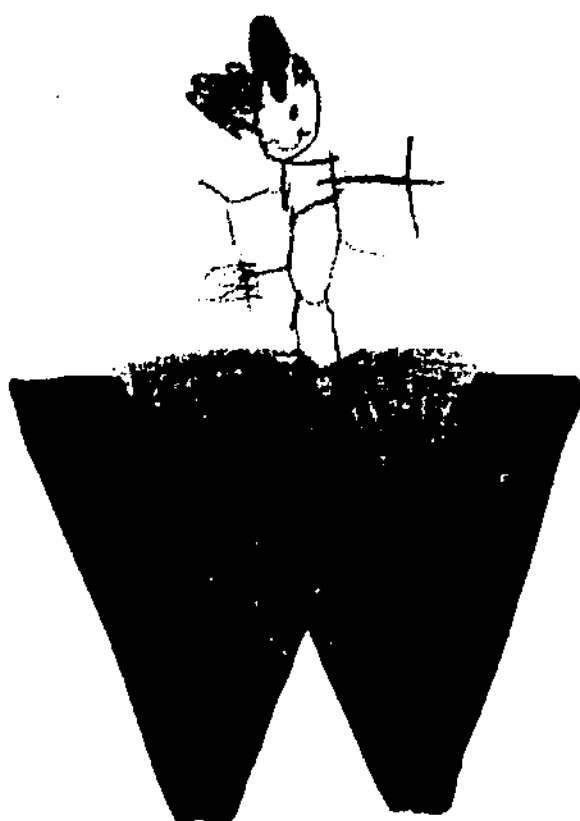
This is Fireman Fred.

Sample of Amanda's Letterland character for the letter "h" taught in Phase C



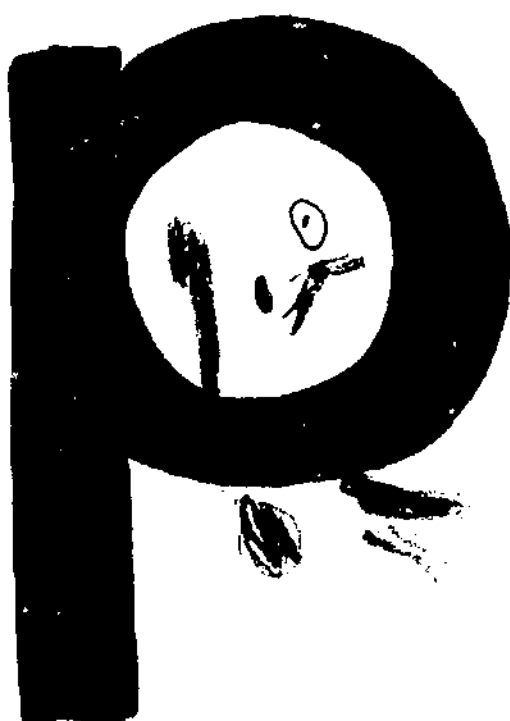
This is Hairy Hat Man.

Sample of Charlotte's *Letterland* character for the letter "w" taught in Phase B



This is the Wicked Water Witch.

Sample of Charlotte's *Letterland* character for the letter "p" taught in Phase C



This is Poor Peter.

APPENDIX F
LESSON PLANS

LESSON PLAN - INTERVENTION 1 (1st LESSON)

Objectives

At the end of the lesson the student will be able to :-

- 1) Identify the letters 'b' and 'e'.
- 2) Identify the *Letterland* characters and sounds for the letter 'b' and 'e'.

Method

*

Introduce letter card (plain side) for 'b'.

Q What is the name for this letter?

(If not known, tell the letter.)

Q Do you know what sound it makes?

Show the *Letterland* side of card of letter 'b'.

This is Bouncy Ben. Tell story (See *Program One Teacher's Guide*).

Highlight key features in picture. E.g ears stand up and face faces forward.

Q What sound can you hear at the beginning of Bouncy Ben?

Q Can you think of a word starting with that sound?

Draw the character in the letter (Large letter 'b' printed on A5 paper)

When the student has completed the drawing write 'This is Bouncy Ben.'

Q What sound is this letter and who lives in this letter?

**

Repeat from * to ** for the letter 'e' - Eddy Elephant.

Show both 'b' and 'e' cards.

Q What sound do they make?

Flash the cards 'b' and 'e' four times mixing the order.

LESSON PLAN- INTERVENTION 1 (2nd LESSON)

Objectives

At the end of the lesson the student will be able to :-

- 1) Recall the letters 'b' and 'e'.
- 2) Identify the letters 'f' and 'l'.
- 3) Identify the *Letterland* characters and sounds for the letter 'f' and 'l'.

Method

Show cards for the letters 'b' and 'e'.

Q What sound does this letter make and what is the name of the character who lives in the letter?

Flash cards b e twice.

Repeat from * to ** for the letter 'f' and then for the letter 'l'. Characters are Fireman Fred and Lucy Lamp Lady.

Show 'f' and 'l' cards.

Q What sound do they make?

Flash all the cards four times mixing the order.

LESSON PLAN - INTERVENTION 1 (3rd LESSON)

Objectives

At the end of the lesson the student will be able to :-

- 1) Recall the letters 'b', 'e', 'f' and 'l'.
- 2) Identify the letters 'm'.
- 3) Identify the *Letterland* character and sound for the letter 'm'.

Method

- 1) Show cards for the letters 'b', 'e', 'f' and 'l'.

Q What sound does this letter make and what is the name of the character who lives in the letter?

Flash cards e b f l twice.

Repeat from * to ** for the letter 'm'. The character is Munching Mike.

Show 'm' card.

Q What sound does it make?

Flash all the cards taught in the intervention four times.

Lesson 4 and 5 are the same as lesson 3 except each time you are reviewing all the letters from previous lessons. The character for the letter 't' is Ticking Tess and for the letter 'w' is Wicked Water Witch.

LESSON PLAN - INTERVENTION 1 (6th LESSON)

Objective

At the end of the lesson the student will be able to :-

- 1) Recall the letters 'b', 'e', 'f', 'l', 'm', 't' and 'w'.

Method

Flash the cards.

Q What is the name of this letter and what sound does it make? What is the name of the character that lives in them?

Q Can you think of a word that starts with each letter?

Flash the cards four times identifying each sound.

LESSON PLAN - INTERVENTION 2 (1st LESSON)

Objectives

At the end of the lesson the student will be able to :-

- 1) Identify the letters 'd' and 'h' as quickly as possible.
- 2) Identify the *Letterland* characters and sounds for the letter 'd' and 'h'.
- 3) Reduce the time taken to identify each letter.

Method

*

Introduce letter card (plain side) for 'd'.

Q What is the name for this letter?

(If not known, tell the letter.)

Q Do you know what sound it makes?

Show the *Letterland* side of card of letter 'd'.

This is Dippy Duck. Tell story (See *Program One Teacher's Guide*).

Highlight key features in picture. E.g Head faces forward and tail at the back.

Q What sound can you hear at the beginning of Dippy Duck?

Q Can you think of a word starting with that sound?

Draw the character in the letter (Large letter 'd' printed on A5 paper)

Q This time I want you to see how quick you can say what sound is this letter and who lives in this letter? (Show card)

**

Repeat from * to ** for the letter 'h' - Hairy Hat Man

Show both 'd' and 'h' cards.

Q As quickly as possible can you tell me what sound do they make?

Flash the cards d h four times mixing the order. Flash them as quickly as possible for the student to identify.

The remaining lessons use the same format as Intervention 1 introducing two new letters in Lesson 2 and one new letter in Lesson 3,4,5 and reviewing all seven letters in Lesson 6.

The Letterland characters for the letters are 'I' - Impy Ink, 'N'- Naughty Nick, 'P' - Poor Peter, 'R' - Robber Red and 'S' - Sammy Snake.

LESSON PLAN - INTERVENTION 3 (ALL LESSONS)

Objectives

At the end of the lesson the student will be able to :-

- 1) Identify the *Letterland* characters and sounds for the letter 'b', 'd', 'e', 'f', 'h', 'i', 'l', 'm', 'n', 'p', 'r', 's', 't' and 'w'.
- 2) Reduce the time taken to identify each letter.

Method

All the letter sounds and *Letterland* characters that have been learnt are to be reviewed. Show the students the book of their pictures of the *Letterland* characters.

Ask the students to identify each character.

Using the wall chart identify the *Letterland* characters.

Using the Picture code cards show all the letters and ask the students to identify the sound. If incorrect sound given, correct immediately.

Reteach any letter sounds the students have difficulties with.

Ask the students to identify a word starting with each sound.

Show all letters twice and ask for the sound. Emphasise identifying sounds as quickly as possible.

APPENDIX G
LETTER TO PRINCIPAL
PARENT CONSENT

Dianne Hodgson
[REDACTED]
[REDACTED]
[REDACTED]

20th September, 1998

Dear (Name of Principal),

I am a university student studying my Bachelor of Education, Special Education (with Honours) at Edith Cowan University. For my Honours Thesis, I am conducting research in Letterland and its relation to children who are 'at risk' for reading and their ability to decode sounds.

Four Year One students will be required to carry out the research. I would like to conduct this testing in early November. Students identified to be 'at risk' readers will be selected from the class and permission letters sent to parents. The study will initially require two testing sessions of possibly ten minutes duration. Then there are eighteen 10 - 15 minute intervention sessions and one 10 minute follow up sessions.

Should you seek any further information, please contact me on the above phone number. I would like to seek your school's assistance in carrying out this research and look forward to hearing from you. A copy of the findings of this research will be available to you and your staff next year.

Yours faithfully,

Dianne Hodgson

PARENT CONSENT FOR MALE STUDENT

30th October, 1998

Dear Parent,

I am training to be a teacher and are investigating ways of helping young children improve their reading. I am doing this work as part of my Honours degree in Education at Edith Cowan University. I am writing to ask your permission to work with your child and use the information I collect as part of my Honours project. If you agree, I will take your child out of the class for about 15 minutes once per day for three weeks this term and give him one-to-one tuition in reading. I have done this work with young children in the past and they have always found the activities enjoyable and motivating.

When I report the results of this work, I will not use your child's name but will make up a different name. If you have any questions please do not hesitate to phone me on [REDACTED]

Yours faithfully,

Dianne Hodgson

I give permission for _____ to participate in this study on reading. I understand I may withdraw my child from this study later if I wish.

Parent's signature.

PARENT CONSENT FOR FEMALE STUDENT

30th October, 1998

Dear Parent,

I am training to be a teacher and am investigating ways of helping young children improve their reading. I am doing this work as part of my Honours degree in Education at Edith Cowan University. I am writing to ask your permission to work with your child and use the information I collect as part of my Honours project. If you agree, I will take your child out of the class for about 15 minutes once per day for three weeks next term and give her one-to-one tuition in reading. I have done this work with young children in the past and they have always found the activities enjoyable and motivating.

When I report the results of this work, I will not use your child's name but will make up a different name. If you have any questions please do not hesitate to phone me on [REDACTED]

Yours faithfully,

Dianne Hodgson

I give permission for _____ to participate in this study on reading. I understand I may withdraw my child from this study later if I wish.

_____ Parent's signature.