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**THE EFFECTS OF USING THINK-PAIR-SHARE
DURING GUIDED READING LESSONS**

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ABSTRACT

The aim of this research was to describe the effects of Think-Pair-Share strategies, used during Guided Reading lessons, on reading achievement. Think-Pair-Share is a co-operative teaching strategy that includes three components; time for thinking, time for sharing with a partner and time for each pair to share back to a larger group. The use of Think-Pair-Share unites the cognitive and social aspects of learning, promoting the development of thinking and the construction of knowledge. The strategy lends itself to inclusion within Guided Reading lessons, where the focus is on meaningful discussion around text and promotion of the use of comprehension skills and strategies to foster comprehension. The literature review describes the effectiveness of explicit comprehension strategy instruction within the context of small group discussion. Strategies that foster cooperative learning have been successful in developing interpersonal skills, cognitive skills and metacognitive awareness. There is very little research documenting the effects of the use of the Think-Pair-Share strategy.

The study took place in a Year 6 classroom with two intervention groups, each containing six children. One group was reading above their chronological age and the other below. Control groups reading at these levels were also used. Three variations of Think-Pair-Share were utilised during the eight week intervention period; Predict-Pair-Share, Image-Pair-Share and Summarise-Pair-Share, and the research centred on the effects of the intervention on reading comprehension. A quasi-experimental design was employed using a pre-test, post-test format and a mix of quantitative and qualitative measures to ascertain the effects.

The results confirmed the positive effects of the strategy on reading achievement, especially for those students reading above their chronological age, although an extended period of intervention may have had more significant effects on those reading below. Positive effects on aspects of oral language use, thinking, metacognitive awareness, and the development of reading comprehension strategies were noted with both of the intervention groups. Results have significance for those concerned with implementing effective literacy practice. They demonstrate the versatility of the Think-Pair-Share strategy as a tool to foster conversation, and one

that can be adapted to suit the learning focus and the needs of particular groups of students.

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CHAPTER ONE

INTRODUCTION

The use of the Think-Pair-Share strategy has been observed across the spectrum of educational settings from primary to tertiary levels. This strategy, first developed by Lyman in 1978 (McTighe & Lyman, 1988), is still valued after nearly 30 years as a teaching strategy which fosters cooperative learning. This study will attempt to determine the effects of using modifications of the strategy within the context of Guided Reading lessons.

The Context for the Study

There has been a major emphasis on the effective teaching of literacy in New Zealand since the government announced in 1999 that ‘by 2005 every child turning nine will be able to read, write and do maths for success’ (Ministry of Education [MOE], 1999, p. 5). Research had demonstrated that whilst New Zealand children, in general, were successful readers, there were significant gaps between the highest and lowest levels of reading achievement and differences between particular groups of students (MOE, 1999). In order to read for success students must be able to extract and construct meaning through interactions with texts. Comprehension results from an ongoing interplay between the text, the reader, and the context of the reading event (Block & Pressley, 2002; Sweet & Snow, 2003). There has been much research and debate over the range of cognitive processes involved in effective comprehension, but there does appear to be general agreement that fluent readers engage in predicting, clarifying, self-questioning, making connections, visualizing, and summarizing (Duffy, 2003; MOE, 2003; Pressley, 2000).

Evidence from New Zealand classrooms, as well as overseas, has led to concern that, for some groups of students, comprehension levels do not match levels of decoding (Lai, McNaughton, Macdonald & Farry, 2004; National Education Monitoring Project [NEMP], 2005). This evidence has led to a renewed focus on the need for explicit discussion and instruction around the cognitive functions involved in comprehending. Recent New Zealand literacy handbooks now include sections relating to these functions and incorporate reference to the large body of literature

describing comprehension strategy instruction from overseas (MOE, 2003; MOE, 2006).

There is general agreement from this research that oral language and more specifically discussion around text, play an important role in uniting the cognitive and social aspects of learning. Based on social constructivist principles (Vygotsky, 1978), and dependent on the teaching strategies used, small groups of children working collaboratively with a teacher allowed for shared interpretation of the messages in the text and resulted in increases in engagement, comprehension and metacognitive awareness of the strategies involved (Gambrell, 1996; Ketch, 2005). The Guided Reading approach, typically used in New Zealand classrooms, is consistent with these conditions but as noted above success is dependent, in part, on the teaching strategies employed within the approach.

It is conclusions such as these, highlighting the importance of oral language and quality interactions in generating learning, that have prompted the current study. Interaction with others assists in the construction of knowledge and the development of thinking (Clay, 1998; Palincsar, 2003), and the traditional question answer sequences which follow an 'initiate-respond-evaluate' pattern are not sufficient in generating the degree of interaction required (Perrott, 1988). Teachers need a repertoire of effective instructional strategies to engage students effectively (Ketch, 2005; Mehigan, 2005, MOE, 2006).

There is a significant body of research that has investigated instructional strategies that foster cooperative learning. These strategies allow students to work together to complete a task, develop interpersonal and cognitive skills, and metacognitive awareness (Stevens & Slavin, 1995). One such strategy that is widely used is Think-Pair-Share (TPS), developed by Lyman to encourage interaction, thinking and quality engagement in discussion around text (McTighe & Lyman, 1988). It typically consists of:

1. A silent thinking time following the posing of a question
2. Sharing with a partner which allows for the sharing and refinement of ideas
3. Sharing back to a larger group.

Subsequent research in the United States, reported in an unpublished doctoral thesis (Baumeister, 1992), demonstrated that use of this strategy resulted in increased

student involvement, improved quality and length of responses, and increased verbal interaction. Adaptations of the strategy have been described in the literature (Whitehead, 2001) and as Whitehead suggests, TPS can be modified to engage students in the use of specific cognitive functions such as prediction, the use of imagery, and summarisation.

While the TPS strategy is used in New Zealand classrooms there does not appear to be any research completed in New Zealand, documenting the effectiveness of its use. It would seem that such research is timely considering that the Education Review Office and Ministry of Education have identified TPS as an effective cooperative learning strategy that fosters genuine conversation, joint construction of learning, and metacognitive awareness (Education Review Office [ERO], 2005; MOE, 2003; MOE, 2006). The outcomes of this study would be of significance to pre-service and primary teachers, as well as teacher educators, who are involved in the planning and facilitation of small group instruction to support the development of oral language and reading comprehension.

The Research

The focus of the current research was to document the effects of using three Think-Pair-Share strategies during Guided Reading lessons with two groups of children, one group reading above their chronological age and the other reading below their chronological age.

The study was located within a Year 6 classroom in an inner city primary school with children aged 10 and 11 years. A quasi-experimental design was employed with a pre-test-post-test format. Two intervention groups were selected with reading levels as described in the preceding paragraph and control groups at each level were also employed. An eight week period of intervention was implemented involving the use of Predict-Pair-Share, Image-Pair-Share and Summarise-Pair-Share strategies within the context of Guided Reading lessons

A mix of both quantitative and qualitative measures was used to enable the effects of the intervention to be ascertained. Data collected by the classroom teacher as part of the school's regular assessment cycle was also utilized to determine instructional reading levels. Interviews were carried out with students both before

and after the intervention and with the teacher following the completion of post-intervention testing, and lesson observations occurred for some of the intervention lessons.

Overview of the Structure of the Thesis

Chapter Two presents a review of relevant literature from the areas of research into language and thought, reading comprehension and comprehension strategy instruction, and cooperative learning strategies. It concludes that Think-Pair-Share is a useful cooperative learning strategy which includes; ‘think-time’ to allow for the organization of thoughts, opportunities to share and adjust these thoughts, and a high level of student engagement. The teaching strategy is able to be adapted to encourage particular types of thinking and to support students in developing a meta-language with which to discuss the cognitive processing that occurs during reading. Although widely used, there is little research to document the effectiveness of the strategy within the context of Guided Reading lessons.

Chapter Three details the research question and explains the design of the project and the methodology used. Both quantitative and qualitative research measures are outlined and the sequence for data collection and recording is described.

The results are presented in Chapter Four with statistical analysis of Probe, asTTle and Informal Reading Inventory data, thematic analysis of lesson observations and a descriptive analysis of interviews with both teacher and students.

Chapter Five links the results back to the literature reviewed in Chapter Two, and suggests that teachers should value the use of variations of the Think-Pair-Share strategy in promoting oral language, thinking, reading comprehension and the development of comprehension strategies. Limitations of the study and suggestions for further research are also identified and discussed.

CHAPTER TWO

LITERATURE REVIEW

Overview

This review describes and critiques literature central to an understanding of the Think-Pair-Share (TPS) strategy. It provides a rationale for the design of the research questions addressed within this project. To achieve this, the chapter first reviews and critiques literature explaining the links between language and thinking, and then describes aspects of reading comprehension relevant to the study. The role of prediction, the use of imagery and summarisation as comprehension processes are addressed specifically. The review then discusses the use of cooperative learning strategies in promoting reading comprehension, and finally focuses on the use of variations of Think-Pair-Share strategies as a way of engaging readers and promoting independent use of comprehension strategies.

Language and Thinking

The *English in the New Zealand Curriculum* document (Ministry of Education [MOE], 1994) states, “Language is fundamental to thinking and learning. As the primary means by which we gather and communicate meaning and information, language is essential for reflecting and reasoning, and for clarifying and expressing thought in all areas of the curriculum” (p.10).

Although the link between verbal language and thought is implicit and valued in this statement, this link has been debated from various paradigmatic perspectives. In the area of cognitive neuroscience, advances in brain imaging technology have allowed the functions of various parts of the brain to be ascertained and described in more detail than was previously possible (Harley, 2001). It appears that the frontal lobes are primarily concerned with thinking while the temporal lobes are more involved with processing language (Owens, 2001). These areas are intricately connected and work in highly orchestrated ways. The development of language therefore has a close relationship with the development of thinking; however the processes are not mutually exclusive. Children are able to communicate their thoughts before acquiring the relevant vocabulary, and as Pinker (1994) stated,

language is not adequate for all our thoughts. He suggested each thought consists of a web of information, or propositions and one can often only translate a small chunk of this into words. Another example of the disjuncture between verbal language and thought is that thoughts are not retained as precise strings of words; for example, one remembers the gist or main points of a conversation rather than a word-by-word mental transcript. Language can be seen as a vehicle for representing thought, but is not the only mode utilised by the brain for organising information.

Sadoski and Paivio (1994, 2001) offer an alternative, and what they claim as a more comprehensive explanation of the links between language and thought. Their Dual Coding Theory of cognition, first proposed by Paivio in 1971, proposed that cognition occurs simultaneously through two subsystems; one verbal for language and one nonverbal or image based for processing non-linguistic objects and events. The theory suggests that the nonverbal or image based subsystem should be acknowledged and considered alongside the verbal system in any description of effective literacy teaching. As the use of imagery is to be promoted in this study, with one of the modified Think-Pair-Share strategies, research relating to the importance of imagery in reading comprehension will be addressed later in the review.

Language (verbal and non-verbal) and thinking are central to society. Pinker (2002) stated, 'Language is the conduit through which people share their thoughts and intentions and thereby acquire the knowledge, customs, and values of those around them' (p.209). Language is considered a tool for the expression of ideas, however multiple meanings of words, and lack of concise delivery may mean that the listener has to infer meaning. Connections are created to existing knowledge, thoughts are reorganised, and new knowledge is constructed by the listener (Bloom & Keil, 2001; Whitehead, 2005; Zhang & Alex, 1995). The importance of sharing with other learners as a means of linking to prior knowledge and developing thinking, is reflected in social constructivist theory (Vygotsky, 1978).

Social Constructivism

The role of language and thought in learning can be contextualised within a social constructivist paradigm. This paradigm provides a suitable framework for the current investigation, which has an emphasis on the social context of learning. Literature surveyed repeatedly includes reference to Vygotsky's theory of learning (Almasi & Gambrell, 1997; Clark & Graves, 2005; Eeds & Wells, 1991; McCormack, 1997; Palinscar, 2003). A social learning environment is considered effective because of the role played by more experienced others in the development of language and thinking. The learners observe and interact with these significant others and develop cognitive functions which they are able to use with support, but not yet independently. Through the scaffolding and practice provided in this 'zone of proximal development' learners gradually internalise these functions. Learning moves from the 'interpsychological' plane (between individuals) to the 'intrapyschological' plane (within the individual) with the help of those more knowledgeable (McCormack, 1997, p.27).

Vygotsky's theory of learning tends to focus on a one-on-one relationship between teacher (significant other) and child. As such it does not extend to the realities of the classroom setting where social organisation becomes a key factor. It also fails to acknowledge the role of peer conversation in the learning process. In a study reported by Foreman and Cazden (2004), Foreman set up tasks involving chemical reactions and allocated nine year old children to these tasks in pairs. Resulting data showed the shift from interpsychological to intrapsychological regulation, suggested by Vygotsky, also occurred when neither partner was seen as more capable. The pairs did however take on complimentary roles of observer/supporter and performer. Foreman and Cazden suggest these learner partnerships provide an intermediate position on the scale between adult-child interactions and the child's inner speech. The implications of this will be discussed later in this chapter when considering classroom practice.

Regardless of the roles played by the various participants it has been demonstrated by many researchers that interaction with others assists in the construction of knowledge and the development of thinking (Clay, 1998; Coles, 1995; Eeds & Wells, 1991; McCormack, 1997; Palinscar, 2003). Conversation and feedback from others allows for clarification and evaluation of ideas and critical

thinking. Reed (1983) suggested that if the power of talk is not acknowledged we are in fact minimising children's opportunities for learning. He stated "take talking away from ... children and the process of education grinds to a halt. We must make space – a large space – in the curriculum where the need of the child to talk is recognised and encouraged" (p.120). The link between language and thinking in a social context is clearly indicated in the above paragraphs; language is an essential vehicle for both communicating and constructing meaning. In the classroom setting this link can be facilitated within a social constructivist framework, through interaction between teacher and child, and between children themselves. The use of variations of TPS strategies allows for this interaction to occur on both of these levels.

The current study is located within the social context of the Guided Reading approach (MOE, 2005) and investigates the effects of TPS on reading comprehension. It is essential, therefore, to review literature in this field before moving to instructional strategies.

Reading Comprehension

Biemiller (1999) defined reading comprehension as the "ability to answer reasonable questions about a passage one has heard or read" (p.6). McNaughton (2002) termed this a "straight forward working definition" and cautions that it does not indicate what "reasonable questions" might be or the complexity involved in the process of comprehension (p.164). In comparison, the definition proposed by the RAND Reading Study Group (RRSG, 2002) who summarised the contributions of many experts, defines reading comprehension as an active and complex cognitive process during which the reader is "simultaneously extracting and constructing meaning through interaction and involvement with written language" (p.11). The process involves the continual interplay between three elements; the reader, the text and the activity; within a sociocultural context (Block & Pressley, 2002; McLaughlin & Allen, 2002; National Reading Panel [NRP], 2000; RRSg, 2002; Sweet & Snow, 2003). Thus the way politicians read the latest crime thriller will be quite different to the way they scrutinise government documents prior to voting on a new law in parliament. The process of constructing meaning involves the reader in actively relating new knowledge from the text to existing knowledge and experience. The

resulting understanding may or may not parallel the intended message sent by the writer.

This definition of reading comprehension is consistent with the research findings of cognitive psychologists such as Kintsch who proposed that readers construct mental representations as they read (Harley, 2001; Kintsch, 1998; NRP, 2000). His model of reading comprehension, known as the construction-integration model, suggests there are two stages in comprehending text. The first, the construction phase, involves processing of print in a bottom-up manner with the activation of word meanings and formation of propositions which are connected into a propositional network in working memory. During the integration phase, which is usually at the end of a sentence, propositions are organised into more coherent structures and those considered most relevant are transferred into the long term memory. The model is more detailed than earlier schema based theories and does explain research findings relating to readability and the interaction between texts and readers (Harley, 2001).

It is acknowledged that reading comprehension, as distinct from listening comprehension, is closely intertwined with processing written text and that good comprehenders usually display efficient decoding, fluency and knowledge of vocabulary (McNaughton, 2002; Pressley, 2002). These components of reading comprehension are important, however, they are not directly related to this study and are therefore not addressed in this review.

Comprehension Strategies

Van Keer (2004) defined comprehension strategies as “conscious, instantiated, and flexible plans readers apply and adapt deliberately to a variety of texts and tasks” (p.38). Many similar definitions can be found which highlight this conscious metacognitive selection and application (Duke & Pearson, 2002; Harp, 1999; MOE, 2003; Trabasso & Bouchard, 2002). In comparison skills are typically defined as cognitive processes that are unconscious and automatic (Harp, 1999; Stahl, 1997). A fluent reader, while reading in a skilled manner for much of the time, will apply strategies, which require a conscious application of effort, when encountering difficulties. For example; the use of imagery occurs automatically (as a skill) for many fluent readers; however, consider the scenario when one encounters a set of

written instructions, minus diagrams, to put together a kitset bicycle. One would probably be concentrating with maximum effort and imaging consciously (applying a strategy) to fit the multitude of pieces together.

In the literature surveyed there appears to be agreement that comprehension strategies used by fluent readers include the following:

- Predicting
- Clarifying
- Self questioning
- Making connections
- Visualising
- Summarising

(Duffy, 2003; Duke & Pearson, 2002; Farstrup, 2002; McLaughlin & Allen, 2002; MOE, 2003; Pressley, 2000). Reutzel and Fawson (2002) synthesised the recommendations made in six national American reading research reports published between 1998 and 2000 and reported that these six strategies were identified as important in three or more of the reports. The list is, however, by no means conclusive and others have added strategies such as inferring and analysing (McLaughlin & Allen, 2002; MOE, 2003; Trabasso & Bouchard, 2002). These strategies were identified from research that employed ‘think-aloud’ methodology with fluent readers (Pressley, 2002). However, it is generally not acknowledged that for fluent readers these strategies are actually skills that they use automatically. Among the few who explicitly consider this difference between skills and strategies are Harp (1998), Stahl (1997) and Whitehead (2005).

McLaughlin and Allen (2002) use the nomenclature comprehension ‘skills’ although they do not explicitly discuss the terms skills and strategies in their text. However, they do suggest the skill of ‘generating questions’ is a part of all comprehension strategies. They also refer to an example from Lipson (2001) who states ‘comprehension skills of sequencing, making judgements, noting details, making generalisations and using text structure can be linked to summarising which is a comprehension strategy’ (cited in McLaughlin & Allen, 2002, p14). Others such as Schmitt (1990) tend to use the terms interchangeably without clear definition.

For the purposes of this study and to avoid confusion for the reader, the term comprehension strategies will be used in the manner consistent with the majority of

references consulted; even though the writer is aware of the issues as described above.

While comprehension strategies are often discussed individually it must be remembered that fluent, skilled readers coordinate the use of strategies in a flexible manner, and that no one strategy has been proven more effective than others. Such readers are metacognitively aware and are able to self-monitor and self-regulate their reading, applying strategies as necessary (McLaughlin & Allen, 2002; MOE, 2003; Nolan, 1991; Pressley, 2002; Van Keer, 2004). In comparison, many of the texts already referenced suggested emergent and poor comprehenders are more passive in their selection and use of comprehension strategies and have limited metacognitive awareness of the strategic nature of reading. Such readers tend to believe the purpose of reading is errorless processing of text (Duffy et al, 1986; Nolan, 1991). It should be noted that Stevens and Slavin (1995) cautioned that studies claiming improved metacognition should be viewed critically, as often only reading comprehension has been measured rather than metacognitive awareness. In this study it is anticipated that interviewing the children before and after the intervention period, and analysis of lesson transcripts may reveal information relating to metacognitive awareness.

The scope of this particular research was limited in respect to the extent to which it was able to explore the effects of Think-Pair-Share strategies on reading comprehension. Whilst acknowledging the need for readers to develop a flexible repertoire of comprehension strategies, and the fore-mentioned fact that particular strategies have not been proven to be any more effective than others in improving comprehension, just three comprehension strategies; prediction, imagery and summarisation, were selected as intervention strategies for the promotion of reading comprehension.

Three Reading Comprehension Strategies

Prediction.

Good readers anticipate meaning and revise their predictions as they read. Consequently prediction has long been valued as an essential comprehension strategy. It provides a purpose for reading, triggers engagement, and is conducive to a higher level of comprehension as readers engage with the text to confirm or reject predictions. An essential part of prediction is being able to activate relevant prior

knowledge brought to the text, or knowledge acquired from the text (Duffy, 2003; MOE, 2003; Nolan, 1991; Palincsar, 2003; Wood & Endres, 2004). Duke and Pearson (2002) elaborated on the commonly held view of prediction as a single comprehension strategy by suggesting it is actually a family of activities comprising activating prior knowledge, previewing and overviewing. These processes allow readers to link newly acquired information to existing knowledge as they process the text.

In a survey of American reading research reports undertaken by Reutzel and Fawson (2002), four out of the six reports identified prediction as necessary to engage readers and improve reading comprehension. Nolan (1991) suggested that encouraging prediction enhanced reader involvement. Using small group instructional settings similar to Guided Reading lessons, he demonstrated that encouraging readers to self-question and predict was more effective than just teaching children to self-question. Other researchers have also shown that the explicit teaching of prediction has lifted engagement and comprehension levels. McGinley and Denner (1987), asked students to write predictions prior to reading narratives and reported that the accuracy or relevance of the predictions was unimportant. They suggested it was the level of engagement resulting from the prediction that triggered the depth of comprehension. However, Fielding, Anderson, and Pearson (1990) found that prediction leads to improved comprehension only if the predictions were revisited and evaluated against text ideas as students read.

Research documenting reading comprehension levels in Mangere schools supported this finding (Lai, McNaughton, MacDonald & Farry, 2004). These students were performing well on decoding text, but poorly on tests of comprehension. One reason suggested for this disjuncture was that while prediction was widely promoted in “standard classroom reading activities,” these predictions were rarely revisited or checked against information from the text. Prompting readers to check their predictions occurred only nine times in 16 hours of observation. This suggests that the process of prediction alone may not be sufficient, it needs to be accompanied by verification to be effective. Verification prompts readers to synthesise and compare their predictions with the text and perhaps engages them in a higher level of thinking.

While research reviewed by Duke and Pearson (2002), suggested that explicit instruction in prediction, can positively influence comprehension; the research

involved only narrative text types with familiar topics and predictable text structures. Duke and Pearson suggested results might not be as successful with non-fiction texts. Sweet and Snow (2003) however, stated that promoting use of prediction strategies also works with expository text, especially when such instruction is based around helping students to use headings and subheadings.

This particular strategy is widely used by New Zealand teachers and promoted in Ministry of Education handbooks (MOE 1996, 2003, 2005). It would seem, however, that revisiting predictions and explicit discussion of the value of the strategy, which both appear to contribute to increased comprehension, may be lacking in classroom practice. It was possible to include both of these aspects in lessons involving the use of Predict-Pair-Share.

Visual imagery.

Spontaneous visualisation or the conscious representation of mental images enables readers to store information in memory. It is a cognitive function that allows readers to organise information and remember text. Sadoski (1983), found imagery appeared to be naturally present and utilized effectively by readers. Images appear to be arranged into a “vast database of knowledge, which allows them to be evaluated and interpreted in terms of what they stand for” (Pinker, 2002, pp.215/216).

The conceptual peg hypothesis described by Paivio (1971) suggests key images may serve as “mental pegs” for memory storage and retrieval. This is not however, a rigid storage system but is rather viewed as an “active information handling process” (Gambrell & Koskinen, 2002). This system constitutes the non-verbal component of Sadoski and Pavio’s (2001) Dual Coding Theory outlined in the initial section of this review. When readers comprehend text it is suggested that the effort required to construct meaning using both verbal and visual systems, either independently or in an integrated manner, results in a greater depth of comprehension (Gambrell & Jawitz, 1993; Gambrell & Koskinen, 2002).

The RAND report (RRSG, 2002), identified the use of imagery as a critical element of effective comprehension. This finding is consistent with other research that has demonstrated imagery plays an important role in reading comprehension (Sadoski, 1983, 1985; Gambrell & Koskinen, 2002). For example, Sadoski’s research (1983,1985) found third and fifth grade students most often reported

imaging at the climax of a narrative and that more imagery was generated when the text lacked illustrations. In contrast to these findings, Gambrell and Jawitz (1993) suggested that both illustrations and the use of imagery enhance comprehension because they interact in dynamic ways, with the illustrations providing a bridge from the text to the nonverbal subsystem. Working with fourth grade children, they found the treatment group that combined the strategic use of illustrations with instruction to induce imagery, increased comprehension and recall in comparison to groups using just one of these strategies. In the single strategy groups, those that were encouraged to image without illustrations were able to recall more elements of story structure than those with just illustrations. However, these differences were not significant, suggesting that both are equally effective in assisting readers to make links within text and comprehend.

Readers who struggle to comprehend generate fewer images than above average readers (Finch, 1982). Gambrell and Bales (1986) also reported that poor readers did not use imagery as a strategy for monitoring comprehension. This could be because they are allocating attention and capacity in working memory to using the verbal subsystems to process print. Poor comprehenders can however, be assisted to use imagery strategically and improve their text comprehension (Duffy, 2003; Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Sadoski, 1983, 1985; Trabasso & Bouchard, 2002; Wood & Endres, 2004). Gambrell and Bales (1986) suggested that although comprehension can be improved through the strategic use of imagery it was seldom discussed during instructional reading time.

New Zealand reading resource handbooks published during the 1980s and 1990s did not acknowledge the contribution of visual imagery to the comprehension process (DOE, 1985; MOE, 1996); however the use of imagery does receive attention in more recent publications. *Effective Literacy Practice in Years 1-4* (MOE, 2003) includes a paragraph detailing “visualisation” as a comprehension strategy (p. 132). The text suggests teachers ask relevant questions to prompt readers to describe the pictures they see in their heads, encourage the sharing of responses, and perhaps ask those students having difficulty in verbalising their images to draw what they see. The more recent handbook, *Effective Literacy Practice in Years 5 to 8* (MOE, 2006) adds further depth with a more detailed explanation and several suggestions as to

“how teachers can support learners” (p.145). Kenyon and Griffith (2005) also provided ideas for teachers to use in prompting students to image. These include asking readers to run a video in their heads and press pause. However, a search of New Zealand databases failed to return any classroom-based research investigating the use of imagery. The inclusion of Image-Pair-Share in the current study enabled the researcher to examine of the use of imagery by readers in both ability groups, and also to investigate the relationship between illustrations in texts and the use of imagery.

Summarisation.

Summarisation requires the reader to “sift through large units of text, differentiate important from unimportant ideas, and then synthesise those ideas and create a new coherent text that stands for...the original” (Dole, Duffy, Roehler & Pearson, 1991, p.244). In order for this to occur, readers must understand the content and text structure at sentence, paragraph and whole text levels (Palincsar, 2003; Trabasso & Bouchard, 2002). The literature suggests this is one of the most challenging of comprehension strategies (Coley, DePinto, Craig & Gardner, 1993; Duke & Pearson, 2002; MOE, 2003; National Education Monitoring Project [NEMP], 2005).

Summarisation can be explained using Kintsch’s construction-integration model. This model explains how readers form the gist of a passage or text as a network of interrelated propositions which is refined and integrated during the construction phase (Gajria & Salvia, 1992; Harley, 2001). The network of propositions, or microstructure, is organized into a hierarchical macrostructure that represents a more global overview of the text. Propositions that are not essential for interpretation are deleted, a sequence or group of propositions may be replaced by a more generalized proposition, and a proposition may be constructed that encompasses the meaning conveyed by a joint set of propositions (Kintsch, 1998).

There appears to be two major strategies used to teach summarisation, with the most commonly reported involving the use of a set of rules established originally by Brown and Day (1983) and based around the three macrorules; selection, generalization and construction discussed above. The second approach to teaching

summarisation is the GIST procedure (Cunningham, 1982) which is less structured in comparison and involves readers creating summaries with increasingly large amounts of text. Bean and Steenwyk (1984) compared both strategies and found they were equally effective in improving written summaries and overall comprehension of text. Trabasso and Bouchard (2000) located eighteen studies involving summarisation instruction with children aged between nine and 14, during the period from 1980 to 2000, as part of their review for the National Reading Panel in the United States. They found, in general, readers improved the quality of their summaries through direct instruction and were able to delete, generalise and construct, thus confirming the macrorules suggested above by Kintsch and van Dijk (1978). Long term usage of the summarisation strategy as a result of instruction, and transfer across text types, have also been documented (Gajria & Salvia, 1992). There has been a significant amount of research into the teaching of summarisation as a component of the Reciprocal Teaching strategy, which will be addressed in the following section (Rosenshine & Meister, 1994). Such studies investigated overall changes in comprehension as it was not possible to isolate effects of each of the four strategies involved. It should be noted that during the current study, Summarise-Pair-Share is used to prompt readers to summarise text and to talk about the use of this strategy, rather than to teach them how to summarise.

Comprehension Strategy Instruction

Although “cracking the code” and developing automaticity and fluency are important aspects of learning to read the benefits of these skills would be wasted unless readers are also able to comprehend. As Sweet and Snow (2003) commented, “a focus on reading comprehension is... a crucial part of literacy instruction during the preschool and primary years and a crucial part of content area instruction thereafter” (p.xii).

Research since the late 1970s has consistently demonstrated that instruction in comprehension strategies will enhance comprehension (Duke & Pearson, 2002). Durkin’s (1978/79) research appears pivotal in motivating research in this area. The study found that only 2% of class time allocated to reading instruction was spent assisting students to comprehend. As a result of this study, the 1980s saw a major focus on research into the identification of comprehension strategies that could be

taught, and the development and observation of comprehension strategy instruction that would promote metacognitive awareness (Barry, 2002; Brown, Pressley, Van Meter & Schuder, 1996; Gambrell & Jawitz, 1993; Rosenshine & Meister, 1994). As the 1980s progressed the focus moved away from research investigating the teaching of single strategies, (see Gambrell & Bales' 1986 work on imagery), to researching a more interactive style of instruction. The effects of using multiple, interrelated strategies, in approaches such as Reciprocal Teaching were investigated (Kucan & Beck, 1997; Palincsar & Brown, 1984).

Traditional teaching practice had typically consisted of a series of comprehension questions related to the content of the reading and little explicit discussion of strategies, in comparison to comprehension strategy instruction as described above. Research has found that the latter approach generates significant gains in reading comprehension, particularly for those struggling with this aspect of reading (NRP, 2000; Pressley, 1998, 2000; Sweet & Snow, 2003; Van Keer, 2004).

There are however, differing opinions among researchers as to who should receive such instruction. Some have focused their discussion and research around poor comprehenders (Duffy, 2003; Duffy et al., 1986; RAND, 2002). The RAND report noted that good readers become actively involved with texts and this triggers the use of comprehension strategies. In contrast poorer readers may require explicit instruction as their attention capacity is allocated to decoding the print and they are unable to engage to the extent where comprehension strategies are developed (Pressley, 2000). Other writers, Trabasso and Bouchard (2002) and the NRP (2000), suggested comprehension strategies must be taught explicitly to all readers since they do not develop spontaneously. Block and Pressley (2002) and Vacca (2002) concur with this and state that instruction in comprehension must sit alongside decoding instruction from the emergent level in order for students to comprehend and critically reflect on the increasing diversity of text types with which they interact in the 21st century.

Despite considerable research into this area of reading comprehension there still appears concern as to whether the resulting knowledge is being transferred into schools and utilised by teachers in delivering effective practice (Pressley, 2002). The tendency has been for educational policy makers to focus on developing literacy at the emergent levels and teachers have perpetuated the effects of this concentration by

presuming that once readers can decode and read fluently, explicit reading instruction is no longer necessary (Vacca, 2002). This was mirrored in New Zealand schools where the initial focus of the Literacy Strategy was on developing literacy in Years 1-4 (MOE, 1999). It was six years before support materials for year 5-8 students were developed (MOE, 2005; 2006). NEMP results in 2001 showed achievement levels on comprehension tasks were lower than scores for decoding tasks for Maori and Pasifika children and for children in low decile schools at the year 8 level (Flockton & Crooks, 2001). This data, along with that reported earlier by Lai et al. (2004) from research in Mangere schools, suggests a need for a more explicit focus on the teaching of comprehension strategies in New Zealand primary classrooms in years 5 to 8. Such a focus is possible with the use of variations of Think-Pair-Share strategies within the context of Guided Reading lessons.

Instructional processes.

There appears general agreement that strategy instruction should consist of explicit explanation of how and when the strategy is used, followed by teacher modeling, and then a period of scaffolded assistance. During this time students practice the strategy and then support is released gradually as independence develops (Block & Pressley, 2002; Duke & Pearson, 2002; Ketch, 2005; Kragler, Walker & Martin, 2005; NRP, 2000; Pressley, 1998; RAND, 2002; Schmitt, 1990; Stevens et al., 1991). This type of strategy instruction does not produce instant results. Researchers agree on the need for extended periods of instruction involving multiple opportunities for practice to develop independence and flexibility in applying strategies (Duffy, 2003; Pressley, 1998, 2002; Trabasso & Bouchard, 2002).

Duffy et al. (1986), for example, involved 22 fifth grade (Year 6) teachers and their lower ability reading groups in a project encouraging explicit instruction in comprehension strategies. Results showed that while teachers became more explicit and students became more aware, there were no significant gains in reading achievement measured using standardised tests. They found that students took longer to complete such tests and suggested that this could indicate that they were consciously applying strategies learned during the intervention. It was also suggested that low ability readers may take more than six months to apply the strategies learned in an independent and self-regulated manner during such

standardised tests. In the research currently being undertaken, the use of two intervention groups, one of lower ability and one reading above chronological age, allows this link between ability level, timing, and positive gains to be further investigated.

The results from the research of Duffy et al. (1986) can also be attributed to problems noted in the testing methods used. Duffy et al. suggested that the use of strategies could have been measured directly rather than using a standardized test which provides a more global measure of comprehension and is less sensitive to instructional interventions. The mix of a variety of quantitative and qualitative measures used in the current study provided a more comprehensive illustration of the use of strategies than would be possible with just standardized testing.

A third issue raised by this group (Duffy et al., 1986) was a lack of commitment by some teachers to adopt the focus teaching strategies. Although the teachers involved in the intervention did become more explicit, some had difficulties in committing themselves to undertake the specific teaching and modeling of strategies required, and in adapting existing routines and resources to provide relevant practice. They used the required procedures only on the days they were observed and consequently students had less opportunity to develop understanding of the strategies. Analysis of lesson transcripts showed some teachers had greater understanding of the required procedures and this transferred into more focused and effective discussion with their students. Transfer of learning and application of strategies to real texts was also an issue with treatment teachers using workbook type exercises rather than real texts. This study highlights the complexity of classroom-based research and signals the need to encourage treatment teachers to be committed in implementing requirements.

The research being undertaken for this project was relatively small in relation to the study by Duffy et al. (1986). It involved one teacher only, and local literacy specialists had identified this teacher as someone who was committed to delivering effective literacy practice. Initial discussions with the teacher confirmed this commitment, identifying her as a reflective practitioner who understood the importance of instructional talk and was keen to improve her teaching.

The role of small group interaction in comprehension strategy instruction.

Much of the research reported above was carried out with small groups of children working collaboratively with a teacher, where the importance of the dialogue in developing and extending thinking and strategy use was a critical factor. This collaboration, depending on teaching strategies used, enabled shared interpretation of the messages from the text, increased engagement, a deeper level of comprehension, and metacognitive awareness of strategies involved (Almasi & Gambrell, 1997; Ketch, 2005; Kucan & Beck, 2003; NRP, 2000; Van Keer, 2004). Through discussion readers can refine and evaluate their comprehension strategies, an outcome consistent with Vygotsky's theory outlined in the initial section of the review, that readers acquire literacy through social interaction with more expert peers and adults. The Guided Reading approach, typically used in New Zealand classrooms, is based on these social constructivist principles. The Ministry of Education (2002) states that, "Focused discussion in Guided Reading, including the sensitive use of questioning and prompting, will enhance comprehension and critical awareness. Talking about strategies and about what they do as readers builds learner's metacognitive awareness and their ability to self-regulate" (p.9).

The use of small groups engaged in purposeful talk enables readers to collaboratively construct meaning and unite the cognitive and social aspects of reading (Almasi & Gambrell, 1997; Baumeister, 1992; Cazden, 2001; Ketch, 2005; McLaughlin & Allen, 2002). Cazden (2001) suggests that instructional dialogue enables thinking to be shared aloud. This results in a broader expanse of relevant information being laid out for evaluation and assimilation by each member of the group. As mentioned earlier, Foreman and Cazden (2004) also emphasized the value of interactions between students in this group setting as providing a middle-field between the external adult-child interactions and the internalization of new learning. They see this as a positive aspect which may compensate for the limitations of teacher-student interactions in some classrooms. There is an expectation of participation and as each member contributes to the sharing of ideas they are having to process information, construct meaning, and articulate, resulting in a deeper level of understanding than if the student was reading alone (Foreman & Cazden, 2004; Stevens, Slavin & Farnish, 1991).

Findings by Wilkinson and Anderson (1995) confirmed these understandings. In a study involving third grade classes, they found that the benefits of silent reading arose from the children's participation in the group discussion and not from the cognitive demands of the task itself. These benefits were dependent on the way teachers and students interacted within the group. Ketch (2005), sees this conversation as "the thread that is woven throughout the comprehension quilt" (p.9); assisting the reader in tying together the various cognitive strategies required to construct meaning and providing a base for critical thinking and the development of metacognitive awareness.

The facilitating role of the teacher is critical to the use of cooperative learning strategies in comprehension strategy instruction. As Booth (1974, cited in Cazden, 2001) stated; "speech makes available to reflection the processes by which [readers] relate new knowledge to old. But this depends on the social relationships and the communication system, which the teacher sets up" (p.2). The report titled the *Quality of teaching in years 4 to 8: Speaking*, by the Education Review Office (2005) suggested New Zealand teachers must provide a learning environment which encourages critical reflection. Patterns of interaction initiated by the teacher are imperative. Those in the field refer to the "talk of traditional lessons" as the "Initiate-Response-Evaluate" (IRE) sequence, where the teacher asks a question, a child responds and the teacher provides some sort of evaluative response before moving on to the next question (Gambrell, 2004; McCormack, 1997; Perrott, 1988; Van Keer, 2004). The danger here is that the teacher is doing the thinking and the students are tagging along trying to guess the answer the teacher requires. Comprehension becomes a test and the student is denied opportunity to elaborate on answers, explore a range of ideas, consider the views of others and integrate new understanding with their existing ideas. Van Keer (2004) suggested that this questioning routine results in passive learners who lack deeper understanding of text. Alvermann and Hayes (1989) found that despite teachers' perceptions as to what constituted purposeful discussion; classroom observations found little time for students to talk, short answers, wait times of less than one second and little student to student interaction. This research is now 17 years old and one would hope that teachers now use a substantial amount of interactive discussion; however Alvermann (2000) continued to claim this was not the case.

In comparison to this traditional view, the teacher should be viewed as the facilitator of conversation (Ketch, 2005; Zhang & Alex, 1995). This role involves explicit teaching of the discussion skills used in conversation, prompting for elaboration, allowing wait time and assisting students to make connections to extend their knowledge and depth of thinking (Clay, 1998; MOE, 2003; Schleppegrell & Simich-Dudgeon, 1996). Think-Pair-Share strategies generate these critical components required for effective strategy instruction. The small group focus provides opportunities for explicit teaching where necessary, and facilitation of purposeful dialogue. Together, these factors should enhance reading comprehension.

Teaching strategies that foster cooperative learning.

Effective teachers need to strike a balance between ‘stand alone’ strategy instruction and facilitating the comprehension of literature in meaningful instructional contexts (MOE, 2003; Palincsar, 2003; RRSg, 2000). A review of the literature suggests teachers need a repertoire of instructional strategies that can be employed in a flexible manner according to student needs. There are several strategies consistent with a social constructivist perspective that can either be incorporated into Guided Reading lessons, or that provide an alternative structure to lessons that allow for the joint construction of meaning around text through focused quality conversation (Ketch, 2005; MOE, 2003; Palincsar, 2003). These are typically classified as teaching strategies that foster cooperative learning. Brown and Thomson (2000) define such a strategy as “a teaching procedure that enhances both academic and social skills. It provides a platform for students to develop effective learning strategies” (p.11). Literature in this area spans almost 30 years and is diverse and expansive. According to Stevens, Slavin and Farnish (1991), research projects ranging in length from 4 to 30 weeks duration have consistently reported improvement in academic achievement when compared with more traditional methods of learning. Schleppegrell and Simich-Dudgeon (1996) caution that cooperative learning activities will only be successful if students believe they will learn from each other and if they are explicitly taught the procedures followed by opportunities to practice.

The three main purposes of cooperative group work are to:

1. improve academic skills through working together,

2. to learn the necessary interpersonal skills required to complete the task and
3. to develop cognitive skills and metacognitive awareness (Brown & Thomson, 2000; Stevens & Slavin, 1995).

Much of the understanding in this area has been based around the research of Johnson and Johnson (1987). The model that stems from their work outlines five essential elements of cooperative learning:

1. Positive interdependence – students need to work together to complete the task.
2. Individual accountability – each student needs to develop a sense of responsibility towards completing the task and assisting other members.
3. Group and Individual reflection – it is necessary to reflect on the task and review goals.
4. Small group skills – teachers need to teach interpersonal skills so that the group functions efficiently.
5. Face to face interaction – physical proximity is required to enable ease of communication.

Listed in this order they provide the acronym PIGSF (Pigs fly), created by Brown (Brown & Thomson, 2000). There have been numerous adaptations and alternatives to this structure. Stevens and Slavin (Stevens & Slavin, 1995; Stevens et al., 1991) stated that the two most important characteristics for cooperative learning were individual accountability and an incentive to cooperate, in the form of reward systems, which they deemed necessary for effective teamwork. One would have to question the place of rewards in developing self motivated learners who are regularly engaged in learning not just when motivated by extrinsic compensation.

Another significant contributor to our understanding of cooperative learning was Kagan (1998) who suggested regular lessons could be transformed into cooperative lessons by incorporating simple cooperative strategies, rather than teachers having to devise some of the earlier more complex lesson formats. Think-pair-share strategies fit into this category along with the “doughnut” and “jigsaw” techniques commonly used in New Zealand classrooms (Brown & Thomson, 2000).

Much of the literature in this area relates to cooperative learning sequences where the teacher begins the activity with a period of explicit teaching, then sets up

an activity and leaves children to work at the activity without direct guidance while the teacher instructs other groups. There is usually a period of evaluation and feedback at the conclusion (Stevens et al., 1991). To align with the context of this particular study, only literature relating to cooperative learning strategies where the teacher is present and interacting in a purposeful manner for much of the lesson, is considered. It should be noted however, that there can be a gradual release of responsibility for the use of these strategies. Students eventually take over the operation of the instructional strategy as scaffolding is withdrawn in Vygotskian fashion.

Considering the characteristics of co-operative learning strategies, it would seem that such tools would provide a useful platform for the development of comprehension strategies, with the inclusion of scaffolding and cognitive apprenticeship, as teacher and students supply support and guidance to each other. There is opportunity for practice to develop confidence and to internalise the learning, and reflection time. From 10 studies incorporating cooperative learning of comprehension strategies within the Grade 3 to 6 level (Years 4 to 7), Trabasso and Bouchard (2002) found positive results in terms of learning comprehension strategies, increased control over learning, improved social interaction and a higher level of intellectual discussion.

Reflecting on the criteria for effective co-operative learning strategies, as outlined in this section, it can be concluded that Think-Pair-Share should facilitate the development of comprehension and metacognitive awareness, when incorporated into Guided Reading lessons. It is a simple strategy that provides a base for scaffolding where necessary and meaningful interaction, it also incorporates the essential elements of interdependence, accountability and face-to-face interaction.

Reciprocal teaching.

Perhaps the most researched and one of the most widely used cooperative learning procedures in the area of reading comprehension is Reciprocal Teaching (RT). It involves teacher and students engaging in meaningful dialogue and jointly constructing meaning around a chosen text. The dialogue is structured around the use of four comprehension strategies; predicting, clarifying, questioning and summarising. These are employed after each segment of text is read (Palincsar, 2003;

Palincsar & Brown, 1984; Rosenshine & Meister, 1994). Initially the teacher provides explicit modelling of these strategies and then group members assume responsibility for leading the group as they are able. This is consistent with social constructivist principles where the teacher, as expert, gradually releases responsibility to the students after a period of apprenticeship.

In a review of the research around the RT procedure, Rosenshine and Meister (1994) identified two basic forms. The first involved RT in its original form as described above and reported in Palincsar and Brown (1984). This form involves the introduction of the four strategies within the context of the lesson. The second, arising from subsequent work reported by Palincsar, Brown and Martin (1987), includes the explicit teaching of the four strategies in four to six traditional style lessons prior to the dialogue lessons beginning. This enables the introduction of the particular strategies and related terminology. Both approaches appeared to produce significant results when measured by experimenter designed comprehension tests, but results were rarely significant when measured with standardised tests (Brown et al., 1996; Rosenshine & Meister, 1994). Closer inspection of these outcomes led Rosenshine and Meister to suggest that experimenter designed tests were easier to answer as the passages were usually arranged with a clear topic sentence followed by supporting detail, and were generally longer allowing greater use of context cues. Passages used were similar to those employed during the intervention and the test items relied less on background knowledge and searching through text. Standardised tests, in comparison, tended to use a wider variety of text types and required greater conceptual knowledge to answer inferential questions. These factors will be considered when designing the assessment component of the research methodology.

Since 1984 numerous adaptations have been made to the original RT procedure. Particular findings that have relevance to this review include the following:

- Group size appeared insignificant – group sizes in studies reviewed ranged from 2-23.
- The number of lessons taken appeared to have no significant relationship to comprehension gains – the number of sessions ranged from 6-25. Palincsar and Brown (1984) had suggested 20 lessons would be effective.

- The importance of having comparable control groups – the initial study lacked this (Palincsar & Brown, 1984).
- There appeared no set criteria specifically designed to evaluate the RT procedure itself.
- There appeared no observation of the dialogue involved.
- There was no relationship between the number of strategies taught and achievement – different research studies have incorporated varying numbers of strategies from 2 to 10. Nolan (1991) taught just two strategies, self questioning and prediction and achieved positive results with lower ability readers.

Regardless of adaptations, RT appears to have increased teacher awareness of the need for explicit comprehension strategy instruction and resulted in increased engagement and depth of processing of text. Teachers have shifted focus from checking off complex lists of reading skills in workbooks to fostering meaningful dialogue around rich texts through the use of the four specific comprehension strategies. RT allows students the time to monitor their use of comprehension strategies, reflect on their reading and learn from the ideas of others. The question remains whether the success of RT is due to the procedure as a whole, or to the development of comprehension strategies and metacognitive awareness, or a combination of all of these factors (Kucan & Beck, 1997; Rosenshine & Meister, 1994).

Not all teaching experiences with RT have been positive in nature however. Many teachers trained in the procedure have abandoned it completely due to frustration with the original structure and a desire for greater levels of student participation. Some have modified the participation structure to overcome this and others have used RT to provide a post-reading discussion structure rather than during the reading (Marks et al., 1993).

Reciprocal teaching has provided a cooperative format for the teaching of comprehension strategies and has succeeded in developing awareness of the importance of teaching comprehension within the context of meaningful texts using a social constructivist approach. As has been shown though, it is but one teaching procedure. Although wide-spread in its use and well researched; it does not suit the teaching/learning needs of all classrooms. The adaptations described in the literature serve to remind us of the need for teachers to use approaches flexibly, and to develop

a repertoire of different strategies that might be used within approaches, that can provide variety and be utilised as and when required. Perhaps, as suggested by Kagan (1998) teachers need a range of “simple cooperative strategies” rather than complex lesson formats. This view is supported by others who add that teachers should be aware of the advantages and disadvantages of using each strategy and should be able to select those suited to their students’ level and teaching needs (Alvermann, Dillon & O’Brien, 1987; Baumeister, 1992; Brown & Thomson, 2000; Mehigan, 2005; Palincsar, 2003).

Despite the limitations of the RT approach, it does provide for the teaching of the core cognitive processes of prediction, clarifying, questioning and summarization, used by fluent readers. The current study provides an alternative strategy to develop two of these essential cognitive processes, prediction and summarization, along with the use of imagery. In comparison to RT, Think-Pair-Share is a simple co-operative learning strategy that can easily be adapted and integrated into regular Guided Reading lessons. Think-Pair-Share is widely used in educational settings but rarely researched.

Think-Pair-Share Strategies

Think-Pair-Share (TPS) is a co-operative learning strategy developed by Lyman in 1978 and can be defined as “a multi-mode discussion cycle in which students listen to a question or presentation, have time to think individually, talk with each other in pairs, and finally share responses with the larger group” (McTighe & Lyman, 1988, p.243). The strategy incorporates wait-time, verbal rehearsal, discussion, and cooperative learning. In its original form Lyman defined two wait periods; the initial time after the question was asked (Wait-time I) of three to five seconds and then another wait period (Wait-time II) of at least three seconds after each pair shared back to the group (Lyman, 1989, cited in Baumeister, 1992, p.19). It was suggested that visual cues such as hand signals, cards or a cube can be used to announce transitions from one component of the strategy to the next (Baumeister, 1992, McTighe & Lyman, 1988; Thompson & Taymans, 1996). Lyman proposed that children would develop social skills, engage more positively in class discussion and develop metacognitive awareness through use of the strategy (Baumeister, 1992).

Think-Pair-Share incorporates the benefits of discussion as outlined in earlier sections of this review. Howe (1992) describes pair talk as a “high intensity talk arena” due to the responsibility placed on each person to become engaged directly in speaking and listening (p.14). Pair talk is usually very focused and suitable for short tasks. Alverman et al. (1987) state that this level of active engagement allows students to share ideas and refine their thinking. Less confident children have the opportunity to participate and to rehearse ideas before reporting to the larger group.

The thinking component of the strategy or ‘wait time’ has been researched for many years. Rowe (1974, cited in Baumeister, 1992; Stahl, 1994), developed the term ‘wait-time’ and in extensive research across levels and settings, found that when teachers question they typically wait one second or less, and then once the student has replied they give feedback or start the next question within a second as well. By extending this wait time to three seconds, there were significant improvements in language use, attitudes and teacher expectations. Teachers had time to think as well and they were more likely to encourage elaboration of original answers and to ask more complex questions (Rowe, 1986).

Other researchers state that increasing wait time promotes higher levels of participation and longer responses which tend to be more substantial. The frequency of “I don’t know” responses decreases and it also allows time for new learning to be incorporated with old (Gambrell, 1983; McTighe & Lyman, 1988; Stahl, 1994). In 1985 Stahl proposed the term ‘think time’ in preference to ‘wait time’ as he felt it more aptly described the main purpose of the time period. He suggested three seconds as the minimum think time but felt the main factor in determining the time period should be the length of time needed to allow nearly every student to complete the thinking needed for the task. In concurrence with this, Tobin (1980) states that higher order thinking will require longer periods of wait time than questions requiring only recall.

Although these two components; think time and pair talk, have been researched individually, there is very little research into the TPS strategy as a teaching tool. Lyman (1989, cited in Baumeister, 1992) discussed personal observations of the success of the strategy and reported action research studies; but at the time of Baumeister’s (1992) doctoral research he had no knowledge of any published empirical studies relating to the Think-Pair-Share strategy.

In the course of locating relevant literature for this review, Baumeister's (1992) unpublished doctoral thesis, from the University of Maryland College Park, was the only research focused specifically on the effects of using the strategy. The fact that it investigated the effects on oral language, reading comprehension and attitudes made this study particularly pertinent. One hundred and seven third grade (Year 4) students slightly below average in reading ability were allocated in groups of 6-12 to one of three treatment conditions; wait time, TPS or regular instruction. She used 3-5 second wait time intervals and each group took part in four reading lessons using the relevant instructional sequence. Students read the required passage and then TPS was integrated into the follow up discussion where teachers were each given six questions of which three were essential. Four lessons were thought to be adequate to both overcome the novelty effects and effect change in learning behaviour. Long term change was not the aim of the study, rather research questions focused on frequency, length and elaboration of response to different question types. Comprehension was compared using written recall and attitudes towards themselves as readers and towards the various components of the lessons were measured.

Both the wait time intervention and the TPS intervention resulted in increased participation and improvement in the quality and quantity of responses, but TPS also revealed an increase in comprehension. These results were more marked for the textually implicit questions requiring synthesis or summarisation of details, perhaps due to the benefits of collaborating with a partner in synthesizing information from a range of locations. Attitudes of the TPS group were slightly less positive than the other two groups but it was suggested that perhaps this was because they were engaging with an unfamiliar strategy.

In a critique of her methodology Baumeister suggested the need for a longer treatment time frame to study the effects of the intervention more fully. She also suggests research into the use of the strategy with different age groups, types of learners, text types and content areas. The methodology employed by Baumeister differs from that proposed in this research in that it limits the use of TPS to facilitating comprehension in follow up discussion, rather than to fostering the use of comprehension strategies during reading. The follow up discussion timeframe of twenty five minutes maximum also differs from the proposed study where the total lesson including reading is designed to occupy approximately thirty minutes.

Baumeister used Lyman's traditional form of TPS with two wait periods. After each pair reported back there was another wait period before the next pair was able to contribute. This produced a drawn out, stilted discussion that no doubt, required close monitoring of children's level of engagement. It does not appear to equate with current use of TPS where only one wait time period is utilised before students share in pairs (Banikowski & Mehring, 1999; Brown & Thomson, 2000; Street, 2002; Thompson & Taymans, 1996; Whitehead, 2001).

Extensive database searches failed to locate any further empirical studies of TPS. More globally, Mehigan (2005) in discussing the need for teachers to develop a "Strategy Toolbox" of successful teaching strategies that might be used in teaching reading and writing; proposed three types of meaning making strategies. These were labeled "research based", "time honoured favourites" and "original strategies created by teachers" (p.553). Think-Pair-Share was one of those labeled a "time honoured favourite", indicative of its popularity, but lack of research backing. In support of this categorization; the most recent ERIC database search (5/3/06), revealed 26 entries for Think-Pair-Share. Of these, 12 were classed as descriptive reports, 9 as guides, one speech, one opinion paper and one book. There were two research reports both qualitative descriptions of tertiary student preferences and perceptions of cooperative learning strategies. The spread of these entries across the various sectors of the education system verifies the versatility of TPS as described by the literature (Baumeister, 1992; Brown & Thomson, 2000). Seven of the database entries were located at the primary level, two overlapped primary and secondary, three were secondary in focus and 14 targeted the areas of tertiary and adult learning.

In comparison to the focused use of TPS in Baumeister's research (1992) and the generic description of the strategy in literature referred to above; the versatility of the strategy can also be demonstrated by the way in which it has been adapted to support a range of different comprehension strategies. For example Whitehead (2001) uses the terms "Image-Pair-Share", "Predict-Pair-Share", and "Summarise-Pair-Share" among others, to refine the use of the traditional format. These adaptations have been selected for use in the current study as they are consistent with the comprehension strategies used by fluent readers and the key components described in models of reading comprehension (Duffy, 2003; Duke & Pearson, 2002; Farstrup, 2002; Pressley, 2000).

Think-Pair-Share is also robust in terms of reflecting the essential elements for cooperative learning listed by Johnson and Johnson (1987) and discussed earlier in this review. Peer interaction promotes positive interdependence; the students learn from each other and have to share ideas to be able to report to the group. Each student is accountable in this partnership. Interpersonal skills are highlighted in both the pair and group sharing components and face to face interaction is essential for the successful operation of TPS. The third criteria, group reflection, is possibly not always included but will be a focus of this research project.

Think-Pair-Share relates closely to the aims and objectives of the *English in the New Zealand curriculum* document (MOE, 1994). Consistent with this document the think time fosters thinking skills, listening skills are promoted through pair and group sharing and there is a high level of involvement as children work in a paired situation, elaborate their ideas and extend their vocabulary in meaningful contexts. Students are willing to take risks and share with the larger group because they have already trialed their ideas with their partner. TPS is also the only cooperative strategy receiving mention in the ‘Pedagogical knowledge of teachers’ section of the New Zealand Education Review Office’s (ERO) report on Speaking. It was described as being “a feature of some classrooms” and as “helping with cooperative learning, extending students’ thinking and [as] a tool for promoting oral language skills” (ERO, 2005). The strategy is also included in three sections of the recently released Ministry of Education handbook, *Effective Literacy Practice in Years 5-8* (MOE, 2006) where it is promoted for its value in engaging all students and generating genuine conversation during Guided Reading, Shared Reading and writing.

Conclusion

This review has described the importance of supporting children’s thinking and learning by providing opportunities for them to interact with others in a collaborative social setting. In these settings conversation allows readers to reflect, share and refine ideas and construct knowledge by linking new understanding to existing propositions. Both teacher-student, and student-student interactions are significant contributors to the development of reading comprehension.

Research has repeatedly shown that instruction in the use of comprehension strategies can enhance readers’ comprehension, and this is particularly so for poorer

readers. Explicit instruction of these strategies, teacher modeling and supported practice have been identified as required components of instruction as the reader is scaffolded towards independence. Fluent readers monitor comprehension and apply comprehension strategies in a highly orchestrated manner as required and it is both unnecessary and difficult to assess the isolated influence on instruction of any one particular strategy. However, for ease of management and given the scale of this study, three core comprehension strategies; prediction, imagery and summarisation have been selected for inclusion in this research. The selection of these three strategies was discussed earlier in the review and they also feature among strategies that should be targeted to promote effective comprehension, in the recent Ministry of Education handbooks (MOE, 2003; 2006).

Cooperative learning strategies allow for the melding of these areas of interactive discussion and reading comprehension. Reciprocal Teaching, a structured cooperative lesson sequence has received considerable attention. It has been widely adapted to suit the needs of learners and rejected by some as too rigid for the realities of the classroom learning environment. In comparison, the adoption of a repertoire of more flexible strategies, which are easy to apply in a range of settings, appears to be favoured by current researchers.

Think-Pair-Share is one such strategy. It is widely used and frequently discussed in the literature. It allows for a high level of student engagement, time for readers to rehearse their thoughts and opportunities to share and modify their thoughts with a partner before sharing them with the wider audience. As discussed in the previous section, there is little research to substantiate the effect of this strategy on reading comprehension. In 1992 Lyman was unaware of any published empirical studies (Baumeister, 1992) and extensive database searches undertaken for this project have only managed to locate Baumeister's unpublished doctoral thesis. With the inclusion of TPS in *Effective Literacy Practice* handbooks (MOE, 2003; 2006), it is timely that such research is undertaken.

Based on this review the present study proposes to document the effects of using TPS in the context of Guided Reading lessons with students reading above and below their chronological age. Three variations of TPS will be used to encourage the use of prediction, imagery and summarization.

CHAPTER THREE

METHODOLOGY

Overview

The previous chapter highlighted the lack of empirical research into the effects of the Think-Pair-Share (TPS) strategy and the possibility of modifying the strategy to more closely reflect strategies employed by fluent readers. Consequently, this quasi-experimental study was designed to document the effects of using Think-Pair-Share strategies in the context of Guided Reading lessons with two groups of children, one group reading above, and the other reading below their chronological reading age. Three adaptations of the TPS strategy were used; Predict-Pair-Share, Image-Pair-Share and Summarise-Pair-Share. Effects on reading comprehension and oral language of each strategy, separately and together, were investigated.

Description of Research Methodology

As is common in research located within classroom settings this study employed a quasi-experimental design. In this context it was not possible or ethical, to impose full experimental control with randomised subjects. One reason for this is the size of the study which was limited to one class and two groups at different reading levels. These instructional groups were intact and constituted by means other than random selection so it could therefore be considered a ‘compromise design’ as random selection was not practical (Kerlinger, 1970; cited in Cohen, Manion & Morrison, 2001, p.214). Within the limitations of this quasi-experimental design a pre-test – post-test control group format was utilised. The presence of control groups helped to enhance the robustness of the research design and the validity of results.

Research Design

Within the study the independent variables which were introduced to this setting were the three pair-share strategies. The effects of this intervention were reflected in changes to the dependent variables which were the Probe and asTTle test

results and instructional reading ages determined from running records administered by the classroom teacher.

For the purposes of this study the Think-Pair-Share strategy consisted of:

- Think time – 20 seconds when using Predict-Pair-Share (PPS) and Image-Pair-Share (IPS), and up to 30 seconds when using Summarise-Pair-Share (SPS). This think-time followed the posing of a question by the teacher
- Sharing ideas or images with a partner
- Reporting back to the reading group, one student from each pair each time the strategy was used.

This study involved both quantitative and qualitative measures and was designed to ensure the triangulation of data. Quantitative data was provided through the March and November asTTle tests, both pre and post-intervention Probe testing (Pool, Parkin & Parkin, 1999), and reading levels established by the teacher using an Informal Prose Inventory (Ayrey, 2001). This data was descriptively and comparatively analysed using the SPSS programme. Qualitative data, including verbal protocols, observations and interviews with both teacher and students, were subject to thematic and descriptive analysis.

Selection of Subjects

The school within which the study was located is an inner city school ranked decile 5, which is close to the mean socioeconomic linked decile range of schools across New Zealand. Initial contact was made with the principal in person to outline the proposed research. Following this the teacher was approached to ascertain her willingness to become involved in the project. The teacher had emerged as a potential candidate through the local network of literacy educators, as someone with whom a collaborative working relationship could be established. The class consisted of twenty nine Year 6 children aged 10-11 years.

As is typical in small scale research of this nature, a non-probability sample was used as the researcher wished to compare the effects of the intervention on two particular groups (Burns, 2000; Cohen, Manion & Morrison, 2001). The researcher and the classroom teacher met with the initial aim of selecting a 'high' group of students 6–12 months ahead of their chronological age in reading, and a 'low' group

with reading achievement 6–12 months below their chronological age. Purposive sampling was used to select students on the basis of instructional reading ages determined by the Informal Prose Inventory (Ayrey, 2001), which the teacher had used at the end of the previous term. This inventory consists of running records (Clay, 1993), a retell, and comprehension questions. While this sampling method is selective and biased it fulfils the specific needs of the project. It is common practice in New Zealand primary schools for teachers to establish instructional reading levels with running records accompanied by a retell of the text or questioning, and to group students at a particular level for instruction. Therefore, in adopting this form of grouping the Hawthorne effect was reduced (Cohen, Manion & Morrison, 2001).

From these two ability groups random selection measures were used to assign students to equivalent treatment and control groups at each of the two levels. The names of students at each level were placed in a container, then withdrawn and placed in intervention and control groups alternatively until all names were assigned. This grouping allowed for the quantitative documentation of the impact of the intervention on students in comparison to those continuing regular Guided Reading instruction, and for the comparison of the impact of the intervention on those at different reading levels. The verbal responses of the children at the different levels were able to be examined and compared using qualitative data.

The four groups formed as a result of this procedure each contained five to six students, which is consistent with the characteristics of the Guided Reading approach (MOE, 2002; 2005). This sized grouping allowed for inclusiveness and for effective conversation facilitated by the teacher. The benefits of this group collaboration, enabling shared interpretation of the text, clarification of vocabulary and meaning, were outlined in the previous chapter and included increased engagement and greater comprehension and metacognitive awareness (Gambrell, 1986; Kucan & Beck, 2003; MOE, 2006).

To enable those participating to be fully informed, letters outlining the project were sent to the Principal and Board of Trustees, the classroom teacher and parents and caregivers of children selected in both intervention and control groups (see Appendices A – C). These letters included details of the purpose and length of the project and explained the rights of the subjects to withdraw at any time during the

first four weeks. Contact details for both the researcher and the researcher's supervisor were included to enable any queries to be addressed and all letters were accompanied by consent forms which were collected before the intervention began.

To protect participant confidentiality the school, teacher and students have not been named in any part of the research, apart from the use of Christian names of the students during the reporting of results. All data collected was stored in a locked cabinet for the duration of the research and will remain there for a period of five years from the conclusion of the study.

Quantitative Measures

The Prose Reading Observation, Behaviour and Evaluation of Comprehension (PROBE).

This test was developed in 1999 and is an individual reading assessment tool designed for reading ages 7–15 (Pool, Parkin & Parkin, 1999). Passages include both fiction and nonfiction texts at each level and these can be used as conventional running record texts to establish reading accuracy. The student reads the passage silently, then if required, aloud so that the running record can be taken. In this study running records were taken to ensure the text was at an instructional (90-94% accuracy) or independent (95–100% accuracy) level of difficulty (Clay, 1993). The accompanying questions for each passage are typical of those asked during Guided Reading lessons and allow a comprehension level to be established. These open ended questions are classified according to six categories of comprehension; literal, inferential, vocabulary, evaluation, reorganisation, and reaction. This allows for diagnostic analysis of children's responses however, the number of questions varies from 5 at the lower levels to 10 at the higher levels and not every test has the same number of questions in each category. It is described as "an informal reading inventory emphasising comprehension". An independent reading level is determined as 95% or above for accuracy and 70% for comprehension (Pool, Parkin & Parkin, 1999).

Difficulty levels for Probe passages were established using Elley's Noun Frequency Method, supplemented by the Fry Readability Formula and Holdaway's Sight Words approach. Although designed in New Zealand the content of the

passages is not geographically or culturally specific which allows for unbiased application with students from other countries. Standardised procedures for administration are provided. While the accompanying administration guide does not contain statements or data relating to the reliability or validity of the procedure, the *National Survey/Stocktake of diagnostic tools in English for Reading, Writing and Mathematics for ages 5 to 9 years* (Croft, Stafford & Mapa, 2000), comments that face validity is evident and content validity appears relatively high. Probe was administered with each student as a pre and post test to monitor change in comprehension levels. To maintain validity all testing was carried out by the researcher and each student read the passage silently to themselves then aloud, before answering the comprehension questions.

Assessment Tools for Teaching and Learning (asTTle).

asTTle is a Ministry of Education assessment instrument currently used in many schools as part of their teaching and assessment cycle (Hattie et al., 2004). It is designed to test literacy and numeracy skills with students in Years 4 to 12. The English component is based on the learning objectives of levels 2 to 6 of *English in the New Zealand Curriculum* (MOE, 1992). The designers considered curriculum levels too broad for explicit classroom assessment and as a result each level is subdivided into three sublevels; basic, proficient and advanced. For the assessment of reading, items were developed around the six major content areas identified from the curriculum. These include; finding information, understanding, inference, knowledge, connections, and surface features. The first five of these are classified as deep features (Hattie et al., 2004).

Classroom teachers are able to generate a 40 minute pencil and paper test from an item bank included on the asTTle compact disc. The test is composed by adjusting a set of sliders to control the number of items both in the content categories of finding information, knowledge and understanding, and across the curriculum levels. Standardisation of items for reading, writing and mathematics was achieved by sampling from over 84,000 students from a range of schools across New Zealand.

Data is fed back into the computer after marking and a variety of report formats can be generated that enable teachers to compare student performance in

relation to curriculum levels and against a national sample. Individual learning pathways reports can also be generated to identify individual areas of strength and weakness.

asTTle reading tests had been administered across the senior classes of this particular school in March and were readministered in November of that year, after the intervention. The asTTle reading scores and levels for the deep features were used as a means of triangulating data collected from Probe testing. As the children in both intervention and control groups had remained in the class for the year with the same teacher reliability was maintained.

Informal Prose Inventory

The school in which this intervention was carried out utilised the Informal Prose Inventory (Ayrey, 2001) for the establishment of instructional reading levels at the beginning of the year and in June and November. This measure covers reading ages from 7-15 and there are two passages of narrative text at each of the 8 levels. Running records are administered and scored according to Clay's conventions (Clay, 1993). Each passage is accompanied by a series of questions to assess comprehension and a set of statements detailing events in the story that can be checked off as students retell the text. While use of this inventory is wide spread there are no reports describing reliability or validity.

Data gained from the June administration of this measure was used to sort students into higher and lower ability levels prior to establishing intervention and control groups. It was also reported, along with data from retesting in November, as another means of triangulation.

Qualitative Measures

Interview procedures.

Semi-structured interviews are defined in Cohen et al. (2001) as "a two person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information, and focused ... on content specified by research objective of systematic description, prediction or explanation" (p.269). The semi-structured framework ensures all topics are covered, but room is provided for

elaboration of topics and diversification onto related matters that may arise. Open ended questions are used where possible so there are no constraints on the answers. Such interviews are also conducive to establishing an open, relaxed atmosphere of trust and honesty. The researcher must be aware of nonverbal language that may signal other emotions such as frustration, nervousness and anger.

All semi-structured interviews with the children in this study were recorded to facilitate accurate analysis of the dialogue, and anecdotal notes were made as the interviews progressed. Interviews were reviewed and summarised soon after completion to maintain validity. During the final interview with the teacher, notes were recorded by the researcher, then written up immediately and presented to the teacher so they were able to check for accuracy. This process ensured validity was maintained.

A seven point semantic differential scale (Burns, 2000; Cohen, Manion & Morrison, 2001) was used in pre and post intervention interviews with the students (see Appendix D). This form of rating scale allows for an adjective at one and its opposite at the other end. For example, question one stated “How good do you think you are at reading?” with 1 being “Not good at all” and 7 “Very good.” A card containing a number line from 1-7 was used and students chose the position on the scale that best represented their thinking by placing a peg on the relevant number. The use of the scale provided a focus and starting point for the discussion and allowed for numerical differentiation and some quantitative analysis of these responses. Such scales are however, subjective and interpretations of the various points on the scale will vary from student to student.

Lesson observations.

Creswell (2005) describes observation as “the process of gathering open-ended, firsthand information by observing people and places at a research site” (p.211). This allows the researcher to study behaviour and record information as it occurs. It also provides a means to validate data gained from interviews and from statistical measures.

The role of non-participant observer was more suited to this intervention than that of participant, as the classroom teacher was involved in delivering the

intervention lessons and participation by the researcher would have introduced another variable and interfered with established group dynamics. It was not possible however, to achieve the role of a true non-participant observer in the classroom setting as physical proximity was necessary to hear and observe verbal interactions and body language within the group. To reduce the effects of this proximity, efforts were made to build positive relationships and trust during pre-intervention interviews.

Lesson observations were also audio-taped to allow accurate transcribing of lesson dialogue and more specifically, the responses to prompts to use TPS strategies. Audio-tapes from these lessons were transcribed by an independent person ensuring accuracy and lack of bias.

Data Collection and Recording: The Pre-intervention Period

Introduction to the site.

Prior to the start of the intervention period the researcher was introduced to the class group as someone who would be visiting on a regular basis over the next few weeks to assist the teacher with the teaching of reading. Children were also introduced to the dictaphone prior to observation of the initial lessons. These procedures protected the study from the Hawthorne effect whereby children felt the focus was on them and on their performance in reading. Regular Guided Reading lessons were observed and audio-taped with each of the treatment groups. The teacher was encouraged to use children's names during the discussion phase of these lessons to allow for ease of identification when analysing the tapes.

Training the teacher.

In order not to contaminate baseline data, a training session was held with the classroom teacher following the researcher's introduction to the site and the observation and the taping of Guided Reading lessons. During this session the researcher provided an outline of the project which included the following points:

- The importance of developing prediction, the use of imagery and summarisation as reading strategies that enable critical engagement around text.
- The use of 'think-alouds' to demonstrate these skills to children.

- The introduction and explanation of the three focus variations of the Think-Pair-Share strategy.
- The suggestion that the thinking component should be of 20 seconds duration for Predict-pair-share and Image-pair-share and 30 seconds for Summarise-pair-share.
- The use a cube was introduced to assist in helping the students adjust to the requirements of the TPS strategies. This cube had the words ‘think,’ ‘pair’ and ‘share’ on different sides and was placed in the centre of the group and turned by the teacher at the appropriate times.
- The required Guided Reading lesson structure, that included options for TPS, was outlined using an example to provide uniformity. A lesson template was subsequently emailed to the teacher for use in planning the sixteen lessons. The standard format proposed for the lessons was consistent with that suggested in Guided Reading Years 5-8 (MOE, 2005).

Following this, texts were selected for the initial TPS lessons and the lessons planned co-operatively. All subsequent plans were emailed to the researcher prior to teaching to ensure lessons were planned systematically in line with the sequence suggested, and lesson plans were kept as artifactual evidence that the focus strategies were used.

The teacher conducted a pilot lesson using the PPS strategy with a group of children not involved in the study. This lesson, observed by the researcher, allowed the teacher to become familiar with using the cube and the TPS strategy, ensuring all three components were included. It also enabled the recording procedures to be further refined with the teacher practising the inclusion of children’s names as she spoke to them and the rest of the class becoming more aware of requirements in terms of working tone and noise levels.

Interview procedures.

Individual interviews were held with students in all four groups. These interviews were conducted in the classroom setting to ensure consistency. A semi-structured interview format was developed with questions to prompt discussion, and a

semantic differential scale was employed to assist in quantifying ideas (see Appendix D). The intended purpose was to empower students to gauge perceptions of themselves as readers and to discover their prior knowledge of prediction, imagery and summarisation when reading. The first three questions were developed to determine students' attitudes towards reading and the last four to ascertain their awareness and use of the focus comprehension strategies; prediction, the use of imagery and summarisation. Questions were developed to promote conversation as follows:

- Tell me how you feel about reading? About reading in a group with your teacher?
- How good do you think you are at reading?
- Tell me what happened in your head as you read today?
- Do you guess what the text is about before you read?
- Do you form pictures in your head as you read? How does this help?
- Could you use one or two sentences to tell your teacher what the story is about after reading?

Quantitative Measures.

The Probe test was administered in the classroom environment with each child, in an attempt to maintain validity. Testing continued through successively higher levels until comprehension levels dropped below 70%. As the designers of the test accept this level as being the threshold for independence, a score below 70% was considered an instructional level (Pool et al., 1999).

Data consisting of the asTTle reading score and levels for deep features, were gathered from the asTTle testing held in March and instructional reading levels were recorded from the running records carried out by the classroom teacher in June using the Informal Prose Inventory (Ayrey, 2001).

Data Collection and Recording: The Intervention Period

A programme of focus interventions was designed so that the TPS strategies were taught within the context of regular Guided Reading lessons with each of the two intervention groups over eight, weekly lessons. Texts were selected at the

groups' instructional or independent levels (above 90% accuracy) with reading ages being obtained from the New Zealand journal search (Learning Media, 2003). In addition to consideration of the instructional level, all texts were chosen for their links to current topics underway in the classroom programme or to children's interests, and included a mix of fiction and non-fiction, as indicated on the weekly schedule below.

The lessons were planned for 20 to 30 minutes duration and followed a typical sequence as follows:

- Explanation of the purpose of the lesson with links to the particular TPS strategy being used in the lesson.
- Introduction with activation of prior knowledge, discussion of title and illustrations
- With lessons 1, 3 and 5 this also included introduction to the relevant Pair-Share strategy. This introduction involving modelling and the use of 'think alouds' of the related comprehension skill
- The text was semantically separated into several coherent chunks and a purpose set prior to reading each one. The relevant TPS strategy was used as appropriate for the particular text
- Conclusion involving dialogue relating back to the purpose of the lesson
- Lesson closure including standardised questions reflecting on the TPS strategies used in the lesson. Questions included, "Tell me about the TPS that you used today?" "What affect did it have on your reading?" "What affect did it have on your understanding of the text?" (The teacher made anecdotal notes of responses).

On those occasions where the lessons were recorded, the researcher and teacher discussed how the children had responded, the quality of verbal responses associated with the use of a TPS strategy, and any modification required to the lesson protocol.

At the conclusion of each lesson students completed a paper and pencil task which focused on the comprehension strategy for the lesson. This provided the researcher with additional data about the impact of the intervention. When using Predict-Pair-Share students drew and labelled what might happen next for fiction

texts and ‘what might happen if...’ in nonfiction texts. After using Image-Pair-Share students drew and labelled a particular character from fiction texts and for nonfiction texts drew and labelled a diagram relating to the context. When using Summarise-Pair-Share they drew and labelled the three main events in the text. The drawing activity, based on the ‘sketch to stretch’ strategy (Whitin, 2002) was selected so that those less capable at writing were not disadvantaged in the follow up task, and as a means of consolidating the learning through encouraging a personal response to the text.

A schedule for the eight weekly lessons was created to allow for the focused introduction and mastery of each TPS strategy over a two week period. This was followed in weeks 7 and 8 by lessons including all three strategies. The final mix of strategies within a lesson allowed for maintenance of each and flexibility to respond to the demands of particular texts. The weekly schedule was as follows:

1. Predict pair share (PPS) with fiction texts
2. Predict pair share with nonfiction texts
3. Image pair share (IPS) with fiction texts
4. Image pair share with nonfiction texts
5. Summarise pair share (SPS) with fiction texts
6. Summarise pair share with nonfiction texts
7. PPS + IPS + SPS with fiction texts
8. PPS + IPS + SPS with nonfiction texts

Audio-taped observations of lessons for both groups were planned for weeks 1, 4, 5 and 7. These observations were timed to enable each of the three TPS strategies and a balance of fiction and nonfiction to be monitored.

Control groups continued regular Guided Reading lessons with the classroom teacher throughout this eight week period. There was no professional development in reading taking place in the school during the year the research was carried out, and there were no other significant intervention programmes taking place in the classroom.

Data Collection and Recording: Post-intervention

Children in both intervention and control groups were interviewed using the same pre-treatment questions as previously. Those in the intervention groups were also asked to talk about the use of the TPS strategies in general and to comment on the use of each of the three focus strategies, PPS, IPS and SPS (see Appendix E). All interviews were again audio-taped and transcribed.

The teacher was interviewed using a semi-structured format to document impressions in respect to the impact of using TPS strategies during Guided Reading lessons. Focus questions targeted three areas which included; observations of the children involved and any changes or comments noted relating to their level of involvement, the quality of oral language and thinking, and the level of comprehension. For each area the teacher was asked to note any observed differences between the two groups and any noticeable subgroups or comments relating to particular individuals. The teacher was also asked to comment on the use of the three TPS strategies and on the research design. Finally, any resulting influence on teaching methods or beliefs about the teaching of reading was discussed. This interview was written up and then presented to the teacher for elaboration and to ensure validity.

All children were retested using the Probe inventory and as previously, successive passages were used until the percentage for comprehension dropped below the 70% level, thus indicating a level suitable for instruction. Data from the regular end of year testing carried out by the teacher using the Informal Prose Inventory (Ayrey, 2001) and from the school wide asTTle testing was also collected as a means of providing triangulation.

Analysis of Data

A descriptive and comparative analysis of Probe levels of both intervention and control groups was conducted using independent and paired t-tests to provide within and between group comparisons. This analysis was also repeated with levels obtained from the use of the Informal Prose Inventory and with asTTle reading scores and levels for deep features. As each curriculum level for deep features is divided

into basic, proficient and advanced sublevels in the asTTle test, a coding system was used to assign a numerical value to each sublevel to enable statistical analysis.

Audio-tapes of the lessons observed and field notes were analysed to locate common themes that would provide qualitative data relating to the effects of the intervention, and a descriptive analysis of the interview data was also undertaken.

Summary

This quasi-experimental study was designed to investigate the effects of the use of Think-Pair-Share strategies during Guided Reading lessons. This chapter has detailed the methodology and design of the intervention which involved a pretest-post-test control group format. Methods used to select and group participants into the two intervention and two control groups have been outlined.

Data collection employed a number of quantitative measures including those already in use within the particular school setting, to provide numeric data with which to explain the effects of the intervention. Qualitative data from lesson observations and interviews has provided a balance to this numeric analysis and allowed for a broader illustration of the effects, with consideration of the views of the participants collected from interview transcripts and observation of their dialogue and body language during lessons. An overview of the sequence of the study details data collection procedures before, during and after the intervention, and illustrates the focus of each of the eight intervention lessons.

CHAPTER FOUR

RESULTS

Overview

This study was designed to document the effects of using modifications of Think-Pair-Share (TPS) strategies during Guided Reading lessons with two groups of children, one reading above their chronological age and one group reading below their chronological age. The quasi-experimental design employed pre and post intervention testing administered to an intervention cohort and a control group at each of the two reading levels to provide for data comparison. Quantitative data measuring comprehension levels was gathered from the *Prose Reading Observation, Behaviour and Evaluation of Comprehension* (PROBE), administered before and after the eight intervention lessons, from the school's scheduled testing using *Assessment Tools for Teaching and Learning* (AsTTLe) in March and November, and from administration of the *Informal Prose Inventory* (Ayrey, 2001) by the classroom teacher. To provide additional information about the impact of the intervention on comprehension and oral language, a range of qualitative measures were used. These included a thematic analysis of audiotapes recorded during Guided Reading lessons and during interviews held with the children before and after the testing. The classroom teacher was also interviewed at the conclusion of the intervention.

This chapter will initially describe the composition of the four groups involved in the study and then present an analysis of the quantitative data. Following this the qualitative data will be described and emerging themes outlined.

Description of Participant Groups

Initially it was intended to select a cohort of children 6 – 12 months below their chronological age in reading achievement, and a cohort 6 – 12 months above their chronological age in reading achievement. However, on close examination of the initial reading levels provided by the classroom teacher, and based on instructional reading ages (IRA) obtained from an informal prose inventory (Ayrey, 2001) administered in June, it

was determined that the children did not distribute themselves into these six month bands of reading ability. Subsequently, eleven children were identified as reading from 0 – 12 months below their reading age and one was identified as reading almost two years below his age. When the project was introduced to the children and consent forms sent home prior to the researcher commencing the interviews and Probe testing, one child in this lower group chose not to participate in the project. Random selection from the remaining eleven led to a lower intervention group of six children and a lower control group of five.

An independent t-test was then conducted to compare the Instructional Reading Age (IRA) scores of the Lower Intervention Group (LIG) and the Lower Control Group (LCG) in June. There was no significant difference in scores for the LIG ($M = 10.75$, $SD = 0.27$) and the LCG [$M = 10.2$, $SD = 1.0$, $t(9) = 1.26$, $p = 0.23$] suggesting a degree of equivalence between the groups.

Additionally, twelve children were identified from the teacher's assessment as having reading ages 12 – 24 months above their chronological age and these children were also divided into two higher groups of six using random selection. Part way through the project one child moved schools leaving a higher intervention group of five and a higher control group of six.

An independent t-test was conducted to compare the IRA scores of the Higher Intervention Group (HIG) and the Higher Control Group (HCG) for June. Again there was no significant difference in scores for the HIG ($M = 13.0$, $SD = 0.94$) and the HCG [$M = 12.4$, $SD = 0.92$; $t(9) = 1.04$, $p = 0.32$] in June, indicating a degree of equivalence between these two groups also. Although gender and ethnicity are not focus variables for this particular intervention, Table 1 outlines the characteristics of the four groups, and shows an approximate gender balance.

Table 1.
Gender and linguistic competence of the four groups

Group	Male	Female	EAL student*
–			
Lower Intervention	4	2	2
Lower Control	3	2	1
Upper Intervention	2	3	0
Upper Control	3	3	1

* English as an additional language

Quantitative Test Results

Prose Reading Observation, Behaviour and Evaluation of Comprehension (PROBE)

The fiction passages from the *Probe* test were administered to compare accuracy and comprehension levels both pre and post intervention. The test was administered to children individually and the researcher began with a passage at a level equal to that suggested by the classroom teacher's assessment. Testing continued until the comprehension level dropped below 70%, this being the level at which Pool, Parkin and Parkin (1999) suggest readers are able to comprehend text independently. A comprehension level below 70% was, therefore, considered to be a suitable instructional level for Guided Reading. Each passage covers a one year band in terms of reading age, and for ease of management of data the midpoint of this reading age was recorded as the reading level. For example a reading age of 10 – 11 years was recorded as 10.5 years. From the data in Table 2, it can be seen that accuracy levels were almost consistently in the independent range (95% and above) for both the LIG and LCG groups.

Assumptions in respect to the equality of variances between the two lower groups were checked using Levene's test. Values of larger than .05 were assumed to indicate equal variances while values of .05 or less were taken as indicative that the

data violated the assumption of equal variance. The data reported below was selected on the basis of these assumptions.

Table 2.
Probe results for the Lower Intervention Group and the Lower Control Group, August and November.

Child	Lower Intervention Group					
	August (Pre-test)			November (Post-test)		
	Probe Level	Accuracy %	Comp. %	Probe Level	Accuracy %	Comp %
1	10.5	99	50	11.5	98	50
2	11	98	40	11	99	60
3	11	96	40	11.5	98	40
4	11	100	60	11.5	96	60
5	11.5	95	60	12.5	98	50
6	11	98	60	12.5	99	60
Mean	11.0 (.32)			11.75(.61)		
Lower Control Group						
1	9	92	60	10	93	60
2	10.5	99	50	10.5	100	60
3	10.5	98	60	11	99	60
4	11	96	50	11.5	99	60
5	11.5	98	40	11.5	98	60
Mean	10.5 (.94)			10.9 (.65)		

It was noted from Table 2 that the difference in the mean Probe Reading Ages of the LIG from August to November (0.75) was larger than that between the means of the LCG, (0.4) in the same period. Therefore, an independent t-test was conducted to ascertain whether the difference between these measures was significant. There was no significant difference in scores for the LIG ($M = 11$, $SD = .32$) and the LCG [$M = 10.5$, $SD = .94$; $t(9) = 1.24$, $p = .25$] in August. However, there was a significant difference in scores for the LIG ($M = 11.75$, $SD = .61$) and the LCG [$M = 10.9$, $SD = .65$; $t(9) = 2.23$, $p = .05$] in November.

To further illustrate the difference between the groups, a paired samples t-test was conducted to evaluate the impact of the intervention on PRA scores of the LIG students. There was a statistically significant difference in the PRA scores from August ($M = 11$, $SD = .32$) to November [$M = 11.75$, $SD = .61$, $t(5) = 3.50$, $p = .02$]. The eta squared statistic (.70) indicated a large effect size.

For comparison, a paired samples t-test was also conducted on PRA scores of the LCG students. There was no statistically significant difference between the PRA scores from August ($M = 10.5$, $SD = 0.94$) to November [$M = 10.9$, $SD = 0.65$, $t(4) = 2.1$, $p = 0.9$]. These statistics tend to suggest that the Think-Pair-Share intervention, in the context of Guided Reading lessons, had a positive impact on the Probe Reading Age scores of the LIG students.

A similar analysis was conducted on scores from the higher groups. Table 3 indicates there was a substantial increase in the mean PRA score of the HIG students from August to November (1.2), in comparison to the mean increase in PRA scores for the HCG students of just 0.3. An independent t-test was conducted to ascertain whether the difference between these means was significant. There was no significant difference in scores for the HIG ($M = 13$, $SD = .71$) and the HCG [$M = 12.3$, $SD = .93$; $t(9) = 1.3$, $p = .22$] in August. However, there was a significant difference in scores for the HIG ($M = 14.2$, $SD = .67$) and the HCG [$M = 12.6$, $SD = 1.24$; $t(9) = 2.5$, $p = .03$] in November.

Table 3.
Probe results for the Higher Intervention Group and the Higher Control Group, August and November.

Child	Higher Intervention Group					
	August (Pre-test)			November (Post-test)		
	Probe Level	Accuracy %	Comp. %	Probe Level	Accuracy %	Comp %
1	12.5	99	50	13.5	100	60
2	12.5	98	50	13.5	100	50
3	12.5	93	60	14.5	95	60
4	12	98	60	Moved	schools	
5	14	99	50	14.5	100	50
6	13.5	99	60	15	98	50
Mean	13.0 (.71)			14.2 (.67)		

Higher Control Group						
1	11	98	50	11	97	60
2	11.5	99	60	11.5	100	60
3	12.5	96	60	12.5	98	60
4	13	98	60	14	98	60
5	12.5	97	60	12.5	99	60
6	13.5	97	50	14	99	60
Mean	12.3 (.93)			12.6(1.24)		

To confirm this difference, a paired samples t-test was conducted to evaluate the impact of the intervention on HIG students PRA scores. There was a statistically

significant increase in PRA scores from August ($M = 13$, $SD = .71$) to November [$M = 14.2$, $SD = .67$, $t(4) = 4.7$, $p = .009$]. The eta squared statistic (.84) indicated a large effect size.

A paired samples t-test was also conducted to evaluate the impact of the regular classroom programme on HCG students PRA scores. In comparison to the HIG, the increase in PRA scores from August ($M = 12.3$, $SD = .93$) to November [$M = 12.6$, $SD = 1.24$, $t(5) = 1.46$, $p = .20$] was not significant. Together, results suggest that the TPS intervention, in the context of Guided Reading lessons, had a positive impact on Probe Reading Age scores for both lower and upper intervention groups.

asTTle

The asTTle reading test (Hattie et al., 2004) was administered in March as part of the school's assessment cycle for 2005. As all children taking part in the study had been in this class all year with the same teacher it was therefore acceptable to use data from this test, and from the retest in November, to support data obtained from the Probe test. Table 4 shows the asTTle reading score from the March and November administration of asTTle, and the level obtained for 'deep features,' as this dimension relates more specifically to the comprehension focus of the study than does the level for the surface feature dimension.

As can be seen from the data, there was little movement in mean asTTle reading scores (ARS) from March to November for either group. The mean for the LIG group remained almost the same and the LCG mean increased by 20. It should be noted however, that four out of six of the LIG students increased their scores. An independent t-test was conducted to compare ARS between the LIG and the LCG for March and November. There was no significant difference in scores for the LIG ($M = 492.66$, $SD = 30.4$) and the LCG [$M = 456.75$, $SD = 29.1$; $t(8) = 1.86$, $p = .10$] in March, and also no significant difference in scores for the LIG ($M = 491.8$, $SD = 23.1$) and the LCG [$M = 476.75$, $SD = 37.8$; $t(8) = .79$, $p = .45$] in November, suggesting the two groups were somewhat equivalent on this measure.

Table 4.
asTTLe test results for the Lower Intervention Group and the Lower Control Group, March and November

Child	Lower Intervention Group			
	March		November	
	asTTLe reading score (ARS)	Deep features* Level (DF)	asTTLe reading score	Deep features level
1	490	3B (3)	491	3B (3)
2	452	2A (2)	482	3B (3)
3	534	3P (4)	460	2A (2)
4	465	3B (3)	482	3B (3)
5	502	3B (3)	525	3P (4)
6	513	3A (5)	511	3A (5)
Mean ARS	492.66 (30.4)		491.8 (23.1)	
Mean DF		(3.3, 1.03)		(3.3, 1.03)

Lower Control Group				
1	465	3B (3)	491	3B (3)
2	452	3B (3)	482	3B (3)
3	490	3P (4)	511	2A (2)
4	420	2A (2)	423	2P (1)
Mean ARS	456.75 (29.1)		476.75 (37.8)	
Mean DF		(3.0, 0.82)		(2.2, 0.96)

* The scores for deep features relate to the curriculum levels of *English in the New Zealand Curriculum* (MOE,1994) and the sublevels that are a feature of the asTTLe tool. A coding system was used to assign a numerical value to the range of levels across the four groups, with '1' equating to level 2P and '7' equating to level 4P. This enabled statistical analysis to be carried out. These values are shown in brackets.

A paired samples t-test produced similar results for the LIG with the intervention showing no significant difference in ARS from March ($M = 492.66$, $SD = 30.4$) to November [$M = 491.8$, $SD = 23.1$, $t(5) = 0.54$, $p = 0.9$].

In comparison, a paired samples t-test conducted to evaluate the difference in ARS for the LCG from March ($M = 456.75$, $SD = 29.1$) to November [$M = 476.75$, $SD = 37.8$, $t(3) = 3.36$, $p = 0.04$], showed there was a statistically significant increase in ARS for this group. It should be remembered that this is the total asTTle reading score inclusive of both surface and deep features.

To provide further information on the students' thinking, specifically in relation to the deep features, the asTTle depth of thinking levels for deep features (DF) were analysed. The coding system shown in brackets in Tables 4 and 5 was used in these calculations.

It was noted that there was no change in the mean level (3.3) for the LIG deep features from March to November, in comparison to a drop in the mean level of 0.8 for the LCG group. However, an independent t-test was conducted to compare DF levels between the LIG and LCG. This showed there was no significant difference in levels for the LIG ($M = 3.3$, $SD = 1.03$) and the LCG [$M = 3.0$, $SD = 0.82$; $t(8) = 0.54$, $p = 0.60$] in March and also no significant difference in levels for the LIG ($M = 3.3$, $SD = 1.03$) and the LCG [$M = 2.2$, $SD = 0.96$; $t(8) = 1.6$, $p = 0.13$] in November.

A paired samples t-test was conducted to evaluate the impact of the intervention on the LIG deep feature levels. There was no significant difference in DF levels from March ($M = 3.3$, $SD = 1.03$) to November [$M = 3.3$, $SD = 1.03$, $t(5) = 0.0$, $p = 1$].

A paired samples t-test was also conducted to evaluate the impact of the regular classroom programme on LCG deep feature levels. Although the mean level had dropped by 0.8 there was no significant difference in DF levels from March ($M = 3.0$, $SD = 0.8$) to November [$M = 2.25$, $SD = 0.9$, $t(3) = 1.57$, $p = 0.21$].

It would appear that there was no significant change in the asTTle scores and deep feature levels in either of these lower groups over the year.

Table 5.
asTTLe results for the Higher Intervention Group and the Higher Control Group, March and November.

Child	Higher Intervention Group			
	March		November	
	asTTLe Reading score	Deep features* Level	asTTLe Reading score	Deep features Level
–				
1	544	3B (3)	584	3A (5)
2	534	3B (3)	572	3A (5)
3	478	3B (3)	596	4P (7)
4	513	3B (3)	530	3P (4)
5	544	3P (4)	530	3B (3)
Mean ARS	522.6 (28.0)		562.4 (30.8)	
Mean DF		(3.2, .44)		(4.8, 1.48)
Higher Control Group				
1	478	2P (1)	530	3B (3)
2	465	3B (3)	520	3B (3)
3	554	3A (5)	540	3B (3)
4	587	4P (7)	561	3A (5)
5	534	3A (5)	572	4B (6)
Mean ARS	523.60 (51.4)		544.6 (21.6)	
Mean DF		(4.2, 2.28)		(4.0, 1.4)

* The scores for deep features relate to the curriculum levels of *English in the New Zealand Curriculum* (MOE,1994) and the sublevels that are a feature of the asTTLe tool. A coding system was used to assign a numerical value to the range of levels across the four groups, with ‘1’ equating to level 2P and ‘7’ equating to level 4P. This enabled statistical analysis to be carried out. These values are shown in brackets.

A similar analysis was conducted on asTTle scores from the higher groups with an independent t-test comparing asTTle reading scores between the HIG and the HCG for March and November. There was no significant difference in scores for the HIG ($M = 522.6$, $SD = 28.0$) and the HCG [$M = 523.6$, $SD = 51.4$; $t(8) = .04$, $p = .97$] in March. There was also no significant difference in scores for the HIG ($M = 562.4$, $SD = 30.8$) and the HCG [$M = 544.6$, $SD = 21.6$; $t(8) = 1.06$, $p = .32$] in November, suggesting again that the two groups are relatively equivalent on this measure. It was noted however, from Table 5, that the mean ARS for the HIG rose by 39.8 from March to November, while the mean for the HCG rose by just over half this amount, 21.0.

To further investigate this discrepancy, a paired t-test was conducted to ascertain the impact of the intervention on the HIG students' ARS. The increase in the mean ARS for this group from March ($M = 522.6$, $SD = 28$) to November [$M = 562.4$, $SD = 30.8$, $t(4) = 1.82$, $p = 0.14$] was not statistically significant.

A paired t-test was also conducted to evaluate the impact of the regular classroom programme on the ARS for the HCG. There was a no significant difference in the ARS from March ($M = 523.6$, $SD = 51.4$) to November [$M = 544.6$, $SD = 21.6$, $t(4) = 1.23$, $p = 0.28$].

As with the LIG and LCG groups, statistical analysis of the asTTle levels for deep features, for the HIG and HCG, was undertaken. It was noted in Table 5, that the mean DF level for the HIG showed an increase (1.6) from March to November, in comparison to the mean DF level for the HCG where the mean showed a decrease of 0.2 over the same time period. To investigate this difference, an independent t-test was conducted to compare asTTle reading DF levels between the HIG and the HCG for March and November. There was no significant difference in scores for the HIG ($M = 3.2$, $SD = 0.44$) and the HCG [$M = 4.2$, $SD = 2.28$; $t(8) = 0.96$, $p = 0.37$] in March. There was also no significant difference between scores for the HIG ($M = 4.8$, $SD = 1.48$) and the HCG [$M = 4.0$, $SD = 1.4$; $t(8) = .87$, $p = 0.41$] in November, suggesting that the two groups were relatively equivalent on this measure.

A paired samples t-test was conducted to investigate changes in DF levels associated with the intervention among HIG students. There was a non significant

increase in DF levels from March ($M = 3.2$, $SD = 0.4$) to November [$M = 4.8$, $SD = 1.48$, $t(4) = 1.97$, $p = .12$].

A paired samples t-test was also conducted to investigate changes in DF levels for the HCG students. There was a nonsignificant decrease in DF levels from March ($M = 4.2$, $SD = 2.28$) to November [$M = 4.0$, $SD = 1.41$, $t(4) = .25$, $p = .81$].

Although there were more positive changes in the ARS and DF levels of the HIG than the HCG from March to November, these changes were not statistically significant. Results suggest that the intervention has not impacted on asTTle reading scores and deep feature levels for either of the intervention groups.

Informal Prose Inventory

The Informal Prose Inventory was administered by the classroom teacher to establish Instructional Reading Ages in June, as part of the school's annual assessment cycle and for the purpose of reporting to parents. These were repeated in December. It should be noted that this assessment includes running records, a retell and comprehension questions. As with the Probe tool each passage spanned a year in reading age. The midpoint of that year has been recorded in Table 6.

Table 6 shows similar increases in the mean reading instructional reading age (IRA) for both LIG and LCG groups from June to December (0.7 and 0.8 respectively). To investigate this further, an independent t-test was conducted to compare IRA between the LIG and the LCG for June and December. There was no significant difference in scores for the LIG ($M = 10.75$, $SD = 0.27$) and the LCG [$M = 10.4$, $SD = 1.14$; $t(9) = 0.73$, $p = 0.48$] in June. As suspected there was also no significant difference in scores for the LIG ($M = 11.5$, $SD = 0.63$) and the LCG [$M = 11.2$, $SD = 0.97$; $t(9) = 0.62$, $p = 0.55$] in November.

A within group analysis was also conducted using a paired samples t-test to evaluate the impact of the intervention on the IRA of LIG students. There was a statistically significant increase in IRA from June ($M = 10.75$, $SD = .27$) to December [$M = 11.5$, $SD = .63$, $t(5) = 3.5$, $p = .02$]. The eta squared statistic (0.7) indicates a large effect size.

Table 6.
*Instructional Reading Ages for Lower Intervention Group and Lower Control Group,
 June and December*

Child	Lower Intervention Group	
	June (Pre-test)	December (Post-test)
	Instructional Reading Age	Instructional Reading Age
–		
1	10.5	11.5
2	10.5	10.5
3	10.5	11.5
4	11	11.5
5	11	12.5
6	11	11.5
Mean	10.8 (.27)	11.5 (.63)
	Lower Control Group	
1	8.5	10
2	10.5	10.5
3	10.5	11.5
4	11	12.5
5	11.5	11.5
Mean	10.4 (1.14)	11.2 (.97)

A within group analysis was also conducted using a paired samples t-test to evaluate the impact of the regular classroom programme on the IRA of LCG students. In comparison to the LIG, the increase in IRA from June (M = 10.4, SD = 1.14) to

December [$M = 11.2$, $SD = .97$, $t(4) = 2.36$, $p = .08$] was not statistically significant.

From this analysis it can, therefore, be concluded that the intervention had a significant impact on the instructional reading ages of the lower intervention group as demonstrated by the paired t-test results for this group.

In considering Instructional Reading Ages for the higher groups, it was noted from Table 7 that the mean IRA for the HIG increased by 1.2 from 13 to 14.2, while the mean IRA for the control group increased by only 0.4 from 12.4 to 12.8.

To ascertain whether the difference in these mean scores was significant, an independent t-test was conducted to compare IRA between the HIG and the HCG for June and December. There was no significant difference in scores between the HIG ($M = 13.0$, $SD = 0.94$) and the HCG [$M = 12.4$, $SD = 0.92$; $t(9) = 1.04$, $p = 0.32$] in June. However, there was a significant difference in scores between the HIG ($M = 14.2$, $SD = 0.57$) and the HCG [$M = 12.8$, $SD = 1.1$; $t(9) = 2.5$, $p = 0.03$] in December, suggesting that on this measure, the intervention had a positive effect on instructional reading ages for this group.

To further investigate the significance of this result, a paired samples t-test was conducted to evaluate the impact of the intervention on the IRA of HIG students. There was a statistically significant increase in IRA from June ($M = 13.0$, $SD = .94$) to December [$M = 14.2$, $SD = .57$, $t(4) = 4.71$, $p = .01$].

A paired samples t-test was also conducted to evaluate the impact of the regular classroom programme on the IRA of HCG students. There was no statistically significant increase in IRA from June ($M = 12.42$, $SD = .92$) to December [$M = 12.75$, $SD = 1.08$, $t(5) = 2.0$, $p = .1$].

Both independent and paired t-tests suggest that the intervention had a positive impact on Instructional Reading Age levels for the HIG.

*Table 7.
Recommended Instructional Reading Age based on Running Records for Higher
Intervention Group and Higher Control Group, June and December*

Child	Higher Intervention Group	
	June (Pre-test)	December (Post-test)
	Instructional reading age	Instructional reading age
1	12	14
2	12.5	13.5
3	12.5	14
4	14	14.5
5	14	15
Mean	13.0 (0.94)	14.2 (0.57)
Higher Control Group		
1	11.5	12.0
2	11.5	11.5
3	12.5	12.5
4	12.5	13.5
5	12.5	12.5
6	14.0	14.5
Mean	12.4 (0.92)	12.8 (1.1)

In summary it would appear that the intervention has been associated with significant gains in the Probe reading age scores for both intervention groups, with the gain for the Higher Intervention group displaying a greater degree of significance

than that for the Lower Intervention Group. Significant increases for both intervention groups were also noted in the Instructional Reading Ages gained from administration of the Informal Prose Inventory. In contrast, although there were positive shifts in mean asTTle reading scores and deep feature levels for the Higher Intervention Group, there were no significant gains in these measures for either of the intervention groups.

Qualitative Results

To provide alternative ways of investigating the impact of the intervention, a range of qualitative measures were also employed. Four of the eight intervention lessons were audio-taped, students in all four groups were interviewed, both before and after the intervention period and the teacher was also interviewed after the intervention.

Lesson Observations

Observation and audio-taping of regular Guided Reading lessons were carried out with each of the two intervention groups prior to the start of the intervention, to provide baseline data. Lessons were also observed and taped in weeks 1, 4 and 5 to provide data showing the use of the three TPS strategies in isolation and then again in week 7 to observe lessons that integrated all three strategies. Due to technical problems during week 1 where only half of each lesson was able to be taped, lessons were also taped and observed during week 2. Audiotapes were transcribed by an independent assistant and analysed simultaneously with notes made by the researcher during the observations.

Before discussing themes that emerged from the observations and transcripts, there are a number of organisational aspects emerging from the observations that should be reported as they contextualise the emerging themes. These include choice of texts, timing of lessons and teaching strategies.

Texts used included a mix of fiction and non-fiction and a range of text types including recount (Orbell, 1986), procedural writing (MacLachlan, 1985) and narrative (Wilson, 2001). The choice of texts was successful and, with one exception, children engaged in the reading and accompanying discussion readily. The exception

to this was the text *Willow Weavers* (MacGregor, 2004) which the LIG used for the second Image Pair Share lesson. With the illustrations removed to promote imaging it was interesting to note the lack of concentration by the male members of the group.

Lessons were planned to last approximately 20-30 minutes but they often continued for longer with the inclusion of the Think-Pair-Share strategies. In consultation with the researcher the teacher attempted to adjust lessons as the intervention continued, by choosing shorter texts and monitoring whole group discussion times. The planned 20 seconds thinking time for the TPS strategies was also reduced to 15 seconds after the Predict-Pair-Share lessons, as this was found to be sufficient time for students to formulate their ideas. During the Summarise-Pair-Share lessons the time was again extended to 20-30 seconds.

Also worthy of note were the range of teaching strategies used by the teacher during pre-intervention lessons as opposed to those used in lessons that took place during the intervention. During the observed pre-intervention lessons the following teaching strategies were observed:

- Pre-reading prediction of the text from title and pictures and the use of prediction prior to reading the climax of the story
- Chunking of text into relevant sections for student reading but often without a stated purpose/question to focus reading of the chunk
- At the end of each chunk there was often discussion and clarification of the meaning of vocabulary and phrases such as ‘a perfect 10’ from the pre-intervention LIG lesson
- The use of ‘pair-share’ was observed once in each lesson to clarify the meaning of vocabulary, however, there was no thinking time included. With the HIG, ‘pair share’ was also used once in an attempt to summarise by locating two important facts from a page of text
- One request for HIG students to locate information in the text to substantiate their answers
- The use of inference questions in one part of the LIG lesson to check understanding and once in the HIG lesson.
- Discussion of text type in the HIG lesson and the ways in which the author has made the story interesting to read in the LIG lesson.

As would be expected, prompts for the use of prediction, imagery and summarisation increased throughout the intervention. In addition, an increase in the following was also noted:

- The number of questions requiring children to use prior knowledge
- Revisiting of predictions to evaluate them against the text
- Requests to justify and substantiate answers using information from the text
- Purposes and questions given prior to reading particular chunks
- Requests for elaboration of answers.

It appeared that the intervention had impacted on teacher practice during Guided Reading lessons, with a greater focus on encouraging thinking by linking to prior knowledge and knowledge gained from the text. There also appeared to be an increased number of opportunities for children to use the higher order processing associated with synthesis of ideas, evaluation and justification. There was a greater focus on talk around the text and it would seem that the intervention has either extended or perhaps rekindled the teacher's own metacognitive awareness and understanding of the importance of developing language and thinking with her students.

Audio-tape Analysis

The effects of the use of the TPS strategies on oral language and reading comprehension can be further demonstrated through examining the themes emerging from analysis of student contributions during audio-taping of the lessons. Relevant themes that emerged included:

- The quality of responses
- Time to think
- Engagement in co-operative learning
- The use of prediction
- The use of imagery
- The use of summarisation
- Engagement in higher order thinking

Quality of response.

Lesson transcripts from both intervention groups were initially examined to investigate the complexity of sentences used, the length of the utterance, the use of vocabulary, and the degree of description given.

For the LIG, responses from the three male students present during the pre-intervention lesson were short and consisted of simple sentences containing one or two ideas. During the reading of the text *Cindy Limpics* (Wilson, 2001), Cindy was trapped in the paddock with stampeding sheep after her rather inaccurate frisbee throw. In reply to the question, “What do you think might happen next?” the students shared in pairs without think time. In reporting back, Jordan’s response included two ideas and eight words, “She jumped the fence and hurt her leg.”

In comparison, the two female members of the group were able to give detailed responses with justification and elaboration of ideas. Rachel’s response to the same question, containing 24 words and four ideas, was,

We thought she’d get in trouble ‘cos of the sheep stampeded and maybe she’d break her leg while she was running away from them.

Once these male students from the LIG began using the TPS strategies, the length of the utterance increased and language became more descriptive, particularly when students were prompted to use imagery. During the observed Image-Pair-Share lesson students were asked to image and then describe what a willow tree looked like, Jordan who contributed the short response above, reported,

I thought that it was like a big fat tree that was like a willow, and just twigs. Peter thought they were skinny trees, skinny branches that you can break them off, and Jardine thought that they were really big.

In comparison to his pre-intervention response, this contained his own ideas and those of his group (there being three in his group that day as a result of another student being absent). Although not grammatically correct, the response contained two detailed sentences, six ideas and 40 words.

The use of IPS also prompted more descriptive language from the female members of the LIG group, as evidenced by Stevie’s response to the same prompt,

...I know that it's quite fat at the bottom, and it's got lots of nobbles on it, then it comes out in a crown and there's lots of big, thin, long, thin sticks. They are very flexible and there's hardly any left.

At times the quality of response increased as a lesson progressed and the students had practised the TPS strategy. For example, Peter (an ESOL student), when asked to report back from the Predict-Pair-Share regarding what the text *Operation Skatebowl* (Belcher, 1998) might be about, volunteered; "I think it's a skatebowl and you skate in it." This response contains just 10 words and two ideas.

Later in the lesson during the third cycle of PPS to predict the outcome of the children's meeting with councillors, he was able to elaborate with 32 words and five ideas,

We think they're going to make a skatebowl, and they're thinking about all the kids and what they're going to do with it, what they need and stuff like drinking fountains, hills...

This pattern of increasingly elaborate responses as the lesson progressed was also evident in observations of the Summarise-Pair-Share and in the final lessons incorporating all three TPS strategies. When discussing the PPS strategy after the PPS lesson, Peter himself commented, "it helps you with the words, to get your ideas together."

In contrast to the LIG students, most of the HIG students gave very fluent responses from the outset of the intervention. Rose provided a response typical of this group during the pre-intervention lesson when reading *Return Ticket Please* (Singleton, 2000). The teacher asked the question, "Why are scientists interested in visiting Mars?" Rose's response was,

It's the only place that's like earth, and because every other place like Venus which is closer, is far too hot, things can melt there.

This response shows complexity of sentence structure and contains three ideas and 25 words, along with elaboration to provide an example of "other places." These more semantically complex contributions continued throughout the intervention and,

as with the LIG, the use of the Image-Pair-Share strategy prompted more extensive use of descriptive language. During the final lesson incorporating the use of all three TPS strategies and using the text *Beetle* (Werry, 2002), students were asked to use Image-Pair-Share to describe the scene in the tin hut, where the children were camping during a storm. The extensive description given by Rose, containing three sentences, 69 words and 12 ideas, was typical of the detail these more capable readers provided,

We thought that it was a log cabin with a round table and chairs round it and four chairs, two bedrooms and a kitchen and two funny doors and you open them up and all the stuff falls out. They've got bunk beds, and on top there's one of those cabinet things that open up. It's very dark and not very nice; and the kitchen was smelly and mouldy.

For the less confident members of the HIG group, Nick and Courtney, the use of TPS improved the quality of their responses. Nick, who volunteered information rarely during the pre-intervention lesson, was able to give a concise response when sharing back during the observed Predict-Pair-Share lesson. When reading the text *New Zealand's Treasure Island* (Campbell, 2003), students were asked to predict what the survivors might be going to do to stay alive. Nick contributed little to the pair-sharing but was able to share back to the group, with a response of one sentence, 14 words and three ideas, suggesting they would, "Go hunting for food and get some more wood to make the fire bigger." His contributions during the Image-Pair-Share lesson were minimal and he was absent during the Summarise-Pair-Share lesson. However, during the final lesson when all three strategies were used his contributions were lengthy and descriptive. When asked to use SPS to summarise the instructions for playing Beetle in the text *Beetle* (Werry, 2002) he was able to provide the following response containing two sentences, 37 words and five ideas.

We thought that he had to start off to get a six for the body and other numbers for the rest of the body parts. They needed a piece of paper and a pencil and a dice.

While the equipment should logically be described first, he has at least provided full sentences and sufficient detail for the listener to understand.

Together, these results suggest that the use of TPS strategies appears to have encouraged increased length of utterances, more complex sentence structure and greater use of descriptive language, particularly among male students from the LIG and those less confident members of the HIG.

Time to think.

The teacher had used Pair-Share strategies previously without the inclusion of think time, and they were included in both of the observed pre-intervention lessons. However, the inclusion of think time in these intervention lessons appeared valued by students from both groups. Comments from the LIG group included,

It made me think more using three strategies, I usually just read a book and forget what it was about’
(Jardine, final intervention lesson).

SPS made me think longer, I can do it now. It helps me to think about what to say – I’m usually still reading.
(Jordan, final intervention lesson).

It helps me think a bit more, gave me a chance to actually think before we go around answering the question
(Stevie, PPS lesson).

The use of Pair-Share with the think time component allowed more time for these lower ability readers to process ideas than was normally available during regular Guided Reading lessons. Despite being fluent readers, HIG students made similar comments throughout the period of the intervention, ‘You think more about what we are reading about, it helps you understand things that are happening’ (Rose, PPS lesson).

Engagement in co-operative learning.

Within the bounds of the normal classroom programme it was not possible to record the discussion between each pair during use of the TPS strategy. However, an analysis of the behaviour and level of engagement throughout the intervention enabled the researcher to formulate the following hypotheses:

1. Group composition may affect the level of engagement in TPS strategies. On two occasions where a student was absent the teacher allocated three to a group and during the PPS lesson for the HIG this resulted in Nick, a reluctant participant normally, contributing even less to the spontaneous sharing of ideas. Mixed gender groupings can also be critical at the Year 6 level, in the PPS lesson for the HIG group the boy/girl pairing resulted in a lack of communication during the pair sharing.
2. Students who failed to contribute when questioned during the pre-intervention lessons gained confidence and participated more readily in group discussions after engaging in pair talk. For example, Peter and Jordan from the LIG group, both experienced instances where they were unable to answer questions during the pre-intervention lesson. While reading *The Cindy Limpics* (Wilson, 2001) the teacher asked “What did the writer mean when she wrote *she was the sort of girl that accidents happened to?*” Peter and Jordan both failed to share any ideas when prompted. Apart from one instance where Jordan reneged during the first intervention lesson (Predict-Pair-Share), both these students contributed readily when chosen to report back from their pair sessions throughout the intervention period. Similarly in the HIG group Courtney was often a less vocal participant. During the SPS lesson she abstained from sharing how Mr Orbell might be feeling about hunting for the extinct Takahe in the text *The Bird That Hid* (Orbell, 1986), saying she was “too shy.” However, later after consultation with her partner, she was able to give detail regarding the important steps in planning the exploration.
3. The use of the TPS strategy also generated a more supportive learning environment in which students were happy to add to the contributions of their partner if they had missed details. An example of this occurred during the Summarise-Pair-Share lesson for the LIG group reading *My Kiwi Will Fly*

(Maclachlan, 1995). After scanning through the text to decide on the main points to describe how Lydia set the print of the kiwi, Stevie reported, “She ironed it to make sure that it wouldn’t wash out, so when he puts it in the washing machine it won’t wash off and she put newspaper inside the pillow case.” Rachael realised Stevie had neglected to explain this last point and added “the newspaper is so the dye won’t go through both sides.”

Comments made by students from both groups further illustrated the benefits of the TPS strategies in encouraging co-operative learning. From the LIG group, Jordan who appeared to gain confidence and fluency from using the strategy, commented during the Predict-Pair-Share lesson that: ‘it’s easier talking to a person first’ then in the second observed lesson added: ‘it takes a bit longer but its still good because when somebody else says their bit you know more.’ Stevie, who struggled with summarisation in the example above, commented “it’s good to share ideas with someone else first, you can help each other.”

Students in the HIG also shared these sentiments. Courtney (during the Image-Pair-Share lesson) stated; ‘It’s better to know what other people think, you build on your thinking.’ Morgan shared his opinion, not grammatically correct, but the general idea is conveyed,

If you have a good idea and you don’t know quite how to say it, you just think you know how to say it and then somebody else will help you say it better, then it will help you say it (PPS lesson). After the final lesson of the intervention he stated more concisely, “it’s fun to talk so you get a better picture in your mind.”

Maggie provided a more comprehensive statement during the IPS lesson, Sometimes you read and you sometimes miss out some words and you don’t understand it after that. If you are in a group you understand better and you’re thinking about it. She found the SPS strategy particularly helpful to share and compare the main ideas with a partner.

Based on this evidence it would appear that individuals from both groups valued and gained benefit from the co-operative nature of the TPS strategies. As explained in Chapter Two, the intervention included adaptations of Think-Pair-Share to promote the use of three comprehension strategies; prediction, imagery and summarisation

The use of prediction.

The use of prediction was a regular feature of Guided Reading lessons in this class. In both of the observed pre-intervention lessons the children were prompted to predict the storyline from the title and front page illustrations. Prediction was also used in the middle of the LIG lesson to predict what might happen as the climax of the story was approaching. During Predict-Pair-Share lessons the use of prediction was extended to include prediction of what the characters might be thinking and feeling, what ideas might be contained in a letter and questions that councillors might ask children in regards to setting up a skatebowl.

It was evident in both intervention groups during PPS lessons that the strategy allowed most students to elaborate on and justify their answers using information from the text. During the reading of *Operation Skatebowl* (Belcher, 1998) LIG students were asked to predict what might be in the letter to the editor of the local newspaper, regarding skateboarders. Students were asked to link their predictions to information in the text so far. Initially Jardine found it difficult to justify his prediction and merely answered with “no skating in the car park.” Later in the lesson after practising the PPS strategy three times, and being asked to PPS regarding what would happen now that council had given their support to the project, Jardine was able to contribute a more indepth and substantiated response after sharing with his partner,

They’re probably going to build a skatebowl and it will be bigger than they thought because it says it will take two years (stated at the beginning of the text) and they will raise the money.

Students in the HIG were able to justify predictions by substantiating with information from the text, thinking beyond the story and rephrasing ideas. When

reading *New Zealand's Treasure Island* (Campbell, 2003), Maggie gave this detailed response when asked to Predict-Pair-Share in regards to how the passengers on the General Grant might be feeling,

We thought that they'd be cold because it's down the bottom of the world and they'll feel like they've got hyperthermia and they'll be frightened and feeling miserable and horrible because they don't know where they are. If you think it's your fault... if they die it'll be your fault and you can't forget it.

The use of imagery.

The teacher had been focusing on “painting a picture for your readers” during her writing programme, but had not actively promoted the use of imagery while reading. At times when the use of Image-Pair-Share was being initiated she used the word “think” instead of “image” for example, “What does the title make you think of?” rather than “Describe the image created by the title” (IPS lesson with HIG). This aspect was discussed and modified for future lessons.

Observation of the students during lessons provided an insight into the degree of engagement during the imaging components of IPS. Initially the male members of the LIG spent their thinking time gazing around the classroom and fidgeting, conveying the impression that they were not really engaged in the task. This lack of engagement was more obvious during the IPS lesson when illustrations were removed to encourage imaging. As the intervention progressed, these students appeared to become more focused on the thinking task, with less movement and a more constant gaze. In comparison, the body language of other students such as Rose and Stevie during the IPS lessons indicated a high degree of involvement in imaging behaviour. Their eyes were usually raised and almost glazed over and out of focus at times as they imaged.

Students who displayed greater involvement in imaging were often those who gave more detailed description as described in the previous section. Stevie, who appeared to engage heavily in imaging, added gesture to her detailed description of the willow tree as described earlier. Nick, in comparison, displayed little evidence of imaging behaviour, had little to discuss with his partner during the pair component and gave a very basic description of the sponges the children found in the text *Spongy*

Skeletons (MacGregor, 2004). He stated that they were “oval shaped and like coral and a different colour.” This contrasted with the description given by Maggie, who displayed strong imaging behaviour, of sponges as “round shaped, perhaps like a giant car sponge, they might have little things sticking out all over the place and they’re holey and crusty.”

Students also made specific mention of the use of the imaging component of Image-Pair-Share with comments such as that by Morgan “It made us a lot more creative, using our imagination a lot more instead of looking at the pictures. It helps you take in the information and what it says.”

The use of Image-Pair-Share has introduced students to a more explicit focus on the use of imagery within the context of Guided Reading. It appeared to add to the sophistication of students’ understanding; they were able to use prior knowledge and information from the text to create images which supported their understanding of the text as they read. Stevie’s detailed image of the willow tree, mentioned previously, included, “there’s lots of big, thin, long, thin sticks, they are very flexible...” This helped all the students in the group to understand the way in which these willow branches could then be woven into baskets and other items. Student comments related to imaging also provide evidence that metacognitive awareness has increased as a result of the intervention.

The use of summarisation.

Summarisation was an aspect of comprehension that the teacher had not often addressed during her Guided Reading lessons. During the first SPS lesson which was not observed, she found students in both groups struggled with identifying the important ideas and she spent time revisiting and demonstrating the strategy using the ‘think-aloud’ technique before the second lesson.

Those in the LIG group developed competence in summarising during the second SPS lesson relating to the text *My Kiwi will Fly* (MacLachlan, 1995). The two female members, Rachael and Stevie, were observed scanning through the text and using illustrations to assist in locating main ideas during both the thinking and sharing components of SPS. They used their fingers to count off the points of their summary as they prepared to report back to the group. Their summaries were accurate and concise. At the conclusion of the lesson students were asked to summarise the

main points in making a fabric print on a pillow case. Background noise at this point in the lesson has prevented an accurate transcription but Rachael described the main steps in the process while the two pairs of males tended to focus just on the equipment required. Jordan had difficulty in identifying the main points and was inclined to retell the complete story without deleting irrelevant details and constructing a summary.

The HIG also had difficulty in separating the main ideas from the detail and constructing a summary. When asked to create a summary of important ideas that Mr Orbell would want people to remember about his discovery of the Takahe (Orbell, 1986), Rose stated,

We think that he would have wanted everyone to remember that he caught them and he was the one, and he spent two nights when he went up and looked for them and lots of other nights down still looking for them...it was about 20 metres away and he had caught two.

This summary does not provide evidence of the reader having used the three steps or macrorules of summarisation; deletion, generalisation and construction (Kintsch, 1998), it is a mere retell of some of the details. The teacher did prompt the group to think about Rose's contribution and whether there was any information in it that made the story interesting but was not absolutely vital for people to know.

Despite the difficulties encountered with the use of summarisation students did acknowledge the value of the SPS strategy in helping them to summarise. Peter stated: 'it helped me to focus on the main points not details we don't really need to know.' Rachael added 'I felt confident about using it, it gave me time to think about what's really important.'

An analysis of the transcripts suggests that the use of the three variations of TPS did contribute in a positive way towards comprehension of the text and use of the focus comprehension strategies. The pre-reading discussion for each lesson included talk around the proposed focus comprehension strategy, or strategies (as in the last two lessons combining all three), and the related adaptations of Pair-Share to be used. This discussion, combined with the labelling of the Pair-Share strategies

according to the strategy being promoted, appears to have provided the students with a meta-language to talk about comprehension strategies. Stevie's comment on the use of all three TPS strategies summed up ideas expressed by other group members, "They made it easy, you can read different things (types of text) and image, predict and summarise, three different ways of thinking."

Engagement in higher order thinking.

As mentioned previously the intervention appeared to extend the range of questions/prompts used by the teacher and this consequently encouraged the use of higher order thinking across a range of text types. One problem which interfered with comprehension and thinking on some occasions was incorrect interpretation of the questions or requirements. This tended to occur with the ESOL students and caused confusion when sharing in pairs. An example of this was when students had been discussing the skateboarders in *Operation Skatebowl* (Belcher, 1998). The teacher then asked them to PPS what action they might take to solve the problem of having nowhere to skateboard. Peter interpreted this to mean; what action might the councillors take, not the skateboarders. However, Peter's language background was not always a hindrance to his understanding of the text, he was the first in his group to identify the play on words in the text *The Cindy Limpics* (Wilson, 2001).

With the focus on the three strategies of prediction, imagery and summarisation there were less opportunities for thinking beyond the text, but some students did appear to become more divergent in their thinking and able to offer different options rather than just confining their sharing to one set of ideas. After reading the text *New Zealand's Treasure Island* (Campbell, 2003), Maggie and Rose were able to share two versions of how the text might end, one happy and one sad.

Observation of the lessons along with examination of the transcripts provided qualitative data to supplement the quantitative results and establish the effects of using the TPS strategies. Analysis of this qualitative data suggests there have been shifts in the quality of students' oral responses, text comprehension and higher order thinking. The inclusion of thinking time and co-operative sharing seems to have contributed to, or at least been associated with these shifts.

Student Interviews

As described in the Methodology students in both intervention and control groups were interviewed, one-on-one, both before and after the intervention. The following questions were used during this semi-structured interview.

1. Tell me how you feel about reading?
2. How do you feel about reading in a group with your teacher?
3. How good do you think you are at reading?
4. Tell me what happened in your head as you read today?
5. Do you guess what the text is about before you read?
6. Do you form pictures in your head as you read? How does this help?
7. Could you use one or two sentences to tell your teacher what the story is about after reading?

The first three questions were designed to ascertain students' attitudes towards reading and the last four to investigate their awareness and use of the focus comprehension strategies. During the post-intervention interviews students from the two intervention groups were also asked to comment on the use of the three TPS strategies (see Appendix E).

Semantic Differential Scale.

A semantic differential scale numbered one to seven was also used to provide a focus for students during the interviews, for all questions except number four (see Appendix D). The use of this scale allowed the mean rating for each question to be calculated. Mean ratings for the two lower groups are shown in Table 8.

Considering mean scores across the range of interview questions it would appear there has been a slight increase in combined means for the intervention group, from 4.0 to 4.1, while the overall mean for the control group has dropped from 4.8 to 4.4.

Table 8 indicates there was little change in ratings for attitudes towards reading, from pre-intervention to post-intervention. Question 1, "Tell me how you feel about reading" showed a slight increase in rating for the intervention group from 4.8 to 5.2, whilst the control group rating stayed the same. Ratings for attitude to

reading in a group (question 2) remained the same for both groups. For question 3 there was a slight positive shift (0.6) in how good the control group students felt they were at reading.

Table 8.
Semantic differential ratings for the Lower Intervention Group and the Lower Control Group, June and December

Question	Lower Intervention Group		Lower Control Group	
	Mean rating	Mean rating	Mean rating	Mean rating
	June	December	June	December
1	4.8	5.2	5.0	5.0
2	5.0	5.0	4.4	4.4
3	4.3	4.3	4.6	5.2
5	4.5	4.0	5.2	4.2
6	5.5	6.0	6.2	5.8
7	4.3	4.3	4.4	6.2
Mean	4.0	4.1	4.8	4.4

In considering comprehension strategies there was a decrease in the frequency with which students guessed “what the text is about before reading.” However, the mean rating dropped by 0.5 for the LIG in comparison to a drop of 1.0 for the LCG. In terms of using imagery (question 6), the mean for the LIG rose by 0.5 compared to a drop of 0.4 for the LCG. There appears to be a substantial increase (1.8) in the rating for the LCG for question 7, which relates to summarisation.

It would appear from Table 8 that the intervention had a slight impact on attitudes towards reading and on the frequency of the use of imagery for students in the Lower Intervention Group. In comparison to their existing familiarity with prediction, which was regularly included in Guided Reading lessons prior to the

intervention, students in this LIG group seem to have gained metacognitive awareness and an ability to talk about imagery from the use of Image-Pair-Share.

The mean ratings for the Higher Intervention and Higher Control Groups are presented in Table 9. It was noted that there was an increase in mean ratings for the interview for the HIG group from 4.4 to 4.8, while the mean overall rating for the HCG dropped from 4.5 to 4.4. For each of the three questions relating to attitude the mean rating for the HIG rose by 0.4-0.6, whilst the ratings for the HCG dropped slightly. The intervention appears to have had a positive impact on the attitudes of these more capable readers. The impact is also more substantial than that recorded in Table 8 for the lower ability readers.

In considering question 5, relating to the use of prediction the mean score for the HIG rose by 1.2 in comparison to just 0.1 for the control group. The HCG recorded an increase of 0.5 in the use of imagery, but a drop off of 0.3 in the mean score relating to the use of summarisation. The HIG maintained ratings for these two areas with a slight increase of 0.2 in the use of summarisation.

Together, it would seem that the intervention has had a more positive effect on HIG students' views of their use of comprehension strategies than for HCG. The increase in mean ratings relating to questions 5 to 7 for the HIG is again more substantial than for the LIG.

Table 9.
Semantic differential ratings for Higher Intervention Group and Higher Control Group, June and December

Question	Higher Intervention Group		Higher Control Group	
	Mean rating	Mean rating	Mean rating	Mean rating
	June	December	June	December
1	5.8	6.2	6.0	5.8
2	5.0	5.6	5.3	4.8
3	5.2	5.8	5.8	5.5
5	4.0	5.2	3.7	3.8
6	5.8	5.8	4.7	5.2
7	5.0	5.2	6.0	5.7
Mean	4.4	4.8	4.5	4.4

Descriptive analysis of interview responses.

A descriptive analysis of interview responses was also carried out for each of the four groups and will be discussed in relation to each of the seven questions in turn.

1. Tell me how you feel about reading?

Almost all students responded positively to this question both before and after the intervention. The most common response, that they liked reading and it was fun, was given by at least 80% of students in each group, except for the LIG group where only 50% made this comment initially. It is worthy of note that this 50% consisted of the three female members of this group. Of the three male members, one said he didn't like reading and two commented that sometimes they enjoyed it.

Following the intervention, Liban, one of these male LIG students, whose initial comment was "sometimes I like it, sometimes it's boring," commented "I like

reading now, before it was boring, I read more at home and get chapter books from the library now.”

Peter, another LIG student, commented before the intervention that he “sometimes liked reading” and afterwards that “most of the time I do [like reading].”

There appear to have been positive shifts in attitude among the male LIG students following the intervention and this corresponds with changes in the rating scale discussed above. The only other student demonstrating a significant change in attitude was Nick, a reluctant participant in the HIG, who commented after the intervention, “I read more at home than I used to.”

2. How do you feel about reading in a group with your teacher?

From the LIG, 50% said they enjoyed reading in a group during the pre-intervention interviews, this compared with 40% or less in the other three groups. The figure remained similar after the intervention. It was noted that two of the LIG students commented initially that reading with the teacher “helps with the words,” however during the post-intervention interviews the comments of these two related to thinking rather than “the words” indicating a possible shift in confidence and in understanding the purpose of reading.

In comparison to the LIG, the number of HIG students who commented that they enjoyed reading in a group doubled from 40% to 80% after the intervention, this was the only group to record a positive increase for this question. There was also an increase, from 20% (pre-intervention) to 60% (post-intervention) of HIG students, who mentioned that “you learn from what other people think.” Initially two of these students had commented that they didn’t like being interrupted when reading in a group. Comments made by students in the LCG and HCG groups remained almost constant in both nature and number from one interview to the next.

Overall the HIG students appear to have made more positive shifts in articulating the benefits of reading in a group, than the LIG students.

3. How good do you think you are at reading?

Students from the LIG and LCG groups were evenly spread during both first and second interviews, between the following comments, “good/fast,” “average,” “I

understand” and “not fast.” Three of the LIG students saw themselves as “not fast” during the pre-intervention and this impression continued after the intervention. One student from this group shifted her opinion of herself from average to good for the second interview.

It was noted during the initial interviews, that 60% of HIG students classified themselves as average, while during the follow up these students had shifted their opinions and saw themselves as ‘good’ readers. There was a slight shift in the opinions of HCG students with two who saw themselves as “not fast” initially, improving their opinions of themselves. These comments parallel the ratings students gave themselves for this question with an increase in mean rating for the HIG of 0.6 and maintenance of the existing rating for the LIG. It appears from this data that the HIG students felt more confident about their ability as readers as a result of engaging in the intervention, whilst the LIG students’ opinions of themselves remained the same.

4. Tell me what happened in your head as you read today?

LCG (20%) and HCG (50%) students mentioned making predictions as they read, during the initial interviews; while none of the students in either of the intervention groups mentioned this. This was an interesting initial result as the teacher often used prediction in Guided Reading lessons. However, during the post-intervention interviews at least half of the students in each of these intervention groups described it as something they did.

Initially all students in the HIG talked about imaging as something that happened as they read and this was maintained later in the second set of interviews. The remaining three groups all recorded an increase in the number of students mentioning imaging, with percentages shifting from 17% to 66% for the LIG, 20% to 60% for the LCG and 50% to 100% for the HCG. This increase in the percentages across control groups may have been the result of a focus on the use of imagery within the class writing programme.

One or two students in each group mentioned ‘thinking about what’s been happening’ but there was no explicit mention of main ideas or summarisation by any of the students. As with question two reported above, there was a focus on

‘concentrating on the words and sounds’ with lower ability students during the first set of interviews, 50% of students in both LIG and LCG groups talked about this. This figure dropped to 0% for LIG students after the intervention, again suggesting the intervention assisted these students in understanding the real purpose of reading.

The intervention has assisted readers at both levels in spontaneously identifying and verbalising the use of prediction and imagery as ‘things’ that happen in their heads while reading. This supports the increase in metacognitive awareness noted from lesson observations. The lack of discussion around summarisation may be due to the difficulty students experienced with the strategy; students are not yet applying it independently.

5. Do you guess what the text is about before you read?

Although the rating on the scale for the LIG dropped 0.5 for this question, the number of students who said, yes they did guess at least sometimes, increased from 17% to 50% while the number of LCG students remained constant at 40%. Two students in each group commented that they did this only when the teacher asked. Shifts in thinking about predicting were evident from comments such as the following from Liban (LIG), “I don’t care about guessing, I don’t like it, it might not be the same when you read it.” After the intervention he said, “I sometimes predict when reading by myself, before I read and [to see] what’s next in the story.”

It was noted that initially two students in the LIG talked about predicting from the title and pictures at the beginning of the text while after the intervention, in addition to predicting before reading, three also mentioned predicting part way through the text or near the end. In comparison, discussion from LCG members focused only on pre-reading predictions during the final interviews. There appear to be positive shifts in the LIG, in the ability to talk about prediction as a result of the intervention, but these were not matched by the means from the rating scale.

Some students from the HIG changed their opinions during the intervention about how often they guessed. Two who said they didn’t guess initially said “sometimes” during the final interview and one student shifted comments from “sometimes” to “often.” Maggie was one of those from the HIG who initially commented, “No, I don’t like to guess, it ruins the story if I’m right.” After the

intervention she changed her opinion to, “Yes, sometimes. I think about other books and their plots. I use the title to predict and at the beginning of a chapter.”

This contrasted with the HCG who almost all mentioned predicting ‘sometimes’ during both interviews. These patterns reflect the increase in mean ratings shown in Table 8 for the HIG, compared to the minimal increase for the HCG. This again supports the positive impact the intervention appears to have had on the awareness of prediction for both LIG and HIG students. Linking back to data gained from lesson observations, it would appear that the use of PPS, involving an extended range of predictions and an increased number of teacher requests to substantiate predictions, has contributed to this increased metacognitive awareness of prediction.

6. Do you form pictures in your head as you read? How does this help?

At least 60% of students in the LCG, HIG and HCG groups mentioned forming pictures “helps them to understand” during the initial interviews and these comments were maintained after the intervention. However, only 17% of the LIG made this comment before the intervention and this increased to 66% in the final interview. For both this group and the HIG the number of students commenting that they image “a lot” increased by at least 40% after the intervention. This contrasted with control groups where 20% made this comment both before and after. There does appear to be a correlation between changes in comments around the topic of imagery and the changes in mean rates for this question in Table 8 for the LIG.

It is also worthy of mention that between 60% and 80% of the capable readers in both the HIG and HCG commented that it was important to see the characters and what’s happening clearly. This contrasted with only 30-40% of lower ability readers in the LIG and LCG.

Results here mirror those in Question 4 and data from lesson observations, with the intervention appearing to have increased awareness and frequency of the use of imagery for both intervention groups.

7. Could you use one or two sentences to tell your teacher what the story is about after reading?

For 50% of the LIG, the initial response to this question was that it was hard to do this, particularly if the text was long. Only one student commented that he could do it and the others said ‘sometimes’. In comparison 40% of the LCG said it was easy. The pre-intervention ratings for this question were very similar however, with 4.3 (LIG) and 4.4 (LCG).

Following the intervention, only 17% (one student) of the LIG said this was hard, while 66% commented that sometimes it’s easy. Two students commented that it was easier with SPS. There appears to have been positive shifts in students’ opinions of summarisation in this group, despite their rating remaining at 4.3. This supports data gained from lesson observations where students appeared more confident at using Summarise-Pair-Share during the second lesson.

Students in the LCG maintained their positive opinions during the final interviews and their rating lifted from 4.4 to 6.2. From their responses though, one could suggest that they did not have the same understanding of the process of summarisation as those in the intervention group who had more recent experience of it. Comments such as the following support this suggestion, “it’s easy to summarise, you concentrate on the book and take your time” (Ellen), and “yes, you tell people about it and make them want to read the book” (Reid).

In comparison, the more able readers seemed able to describe the process of summarising from the start and found it easy, 80% of the HIG and 83% of the HCG. Their mean ratings of 5 and 6 respectively confirmed this. Nick from the HIG was the only student who expressed an inability to summarise with “maybe, but I don’t do that.” Following the intervention he didn’t have a lot to say either, just that “you can share ideas with SPS and compare.”

Most students in both of the higher groups however, maintained their level of competence in being able to summarise in the final interviews and were able to describe the process more explicitly than the lower ability readers. Rose (HIG) commented, “I like to say everything and I was never good at summarising, I talk a lot. Now I can say the main things in smaller sentences.” Scott (HCG) during final

interview said, “You remember what the baseline of the story is and skip all the little side things, say what the big things are.”

Together the data suggests that the intervention has had positive effects on the LIG’s awareness and ability to talk about the three focus comprehension strategies though this was not always substantiated by increases to the mean ratings as seen in Table 8. For the HIG there has also been positive shifts in the comments made, not as significant as for the LIG, but this is possibly because their initial comments demonstrated that they were already more aware of the strategies. These results support research reported in the literature review regarding the importance of talk and cooperative learning strategies in explicit comprehension strategy instruction. The interaction has enabled readers to move along the continuum from supported use of comprehension strategies to more independent application and a greater degree of metacognitive awareness.

Comments on the use of the Think-Pair-Share strategies.

During the final interviews students in the two intervention groups were asked to talk about using the TPS strategies in general, and to comment on each of the three focus strategies, PPS, IPS and SPS. These comments tend to mirror those already reported during the lesson observations.

When reporting on the use of TPS strategies in general, all the students in both groups talked about having more time to think and get their answers ready and also about learning from what their partners said. The chance to rehearse their ideas with a partner enabled them to explain to the group more effectively and confidently. Courtney’s comment (HIG) summed up these feelings,

It helps me understand more about what the story’s really about. It gives me more time to think about what I should say. I know more about what my partner is thinking and their ideas add onto mine.

Similar thoughts were expressed in the LIG. Jardine commented, “It’s good, you think about it and then tell your buddy and see what their answers are and think more, you remember the things you missed out.” In total, 50% of the LIG group made

the comment that using TPS helped them to look for information and focus on what is in the book.

In respect of the use of Predict-Pair-Share, 80% of HIG students and 50% of the LIG commented that sharing with their partner gave them more ideas of what the story might be about. Peter (LIG) commented that this helped him focus on the text. Other students also commented that sharing helped them to explain themselves.

In regards to the use of Image-Pair-Share, one third of the students in both groups said that it was useful to see things from another person's perspective. Maggie (HIG) said that by sharing images with your partner it "could help with understanding." Rose (HIG) added that IPS helped because, "in someone else's mind there's a lot of different things happening and this helped me."

Students in the LIG expressed similar ideas. Fifty percent of this group said that sharing images helped their understanding of the text. In comparison, only 20% of the HIG expressed this view. Stevie (LIG) said, "I always use pictures, [with IPS] I can see what they thought and see if mine was the same or different. This gives me a bit more understanding." Jordan also commented that with IPS, his partner had more to add on and this 'makes a larger picture and the story clearer.'

As reported earlier, the LIG found summarisation difficult. When discussing SPS, 66% of this group commented that the strategy gave them time and helped them in locating the important parts. Stevie said, "it helped having time to think about the important parts and [when you talk] with your partner what they thought was important might help you change your ideas." Although students in the HIG appeared comfortable with summarising before the intervention, 60% also stated that the use of SPS helped them to locate the main ideas and cut out detail.

It would appear that students in both groups view the use of TPS strategies in a positive light and that they see them as supporting their ability to predict, image, summarise and comprehend the text.

Sketch to Stretch Activity

The drawing and labelling activity was used with both groups after intervention lessons to consolidate learning. This activity encourages students to make a personal response to the text. In reality students tended to sit together and

discuss their illustrations as they completed them, as is usual in a collaborative classroom setting. As a result, the sketches cannot, in many instances, be classified as a 'personal response' independent of outside influence. Organisational factors also impacted on the completion of these sketches. The timing of the lessons, the demands of the classroom programme and school-wide activities, meant that sometimes there was insufficient time for sketches to be completed immediately after the reading.

The sketching tasks used following the observed PPS lessons, where students were asked to draw what might happen next, produced similar results for most students. The LIG, after reading *The Bat* (Kent, 1999), were asked to draw the main character preparing for his next softball game. Four students produced detailed sketches that showed Eli getting himself ready with the correct gear, and included captions that referred to the special bat given to him by his Grandad. Two of the ESOL students, Peter and Liban, drew Eli playing the game with little detail and no reference to preparation or the special bat. These two also omitted captions. While this may indicate misunderstanding of the requirements of the task it may also indicate a lack of ability to predict using information gained from the text.

During the HIG's Predict-Pair-Share lesson the teacher inadvertently discussed what might happen next at the conclusion of the reading and as a result students' illustrations were all very similar.

For the observed Image-Pair-Share lessons, involving non-fiction texts, students in both groups were asked to draw and label a diagram relating to the context of the reading. With the LIG this involved creating and labelling a weeping willow tree as a result of reading *Willow Weavers* (MacGregor, 2004). The resulting sketches paralleled the sophistication and detail of images described during the IPS sections of the lesson. It appeared that those who had read the text carefully and used the information given when visualising, also produced more detailed and accurate sketches. For example, when asked to visualise how Eddie wove his baskets, Jordan instead gave a simple retell of the story so far. His sketch at the end of the reading was of a cloud shaped tree rather than a weeping willow. Stevie, in comparison, exhibited strong imaging behaviour during the lesson, gave detailed descriptions of

her images and drew a very accurate sketch of a weeping willow, adding a person alongside to give a sense of perspective.

When planning the lesson for the HIG around the text *Spongy Skeletons* (MacGregor, 2004), the teacher included a task asking students to draw and label the process of farming sea sponges as had been described in the text. Unfortunately as the lesson concluded the task was simplified to requiring a labelled sketch of a sea sponge. This was a relatively easy task for these students, but there were differences exhibited with those who had described more detailed and relevant images during the lesson, again producing more sophisticated sketches.

The use of the Summarise-Pair-Share strategy appeared to support the development of summarisation skills reflected in the sketching task for the LIG's reading of the text, *My Kiwi Will Fly* (MacLachlan, 1995). Students were asked to draw and label three main steps in producing the screen print of the kiwi. Peter struggled to select important ideas for the first SPS task during the lesson but managed to give the main steps in setting the print during the third SPS, and then produced a very concise 3-step sequence chart of the total process with correct use of procedural language. The final intervention lesson gave these students another opportunity to summarise main points into a three step sequence diagram. The task again appeared to illustrate the extent to which students were able to summarise accurately. Jordan, who struggled to select important information from the text during SPS sessions, included irrelevant and incorrect details in his chart.

The sketching task for the SPS lesson with the HIG group was not completed due to most of the group being involved in a sports practice. However, during the final lesson incorporating all three TPS strategies, all students in this group were able to demonstrate their ability to summarise through completing a detailed and well labelled diagram of the steps in playing Beetle.

While this activity was designed to consolidate learning rather than as an evaluative task, it has served to illustrate and confirm students' ability to use the three comprehension strategies as focused on during the intervention lessons. In so doing it has provided another source of information to triangulate findings of the other qualitative measures employed during the study.

Post-intervention Interview with the Classroom Teacher

At the completion of the intervention period a semi-structured interview was conducted with the classroom teacher. The interview focused on the following areas:

- Level of participation
- Quality of oral language/thinking
- Level of comprehension
- Use of think-pair-share strategies
- Influence of the intervention on teaching practice
- Comments on the research design

The main points emerging from this interview have been summarised below.

The level of participation.

The teacher commented that contributions to class discussions had risen, for example during current events each morning. Children from the LIG such as Jordan and Jardine offered ideas more readily. The use of TPS strategies had given them more confidence through having opportunities to practise with a partner. From the HIG, Nick still didn't contribute spontaneously but more detailed responses were evident when he was prompted to participate. These comments parallel information gained from lesson observations, regarding increased participation in the observed lessons by students who were initially more reluctant to join in.

Quality of oral language/thinking.

The teacher noted an improvement in the organisation of ideas when students contributed to discussions. In considering the 'Think' component of the TPS strategies she commented,

When I ask them to think I can see their eyes flicking up and the level of engagement has improved. Those in the HIG plus Stevie [from the LIG] are able to articulate more clearly and there in more depth in their thinking.

She felt that sharing in pairs broadened their thinking and triggered off other ideas that they hadn't considered themselves. The teacher's observations here

support data gained from researcher observation and audio-taping which showed that for some of the lower ability students, in particular, the semantic quality and length of utterances had improved. Comments also allude to the previously mentioned relationship between level of engagement and quality of response.

Level of comprehension.

The teacher felt the HIG had made gains in comprehension levels whereas the LIG didn't seem to have moved so much, except perhaps Stevie and Jardine who she felt would now probably fit into the HIG for Guided Reading. She felt that for Peter, Liban and Jordan who have difficulty with oral English, the gains were not as evident in test results. She substantiated this statement with reference to the November asTTle test in which these three students struggled to summarise main ideas. For each of these students, the majority of items relating to "Identification and understanding of main ideas," were displayed in the "To Be Achieved" section of their Learning Pathways Report. She felt they didn't appear to gather enough detail from the text to be able to distinguish important ideas from those that were less relevant.

Use of the Think-Pair-Share strategies.

The teacher was of the opinion that the students, in general, enjoyed using the strategy. It gave them a chance to gather ideas and think about how one might articulate them. Students liked talking to a partner first, it gave them confidence in their own ideas and enabled them to piggyback on the ideas of their partner if they needed to. It was a supportive setting and different from speaking in front of the whole class. She observed that Image-Pair-Share and Summarise-Pair-Share were initially difficult for the students as she hadn't focused on the use of imagery and explicit teaching of summarisation in reading up to that point. However, she felt the TPS strategies were particularly useful with the LIG in developing these skills. These findings substantiate previously mentioned information from student interviews and lesson observations.

Influence of the intervention on teaching practice.

The intervention had caused the teacher to rethink important aspects of her reading programme. She had always used prediction but now realised the need to focus more explicitly on visualisation, locating information in text to justify contributions and summarising. With the current school focus on inquiry learning she felt these skills were vital to enable students to engage in the process independently. The use of TPS strategies would definitely continue in her Guided Reading lessons. She saw it as another strategy with which to engage readers with text, rather than just 'search and destroy' type questions.

The intervention had heightened her awareness of the need to choose texts that not only related to a particular topic but that would allow practise of required comprehension strategies, for example summarisation. Texts could be at an easy or instructional level for such purposes, but she now felt a need to look more closely at the language used in texts as she had found that this needs to be understood before skills such as summarisation can be developed. An example of this occurred with the LIG reading the text *Poisonous Spiders – Fact or Fiction* (Crowe, 2004). The text states 'There is a story...white tails are poisonous'. Students took it as a fact that white tail spiders **are** poisonous, without considering the initial phrase 'There is a story'. This highlighted for her the importance of explicit discussion of meaning in text.

In terms of ensuring the provision of a balanced literacy programme, the intervention, which included a set number of Guided Reading lessons, had highlighted for the teacher the number of disruptions to the classroom programme at the Year 6 level in that particular school.

The school had been involved in professional development around the teaching of writing and in the Assess to Learn project; however, the teacher felt the research had been the most valuable professional development she had engaged in during the current year. It had resulted in 'huge changes' in her beliefs about teaching reading and she was also more aware of the reciprocal nature of reading and writing and the importance of using examples in texts to promote writing. She was now more aware of what was going on 'in the head' during reading, the way language is used in texts and the assumptions teachers make about children understanding text.

Comments on the research design.

The teacher was happy with the structure of the research project and the manner in which it was undertaken. Once she started to develop awareness of where the gaps were in children's understanding and saw the benefits of using the TPS strategies to support development of comprehension skills she found it difficult to refrain from using them with control groups.

Summary

This chapter has presented the results from a range of both quantitative and qualitative measures employed to document the effects of using three Think-Pair-Share strategies during Guided Reading lessons with two groups of children reading above and below their chronological age. The measures implemented have also allowed comparisons to be made with control groups at each of the two levels.

The intervention appears to have raised the reading ages of both of the target groups as measured by Probe and an independent reading inventory. There seems to have been a greater impact on the reading ages of the Higher Intervention group. Although there was some movement in asTTle scores for this group in particular, the differences recorded were not significant.

An analysis of qualitative measures has provided further support for the positive impact of the intervention. Audio-taped lesson transcripts and observations by the researcher demonstrate shifts in the quality of oral responses, text comprehension and higher order thinking. Student interviews produced an increased awareness and ability to talk about the prediction, imagery and summarisation, amongst the Lower Intervention group students in particular. Both intervention groups provided positive feedback regarding the use of Think-Pair-Share strategies. A post-intervention interview with the teacher substantiated many of these findings and highlighted the value of the project for her own professional beliefs and practice.

CHAPTER FIVE

DISCUSSION

The purpose of this final chapter is to establish links between the literature review and the results reported in the previous chapter, and to discuss how the findings might be interpreted. Limitations and suggestions for further research will also be addressed.

The aim of Guided Reading lessons is to strike a balance between meaningful discussion around text and the promotion of reading comprehension. This discussion will demonstrate how the use of the Think-Pair-Share (TPS) strategies has assisted in achieving this aim, with consideration of the effects of the intervention on the following related aspects:

- Reading comprehension levels
- The use of comprehension strategies
- Metacognitive awareness
- Oral language
- Student attitudes

Following the discussion on outcomes, a reflection on the use of the TPS strategies within this particular intervention will occur. The limitations of the study and areas for further research will also be outlined.

The use of TPS strategies sits within the social constructivist paradigm where the link between language and thought is valued and learning is encouraged through the use of teaching strategies that foster dialogue and cooperation. For students to be actively engaged and motivated to learn, learning experiences must be relevant in terms of level and learning needs, and contain content that challenges thinking and gains their interest. Opportunities for practice are required to assist learners to move towards internalizing the new learning and developing independent application (Vygotsky, 1978).

Reading Comprehension Levels

The reading levels established after the intervention using the Probe test and the Informal Reading Inventory suggest that the introduction of the independent variable, the use of the three variations of the TPS, has impacted positively on the comprehension levels of these students. The changes in reading comprehension levels could be attributed to the ways in which use of the TPS strategy provides for the incorporation of the key principles of learning proposed within the social constructivist paradigm and referred to on the previous page. The nature of the strategy promotes a high level of participation and engagement, and allows the teacher to prompt for integration of the two subsystems, verbal and visual, as suggested by the Dual Coding Theory (Sadoski & Paivio, 1994, 2001). Think-Pair-Share is used several times throughout a lesson providing opportunities for repeated practice and increased confidence in the use of the focus comprehension strategies.

Reasons for the apparent discrepancy in results and lack of support from asTTle data for the impact of the intervention, as compared to the first two measures described, may be attributed to the composition of the asTTle reading test. Both Probe and the Informal Prose Inventory used by the teacher for running records, involved oral testing of children's comprehension, the same language mode used to promote comprehension in the intervention programme. In contrast, asTTle consists of a forty minute pencil and paper test, requiring students to answer a variety of question types such as multi-choice, ranking of alternatives, cloze, true/false and short answer questions. The tests generated for this class included four practice questions, but these did not cover all item types within the body of the assessment. It might be that the necessity to read and interpret the written instructions for each question detracts from comprehension of the test passage itself. A student's writing ability may also impact on the resulting written responses where short answers are required, again affecting the overall score for what is termed "reading comprehension." Combined with these factors and challenges, these lower ability readers may also have taken more time to process text and apply recently developed comprehension strategies in a more conscious manner than their higher ability peers (Duffy et al., 1986), resulting in less movement in asTTle scores and levels.

The asTTle manual states that “valid assessment requires a good fit between what you teach and what you assess” (Hattie et al, 2004, chap.2, p. 2). The manual admits shortcomings are evident in the limited nature of a pen and paper test and suggests that this “one-off snapshot of student achievement” should be triangulated with other information. In this particular research triangulation was achieved through considering quantitative data from three sources and qualitative data.

The content of passages used in the asTTle test may also have influenced the results obtained, as suggested by Rosenshine and Meister (1994). asTTle passages have a New Zealand focus, such as visiting Waimangu, the history of the band *Crowded House* and an article titled *Ruapehu, the restless mountain*. These are topics which ESOL students, such as those in the Lower Intervention Group in particular, may have found difficult to relate to in comparison to Probe passages with content located around more generic topics such as riding bikes, visiting the supermarket and using a computer. This factor may also explain the apparent lack of progress, as measured by asTTle, of the LIG male ESOL students.

As reported, mean scores for Probe testing and Instructional Reading Ages for those in the Higher Intervention Group increased by more than those for any other group. The eight week length of the intervention period may be significant in explaining this result. Duffy et al (1986) suggested lower ability readers require more than six months to apply comprehension strategies in an independent and flexible manner during standardised testing situations. More recent research also supports the need for extended periods of instruction involving multiple opportunities to practice (Duffy, 2003; Pressley, 1998, 2002).

Overall, the use of TPS strategies had a positive effect on the reading comprehension levels of students in both of the intervention groups. This supports the positive shifts in comprehension noted in the only other empirical research located involving the use of TPS (Baumeister, 1992). A larger sample size was used in Baumeister’s research, but comprehension was measured using only written recall. In this respect, the current research is more robust, with triangulation of data strengthening the validity of the findings, and two of the three measures involving oral testing of comprehension.

The Use of Comprehension Strategies

Results support the large body of research that has demonstrated that instruction in comprehension strategies does facilitate improved comprehension of text (Duke & Pearson, 2002). As mentioned in the literature review, comprehension strategies work in flexible and orchestrated combinations and it is neither possible nor necessary to isolate the effects of the use of one particular strategy. However, within the context of the Guided Reading approach and while using rich texts, it is possible to highlight particular strategies to enable readers to develop awareness and effective utilisation of each. The current research concurs with findings by Pressley (2000), Sweet & Snow (2003) & Van Keer (2004) in this respect. Strategies were introduced into the intervention one by one to allow for this specific focus to occur. Results from interviews and observations reflected heightened awareness and increased use of the three strategies.

Prediction

Qualitative data confirmed the theory that prediction enhances comprehension by providing a purpose for reading and promoting engagement (Nolan, 1991; Palincsar, 2003). Lesson observations before the intervention included some instances of the strategy being promoted, but these involved only prediction of the plot and climax of the narrative texts utilised. The extension of the strategy into predicting other aspects of the text was noticeable in the observation of intervention lessons and in the responses of students during the post-intervention interviews. Students in the Lower Intervention Group also showed an increase in their ability to elaborate and justify their predictions with information from the text, reflecting a greater level of engagement, an essential element of prediction as stated by Duke and Pearson (2002), MOE (2003) and Wood and Endres (2004).

Another vital component in the promotion of the use of prediction, which appeared during some of the intervention lessons, was the revisiting and evaluating of predictions against the text. Research by Fielding, Anderson and Pearson (1990), and Lai, McNaughton, Macdonald and Farry (2004) suggested that this is an essential element that engages readers in a higher level of thinking as it requires synthesis and

evaluation. Time restraints prevented this revisiting from occurring as often as the teacher would have liked.

Analysis of interview data demonstrated that the use of Predict-Pair-Share, in addition to promoting engagement and higher order thinking, had increased metacognitive awareness of the prediction strategy. This confirms research reported by the NRP (2000) and Van Keer (2004).

Imagery

The use of imagery is critical to effective comprehension (Gambrell & Jawitz, 1993; Gambrell & Koskinen, 2002; Sadoski & Pavio, 2001). The intervention appeared to support the research surveyed, with the cooperative benefits of the use of Image-Pair-Share (IPS) generating an increase in metacognitive awareness of the use of imagery by lower ability students, in comparison to those in the Higher Intervention Group who were all able to discuss imagery prior to the intervention (Kucan & Beck, 2003; Van Keer, 2004). Both intervention groups demonstrated an increase in how often they imaged, however, this increase may also be the result of a class focus on “painting a picture” when writing. Students felt the use of IPS had a positive effect on comprehension as it was useful to “see” things from another’s perspective, and lesson observations noted instances where the sharing of images contributed to increased understanding later in the lesson. It was also noted that those who appeared to engage more intensively in imaging behaviour were usually those who were able to produce more detailed descriptions. This evidence highlights the importance of imagery in cognitive processing and supports Sadoski and Paivio’s Dual Coding theory (1994, 2001), which suggests cognition requires both verbal and nonverbal (image based) subsystems to process information. It is also consistent with Gambrell’s suggestion that the effort required to use both verbal and visual subsystems contributes to greater depth of comprehension (Gambrell & Jawitz, 1993; & Gambrell & Koskinen, 2002).

There have been conflicting research reports around the relationship between text illustrations and the use of imagery. Sadoski (1983, 1985) suggested that more imagery was generated when the text lacked illustrations, whilst Gambrell and Jawitz (1993) reported that both illustrations and prompting for the use of imagery were necessary to increase comprehension. Observations from the current study provide

support for the later with a lack of engagement and comprehension noted amongst the lower ability male students, when illustrations were absent. It should be noted that this particular lesson involved a non-fiction text and that results may differ with narrative text.

Twenty years ago Gambrell and Bales (1986) expressed concern that imagery was seldom discussed during instructional reading lessons and the classroom teacher involved in this intervention concurred with this finding. As mentioned she often promoted the creation of images through children's writing but not when reading. The intervention alerted her to the need to include promotion of this function in Guided Reading lessons and the need to use the correct terminology with the children, for example "create an image of ..." instead of "think about the picture."

Summarization

Lesson observations and comments made by the teacher and students in both intervention groups support claims in the literature that summarization is one of the more challenging comprehension strategies to teach and apply (Coley & DePinto et al., 1993; Duke & Pearson, 2002; NEMP, 2005).

While students in both the HIG and HCG groups spoke more confidently than the lower ability readers about their ability to summarise during the initial interviews, students in both intervention groups (HIG and LIG) had difficulty separating main ideas from irrelevant detail before constructing summaries, and as reported, the teacher spent extra time in explicit teaching before the second SPS lesson.

Comments in post-intervention interviews with both the HIG and LIG, showed students valued the use of Summarise-Pair-Share because it allowed them time to negotiate the important details with a partner. Consequently they felt more confident about the process of summarization after the intervention. Although based on student opinion rather than quantitative data, this positive support for the use of SPS concurs with Baumeister's (1992) findings where comprehension increased for questions requiring summarization, after collaboration with a partner.

The teacher found that the time given to the thinking and sharing components of SPS needed to be extended in comparison to the use of PPS and IPS and it was evident that even then, there was insufficient time to allow the steps of deletion, generalization and construction to be completed. For future teaching it may be more

effective to extend the time frame for each SPS and perhaps incorporate pencil and paper into the strategy for students to list down main ideas, prioritise them with their partner and create their summaries. Coley, DePinto et al. (1993) found similar adaptations were necessary when developing the use of summarisation during Reciprocal Teaching. Those struggling with summarization will also require more practice sessions with SPS to develop independent application of the strategy. These findings are again consistent with the research by Duffy (2003) and Pressley (2002) and that mentioned earlier, suggesting that extended periods of instruction are required for lower ability students before the results will be reflected in comprehension test scores.

Metacognitive Awareness

Closely linked to effective comprehension and the use of comprehension strategies is the notion of metacognitive awareness. In the current study students in both intervention groups appear to have made positive shifts in their awareness of the three comprehension strategies as evidenced by their ability to discuss them during lessons and interviews. However, comments made in the initial interviews substantiated the research, with the higher ability students already displaying a level of awareness in the initial interviews, and half of the lower ability students mentioning the need to concentrate on the words and sounds. After the intervention involving explicit strategy instruction, not one of the LIG students made this comment in the final interviews, preferring to talk about comprehension strategies, and indicating perhaps an increased level of metacognitive awareness of the strategies involved in comprehending the text rather than merely focusing on processing.

Stevens et al. (1995) warned that research claiming increased metacognitive awareness was often based solely on measures of reading comprehension, and that such claims were in fact not valid. The researcher in this study is aware of such limitations and it should be noted that the comments made here are based on qualitative interpretation of interview transcripts and lesson observations.

Oral Language

Lesson transcripts demonstrated positive shifts in several aspects of oral language usage during the intervention. These combined with comments made by the teacher suggest that the use of TPS strategies can provide a supportive environment in which students are able to gain confidence and experiment with language structures and new vocabulary. The teacher noted that the positive gains from the intervention extended to whole class discussions beyond the context of Guided Reading.

It was evident that the intervention impacted to a greater degree on the oral language of the lower ability students, two of whom used English as an additional language. For this group, improvements were noted in the length of utterances, the complexity of sentence structure and the use of descriptive vocabulary. For those already confident and fluent (mostly members of the HIG), the intervention had less impact on oral language, although an increase in the use of descriptive language was noted.

From an examination of student and teacher comments it appears the key components of the TPS strategies that generate these positive changes are the thinking time and the opportunity to share with a partner before facing the larger group. This supports research by Howe (1992), who described pair talk as providing a “high density talk arena” (p.14) in which both participants accepted the responsibility to become fully engaged in talking and listening. The findings here also concur with Baumeister’s research (1992), where she found the use of TPS resulted in greater shifts in oral language than cohorts using just think time and regular classroom lessons.

Student Attitudes

The first three questions in the student interviews related to student attitudes of themselves as readers and their feelings about reading in a group with their teacher (see Appendix E for questionnaire). As shown by the mean ratings in Tables 8 and 9, the intervention appeared to have a more positive impact on the attitudes of those students in the HIG for these three questions, in comparison to those in the other three groups. This correlates with the more significant increase in reading achievement for this group and their awareness of strategy use prior to the intervention. The more

independent application of comprehension strategies has enabled a higher level of engagement and confidence and consequently resulted in more positive shifts in attitude. In considering individual ratings and comments however, it is worthy of note that the two male EAL students in the LIG and the reluctant male in the HIG, all showed improved attitudes towards reading during the final interviews. These students also displayed increased levels of engagement and confidence during the intervention and their comments during the post intervention interviews shifted from away from initial remarks about concentrating on the words and sounds. Their results in terms of reading achievement were not as significant but one must consider that perhaps these students have not yet attained the independent application of the comprehension strategies needed during testing. These findings highlight the relationship between engagement, understanding and attitude, and this should be considered by teachers when planning and teaching Guided Reading.

More explicitly, evidence from the research suggests students from both intervention groups valued the use of TPS strategies in extending their understanding and their use of the comprehension strategies. They valued the thinking time, the chance to rehearse with and learn from their partner, and felt that it assisted in focusing on the text more closely. This outcome contrasts with findings by Baumeister (1992) who used an attitude scale after each lesson in her research and targeted particular sections of the lesson. Working with lower ability students, she found attitudes towards the use of TPS were less positive than the other two treatments involving wait-time and regular classroom instruction. She surmised that unfamiliarity with the TPS strategy may have influenced student attitudes. The intervention period in this study was twice the length of that in Baumeister's research and this may have enabled students to become more familiar and comfortable with the use of the strategy.

The Use of Think-Pair-Share in the Context of this Intervention

From the evidence presented in Chapter Four and the above discussion, it is clear that as a result of using TPS strategies there have been a variety of positive shifts in comprehension levels, awareness and use of comprehension strategies, aspects of oral language and attitudes. It is now pertinent to focus more specifically on the use of TPS as a teaching strategy.

As a means of promoting the link between language and thinking.

Results obtained from this study illustrate the strong link between language and thinking that underpins the aims of the *English in the New Zealand Curriculum* document (MOE, 1994). The TPS strategies provided students with a vehicle to link existing knowledge with new knowledge, both from texts read and from listening to their partners, a process described by many researchers as a key to learning (Bloom & Kiel, 2001; Pinker, 2002; Whitehead, 2005). This sharing with a partner has also enabled students to trial these new ideas and if necessary, clarify or rearrange them before presenting them to the larger group. Students described the benefits of TPS as helping them to “understand better” and create a clearer picture in their mind. They also said TPS helped them to share and compare main ideas so they were able to then explain these to the group more effectively. As well as confirming the link between language and thought these comments once again indicate increased metacognitive awareness facilitated by the use of the TPS strategies.

The initial component of TPS, the “think-time” or “wait-time” has been well researched over the years, as reported in the literature review. This study confirmed, as Tobin (1980, cited in Baumeister, 1992, p.36) and Baumeister (1992) suggested, that periods of wait-time should be determined by the nature of the thinking required for the task. A think time of 20 seconds was originally suggested in the methodology, however, after completion of the two PPS lessons it was decided that 15 seconds was sufficient to allow internalisation of the question and processing of relevant information. In line with Tobin’s comment (1980), think time was extended for summarisation lessons, as mentioned earlier, to allow for the more complex processing required. Although longer time periods were provided than those given in the research surveyed, results were similar to the findings of others, with the provision of “think-time” contributing to high levels of participation in the pair sharing and very few “I don’t know” responses (Gambrell, 1983; Stahl, 1994). It appears that when using TPS strategies, the length of the ‘think-time’ component should be flexible and determined by the demands of the cognitive task involved.

As reported in the previous chapter the classroom teacher already used “pair-share” without the thinking component. However it would appear, based on analysis

of comments from students in the two intervention groups, that this is an essential ingredient in the success of the strategy. Lower achieving students commented that they were often still reading when the teacher asked questions and they now had a chance to think and prepare themselves before contributing.

While the wait time and paired sharing discussed in the 'Oral language' section above, appeared to elicit gains in the quality and quantity of contributions at the group level during sharing time, there is one area of concern that should be noted. During the third phase of the strategy when students shared back to the group, the interaction patterns often reverted to a more traditional Initiate-Response-Evaluate sequence (Perrott, 1988). Whilst this was sometimes due to time restraints, a more interactive and critical sharing of pair contributions may have produced further benefits in terms of the use of language, with opportunities for the teacher to encourage elaboration and comparison of ideas and for students to engage in reflection and evaluative thinking. If TPS is to be utilized to its full potential, opportunities for interactive talk within both the paired and group sharing components should be maximized.

It can be concluded, however, that the use of TPS in this study has allowed the teacher to promote and strengthen the link between language and thinking for these students. Time to think has been valued by the students and increased metacognitive awareness has enabled them to verbalise their thoughts about the positive effects of the strategy.

As a cooperative learning strategy.

Learning in this social context sits within Vygotsky's social constructivist paradigm where learners interact with and are scaffolded in their thinking by experienced others (Vygotsky, 1978). Comments made by the pupils and confirmed by the teacher, relating to the benefits of using TPS, focused on this partnership, rather than the role of the teacher. It is clear that this pairing has assisted in the development of thinking and construction of new knowledge. This confirms suggestions by Clay (1998), Foreman and Cazden (2004), and Palinscar (2003) that interaction with others, and not just more experienced others, is vital for successful

learning. This is not to underestimate the important role of the teacher in facilitating and monitoring the discussion however.

The study confirmed that the TPS strategies contained the essential elements required for successful cooperative learning tools as defined in the model developed by Johnson and Johnson (1987), and Brown and Thomson (2000). Positive interdependence was exhibited as students needed to work together in pairs to rehearse their contributions and fulfil the requirements of the task. Each individual was accountable to their partner for both sharing their ideas and reporting ideas to the larger group. This level of accountability appeared stronger when students worked in pairs than in groups of three; when individuals were absent and a triad was created it was noticeable that the less confident individual took on a more passive role. The question also arises as to whether this level of accountability is affected by social grouping. For some children, working in mixed gender pairs at the Year six level was a challenge. Overall there was a high degree of interaction with close physical proximity and all children being involved at any one point in time, in active speaking or listening. Finally, lessons involving Predict-Pair-Share, Image-Pair-Share and Summarise-Pair-Share all included group reflection on the use of the focus strategy and consideration as to whether it had helped students to carry out the particular comprehension function.

This intervention has demonstrated that TPS strategies can be classified as simple teaching strategies that foster cooperative learning within the context of regular lessons, and without the constraints of more complex cooperative lesson structures such as Reciprocal Teaching (Brown & Thomson, 2000; Kagan, 1998). Researchers reported that teachers can be frustrated with the rigid structure of RT and the low levels of engagement observed (Marks, Pressley et al. 1993).

As a means of delivering comprehension strategy instruction.

Results reported here concur with research surveyed by Trabasso and Bouchard (2002) who found that teaching strategies fostering cooperative learning can support the development of comprehension strategies, with students gaining increased control over their learning and a resulting higher level of intellectual conversation. As with research into the Reciprocal Teaching approach, lesson

observations and comments made during the interview with the teacher suggest the use of TPS increases teacher awareness of the need for explicit comprehension strategy instruction.

As noted in the literature review there has been considerable debate over whether good readers need comprehension strategy instruction. The present study has demonstrated that all students appear to benefit from such instruction, not just the Lower Intervention Group. Qualitative data confirmed the positive effects for both groups of students and the Higher Intervention Group actually recorded greater gains in comprehension levels in quantitative measures. It should be remembered however, that the LIG may have made greater progress had the intervention involved a longer time frame. These results support suggestions by Block and Pressley (2002), Trabasso and Bouchard (2002), and Vacca (2002), who stated that explicit instruction in comprehension strategies should be implemented with all students to equip them to engage with and critically reflect on the ever increasing diversity of text forms in our society.

The use of PPS, IPS and SPS allowed for scaffolded assistance, particularly in the initial stages when the teacher demonstrated the comprehension strategies, and gradual handing over of responsibility as students became more confident. These strategies allowed time for students to reflect on what they read and for students to engage in meaningful dialogue. The intervention demonstrated that TPS strategies can be adapted easily to suit the demands of the different comprehension strategies. As indicated earlier; the wait time needed to be extended to cater for the processing of ideas and construction of summaries and further adaptations could be made to more successfully promote development in this area of need.

Implications for Classroom Teachers

The study provides important messages for the classroom teacher about the need to maximise learning opportunities within the context of Guided Reading lessons. It is crucial to foster comprehension by maintaining a balance between meaningful dialogue around rich texts and dialogue involving explicit teaching of the skills and strategies required (NEMP, 2001; Sweet & Snow, 2003). The research supports the claim that teachers must include explicit strategy instruction in Guided Reading lessons.

New Zealand literacy handbooks now identify and promote the teaching of comprehension strategies, but teachers require a greater level of knowledge about their importance. Three comprehension strategies, as they are labelled by the MOE (2003, 2006), were targeted in this intervention; prediction, the use of imagery and summarisation, and there are important messages for teachers conveyed from the results. While many teachers have incorporated prediction into instructional lessons using a variety of approaches, the study suggests that it is vital that these predictions are revisited and evaluated against text information. The results of this study indicate that some cognitive functions, such as the use of imagery, may have received a less explicit focus from teachers. However, it is not possible to generalise from an intervention involving just one teacher. An understanding of the role of imagery in the process of reading and comprehending text is particularly necessary in order to shape instructional sequences that involve the use of imagery. When supporting students to develop summarisation skills, an awareness of the sequence of deletion, generalisation and construction is vital. If comprehension strategy instruction is to be successfully integrated into Guided Reading lessons, teachers must have an understanding of the complex cognitive processing involved in comprehending text and the skills and strategies involved. They also require a high level of metacognitive awareness of themselves as readers to promote this awareness in their students.

In order to deliver effective literacy instruction, teachers also require a range of strategies to cater the varying levels of competence amongst their classes. Traditional question and answer sequences encouraging students to guess what is in the teacher's mind, are no longer suitable; to become effective comprehenders students require engagement, practice and interactive discussion to promote the links between oral language and thinking and the construction of meaning from text. Teaching strategies promoting cooperative learning are particularly useful and TPS has been shown to successfully support the development of students' comprehension, and awareness and use of comprehension strategies.

The use of language in texts and in questions posed to students also requires consideration, particularly with the growing numbers of students speaking English as an additional language in our classrooms. As illustrated in the research it is easy for misinterpretations to arise which impact on the quality of pupil contributions.

Teachers need to be skilled observers to monitor such situations and promote accurate interpretation. The use of TPS enables this to happen as the teacher is able to observe pair interactions as well as contributions shared back to the group.

Further to this role of teacher as observer is the need to build comprehensive profiles of student performance that are not reliant on just one source of quantitative data. As this research project has demonstrated, data from standardised test measures should be interpreted cautiously with consideration given to the nature of the testing and the information gained. The information gained should be interpreted alongside that obtained from observation in the classroom.

Limitations of the Study

As with research undertaken in many educational settings, this study was constrained by the reality and complexity of the classroom environment. The aim was to maintain the routines already in place in the instructional reading programme, so full experimental control was not possible. The following limitations should therefore be noted in interpreting the results:

1. The presence of the control groups, the second intervention group and those students not involved in the project added to the background noise level and at times diverted the attention of the teacher.
2. Although the researcher tried to assume the role of non-participant, this was not totally achievable as it was not possible to be hidden from view. As expected a degree of participation occurred with a physical presence being necessary to construct field notes from the group interactions during the lessons. The effects of this were minimised to some extent as efforts were made to build trust, openness and acceptance during the one-to-one interviews and testing carried out by the researcher before the intervention began.
3. Efforts were made to reduce the Hawthorne effect through grouping children according to reading levels as is regular practice in primary classrooms. However, the limitations of the recording equipment meant that the microphone needed to be placed in the centre of the group to enable accurate recording and this signaled 'guinea pig' status to those involved.

4. The demands of school-wide activities and programmes encroached on lessons at times, putting pressure on the teacher to meet deadlines and preventing extension of purposeful discussion and reflection, and the completion of follow up sketching tasks.
5. There were times when the planned questions for the TPS episodes and follow-up tasks deviated from those planned, as would be expected in regular teaching; but this meant children were not always challenged sufficiently to develop the focus strategy.
6. As with all interviews it is necessary to consider whether participants gave genuine responses, or responses they thought the researcher would want to hear. Triangulation of this data with other qualitative and quantitative measures reduced the effects of this.
7. In considering the interpretation of results it must be remembered that the study involved just one classroom teacher and four groups of children within this class.

In terms of the collection and processing of quantitative data there are also limitations that should be considered:

1. The limited numbers of subjects in each of the two intervention and two control groups. This constraint resulted from the size of the class and the number of children falling within the required instructional reading levels.
2. The small group sizes made it difficult to establish valid statistically significant results with the measures applied.
3. Group numbers changed during the intervention with one student shifted schools and reducing the size of the Higher Intervention Group. Two students were not enrolled at the school for the initial asTTle testing in March.
4. The limitations of the asTTle test as a forty minute pencil and paper test, especially with the lower ability readers, have been noted earlier in this chapter
5. The Probe test does include the classification of questions into the categories of comprehension required; however, these are limited in number and these numbers are not consistent from one level to the next. Direct comparisons are therefore not possible beyond the overall comprehension levels.

Despite these limitations the intervention was designed in a reliable manner and could be replicated to other settings without difficulty.

Suggestions for Further Research

Some of the limitations referred to above lead naturally into suggestions for further research. The first suggestion would be to replicate the study with a larger sample size across multiple classes to investigate transferability of the results. This study was carried out with a Year six class and it could also be extended to other class levels to see whether the effects of TPS are similar.

Although gender and the language backgrounds of the subjects were not being investigated here, results indicated the effects may differ between particular groups of students and this may warrant further research.

The intervention period of eight lessons produced more positive effects for students of above average reading ability and it has been suggested that lower ability readers require more time to internalise the use of strategies. It would therefore be useful to ascertain the effects of a longer intervention period with a lower intervention group.

Adaptations to the observation and use of the TPS strategies could be made. The pair discussion is a key component in the strategy. If this discussion were able to be recorded and analysed, it would enable the researcher to more specifically document the role of this component by comparing students' original contributions to their partner with the quality of language and vocabulary used in the responses subsequently given back to the larger group. As suggested earlier in this chapter, a focus on developing the interaction patterns during the group sharing may also be worthy of investigation. This would require rethinking of the total lesson time and ensuring that the focus on comprehension of the text is not lost.

The use of the TPS strategy as part of Guided Reading, Shared Reading and Writing sessions, as a means of encouraging all students to engage in genuine conversation, has been proposed by the MOE (2006). Research into the effectiveness of the strategy within the context of the later two approaches would be valuable.

It would also appear that further investigation of the use of comprehension strategy instruction within Guided Reading lessons would be of value for New Zealand teachers, particularly into the teaching of imagery and summarisation. Such research would provide more information to support teachers in delivering effective instruction and acquaint them with the required understanding and metalanguage.

Conclusion

This study was prompted by an interest in fostering more effective oral language interactions amongst children within the context of Guided Reading lessons. Think-Pair-Share strategies were considered as a means of encouraging this interaction and were acknowledged in the New Zealand Education Review Office's report on Speaking (ERO, 2005) as a tool for promoting both thinking and oral language skills. However, a survey of the literature indicated a lack of empirical research into the effectiveness of this teaching strategy.

The research by Baumeister (1992), an unpublished doctoral thesis, provided some verification as to the value of the strategy and the current study has provided support for Baumeister's conclusions. The context for use of the strategies remained within instructional reading lessons. Her study involved a much larger sample size whilst the intervention and control groups for this project were selected from just one class of students. However, in comparison to her focus on lower ability readers, this study investigated the effects on two intervention groups at different levels of ability and contrasted these effects with control groups at each level. The time period for the intervention was extended from four sessions in Baumeister's study to eight sessions, and TPS was employed within the context of Guided Reading lessons rather than limited to follow-up discussion periods. The TPS strategy involved one longer thinking component rather than Baumeister's use of two and variations were introduced to foster the use of prediction, imagery and summarisation.

Results confirm the positive effects of the strategy and extend the original findings confined to readers of below average reading ability. Following an eight week intervention period quantitative data showed a more positive impact on comprehension levels of the higher ability students, but students from both groups also showed shifts in aspects of oral language, and awareness and use of comprehension strategies. The adaptations of PPS, IPS and SPS appeared to raise

students ability to use and talk about prediction, imagery and summarisation, and positive attitudes were displayed towards the use of the strategies.

The versatility of TPS strategies has been confirmed; however, it must be noted that the tendency by some educators to reduce the tool to “Pair-Share” is to exclude a vital component and deny students the time to organise their thoughts and select appropriate language. In relation to more structured cooperative sequences such as Reciprocal Teaching, the level of accountability encourages participation, the opportunity for rehearsal and a high level of engagement in speaking and listening.

Pressley (2002) expressed concern that knowledge about reading comprehension and comprehension strategies was not getting into schools and being utilised by teachers in delivering effective practice. These areas have been identified by the National Education Monitoring Project and by other New Zealand researchers (Lai, McNaughton et al., 2004; NEMP, 2005), as weaknesses in New Zealand programmes as well. With the acknowledgement of the value of TPS in *Effective Literacy Practice in Years 4 to 8* (MOE, 2006), the use of the TPS strategy will possibly be extended within our primary schools, as a tool that supports teachers in the push to raise comprehension levels and awareness.

In classifying successful teaching strategies that could be used in teaching reading and writing, Mehigan (2005) allocated TPS to the category of ‘time honoured favourite’ and certainly it has earned this title since its development by Professor Lyman almost thirty years ago. However, perhaps the time is coming where Think-Pair-Share might be reclassified by Mehigan as ‘research based’.

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APPENDICES

Appendix A

Letter to the Principal and Board of Trustees

Wendy Carss
11 Golf Rd
Te Awamutu

May 27, 2005

To the Principal and Board of Trustees of _____ School

I am writing to seek permission to work alongside a teacher and a group of twelve to sixteen children in your school as part of a research project being undertaken towards a Masters in Education degree. I am an experienced primary school teacher currently teaching as Senior Tutor in the Arts and Language Department at the University of Waikato.

The project aims to investigate the effect of encouraging teachers to use co-operative learning strategies to engage children in quality discussion during regular Guided Reading lessons in the classroom. In particular the effect on children's oral language and reading comprehension will be measured.

It is anticipated that the project will commence in the middle of term three and run until the middle of term four, a total of eleven weeks. In consultation with the classroom teacher, two groups of 6 to 8 children will be selected, one group with reading achievement twelve months below chronological age and one group with levels twelve months above chronological age. Children will be selected using existing data from running records and the Probe test, and an explanatory letter and consent form will be sent seeking parents/caregivers permission for their child to be involved. This involvement is entirely voluntary.

Initial data will be collected in week one with observation of regular Guided Reading lessons and assessment of children's comprehension levels using a form of test already used in the school. The teacher will also receive training in the use of the co-operative learning strategies during this time. These strategies assist children to talk and think (predict, create images and summarise) about what they have read.

During the following nine weeks the teacher will use these co-operative learning strategies during one Guided Reading lesson per week with each group. I propose to observe and audio tape some of these lessons so that the discussion between the teacher and the children can be analysed. At the conclusion of the research period the children will be retested using the initial pre-test and interviewed as a group with their teacher present.

A summary of the outcomes of the project will be sent to the principal, Board of Trustees and parents once the data has been analysed.

The project has been approved by the School of Education Ethics committee and my supervisor is Dr David Whitehead who can be contacted on (07) 838 4500 extn. 7868. I would be happy to attend one of your regular board meetings to elaborate further on the proposed study and to answer any questions.

Should you decide to grant permission for me to work in your school please complete the consent form below and return to me at the above address.

I look forward to hearing from you.

Yours sincerely

Wendy Carss

Consent form for the Principal and Board of Trustees.

We, the Principal and Board of Trustees of Woodstock School, consent to Wendy Carss working alongside Mrs Reid and the children in her classroom for the purposes of the proposed research study ‘The Effects of Think-Pair-Share strategies on oral language and reading comprehension’.

We understand the School of Education’s Ethics committee has given approval for this study, and that Dr David Whitehead or Dr Richard Ward, chairperson of the Arts and Language Department, may be contacted should there be any concerns about the conduct of the study.

Signed _____

Position _____

Date _____

Appendix B

Letter and consent form for the classroom teacher

Wendy Carss
11 Golf Rd
Te Awamutu

Dear _____

I am writing to request your consent to become involved in the research project I am undertaking as part of my studies towards a Masters in Education degree. I am an experienced primary school teacher currently teaching as Senior Tutor in the Arts and Language Department at the School of Education.

The project aims to investigate the effect of encouraging teachers to use Think-Pair-Share strategies to engage children in quality discussion during Guided Reading lessons. In particular the effect on children's oral language and reading comprehension will be measured.

It is anticipated that the project will commence in the middle of term three and run until the middle of term four, a total of eleven weeks. Two groups of 6 to 8 children will be required from within your class; one group with reading achievement twelve months below chronological age and one group with reading achievement levels twelve months above chronological age. Children will be selected in consultation with you using existing data from running records and the Probe test. An explanatory letter and consent form will be sent seeking parents/caregivers permission for their child to be involved. This involvement is entirely voluntary.

Initial data will be collected in week one with observation of regular guided reading lessons and assessment of children's comprehension levels using a form of test already used in the school. You would receive training in the use of the co-operative strategies and have an opportunity to trial their use before the intervention period begins during the second week.

During the following nine weeks you will use these strategies during one guided reading lesson per week with each group. I will be observing and audio taping some of these lessons so that the discussion can be analysed. At the conclusion children will be tested again in week eleven using the initial pre-test, two regular guided reading lessons would be observed and taped, and both you and the children would be interviewed as a group.

A summary of the outcomes of the project will be sent to you, the principal, Board of Trustees and parents once the data has been analysed.

The project has been approved by the School of Education Ethics committee and my supervisor is Dr David Whitehead who may be contacted on 838 4500.

Should you decide to become involved in this project please complete the consent form below and return it to me at the above address.

I look forward to hearing from you.
Yours sincerely

Wendy Carss

Consent Form for the Classroom Teacher

I consent to taking part in the Think-Pair-Share project as outlined. I understand that I may withdraw my consent at any time during the first four weeks of the project. I understand that the School of Education Ethics committee has approved this study, and that Dr Richard Ward, chairperson of the Arts and Language department may be contacted should there be any concerns about the conduct of the study.

Appendix C

Information and consent form for parents/caregivers

Dear _____

Your child _____ has been invited to take part in a research project looking at oral language and reading comprehension. The use of co-operative learning techniques and the encouragement of quality discussion are thought to enhance children's ability to gain understanding from the books they read. In particular Think-Pair-Share strategies are thought to be effective in this area. When children are asked a question, they spend time thinking about the possible answer, then share with a partner and then with the larger group.

During regular Guided Reading sessions with the classroom teacher, Mrs _____, the use of Think-Pair-Share strategies will be promoted with some of the children selected. This will occur in one guided reading lesson per week over a period of nine weeks. I will be observing and audio taping a total of five of these lessons so that the discussion can be analysed. Other children will continue regular Guided Reading lessons with the teacher. I will be testing all children using the Probe test of reading comprehension both before and after the nine week period of intervention. This test is similar to the form of testing already carried out in the classroom. Children will also be interviewed individually in the classroom at the beginning and end of the project.

A summary of the project will be sent to you once the data has been analysed.

I teach in the Literacy team at the School of Education and I am undertaking this research as part of my studies for a Masters in Education degree. The university has approved the project and my supervisor is Dr David Whitehead.

Taking part in this project is entirely voluntary. If you would like to ask any questions please contact me at the School of Education, 838 4500. Should you wish to withdraw your child once the project has started you are able to do so during the first four weeks. If you are happy for your child to take part then please return the consent form below to Mrs _____ as soon as possible.

Yours sincerely
Wendy Carss.

Consent Form for Parents/Caregivers

I consent to my child _____ taking part in the research project as outlined above. I understand that I am able to withdraw my child at any time during the first four weeks of the project. I also understand that the School of Education Ethics Committee has approved this study, and that Dr Richard Ward, chairperson of the Arts and Language Department, may be contacted should there be any concerns about the conduct of the study.

Signed _____ (Parent or caregiver)

Name _____ Date _____

Appendix D

*Pre-intervention Interview Questions – Both Intervention and Control Groups
Semantic Differential Scale Variables are included for each question.*

1. Tell me how you feel about reading?

	1	2	3	4	5	6	7	
I hate it	–	–	–	–	–	–	–	I really like it

2. About reading in a group with your teacher?

	1	2	3	4	5	6	7	
I hate it	–	–	–	–	–	–	–	I really like it

3. How good do you think you are at reading?

	1	2	3	4	5	6	7	
Bad	–	–	–	–	–	–	–	Very good

4. Tell me what happened in your head as you read today?

Scale not appropriate for this question.

5. Do you guess what the text is about before you read?

	1	2	3	4	5	6	7	
Never	–	–	–	–	–	–	–	Always

6. Do you form pictures in your head as you read? How does this help?

	1	2	3	4	5	6	7	
Never	–	–	–	–	–	–	–	Always

7. Could you use one or two sentences to tell your teacher what the story is about after reading?

	1	2	3	4	5	6	7	
Never	–	–	–	–	–	–	–	Always

Appendix E

Questionnaire used with interview groups following the intervention.

Note: Control groups followed the same format but without the questions relating to TPS strategies.

Name_____ Group_____

1. Tell me how you feel about reading.

2. How do you feel about reading in a group with your teacher?

Tell me about using the Think-Pair-Share strategies for your Guided Reading.

3. How good do you think you are at reading?

4. Tell me what happened in your head as you read today?

5. Do you guess what the text is about before you read?

Tell me about using predict-pair-share for your reading

6. Do you form pictures in your head as you read? How does this help?

Tell me about using image-pair-share in your group.

7. Could you use one or two sentences to tell your teacher what the story is about after reading?

Tell me about using summarise-pair-share in your group.

*