Use of Metacognitive Strategies When Reading
Both Narrative and Expository Text

by

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ABSTRACT

In order to gain detailed and authentic evidence of the metacognitive strategies used by students while reading narrative and expository text, readers in grades four, seven and ten were asked to use a think-aloud procedure. Think-aloud comments were analyzed to determine four areas of information: (1) the actual strategies used by students of varying ages; (2) the ways in which good and poor readers dealt with comprehension break-down; (3) in order to gain a more complete view of their strategy repertoire, students were asked to read both narrative and expository text; and (4) whether there was consistency between actual use and that reported on questionnaires.

Students were asked to complete two questionnaires, to survey their knowledge of and their motivation to use these strategies. All students gave evidence of strategy use, with individual variation at all ages. Older and more expert readers were able to implement strategies that moved them closer to their goal of comprehension, and were able to select strategies appropriate to the style of text. Implications of these results are discussed, in terms of what motivates readers to implement metacognitive strategies, especially those with learning disabilities.

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DEDICATION

This is dedicated to my family: my husband Doug, whose love, support and curiousity make the world a more interesting place, my son Lee with his sense of humour and common sense, and my daughter Meridith, the sunshine who brightens our world. Four university students at the same time in one family has been an education in itself!

CHAPTER ONE

Introduction

In this chapter the meaning of metacognition is introduced, and the importance of metacognitive strategies in active and engaged reading is outlined. Several key studies, in which researchers explain how they have investigated children's use of these strategies and the ages at which they implement them, are proffered. The four goals of the study are briefly outlined, and to conclude the chapter, terms used frequently in this study are defined.

The ability to read with understanding is a critical factor in education. Good readers read with purpose, are aware of comprehension problems and are able to implement strategies that help overcome these problems. However, reading with comprehension is difficult for many students; as Samuels (1989) states, "poor readers read passively, with their only goal being to get to the end of the text regardless of whether or not they understand what they have read" (p. 3). Guiding children to become active and engaged readers represents a significant challenge.

Good readers are active learners who "direct their own cognitive resources to learn from text" (Garner, 1987, p. 15). The process of directing cognitive resources or "thinking about thinking" (Jacobs & Paris, 1987, p. 255) has been labeled 'metacognition' (Flavell, 1978; Brown, 1978) and involves planning, monitoring and repairing comprehension. Examples of strategic behaviours involved in this process are re-reading parts of text, applying prior knowledge and making inferences. Metacognition involves both the self-appraisal and self-management of thinking. Jacobs and Paris (1987) further divide the self-appraisal aspect of metacognitive knowledge into three areas, declarative, procedural and conditional knowledge, and the self-management area into three types of executive processes, planning, evaluation and regulation. The ways in which students manage these metacognitive processes or adjust them to the demands of text are the focus of this study.

Much of the research carried out has investigated the extent of the procedural knowledge which students hold (e.g. Paris & Jacobs, 1984; Pintrich & De Groot, 1990; Chan, 1994). Investigation of procedural knowledge alone may demonstrate

that a student is able to talk about a strategy, but does not indicate that the student is able to apply that strategy, or to apply it appropriately. Less common are investigations of whether students actually apply strategies as they read, or when and how they do so. Examples of studies which investigated this are those by Kletzien, 1991; Zabrucky and Ratner, 1992; McGuire and Yewchuk, 1996. The first purpose of this study is to survey students as to the procedural knowledge they hold, as well as have them think aloud as they read in order to describe the strategies that they actually implement. These procedures provide information, which supports the second purpose of this study, to examine whether there are differences in the ways in which good and poor readers deal with a break-down in comprehension.

Cox (1992), Brenna (1995), and Juliebo, Malicky and Norman (1998) have demonstrated that children possess metacognitive strategies before they begin school. For most children, these strategies become refined with maturation and practice. As well as variation with age, there are inter-individual and intra-individual differences in the ways in which these strategies are applied. Diversity of application may depend on such factors as passage type and level of difficulty as well as context; for example, the structure of expository text has been shown to influence strategy use. The third purpose of this study is to gain a more complete knowledge of the repertoire of metacognitive strategies held by students of different ages, by asking students to read and think aloud about both narrative and expository text.

The motivation to apply strategies to reading, which varies with age, is another factor that has been considered significant to reading comprehension. Some researchers (e.g. Pintrich et al, 1994; Dowson & McInerney, 1998) have found that students who have reported positive motivation to succeed also implement strategies more frequently and effectively. The final purpose of this study is to determine whether the motivations of students who participate in this study are consistent with their utilization of metacognitive strategies.

In conclusion, this study undertakes to examine authentic evidence relating to how students of several grades (grades 4, 7 and 10) and reading levels manage and adjust metacognitive processes when reading narrative and expository text. In this study, both stated and actual use of metacognitive strategies will be elicited, the first

by having readers fill in questionnaires and the second by asking them to carry out a think-aloud process. The ways in which readers of varying proficiency deal with comprehension break-down will be considered and compared. As students read passages of narrative and expository text, a more extensive repertoire of the strategies used by each student will be obtained. The use of the questionnaires was intended to compare stated motivation to implement metacognitive strategies with actual use of these strategies.

Definitions of Terms

The following discussion will include definitions of terms used in this thesis, in order to clarify those which may be ambiguous.

(1) Think-aloud. The 'think-aloud' procedure is a method in which the researcher asks an individual student, at predetermined points in the text, to describe what he or she is thinking. The verbalizations are then analyzed systematically to determine the strategies used.

Some studies that have used this method have been conducted by McGuire and Yewchuk (1996), Norris (1990), and Meyers, Lytle, Devenpeck and Green (1991). Norris (1990) investigated the effectiveness of the think-aloud technique, by asking students in grades 10,11 and 12 to complete a multiple-choice text of critical thinking. Norris concluded that verbal reports provided "a wealth of information useful for diagnosing specific problems" (page 56).

The think-aloud technique has been used in studies investigating metacognitive strategies in many ways. For example, Zabrucky and Ratner (1992) asked students to describe incongruency in text, McGuire and Yewchuk (1996) asked students to read text and determine deliberately-placed errors. Juliebo, Malicky and Norman (1998) asked students to recall strategy use while reviewing video recordings of their reading.

To elicit verbalization, McGuire and Yewchuk (1996) used the technique of placing a red dot at the end of each sentence, which reminds the reader to make a verbal comment at that point. This 'red dot' technique is clearly understood by students, and guards against some of the criticisms of the think-aloud method mentioned by Garner (1992). It provides for immediacy so that there is little memory

failure, and prevents inadvertent cueing by the researcher.

(2) Description of Readers. In this study, the description of readers as good, moderate, fair or poor was limited to readers' ability to decode, for purposes of a starting point in describing each reader. Specifically, definitions for each are as follows:

Good reader: In this study, the term 'good' reader is used to describe a reader who reads at the independent or instructional level for his or her grade level. According to Johns (1997), independent readers decode with 95% accuracy and instructional readers with 90% accuracy.

Poor reader: In this study, the term 'poor' reader is one who reads grade level material with substantially less than 90% accuracy, labeled 'frustration' by Johns (1997).

Moderate and fair reader: The terms "moderate" and "fair" reader are used for those readers who read grade level material slightly below the instructional level (90% accuracy).

(3) Learning disability. The main focus of this study is to compare and contrast students with varying competencies, not to dwell on those with learning disabilities. The definition of a learning disability is provided to clarify the identification policy of the School District, in the description of readers for this study. The term 'learning disabled' is one that has stirred a great deal of discussion. For example, Gresham, MacMillan and Bocian (1996) state that "a heated debate has been generated regarding the similarities and differences between children classified as having learning disabilities and children who show low academic achievement." (p. 570). These authors, in a later paper (1998), state that "debate continues over the definition." Fletcher et al (1994) point out that, in public policy and in research, it is common to identify a child as having a learning disability when there is a discrepancy between observed and expected achievement. Bachor (1986) found that most Canadian definitions of learning disability include the criteria of a significant discrepancy as well as two other elements, a clause which excludes intellectual, cultural, physical or emotional causes and one which suggests a neurological or biochemical link.

For the purpose of this study, the term 'learning disability' is that of the Ministry of Education of British Columbia (1995): "disorders manifested by significant difficulties in acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities ... intrinsic to the individual, presumed to be central nervous system dysfunction ... not the result of other conditions or influences." (p. E-11)

(4) Comprehension break-down. The term 'comprehension break-down' means failure to understand what is intended by the author, for a variety of reasons: mis-read word or phrase, incorrect decoding, omission, unknown meaning or mistaken meaning of word, phrase or sentence, misapprehension of meaning, no attempt to consider meaning, or other reasons.

CHAPTER TWO

Literature Review

A sample of the literature pertinent to the present study is presented in Chapter 2, including a review of the meaning of the term metacognition, and how areas of metacognitive knowledge have been described. Since the early 1970's, researchers in the field of cognitive psychology have considered the concept of metacognition. In 1979 Flavell subtitled his paper on metacognition 'a new area of cognitive-developmental inquiry'.

Current thought will be presented of how metacognitive strategies are utilized by students of differing age and reading ability, when reading both narrative and expository text. This will be followed by a discussion of the role played by motivation in influencing students to use metacognitive strategies. The concluding section of this discussion will present methodologies used by researchers to examine these strategies, and concerns relating to these methods. This is followed by presentation of the research questions considered in this study.

Metacognition

In order to make meaning of text, a reader must carry out metacognitive processes, which are active and goal-directed behaviours involving focus or intention or direction. Flavell (1979) defined metacognition as "knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of metacognitive enterprises." (p. 907). Flavell (1978) said that the ways in which children acquire the skills involved "remains the central mystery in the area of metacognitive development." (p. 238)

Brown (1978) adopted Flavell's definition of metacognition, arguing that knowledge about one's own cognition is a significant part of thoughtful action; she emphasized the importance of planning, monitoring and revising one's thinking, and noted that "conscious executive control...is the essence of intelligent activity" (p. 79). Brown stated that as metacognition involves the individual's perspective of their own performance, it can not be objective; there will always be "contamination" (p. 81) by one's feelings of competence, including such factors as fear of failure, need for achievement, external versus internal control, learned helplessness and level of

aspiration. Metacognitive development thus "deals with the developing child as a whole person" (p. 81).

Metacognitive experiences are likely to occur before, during and after reading, and are used to make progress toward a goal. Metacognition often occurs when cognition fails; Garner (1987) suggested that this failure of cognition leads to a feeling of confusion, which the reader then attempts to resolve. Garner argued that an awareness of some difficulty or lack of comprehension is as valuable as one of understanding, because problem detection allows the reader to make some adjustment through strategy implementation, in order to correct the problem.

Jacobs and Paris (1987) observed that when considering how a person reads, metacognition aids in understanding how a reader plans, monitors and repairs comprehension. Jacobs and Paris used as their starting point Flavell's two areas of metacognitive knowledge, self-appraisal and self-management of cognition, which they then expanded, as follows (p. 259). Self-appraisal, or knowledge of the processes involved in reading, has three aspects of knowledge: declarative (knowing *that*), procedural (knowing *how*) and conditional (knowing *when and where* to access certain information or employ certain processes). The second category, self-management, or application of control strategies, deals with the aspects of planning, evaluation and regulation of knowledge so that the reader monitors progress and adopts strategies to satisfactorily achieve a goal.

These processes are not discrete; as Wade and Reynolds (1989) point out, they are "different but overlapping processes" (p. 6) that often work concurrently to provide meaning. Schraw and Dennison (1994) also supported the relationship between knowledge and regulation of cognition. In their research, they confirmed the two-component model of metacognition determined by Flavell, Brown and Jacobs and Paris. In their study, Schraw and Dennison suggested, much like Wade and Reynolds, that "each [component] makes a unique contribution to cognitive performance." (p. 471)

All readers use metacognitive strategies, although not everyone uses them effectively. One way in which this has been demonstrated is in the work of Goodman (1994), who has developed the area of 'miscue analysis' as a means of examining the

processes involved in reading. Goodman argued that miscues are the unexpected responses of oral readers, which he states are cued by readers' linguistic or conceptual cognitive structures. Miscue analysis demonstrates that there is nothing random about errors, that readers predict and confirm as they proceed. The reader is monitoring, asking himself questions such as "Does this sound like language? Does this make sense in this story?" Goodman interprets his research as indicating that poor readers are using strategies, although they may not be correct or adequate or precise.

Using metacognitive strategies does not guarantee comprehension, however. Meyers, Lytle, Palladino, Devenpeck and Green (1990) in their study of reading comprehension strategies, found that frequent use of metacognitive strategies did not relate to reading comprehension, and in fact seemed to have an inverse relationship to it. McGuire and Yewchuk (1996) investigated the use of metacognitive strategies in a reading task by students designated as "gifted learning disabled", and found that although these students reported frequent use of strategies, they demonstrated poor comprehension of text. McGuire and Yewchuk interpreted these results as demonstrating ineffective use of strategies. They also observed that there was a great deal of variation between individuals in types of strategies implemented, the ways in which they were used and accuracy of their execution. The research of McGuire and Yewchuk and Meyers et al demonstrates that merely using metacognitive strategies is not sufficient. These researchers suggest this may be because the reader is faced with too many tasks at one time and so performs them ineffectively or selects strategies that are incorrect for the immediate task. Another factor that may influence strategy use in these situations is that of conditional knowledge: these students may not have been aware of the correct conditions under which certain strategies should have been implemented, despite knowing of the strategies.

Age-related Differences in Metacognitive Strategy Use

A variety of factors that influence metacognition have been examined. One area that has been explored is the relationship of age (and therefore reading experience) to metacognitive strategy use. Flavell (1978) argued that effective reading requires an active learner to direct their cognitive resources in order to

complete a task and that this direction of resources is refined through practice and experience. Brown (1984) added that the ability to reflect on cognitive processes is a late-developing skill, because reading involves "the strategic deployment of resources to complete a difficult task." Garner (1987) further suggested that children in primary grades know "substantially less" than older children about themselves as readers, and about tasks they complete and strategies they use to complete them. She does caution that her statement is based on reported knowledge collected through interviews and questionnaires, rather than actual performance of strategies. Garner maintained that although development of metacognition occurs, "we know little of the process." Paris, Wasik and Turner (1991) concur, in their review of the literature relating to children's awareness of literature; they conclude that young children do not have detailed ideas about the nature of reading, conventions of print or the purposes and processes of reading.

Bjorklund (1990) agreed that metacognitive strategies develop gradually and continually, and are fine-tuned with experience. Practice results in a decrease in the amount of attention needed for execution of a strategy. Knowledge of the content to which a strategy can be applied (conditional knowledge) is thought to develop gradually; older children are advanced in metacognitive competence, in such skills as reflecting about how to learn. Bjorklund also noted that children need to realize that their actions reflect their progress toward a goal, need to see themselves as active agents. He called for more research on how development influences self-awareness, as self-awareness is presumed to be one important component of the complexity of strategic thinking.

In Bjorklund's view, novices use "partially effective" strategies that impede use of more effective ones. His 'hunch' is that younger readers formulate primitive strategies, while experts deliberately select strategies as "judicious actions undertaken to reach goals." When these become automatic, a variety of strategies can be used simultaneously without cognitive overload. This allows the reader to use additional resources "that can be examined, reported and modified" (p. 260).

Until recently, researchers considered that pre-schoolers, with little experience in reading, would possess little metacognitive knowledge. Flavell (1978), working

with young children, suggested that although they may not understand a passage, they may not realize their lack of understanding, or they may have a fleeting and semi-conscious experience of difficulty in comprehension but do not perceive that this feeling of difficulty is important. Alternately, children may realize that they do not understand but are unaware that there is some action that they can undertake to resolve the problem. Jacobs and Paris (1987) agree with Flavell's view, stating that "interviews with young children indicated how little they understood about reading" (p. 256).

However, researchers using novel methods have recently demonstrated that many students enter school possessing some metacognitive strategies. Cox (1992) found that a significant number of preschoolers implied some aspects of procedural metacognition in their comments as they dictated text to a recorder; declarative knowledge was also indicated in discussions with the adult recorder. Cox argued that greater use of procedural metacognition among preschoolers is associated with more advanced emergent reading, regardless of age. Brenna (1995) observed the metacognitive strategies used by five children who had begun to read prior to receiving formal instruction in grade one. She found that all five of these early readers demonstrated use of a variety of strategies, showing individual preferences for particular ones. Juliebo, Malicky and Norman (1998) examined the metacognition of grade one students who participated in early intervention programs and therefore were considered to have poor early reading skills. These students demonstrated awareness of strategies, both while reading and during stimulated recall while watching videotapes of their intervention sessions.

Studies of metacognition in elementary students carried out by Garner and Reis (1981), Cross and Paris (1988) and Englert, Hiebert and Stewart (1988) have all supported the premise that metacognition varies with age, and that there is a significant relationship between metacognition and reading comprehension. Garner and Reis (1981) found that younger (grade four) readers had little awareness that they must attempt to make sense of text; rather, they focused on reading as a decoding process; older (grade six) readers did demonstrate strategy use, as they looked back in the text to find information. In this study, the failure of younger readers to

"participate actively and strategically" while engaged in reading led to comprehension problems.

Cross and Paris (1988) examined the development of the relationship between metacognition and comprehension by providing training in effective reading strategies to third and fifth grade students. The authors indicated that despite training, there was inconsistency between knowledge about and use of reading strategies for narrative text in the younger age group; increasing congruence did develop in the older age group. Cross and Paris concluded that "children integrate their understanding about reading strategies with their reading performance throughout grades three, four and five" (p. 140).

Englert, Hiebert and Stewart (1988) compared the abilities of grade three and grade six students to detect inconsistencies in expository text. They chose to study students in these grades because at these levels they "were at the beginning of their exposure to expository text" (p. 222). Englert et al found that a large portion of students in both grades had difficulty spotting discrepancies as well as remedying them. Sensitivity to text structure was demonstrated to be significantly weaker in younger students, while older students were more strategic in regulating their understanding of the text.

In more recent research, Hall, Bowman and Myers (1999) investigated the metacognitive awareness of nine-year olds in Great Britain. Using semi-structured interviews, children were asked a series of questions which focused on their own description of themselves as readers, what 'reading well' meant to them, what was involved in becoming a good reader and reading strategies. The child's description of self as reader was related to the teacher's evaluation of reading ability. Hall et al concluded that most nine-year old students were able to describe their ability as a reader (92%), and most did so "accurately" with very strong agreement between their assessment and that of their teacher. The remaining students had difficulty describing their reading ability, needing to rely on the teacher's praise or lack of praise for this evaluation. Ninety-seven per cent of the students participating in this study were able to describe at least one strategy that they would use to deal with difficulties with text. The authors concluded that students who were described by their teachers as

'average' and 'above average' in reading had greater metacognitive knowledge and more effective reading strategies than did the 'below average' students.

By upper elementary grades, there seems to be a great deal of individualization of strategy use. Meyers et al (1990) investigated the use of reading comprehension strategies, through use of self-report processes, at the fourth and fifth grade levels. Meyers et al found that a large number of reading strategies were demonstrated by all participants; readers with similar reading ability, regardless of age, used different strategies with different effects on passage comprehension. In their investigation of the use of metacognitive strategies by gifted learning disabled students at the upper elementary level, McGuire and Yewchuk (1996) also found that students differed a great deal in strategies reported, the ways in which they were implemented and how accurately they were carried out. Chan (1994) compared the use of strategic learning by students in grades five, seven and nine, and found that grade nine students reported use of reading strategies less frequently than the younger students, even though their knowledge of strategies was comparable.

Studies by Gillingham and Garner (1992) and Kletzien (1991) have examined reading proficiency and its relationship to metacognitive strategy use with older adolescents. Gillingham and Garner (1992) asked students in grades seven, nine and eleven to read a passage, carry out a cloze task and summarize what they had read. They concluded that grade level was not an indication of correct prediction of cloze performance; rather, reading ability was the significant factor. Kletzien (1991) also found that reading proficiency rather than age predicted strategy use. Her study was carried out with students in grades ten and eleven, who were asked to complete cloze tasks as they read expository text. These studies provide evidence that age is only a factor of strategy use for students in elementary grades, and that as children mature, reading ability has a greater impact than age on effective use of strategies.

Siegler (1996) offered an explanation for the variety of strategies noted between and within students. Rather than the traditional view of movement of skill from one level up to the next, Siegler described a model of "overlapping waves." He proposed a gradual ebb and flow of old and new ways of thinking, with new strategies being added and old eliminated over time. Siegler demonstrated that intra-individual

differences frequently occur; for example, children solving math problems demonstrated variable strategy use when solving the same problem on two separate occasions a week apart, with some return to less efficient strategy use on subsequent attempts. Siegler also found that eighty per cent of children who participated in his research used more than one strategy to solve a problem. Siegler stated that with increasing experience in a domain, children "calibrate their strategy choices increasingly finely to the demands of the particular task" (p. 222).

Differences Between Novice and Expert Readers

As stated, reading competence is a significant factor contributing to strategy use, although the mere fact of using strategies does not ensure understanding (e.g. McGuire & Yewchuk, 1996; Meyers et al, 1990). Garner (1987) suggested that older and better readers are more attentive to the need for and more likely to employ strategies when reading. Garner has investigated differences between novice and expert readers regardless of age. She describes novice readers as exhibiting the following features: an emphasis on decoding, with a meager strategy repertoire for complex reading situations, deficiencies in both declarative and procedural knowledge, and what Garner terms "piecemeal processing" of text which focuses on lexical items and intra-sentence rather than inter-sentence consistency, so that word rather than sentence and paragraph comprehension is the goal.

Zabrucky and Ratner (1992) did not find significant differences between good and poor readers in their decision to use certain strategies; all of these participants re-read text which was not clear. However, the effectiveness of implementation did make a difference: recall of text information by poor readers was weak, meaning that the rereading strategy was less effective for them. These authors point out that the reading level of the passages used in this research was selected at a grade level appropriate for the poorest readers in the study and that further research must be carried out to see whether difficulty level also influences strategy use.

Kletzien (1991) studied the ways in which varying levels of passage difficulty in expository text influenced strategy use by good and poor readers. Kletzien demonstrated that all participants used the same strategies for each of three levels of text provided, designated independent, instructional and frustration levels. Good and

poor readers alike preferred to use the strategies of focusing on vocabulary, making inferences and using prior knowledge. When reading at the independent level, both groups used strategies equally well. However, at the instructional level, good readers were more able to control strategies and able to switch to more effective strategies when required. At the frustration level, differences between the two groups were even more significant: good readers continued to implement a variety of strategies, changing when necessary; poor readers indicated a decline in number of strategies used and frequency of strategy use. Kletzien concluded that the difference between groups was in the ways in which readers regulated strategies, rather than their knowledge of strategies. She states that "both good and poor comprehenders know of and use the same basic strategies, but good comprehenders are more flexible ... have greater control of strategies ... and are more able to persevere" (p. 80).

Narrative and Expository Text

Type of text has also been demonstrated as a factor influencing metacognitive strategy use. Englert, Hiebert and Stewart (1988) contrast narrative with expository text, saying that narrative text allows children to draw on personal knowledge to aid comprehension. Englert et al state that expository text is unfamiliar to elementary school children and presents a challenge for several reasons: topics are often less familiar, text structure may be less organized or predictable and may be poorly written, and there may be an assumption that the reader has prior knowledge, which results in gaps in information. Samuels (1989) also discussed these differences: he explained that authors who write narrative text follow a consistent structure, which readers are expecting and which enhances comprehension. Authors of expository texts, on the other hand, do not share a common structure, which may cause readers to have greater difficulty with comprehension.

Recall of text was found to be influenced by use of text structure (i.e. the organization intended by the author) rather than by memory, in an early study by Taylor and Samuels (1983). In this study, upper elementary students who were described as "reading on or above grade level" but who differed in awareness of text structure, were asked to read and recall expository passages. Students who had indicated awareness of text structure demonstrated better recall of information, while

students who did not have awareness of text structure had difficulty with comprehension. Taylor and Samuels concluded that these readers encoded the pattern of organization used by the author and used it to strengthen their recall of text.

Garner (1987) noted that typical school texts have densely packed material, with complex information, much or all of which is new to the reader. In order for the student to deal with this expository material, understanding the author's organization of text is necessary. Garner (1985) found that students at the grade nine level lacked experience with expository text; she states that "they either do not possess, or fail to use, knowledge of an author's organization, to aid recall".

Zabrucky and Ratner (1992) have also considered the influence of passage type on comprehension. In their discussion of comprehension, they suggest that two component skills are involved in the process: evaluation or assessment of understanding during reading, and regulation through the use of strategies to correct comprehension failure. They suggest that narrative and expository texts influence comprehension and memory in different ways due to their distinct structures. Narrative texts contain more frequent causal connections, which allow easier encoding and retrieval of information. Zabrucky and Ratner suggested that students are more able to answer comprehension questions after reading narrative text than after reading expository text, suggesting that logical relationships are easier to see in narrative text. They also suggest that students bring to the task expectations, based on previous experience, that expository texts "are typically more difficult" (p. 388).

Affective Aspects of Metacognitive Strategy Use

Borkowski, Carr and Pressley (1987) argued that motivation and strategy use are "bidirectionally related" (p. 67) so that each contributes to development of the other. Motivation provides incentives for implementation of strategies; use of successful strategies strengthens strategic knowledge and positive self-esteem.

The importance of affect in reading is not a new idea; Flavell (1978) discussed the "ability and dispositions to monitor and interpret..." and Brown (1978) stated that "self-evaluation of one's performance is contaminated by feelings of competence". Jacobs and Paris (1987) stated that metacognition and motivation arise in part from the social interactions of instruction: both skill and will, or intent and effort, are

essential aspects of metacognition, so that the reader chooses the behaviours most appropriate to meet the specific purpose. Not only must the strategies be available, but the reader must decide to implement the strategies. Jacobs and Paris suggested several reasons that strategy use may not occur: the reader may ignore the information (similar to Garner's idea of confusion), the reader may forget or be incapable of processing more than one idea at a time, or personal style, such things as risk-taking, achievement aspirations, self- perceptions or fear of failure, may influence choice. The level of metacognitive knowledge available may help determine *if* the reader is capable of the action, but is not sufficient to predict strategy *use* at the time of the action. Jacobs and Paris (1987) offered three motivational features of strategic behaviour: personal significance to the reader of the means and goals involved; utility and efficiency of goal-directed actions; and how the reader manages resources in the 'problem space'.

Borkowski, Carr, Rellinger and Pressley (1990) observed that as children develop strategies and see the importance of being strategic, they learn that they can be in control of the processes of learning. This self-directed behaviour leads to positive self-esteem, an internal locus of control and constructive attributional beliefs about success and failure, all of which Borkowski et al consider "motivational correlates" (p. 67) of metacognition. Strategic performance is strengthened with success; positive feelings of self and ability lead to continued use of strategic behaviour. Children who have immature beliefs about success and failure, attributing success to luck or help given by a teacher for example, may develop "learned helplessness," leading to inadequate strategy use and poor performance when faced with a difficult task. Borkowski et al concluded that the motivational and affective states with which a child enters school may determine the pattern of later metacognitive development.

Mandel, Marcus and Mandel (1992) studied a group of students who were considered to be underachievers, who were given the label 'nonachievement syndrome' (NAS). Typical of students in this category were the following descriptors: failure to plan ahead, even though they expressed good intentions to succeed, or motivation, inaccurate self-appraisal and monitoring, frequently over-

estimating performance, easily distracted when faced with academic challenges, and clear lack of introspection about setting and fulfilling goals, satisfied with current level of performance. Mandel et al. summarized these students as "deficient in executive processing and the formation of possible selves." It is interesting to note that although these students reported strategy use, they did not use these strategies capably.

Pintrich, Anderman and Klobucar (1994) in their study of individual differences in motivation and cognition found that some grade five children with LD had "some gaps in their metacognitive knowledge" (p. 367) although their motivational beliefs were not always negative. Their difficulties with reading were in part due to their lack of metacognitive knowledge about reading strategies. Other LD students who indicated low motivation did not have a large deficit in metacognitive strategies but lacked intrinsic motivation. Pintrich et al stated that students who had more positive motivational beliefs were more likely to report using cognitive and self-regulated learning strategies. They noted that there is a reciprocal relationship between motivation and cognition; that deeper processing leads to qualitatively better motivation and that the nature of the work influences motivational beliefs. If students are able to choose material, are interested in it and are able to work cooperatively they will be more motivated and more cognitively engaged. The information collected in Pintrich's study was gathered in questionnaires, and therefore only assessed knowledge of metacognition, not actual use of these strategies.

Chan (1994) stated that personal-motivational factors "energize the self-regulating skills necessary for strategy selection, implementation and monitoring" (p. 319). Chan has investigated the developmental aspects of affect on metacognition, demonstrating that poor readers are less likely to attribute success to effort and ability and more to luck, while attributing; failure to lack of ability and bad luck. They are less likely to try alternative ways of performing a task. Chan investigated the relationship between metacognition and motivation for LD and non-LD students in grades 5, 7 and 9. She did not find the same distinction between groups of LD students as shown by Pintrich et al. Chan found a general pattern which showed that LD students had less knowledge of learning and reading strategies, as well as less

confidence in their own control over success in school tasks. Again, this information was determined through the use of questionnaires and therefore indicates only students' knowledge, rather than use, of strategies.

Dowson and McInerney (1998) studied the relationship between motivational and cognitive variables, including use of metacognitive strategies, for middle school students in Australia. They reported that there was a complex relationship between students' motivational orientations and cognitive processes, and that this is a "hot" process – cognition is influenced by motivational variables. As they state, "how students learn is associated with why students want to learn." (p. 14). Dowson and McInerney suggest a list of motivational orientations including approval, present and future status, welfare, conformity and work avoidance, which influence student performance. They also state that students showed that they used different strategies in the two subject areas examined in their study, mathematics and English.

Wender (1998), in a review of theoretical and research reports that discussed the function of metacognitive knowledge on learning, concluded that this knowledge is a "prerequisite" for self-regulation of learning. In her review, Wender found metacognitive knowledge to be both motivational and cognitive: someone who possesses metacognitive knowledge is motivated to carry out self-regulation, and these strategies shape and guide the learner's actions, so the actions are purposeful.

In summary, a variety of factors have been shown to influence the awareness and use of metacognitive strategies: age, experience and skill of the reader, their motivation and purpose for reading, as well as type of text being read. This study will be conducted to try to demonstrate, based on authentic evidence following a case study format, that individual students illustrate individual and unique preference and capability to use strategies, based on age, reading ability and personal motivation.

Methodologies Used to Examine Metacognitive Strategies

Many studies have been carried out to investigate metacognition, in which younger and older or expert and novice readers are asked to read various texts and perform various tasks. The great majority of these studies have investigated

declarative knowledge of strategies, frequently through self-report. Paris and Jacobs (1984) used interviews with open-ended questions and questionnaires to assess elementary students' metacognitions of reading. Craig and Yore (1995) used an interview format to examine grade four to eight students' metacognitive knowledge about science reading and science textbooks. Hall, Bowman and Myers (1999) used a semi-structured interview format to determine how nine-year-old students thought of themselves as readers, how to be a good reader and the learning and reading strategies they used.

Questionnaires have also been used in an attempt to assess attributions of cognition: Pintrich and De Groot (1990) developed the Motivated Strategies for Learning Questionnaire, which looks at student motivation, cognitive and metacognitive strategy use and management of effort. Jacobs and Paris (1987) developed an instrument to assess what children know about the goals, tasks and strategies involved in reading, the Index of Reading Awareness. Chan (1994) has created several scales to assess reading and learning strategies of middle school students, as well as a scale for measuring their causal attributions of success. Schraw and Dennison (1994) developed the Metacognitive Awareness Inventory (MAI), suitable for adolescents and adults, which includes items within the eight component processes involved in knowledge and regulation of cognition. Schraw and Dennison stated that the MAI is a reliable initial test of metacognitive awareness, useful in helping to identify 'older' students who display comprehension monitoring deficiencies.

Questionnaires and surveys examine only declarative knowledge, or what the participant knows about; they provide no evidence relating to what the reader actually does as he or she reads. In fact, responses on questionnaires may be based on what the participant considers the researcher would like to see, or which cast a positive light on their abilities. Garner (1987) added several other concerns regarding questionnaires, including the respondent's awareness of strategy use or failure to recall which strategies were used in a task. Garner also pointed out the lack of verbal proficiency of young children; lack of verbalization could also occur with reticent or unforthcoming participants.

In other studies, techniques which are labeled "think-alouds" have been implemented which allow students to verbalize, or self-report, the processes and strategies they use as they read, i.e. procedural knowledge. Ericsson and Simon (1980) argued that, as readers are aware of thinking processes, self-report data is useful as a way of looking at cognitive processing. Afflerbach and Johnston (1984), in their discussion of verbal reports in reading research, stated that "verbal reports offer a unique, if sometimes less than transparent, window for viewing cognitive processes" (p. 321). Olson, Duffy and Mack (1984) state that the think-loud "provides a sample of what's on the subject's mind during the task" (page 254). Olson et al also state that the think-aloud is useful for studying higher level processes such as inference and prediction.

Meyers, Lytle, Palladino, Devenpeck and Green (1991) investigated the use of think-aloud procedures in order to investigate reading comprehension strategies. Readers in grades 4 and 5 were asked to report their strategies at the end of each sentence of a passage and summarize their comprehension of the passage. Meyers et al found that the think-aloud process was useful as "a method to determine the moves and strategies used on reading comprehension tasks" (p. 125).

The think-aloud approach has been implemented with a variety of tasks. Kletzien (1991) examined strategies used by grade ten and eleven readers who were considered to be good and poor comprehenders; she provided readers with a cloze task and asked them to explain why they decided to complete each blank as they did. Kletzien observed that this method did allow her to consider strategies used by readers, although there were limitations. Some readers appeared not to be conscious of strategies; as well, the task may have caused readers to use atypical strategies, by asking them to focus on vocabulary as a comprehension strategy.

In a similar but slightly modified process, Zabrucky and Ratner (1992) asked grade 6 students to read short passages, some containing deliberate incongruencies; these passages were presented one sentence at a time on the computer. Students were able to move backward and forward through text as often as required. After reading, the think-aloud task required students to recall the main ideas, any inconsistencies noted in the text and explain how these inconsistencies were noted. Reading times

and 'look-backs' were calculated along with recall accuracy and assessment of incompatibility of text.

McGuire and Yewchuk (1996) used a think-aloud process to examine the reading strategies of gifted learning disabled students in upper elementary grades. Students were asked to read passages, some of which contained errors which they were to detect. The think-aloud process was cued by a red dot placed at the end of each sentence; readers were asked to verbalize what they were thinking and how they knew that there was an error in the text.

Video recordings were used by Juliebo, Malicky and Norman (1998) to help participants recall strategy use. They recorded first grade students involved in a reading intervention program, took note of the strategies used during the session, and then asked students to watch the video and recall what they were thinking at the time. Juliebo et al state that combining data collection methods gave them information about several aspects of metacognition.

It is important that participants be at ease with self-reporting, or thinking aloud; training sessions for this skill have also been carried out in a variety of ways. McGuire and Yewchuk (1996) provided students with maze puzzles, as a means of providing students with practice in thinking aloud as they carried out the task. Meyers et al (1990) used the Block Design subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R) to accustom students to thinking aloud. Montague and Applegate (1993) provided training to students by showing them a video of a researcher thinking aloud as she worked out a math problem, followed by a live demonstration of the same process. These were followed by having the students practice thinking aloud as they solved problems. As Montague and Applegate point out, this training was in thinking aloud, and did not provide training in strategies useful for problem-solving.

Methodological Concerns

Ericsson and Simon (1980) suggested some factors which increase the accuracy of self-reports: that verbalization not interfere with task performance, time between task performance and verbalization be kept brief, probes be nonspecific and noncuing, students be directed to focus on task rather than verbal report, and that

triangulation with other sources of data take place. Afflerbach and Johnston (1984) considered that verbal reports had advantages and detriments. Advantages reported are that verbal reports provide a converging data source for other methods such as questionnaires; they provide direct authentic descriptions of processes; they allow access to the underlying processes of reasoning used by the reader; and they allow an analysis of the affective aspects of reading. In their discussion of the disadvantages of verbal reports, Afflerbach and Johnston pointed out that transcription of verbal reports omit subtle differences between spoken reports and their transcriptions; such things as inflection, pauses and variations in rate of reading are not typically noted. Pressley and Afflerbach (1995) agreed that there is a clear need for transcription codes and symbols which "preserve the quality of spoken language when it is transcribed" (p. 120).

Another concern expressed by Pressley is that the methodology be clearly and completely described: the subjects and their reading abilities, characteristics of the text especially relative to the reader, directions given to the participants and feedback or coaching provided during training sessions, as well as categories used to score transcripts.

Garner (1992) outlined problems inherent in verbal report methodology. Garner suggested that these include (1) accessibility: a reader may be so accustomed to carrying out a strategy or process that it becomes automatic, so that the individual is not aware that it occurs and so is unable to describe it; (2) memory failure: the account provided by the reader may be inaccurate or incomplete if carried out too long after the strategy occurs; (3) inadvertent cueing: the researcher may suggest responses by the method of questioning; and (4) verbal facility: language facility and willingness to talk about processes varies with age and with individual. Many of these problems can be guarded against, as the advice earlier presented from Ericsson and Simon suggests; however, some lack of precision is inevitable.

As demonstrated by authors discussed in the literature review above, there is a great deal of variation in the ways in which students implement metacognitive strategies. These variations are based on factors such as age, reading ability and motivation of the reader as well as level of difficulty and type of text being read. Just as there are different levels of metacognitive knowledge, students' awareness and reporting of their use of these strategies also differ.

Questions. The methods used to investigate metacognitive knowledge have ranged from having students fill out questionnaires, participate in interviews or engage in detailed reports of their thought processes as they read. Careful examination of the literature and methodology has promoted consideration of the following questions, which are to be examined in this study:

1. What, if any, differences in quantity or variety of metacognitive strategy use exist between age groups? If differences exist, what kinds of differences exist between age groups?

2. What, if any, are the differences between the strategies implemented by good and poor readers when a break-down in comprehension occurs?

3. What, if any, differences in strategy use can be observed as students read narrative as compared to expository text? Do readers use strategies with one sort of text that they fail to use with the other? If so, how?

4. What, if any, differences exist between good/poor or novice/expert readers in their motivation to use metacognitive strategies? Is this motivation influenced by age? If so, how?

CHAPTER THREE

Methodology

In this chapter, information regarding the location and sample characteristics of the study is presented. Characteristics of individual participants are given in detail, in a case study format. The procedures used for the think-aloud technique, including training sessions and analysis are described. Both of the questionnaires used in this study, as well as their administration and scoring procedures are presented, with a brief discussion of each, as well as administration and scoring procedures.

Information gathered in this study is presented as an exploratory case study (Yin, 1994) which will begin to explore the ways in which students in grades 4, 7 and 10 make sense of their understanding of text. This format has been described by Kazdin (1982) as a Type II Case Study, one which "can include self-report inventories, ratings by other persons, and direct measures of overt behaviour." (page 89). This study is pre-experimental, in that its intent is an exploration of how readers in grades 4, 7, and 10 make sense of text when reading.

Location and Sample Characteristics

This study was carried out in a small rural community on the West Coast of British Columbia. The majority of people in the community are employed in the logging industry, tourism and service industries or government agencies. Incomes range widely, from $20,000 to $80,000 per annum. The population is made up of diverse ethnic groups, predominantly Caucasian. All but one of the participants speaks English as their first language.

Participants were drawn from families of lower and middle class. Their parents' education ranges from Grade 8 completion through to University degrees. Some participants have lived in this community all their lives, while others have lived in several communities, having moved once, twice or three times.

Subjects

Description of groups. Subjects were all students enrolled in each of grades four, seven and ten who agreed to participate and whose parents gave permission for their participation. All participants were enrolled in regular classes; several received special services of two hours per week in support of learning difficulties. One student was visually impaired and had received extensive support of this disability during her school career. There were nine female and 12 male participants, with average age of nine years in grade four, 12 in grade seven and 15 in grade ten. The distribution of students was as follows: six in grade four, seven in grade seven and eight in grade ten. Participants' reading abilities were estimated through the researcher's personal knowledge of students as a teacher, through scrutiny of report cards for the past year, as well as more formal assessment in some cases. These more formal assessments consisted of tests of intellectual ability, academic achievement and various other standardized tests. Because this study involves qualitative descriptions of reading behaviour, a brief description will be provided of each participant. All descriptions of individual cases involve the use of a pseudonym to ensure the anonymity of each participant.

Individual descriptions

James. James, a grade four student, was judged to be in the 'high average' range of intellectual ability, based on a teacher estimate. He is a quiet and very thoughtful student who has confidence in his abilities. He was an early reader, starting to read at age five. At the outset of this investigation, James was reading material independently at a level equivalent to an average grade six reader His comprehension was very good.

While reading for this study, James worked carefully and consistently on all material. He did not appear to notice the presence of the video-camera or, at least, did not seem to be distracted by its presence. He was able to express his thoughts on the material fluently, and preferred to comment on things that related to personal experience. He also asked many questions that anticipated the passage, asking, for example, "was the boy scared when waiting for the dragon?"

Ann. Ann is also a student in the 'high average' range of intellectual ability,

demonstrating a great deal of confidence in all endeavours. She was very eager to participate in the study, as she is eager in all school activities. Her reading ability is at least one grade level above that expected for her age, as based on teacher estimate. She reads with strong comprehension.

In the classroom and while reading the material for this study, Ann showed a great deal of self-confidence in her own ability. Her preferred way of responding to text was to state that she visualized what she was reading about. For example, when reading a description of how hawks flew, she said, "I picture that," a phrase she used frequently.

Paul. Paul has been formally diagnosed, by School District staff using standardized testing, as having a Severe Learning Disability in the areas of reading and written language. This assessment demonstrated a significant difference between ability and achievement in the area of reading and writing, more than two grades below average. Paul was receiving learning assistance for an hour each week during the course of this study. He has no behavioural or emotional problems, and is a quiet, thoughtful student who is artistic and enjoys drawing and word games.

Paul's reluctance to read and his lack of confidence during the study were noticeable. He frequently demonstrated his dependence on the help of others for success in reading: when unable to decode the word 'learned' he said, "I don't understand the word." When this word was supplied to him, he replied, "Okay, now I understand the sentence."

Will. A student who reads at grade level based on teacher estimate, Will must work hard to make meaning of what he reads. He has difficulty with comprehension when reading grade level material. An active boy, Will would rather be outside playing sports than sitting in a classroom.

As Will read for this study, he showed discomfort with the video-camera, looking toward it as he read. He had difficulty verbalizing his thoughts; his preference was to paraphrase what he had read. When expressing his thoughts, he appeared to treat each sentence as a separate idea, rather than as part of a greater passage.

Michael. Michael is a student who reads at grade level, based on teacher

estimate and who comprehends well at that level. He is a determined, interested student, with a strong motivation to succeed. As demonstrated in this study, Michael worked hard to decode. For example, he attempted the word 'destination' four times: "destation, detachment, disconnection, destination." When asked about the meaning of this word, he stated that it meant, "where they wanted to go." When reading grade level passages, he persevered at decoding, while with passages above grade level, he did not work to decode difficult vocabulary. Instead, he was not aware of or did not acknowledge errors.

Sam. Sam, a student who reads at grade level based on teacher estimate, demonstrates a great deal of confidence in his abilities. He is a very tenacious student, and shows determination in all of his behaviours. Anecdotal report card comments state that he frequently rushes through assignments.

Sam frequently tried to hurry through much of the reading material given him for this study. For example, when queried about a point of comprehension at the end of a passage, he stated, "I can't really explain," and immediately went on to discuss another topic.

Katie. Katie has been assessed by school personnel as having a reading disability; she reads at a level approximately two years below grade level. This assessment was carried out less than one year prior to this study, using tests of achievement and informal reading inventories. Katie demonstrates normal behavioural and emotional adjustment. Although she has difficulty comprehending text, she is a determined student who works hard and has struggled to overcome her difficulties in reading. Katie was receiving learning assistance for an hour each week during the course of this study.

Katie persevered with reading passages for this study, despite difficulty with decoding and comprehension. As she read, Katie frequently criticized the text for such things as lack of punctuation and choice of words. An illustration of this was when she pointed out, "no one knows who is speaking here," or "there's no point to add that." Although she was conscious of the camera, she was able to provide adequate comments during her sessions.

Mary. A student who has been determined to read at grade level by teacher

estimate, Mary demonstrates difficulty with comprehension. Her self-confidence appears to be low; anecdotal comments on report cards state that Mary is reluctant to volunteer responses in class.

Mary agreed to read for this study, although she was very reluctant to 'think aloud'. She showed discomfort with the camera, and rarely commented on any features of text except her awareness of error in decoding or comprehension break-down. Frequently her sole comment was, "I don't know what that one means."

Joseph. Joseph has been described by his teacher as a student who reads at a level slightly below grade level. His comprehension is good and he works hard to get meaning from what he reads. Anecdotal comments on report cards state that he lacks self-confidence in academic and social situations. He had repeated one grade, several years ago, so was a year older than his classmates involved in this study.

Joseph worked hard to offer his thoughts on what he read. He did not become discouraged when passages became more difficult; rather he speculated on word meaning from its context. An illustration of this was when he said, "I don't know what that word is [Algonquin]. It's probably some tribe."

Vic. This student's reading level has been estimated by his teachers at a level one to two years below grade level. Although there has been no formal assessment, report card comments have noted this for several years. Both decoding and comprehension are areas of difficulty. Report card comments also state that Vic works no harder than he needs to in order to get by; he would rather be playing sports.

Vic was a very cooperative participant in this study; he worked hard to comment as he read. The video-camera may have slightly influenced his performance, especially when he was having difficulty. At one point, he stated, "I messed that up a bit, said that too fast." Think-aloud comments were mainly focused on awareness of error and decoding; he frequently made one-word remarks ("neat!" or "huge") perhaps because he had difficulty articulating his thoughts, or perhaps because he did not comprehend a sentence and felt he had to say something.

Bernie. This student is visually impaired, and reads all text in Braille, as she has through-out her school career. Her reading skills, based on teacher estimate, are well above grade level and she comprehends well what she reads. Despite her strong

skills, anecdotal comments on report cards indicate that Bernie lacks self-confidence.

During the study, she sometimes made comments on the Braille format itself, especially errors made in the transcription of text into Braille: "Oh, she put a dot-3 instead of a dot-2, okay." These errors did not affect comprehension, as she quickly acknowledged the correct form. Some comments demonstrate Bernie's lack of confidence, such as, "That's mainly what I understand." and "I'm not sure, but..."

Ruth. A student who reads well above grade level, based on teacher estimate, Ruth has a wide experience of literature and knowledge, and is a very confident student. Comprehension is also well above grade level.

An eager participant in this study, she expanded on her thoughts in detail: "I guess that Romans and Italians are the same thing. A friend of ours is in Rome right now."

Louise. Based on teacher estimate, Louise reads and comprehends well above grade level. She has a wide experience of literature and knowledge, and is a very confident student.

During the study, she read and commented eagerly, expanding on her thoughts in great detail. This was especially so when she read expository text, illustrating her knowledge of and interest in her surroundings: "Oh, a volcano – I flew over Mount Saint Helen's."

Fred. A student who was one year older than the others in his group, Fred has been diagnosed as having Severe Learning Disability in reading, with a discrepancy of two standard deviations between aptitude and achievement. This assessment was carried out two years before the present study, by District personnel. Fred has also been diagnosed by clinical personnel as having severe to moderate behaviour problems and emotional problems. These behavioural and emotional difficulties had decreased in recent years, with maturity. Fred has received counseling for these difficulties for several years.

Fred eagerly participated and contributed many comments during his reading of each passage for this study. His lack of confidence in his reading was frequently demonstrated by such statements as, "Now I'm more confused about these people" and "These are words I don't know, can't say" but he persevered through many

passages.

Saul. A student whose second language is English, Saul was assessed by District staff several years prior to this study as having 'weakness' in the area of vocabulary and expressive language. Saul has received some support in development of English skills; this support continued during the present study. Saul's reading ability, based on informal reading inventories carried out within six months prior to this study, was approximately two years below grade level. Saul is a very focused student, who spends a great deal of time completing homework. He relies on the dictionary regularly and is able to formulate clear and useful questions about material he is reading.

Saul worked hard to read and comprehend; he contributed many comments and reflected easily on what he read. His interest in the topics of several passages took him on tangents. For example, he said, "Who called the surface of the earth a crust? Sounds more like apple pie!"

Laurence. A student with grade level reading ability, based on teacher estimate, Laurence has good comprehension. He is able to apply a wide background of knowledge and interests to what he reads.

At the beginning of the study, Laurence was conscious of the camera and reluctant to say very much. He said, "that's probably an easy word – I just can't say it." However, as the study progressed, he became more comfortable and was able to express himself with more ease.

Ryan. Ryan is a student with grade level or slightly higher reading ability, based on teacher estimate. He has definite opinions and often questions authority. Schoolwork is often completed quickly, rather than with care. This was frequently noted on report cards.

Ryan accomplished all passages for this study with ease, although several comments demonstrated that he was feeling uncertain about his comprehension: "I'm trying to figure out that word." He read passages quickly, focusing on decoding. The presence of the video-camera may have influenced his performance to some degree.

Amy. A student who reads slightly above grade level, based on teacher estimate, she decodes easily but has some difficulty comprehending material.

Anecdotal comments on report cards state that her language skills are above average. She is an avid reader who enjoys discussing her impressions of what she reads.

While participating in this study, Amy was self-conscious about the camera. This faded with practice and she began to speak in more detail about what she was thinking: "If I was reading this in a book, I would go right by that word."

Ralph. Based on teacher estimate, Ralph is a student who reads at grade level. Comprehension is not at par with decoding; he appears to focus on decoding accurately. Ralph is very confident in his abilities and is concerned about doing well in school.

Ralph did not provide much detail in his comments for this study. He showed some difficulty in comprehension but was unaware of or unable to express this difficulty. Most of the comments he stated were brief: "More facts," and "Describing what she is seeing."

Meg. Based on teacher estimate, Meg is a student who reads more than two years above grade level. Her extensive background knowledge and her interest in the world contribute to strong comprehension skills. She had been enrolled in gifted programs in primary grades, and her academic performance continues to be above average.

Meg provided detailed and enthusiastic comments when reading for this study. She showed no self-consciousness in front of the camera. Her enjoyment at being able to discuss passages was apparent: "I knew that! I did a report on it in grade four!"

Beth. A student who reads more than two years above grade level, based on teacher estimate, Beth has a strong background in literature, and was able to relate what she read to prior knowledge and previous experience. For several years of her schooling, Beth was home-schooled by her mother.

Although initially conscious of the camera, Beth spoke at length about the many associations she made when reading each passage: "Oh, opera glasses, I always see them as gold!" She was an eager and very verbal participant in this study, expressing interest in the theory on which it was based.

Materials

Questionnaires. Two questionnaires were administered to assess determine declarative/declared use of metacognitive strategies: (1) The Index of Reading Awareness (IRA) of Paris and Jacobs (1987) and (2) the Motivated Strategies for Learning Questionnaire (MSLQ) of Pintrich and De Groot (1990).

The Index of Reading Awareness (Paris and Jacobs) has been designed to measure three areas of metacognition: evaluation, planning and regulation. The IRA is said to assess aspects of reading including monitoring progress and repairing understanding. Mayer McLain, Gridley and McIntosh (1991) examined the reliability and validity of the IRA. They determined that it was of "acceptable adequacy" if used as a total score and as only one of several measures of reading.

The Motivated Strategies for Learning Questionnaire (Pintrich and De Groot) is used to measure motivational beliefs and self-regulated learning. It was designed as a self-report instrument to assess the motivational orientations and use of different learning strategies for college students. In a discussion of this questionnaire, presented by Garcia and Pintrich (1995), the authors stated that the subscales "seem to show predictive validity", and that the MSLQ "seems to represent a useful, reliable and valid means for assessing college students' motivation and use of learning strategies in the classroom" (p. 19). Walsh (personal communication, August 8, 2000) stated that test-retest or stability coefficients for a large sample of middle school students were "well over .80 at three months, six months and twelve months."

Think-aloud protocols. Two sets of reading materials were used, one of narrative and one of expository text. These sets were taken from the Basic Reading Inventory (BRI) of Johns (1997). Passages began at the grade three reading level and continued through the grade twelve reading level. The mean number of words per passage was 250, and all passages contained from 17 to 25 sentences, varying in length depending on level of difficulty. Expository passages presented a variety of structures, including description of a sequence of events or cause and effect, and comparison of contrasting information.

In two separate sessions, each lasting approximately 45 minutes, students

were asked to read either narrative or expository selections. The order in which type of text was presented varied randomly. Each student was asked to begin with a passage at estimated "instructional" reading level, based on the researcher's familiarity with that reader. Students were asked to continue reading additional passages until they reached "frustration" level, until they had read for 45 minutes or until they had read all available text to grade 12 level. These limits were required as consideration of student well-being. The number of passages read by each student thus varied, with as few as one expository passage for one student and as many as five for another.

An initial training session was held, which used mazes from "Maze Fun" and "Spooky Mazes" to develop the notion of 'think-aloud'. This was modeled on the procedures suggested by McGuire and Yewchuk (1996). Students were asked to complete several mazes, describing their progress and explaining their choice of pathways in the maze as they worked.

Procedures

Pilot Study. A pilot study was carried out, to check the value of the maze training session and to see if the method of text presentation did encourage students to think aloud. This pilot study used alternate passages from Johns' BRI. Results of the pilot study indicated that comfort with 'thinking aloud' varied with the individual. Of the two students used in the pilot study, one easily described his path through the maze, while the other was more reserved and required occasional prompting. Both students were comfortable with the presentation of text and understood that the red dot at the end of each sentence did signal the need to comment before going on in the passage. During pilot sessions, prompting by the researcher was rarely required.

Training Session. An initial training session was conducted with each participant, following the method of McGuire and Yewchuk (1996). Participants completed mazes prior to beginning the reading passages. This training was implemented in order to help students become accustomed to speaking their thoughts aloud.

Reading Sessions. Participants were given either narrative or expository passages during a session, and were asked to "think-aloud" as they read. They were

told that they were able to look back or forwards in the story at any time. The reading passages were divided into sentences, with a red dot placed at the end of each sentence as a cue that the student was to state what they were thinking as they read (McGuire & Yewchuk, 1996). If the student didn't report at the end of a sentence, he or she was prompted by the question, "What were you thinking as you read the last sentence?" Before students began to read, directions included the request that they summarize the passage when they had completed it. At the end of the passage, if students did not offer a summary, they were asked, "What was the story about?"

By following this methodology, some of the factors raised by Ericsson and Simon (1980) as ways to increase the accuracy of self-reports were addressed. Verbalization did not interfere with task performance, time between task performance and verbalization was immediate, and probes were nonspecific and did not cue responses.

Scoring Procedures and Data Analysis

Transcriptions and scoring procedures. All readings and summaries were video-taped and transcribed; as well, a "running record" was maintained by the researcher as students read, to assist in later transcription. Following a procedure described by Johns (1997), student summaries were judged as indicating good, fair or poor comprehension.

Data Analysis. The researcher viewed video tapes of each student reading various passages. In viewing the viewtapes, notes were made as to student's reading verbal and non-verbal behavior. This provided information on such behaviours as students' hesitation, their physical shifting or gazing away from the task. This additional analysis provided indicators that a reader's attention may have wandered, or that he or she may have become restless or distracted.

Transcribed data was analyzed using two classifications of metacognitive strategies: the first as presented in McGuire and Yewchuk (1996) (Appendix I) and the second by Brenna (1995) (Appendix II). McGuire and Yewchuk developed their list of strategies from an analysis of reading carried out with a group of upper elementary students. Brenna also developed her list of strategies after reading was carried out, in this case by a group of five-year-old early readers.

The running record data of each student's think-aloud comments, including all comments made within and at the end of each sentence. These were analyzed in detail. Every comment made by each student during each passage was examined and categorized based on how well it fit into the description of that category. In many instances, this allowed some confirmation or cross-checking of analysis, as both classifications included many categories that were similar. As well, several categories that were presented in Brenna's list did not occur on the list used by McGuire and Yewchuk. These two lists were merged into one that was used in the final analysis for this study. (Appendix III)

Frequency and percentage of miscue or decoding errors of each passage were calculated for each student. The summaries supplied by each student of each passage were also analyzed to assess whether students had comprehended what they had just read.

Scoring for the two questionnaires was carried out for each student. The frequency of reported think-alouds was counted. Scores for declarative knowledge as reported on the IRA questionnaire, and scores for motivation to use strategies as reported on the MSLQ, were then compared to actual strategy use.

CHAPTER FOUR
Results

In this chapter each research question is briefly outlined, and the results of the think-aloud information provided by each participant in relation to that question are discussed. As well as examples of comments made by students, summary charts in which trends of strategy use and tables giving present individual strategy use for students in each grade are presented.

Differences in Quantity and Variety of Metacognitive Strategies Across Age Groups

The first question asked what, if any, differences exist between age groups of readers in how metacognitive strategies are used, and whether those might be differences in quantity or variety. Discussion of this question is followed by an examination of how the factors of quantity or variety of strategy use influence reading comprehension.

As illustrated in the discussion below, an analysis of all think-aloud protocols indicated that readers at all grade levels use metacognitive strategies. Individual differences exist and many students have developed preferences they maintain, regardless of text style; these observations demonstrate a wide range in both quantity and variety of strategy use for all participants in this study.

Quantity of strategies used. Differences in quantity seem related to the individual rather than age or ability. The number of comments per story range from two (a good grade four reader) to 35 (a good grade seven reader). The two comments made by grade four reader James linked the passage to personal experience. Many of the 35 comments made by grade seven reader Louise also related her personal experiences to the text.

In Table 1 the range of comments as reported by students at each grade level is given. As shown in this table, type of text had no influence on quantity of comments; a wide range of strategies was noted for both narrative and expository text at all three grade levels. In addition, there was little variation between numbers of strategies used or mean calculated for narrative and expository text within each grade.

Table 1

Number of Metacognitive Strategies Per Passage by Students at Three Grade Levels for Narrative and Expository Text

Grade	Number	Narrative Text			Expository Text		
Level	of students	Highest	Lowest	Mean	Highest	Lowest	Mean
4	6	22	2	12	23	3	13
7	7	29	5	17	35	5	20
10	8	32	4	18	34	5	20

In Table 2, the range of comments made by good and poor readers at each grade level is presented. As discussed in the Methods section, students considered to be good decoders were those who read at the 'Instructional' level for their grade or above, while poor decoders read at the 'Frustration' level when reading at or below grade level.

Table 2

Range of Metacognitive Strategies Implemented by Good and Poor Decoders

	Range of comments made					
	Grade 4	Mean	Grade 7	Mean	Grade 10	Mean
Good Decoders	2 – 22	12	5 – 35	20	4 – 22	13
Poor Decoders	6 – 23	15	8 – 29	19	12 – 34	23

As shown in Table 2, there is variation in the number of comments made by both skillful and less skilled decoders. Some readers who were skilled at decoding made few comments, while others made many. The same was evident for poor decoders: some made many comments, while others said little. An interesting point illustrated by Table 2 is that the difference in means for grade four and seven between good and poor decoders did not differ significantly, while for grade ten readers poor decoders made many more comments than the good readers in their grade. Table 2 supports the deduction that the relationship between decoding ability and comprehension was not based solely on quantity of strategy use.

The influence of quantity on comprehension

An examination of quantity of comments by individuals illustrates how comprehension and number of comments may be connected. Several students who were good decoders, Mary in grade seven and Ralph in grade ten, made few comments and demonstrated poor comprehension. Those comments that Mary made were related primarily to errors she made in decoding; she made almost no use of active strategies. When asked to summarize passages, she said, "I don't know what that was about," and "I didn't get any of that, there were too many big words." Possibly the most telling of her comments was when she explained that while reading material assigned for class, she would "go ask what it is" if she did not understand something.

Ralph's comments served mainly to categorize or summarize each sentence: "he's giving his past," "background on beards," or "facts about earthquakes." He dealt with many sentences as separate units rather than parts of a larger passage, which negatively influenced comprehension on several passages.

Although their decoding skills were weak and they read below grade level, several fair readers were able to comprehend fairly well. Michael, Vic, Saul and Fred all commented frequently about the text as they read. These readers demonstrated that a crucial factor in comprehension is "effort" (possibly depth or extent of processing). Number of comments made is one indication of this effort. Although these readers had difficulty with decoding, they made many comments, and were able to comprehend quite well. They were able to make many connections, so that they could fill in meaning despite difficulty with specific words.

Many readers with stronger decoding skills did not have to expend so much effort, or apply such a variety of strategies. They were able to focus on comprehension, rather than try to decode text at the same time as they worked to comprehend. The frequency of comments made by these good readers varied; the number did not have a direct relationship with greater comprehension. Rather, the variety of their comments was the influencing factor; this will be discussed in the next section.

Summary. Quantity of strategy use is related to neither age nor reading ability. Readers of all ages showed some use of strategies and individual variability in number of strategies. Variation in quantity may be related to factors not explored in this thesis such as personality, the reader's comfort with the situation, and their intrinsic or extrinsic orientation. The number of strategies utilized was not the factor that influenced comprehension; greater strategy use did not guarantee reading effectiveness or comprehension. This observation was reinforced in the examination of the number of comments made by grade ten readers: the mean number for students who comprehended poorly was far greater than the mean for good readers.

Readers in this study could be sorted into three groups, in terms of numbers of strategies utilized. One group consisted of those who read well and made many connections, another of those who read less well but made many connections, and a third of those who decoded well but made little effort to comprehend. This grouping may be similar to Pintrich's groups of readers in terms of motivation. He stated that readers who carry out deeper processing also showed qualitatively better motivation and that the nature of the work influenced the students' motivational beliefs.

Variety of Strategies Used

In the section that follows, it will be apparent that the ways in which students of different grades used strategies varied. All but one of the grade four readers, four of the weaker grade seven readers and three good grade ten readers maintained a preferred strategy through both narrative and expository text. Three better grade seven readers and four grade ten readers, including both good and poor readers, demonstrated a preference for certain strategies but did demonstrate variation of strategy use according to text type.

One significant descriptor of older and better readers which was noted was that they were able to "personalize" reading by introducing their own experiences into thinking as they read. This was less evident with younger and poor readers who required many more resources to be used for decoding, and made little comment relating text to past experiences and prior knowledge (Tables 3a and 3b).

Table 3a
Strategies Used For Each Type of Text – Grade Comparisons:
Per Cent of Each Grade Using Strategy at Least 5% of Time

	Narrative Passages			Expository Passages		
Grade	Four	Seven	Ten	Four	Seven	Ten
Number	[6]	[7]	[8]	[6]	[7]	[8]
Strategies Used						
Evaluation of error	0.33	1	0.88	0.50	0.86	0.88
Re-read	1	0.57	0.63	0.83	0.57	0.63
Asked	0.50	0.14	0.13	0.33	0.00	0.13
Sound Out	0.66	1	0.63	0.83	0.83	0.63
Predict word from context	0	0	0.13	0	0	0
Disregard problem when read	0	0.57	0.13	0.50	0.57	0.13
Link to Personal Experience	0.17	0.43	0.50	0.17	0.29	0.50
Link to Prior Knowledge	0.00	0.14	0.25	0.50	0.14	0.25
Visual imagery	0.17	0.14	0.38	0.17	0	0.38
Paraphrase	0.17	0	0.38	0	0	0.38
Planning	0	0	0	0	0	0
Accurate prediction	0.83	0.43	0.25	0.67	0.43	0.25
Opinion	0.17	0.57	0.38	0.50	0.71	0.38

Table 3b
Comparison of Strategies Used For Each Type of Text By Reading Ability:
Number of Readers In Each Group Using Strategy At Least 5% of Time

	Narrative Passages			Expository Passages		
Grade	Four	Seven	Ten	Four	Seven	Ten
Number	[6]	[7]	[8]	[6]	[7]	[8]
Strategies Used						
Evaluation of error	6	5	4	6	9	4
Re-read	6	8	4	4	6	4
Asked	2	0	0	1	0	0
Sound Out	4	8	2	4	8	2
Predict word from context	0	1	0	0	0	0
Disregard problem when read	3	4	2	3	2	3
Link to Personal Experience	5	2	0	5	1	1
Link to Prior Knowledge	1	2	0	5	0	0
Visual imagery	3	2	1	2	2	0
Paraphrase	1	2	0	1	2	0
Planning	0	0	0	0	0	0
Accurate prediction	6	5	0	3	4	0
Opinion	3	3	2	4	3	2

Grade four. When strategy use was examined, it was noted that although all grade four readers used metacognitive strategies, four of the six students at this grade level did not use them predictably or effectively. Within this group, three strategies predominated: re-reading, sounding out and predicting. As shown in Table 4a, all grade four readers demonstrated preferences for certain strategies, using these 'favourite' strategies with both types of text.

Both good readers in this group used strategies effectively. James was the only grade four reader who added the active strategies of using personal experience and prior knowledge to his reading of expository text. For example, he said, "Oh, five feet, that's about as big as me!" Ann relied on visualization as her main strategy with both types of text: "I can picture that!" and "I wonder what her doll looked

like?" She maintained this strategy even when it was no longer effective, although frequency of use decreased as passage difficulty increased.

Two students preferred prediction as their predominant strategy. Sam was able to make accurate predictions, with some decrease when passage difficulty increased: "They'll try to find some kind of a home." Will also preferred prediction, although his predictions were frequently inaccurate: "Because if they (the hawks) didn't [work together], something might attack them." Then later, "They (the hawks) are friendly and stuff." He did not comment on or seem to notice inaccuracies, nor did he make any attempt to correct them.

Michael seemed to have no preferred strategy; rather, he appeared to be utilizing strategies at random, with an emphasis on decoding. When reading more difficult narrative text, he started to paraphrase - which seemed to help him clarify comprehension: "She's worried." Paul focused almost completely on decoding - his evaluative comments indicated awareness that he was not doing well, but he used no active metacognitive strategies. For both types of text, Paul focused on re-reading, sounding out and asking for words: "Tie...tr...what is that word? [supplied] Oh, he tiptoed to the house." And "He b...buv...bove...what is that? [supplied] He dove behind a rock."

Table 4a
Preferred Strategies for Each Type of Text – Grade Four Readers

Strategies	Narrative Passages						Expository Passages					
	Ann	James	Michael	Sam	Paul	Will	Ann	James	Michael	Sam	Paul	Will
Evaluation of Error	√				√		√	√			√	
Re-read	√	√	√	√	√	√	√		√	√	√	√
Asked	√				√		√				√	
Sound Out			√	√	√	√		√	√	√	√	√
Predict word from context												
Disregard problem when read							√	√			√	
Link to personal experience		√						√				
Link to prior knowledge								√	√	√		
Visual Imagery	√						√					
Paraphrase			√									
Planning												
Accurate prediction	√	√	√	√		√			√	√		√
Opinion				√				√	√	√		

It seems that grade four students lacked conditional knowledge. Four of the six students seemed to stick with one preferred strategy through all readings, possibly not aware of its ineffectiveness. The other two grade four readers used few strategies to assist in comprehension. For these two, the desired goal appeared to be accurate word calling rather than acquiring meaning from print. There appears to be little 'personalization' for this age; only James was able to connect prior experience to what he read, mainly in expository text. This could be due to his own preference for that type of material or his past experiences.

Grade seven. When strategy use by grade seven readers was examined, it was noted that five of the seven students in this group indicated definite preference for particular strategies. Some students retained these favourite strategies through-out

both types of texts and all levels of difficulty, while others switched to better suit the passage.

Two poor grade seven readers, similar to most grade four students, maintained similar strategies through all passages. Little use of active strategies was demonstrated, while much effort was focused on decoding. Katie used all of her resources to decode text, and comprehension was poor. Mary was able to decode accurately, but her comprehension was very poor; she appeared to focus entirely on word-calling; many of her comments related to her lack of understanding of individual sentences. For example she said, "What? Did I – oh I just read that." and "I didn't get any of that – too many big words."

Poor readers at this age, again similar to grade four readers, weren't able to relate text to personal experience or prior knowledge. Katie did offer many opinions on text structure and format, perhaps her way of 'personalizing' or justifying to the listener why she did not understand what she read. Some examples are: "I wouldn't use that word in a sentence!" and "There's no point to add that [sentence]." and "No one knows who's speaking – no quotation marks again."

Moderate readers demonstrated some variation in strategy use. One moderate reader, Joseph tended to prefer prediction through-out: "He must be religious, probably don't have a lot of money." He was able to use paraphrasing to assist in comprehension: "Just reading it over… he just wanted his tooth to be ripped out, he's in too much pain."

Moderate reader Vic used different strategies with each type of text; although his focus was on decoding as the main task of reading. He said, "All I could think after I said that 'yichet' word [yacht] was what did that word mean?" and "I messed that up a bit, said it too fast." Vic did use some visual images with both types of text: "I can picture Kay watching the guy do that." and "I'm trying to get a picture of the inside (of the house)." He also applied personal experience several times: "That's the same thing I would do." and "The summer camp I go to is an Iroquois thing, neat."

Good readers at grade seven were able to use many active reading strategies; selection varied with the individual. Ruth had a definite preference for prediction, but was able to implement other strategies, relating what she read to past experience and

prior knowledge when reading expository text. Bernie used a variety of strategies with narrative text, fewer with expository. Her preferred strategy was prediction with both types of text although she was able to relate to personal experience with narrative text. Louise definitely used a wide variety of strategies, preferring visual imagery with narrative text, and supplementing this with other strategies. When reading expository text, she used many examples of linking to personal experience and prior knowledge.

Expansion, or *personalizing* what they were reading, appeared to be significant for these good readers. They were able to relate to personal experience and to recall information they could then apply to improve comprehension of the passage. The following four examples are illustrative: Ruth said, "They had a thing on the Discovery Channel that was the exact same thing!" Bernie commented, "I know a string tied to the tooth doesn't work – I've tried it before." and "Elizabeth- is this about Queen Elizabeth?" Louise, the best reader in this group and one of the best in the entire study, used personal experience and prior knowledge 100 times during the study! Typical of her comments: "All happy and warm – warm can mean warm colours, warm people, nice people." and "There must have been other cities hit because the Mediterranean Sea had lots of cities."

Table 4b
Preferred Strategies for Each Type of Text – Grade Seven Readers

Strategies	Narrative Passages							Expository Passages						
	Ruth	Mary	Kati	Louis	Berni	Jos	Vic	Ruth	Mary	Kati	Louis	Berni	Jos	Vic
Evaluation of Error	√	√	√	√	√	√	√	√	√	√		√	√	√
Re-read	√	√	√		√	√	√	√		√		√		√
Asked					√									
Sound Out	√	√	√	√	√	√	√	√	√	√		√	√	√
Predict word from context														
Disregard problem when read	√	√	√			√		√	√	√				
Link to personal experience				√	√		√	√			√			
Link to prior knowledge				√				√			√			
Visual Imagery				√										
Paraphrase														
Planning														
Accurate prediction	√				√	√		√			√		√	
Opinion			√	√	√		√	√		√		√	√	√

Note. Kati = Katie; Louis = Louise; Berni = Bernie; Jos = Joseph

To conclude, variation in strategy use by grade seven students depended on reading ability and on motivation to apply strategies. One poor reader, like most grade four students, was focused on decoding text and so used few active strategies. A second reader who was an able decoder made no attempt to apply active strategies, placing little importance on comprehension. Good readers at this level skillfully put into practice those strategies that suited the type of text; they applied conditional knowledge that allowed them to select suitable strategies.

Grade ten. Examination of strategy use at the grade ten level showed that all grade ten readers demonstrated variation in strategy use with text type, although several only occasionally. However, such variation was not always related to effectiveness. Both poor readers at this level demonstrated implementation of

different strategies depending on text type. Fred was able to use a variety of strategies while reading narrative text, and few when reading expository text. He used visual imagery when he said, "I can picture how the guy smashed into her, I'm trying to figure out what's going on." An example of prediction is, "I can imagine what's going to happen next – he'll fall over."

Saul showed the reverse pattern, using a variety of strategies with expository text and few with narrative. He linked what he was reading to past experience, saying, "I remember a big earthquake – what was it? Didn't someone die of a heart attack then?" He was also able to use prediction and opinion in comments such as, "Is he going to tame them? You can't tame wild animals, especially when they think of you as breakfast!"

Moderate readers tended to maintain a few preferred strategies with both types of text, with rare changes depending on passage difficulty. Both Lawrence and Ralph predicted and paraphrased, while Ryan preferred to use visual images. These strategies were not always suitable; Lawrence demonstrated good comprehension, while both Ralph and Ryan had difficulty with comprehension. The skill with which strategies were carried out appears to have been the contributing factor. When Lawrence used paraphrasing, he was able to develop his understanding of a phrase or sentence: "On par...they are not greater, they're equal to people." and "So, lots of disasters hit." Ralph also used paraphrasing to summarize text: "This is giving his past." and "Foreshadowing what might happen." Ryan's use of visual images, such as "I picture that happening." and "The world's kinda shaking." seemed to clarify information for him.

Several good grade ten readers also preferred the strategy of visualization, while adding other strategies that varied with text type. Amy and Beth supplemented visualization with links to personal experience and prior knowledge: Amy said, "I picture someone on a bike and the liver choking to death." and "I picture the scale going up and down." Amy's comprehension was fair, possibly because many of her visual images involved isolated pictures that didn't appear to relate to the passage or clarify meaning. Beth used many strong visual images (over 90 in the course of the study) and her comprehension was consistently very good: "Okay, I see him looking

in the little red book, at the really touristy paintings and I see him starring at the paintings." And "Blond curly-haired girl in a toga... oh it's a boy!"

Another good reader, Meg, also showed differences according to text type. She preferred prediction with narrative text, and applied prior knowledge and personal experience to expository text. Her comprehension varied, fair with narrative and very good with expository text. When reading narrative text, Meg commented frequently on the vocabulary and style of the authors; she made comments such as the following: "It's hard to concentrate, because of the big words and long sentences." She also disregarded words which were unfamiliar to her, stating, "Raiment – I don't know what that word means – I'll just read the rest of the sentence and find another word for what it means." This strategy was useful part of the time, but contributed to lack of comprehension occasionally. When reading expository text, which she enjoyed, she was able to link to prior knowledge: "I knew that! I did a report on it in grade four." and "Dad showed me the seismograph at the museum."

This group of grade ten readers demonstrated individual preferences for certain strategies, which varied not only with each student but also with passage type. It appears that students at this grade level were better able to select advantageous strategies, relative to type of text. However, comprehension did not always relate to choice of strategy - there was awareness that there must be some modification of strategy, but the strategy was not always applied to the best or adequate effect.

Table 4c
Preferred Strategies for Each Type of Text – Grade Ten Readers

Strategies	Narrative Passages								Expository Passages							
	Saul	Fred	Ryan	Meg	Beth	Amy	Ralph	Lawr	Saul	Fred	Ryan	Meg	Beth	Amy	Ralph	Lawr
Evaluation of Error	√	√	√	√		√	√	√	√	√	√	√		√	√	√
Re-read	√	√	√	√			√	√	√	√	√				√	√
Asked										√						
Sound Out	√	√	√				√	√	√	√	√					
Predict word from context																
Disregard problem when read	√		√	√												
Link to personal experience	√	√	√						√			√	√	√		
Link to prior knowledge												√	√			
Visual Imagery		√	√		√	√					√		√	√		
Paraphrase							√	√			√				√	√
Planning																
Accurate prediction			√	√		√	√								√	√
Opinion		√	√	√						√						√

Note. Lawr = Lawrence

Although all grade ten readers used active strategies, there was an important difference between good and poor readers, as is evident in Table 4c. Poor readers were often required to apply repair strategies, decoding and sounding out words as well as applying active strategies. It was interesting to note that despite this extra work, the poor readers did persist; they tolerated a great amount of ambiguity in order to comprehend the general ideas of a passage. Their motivation to make meaning from text and to apply strategies was demonstrated by the number and the variety of strategies used as well as the perseverance with which they completed the reading tasks. This positive motivation will be discussed in detail in a further section of this discussion.

Novice and experienced readers. When examining differences in strategy use between novice and experienced readers, several distinctions emerged. First, the majority of grade four students was satisfied to word call, and did not appear to recognize the need for comprehension. Most of the older students were aware that extracting meaning is the essence of reading, although not all of these older students efficiently carried out strategies which enabled them to do so.

As well, older students were more willing to disregard problems with decoding isolated words, recognizing that decoding a name may not have been crucial to comprehension, or realizing that some difficulty with comprehension would be clarified further in the passage. Some examples were the ways in which readers dealt with difficult and irregular words such as yacht, Iroquois and physiognomy. Many novice readers felt the need to decode every word, while experienced readers were able to tolerate ambiguity and go on with the passage. They were aware that they would comprehend the message in the whole passage rather than individual words or phrases.

In conclusion, both ability and age seem to be involved in selection of strategy use; with experience, passage type influenced strategy selection and effectiveness. Younger readers did use active strategies, but most hadn't developed the conditional knowledge necessary for appropriate choice of strategy. By grade seven, all readers were beginning to do this, and better readers of this age did so easily. By grade ten, readers seemed to shift strategies to use what they saw as most appropriate, although poor readers had to deal with other tasks as well.

Recognition and Repair of Comprehension Break-down

The second question concerned the differences in strategy implementation by good and poor readers when a break-down in comprehension occurred. This section includes descriptions of whether students at each of the three grade levels were aware of this break-down. As well, a portrayal is given for each student of whether metacognitive strategies were implemented and how this was done.

All incidents of comprehension break-down were examined to determine each student's course of action in a specific situation. Think-aloud comments were

considered in several ways. First of all, an assessment was made as to whether the student had indicated awareness that there was a break-down in comprehension, even though no action may have taken place to remedy the difficulty. This included any awareness of error when decoding a word, reading a phrase or making an inaccurate comment. Next, all comments that evaluated comprehension and any strategies utilized to improve comprehension in a particular situation were examined, and a determination of strategy type was made.

Grade four readers. Examination of comments indicated that half of the grade four readers were somewhat aware that comprehension had broken down. Only one good reader, Ann, was aware of comprehension break-down most of the time. She occasionally re-read the sentence or indicated confusion with comments such as, "I didn't really think about anything for that one." Ann sometimes used strategies and at other times made no attempt to clear up a problem. When passage difficulty increased, there was a noticeable decrease in her preferred strategy, visual imagery. Another strategy often used by Ann was that of asking for the pronunciation of difficult names.

James occasionally indicated awareness of confusion with expository text. One example was when he said, "I don't think that has anything to do with the story," but made no attempt to clarify the difficulty. Only when he mis-read an isolated word did he go back and correct that word. James showed no difference in type or frequency of strategy use when comprehension became more difficult.

Michael was sometimes aware of comprehension difficulties; when he was aware that he did not understand, he seemed to guess at what was happening in the passage, often incorrectly, and made no attempt to clarify or correct later.

The other grade four students were rarely aware of comprehension break-down. The few times Sam was aware, he re-read the line or the phrase, and decreased use of his preferred strategy, visualization. Will was rarely aware of difficulties; he commonly made predictions which were not based on material he had read, and made no effort to go back and correct errors in these predictions. Paul was very aware that he wasn't decoding correctly; there was little attempt to comprehend text. Sometimes when working to sound out a word, he said "Don't know" or asked for

assistance. He rarely attempted to comprehend sentence or passage, seeming quite helpless to deal with problems, and making few attempts to clarify.

Awareness of comprehension break-down at this grade level appears to be based on the individual student, rather than reading ability. Strong decoding ability did not determine this awareness; Ann was often aware that she did not understand, while good readers James and Sam were only sometimes aware of or concerned about difficulties. Fair reader Michael was sometimes aware. Poor reader Paul was rarely concerned with comprehension. To some degree this is typical of both poor and fair readers at this level; their focus was on decoding individual words, rather than on comprehension of sentence or passage.

Grade fours are often unaware that they don't understand; this could be because they are unaware of the 'aha' idea as described by Garner (1987), or perhaps they are so focused on accurately decoding the passage that they do not consider endeavoring to understand. They perhaps felt no need to comprehend; rather, the task set to them was reading, i.e. decoding, and that was what they were doing.

Grade seven readers. All grade seven students demonstrated awareness of comprehension break-down, the two poor readers less so than the others. These poor readers did little to clarify their difficulties, while both good and moderate readers were frequently aware of difficulty and were able to implement strategies to clarify understanding.

Good readers persisted in strategy use when comprehension broke down. Ruth frequently speculated on meaning or predicted several possibilities in order to clarify a passage. This strategy of prediction left her options open as she continued to read. With increasing difficulty, her over-all strategy use decreased slightly, but she continued to work to clear up difficulties. Louise used a variety of strategies to clarify understanding, persevering in applying these strategies as difficulty decreased. Both of these readers were able to tolerate some ambiguity as they proceeded, confident that understanding would develop as they continued. Bernie was often aware of comprehension break-down, and used a variety of strategies to acquire meaning, showing a slight decrease of over-all strategy use with increased difficulty. When level of difficulty of material was far above grade level (at the grade twelve

level) Bernie continued to indicate awareness of comprehension break-down, although she made few attempts to clarify comprehension at this level.

Joseph was generally aware of faulty comprehension, and like Ruth, often speculated on meaning or presented options. He was occasionally unaware that he had mis-read a word, which led to later miscomprehension. There were also several occasions when he was aware of difficulty but did nothing to clear it up. As difficulty increased, he decreased use of his preferred strategy and most other strategies, and more frequently disregarded word-calling errors. Perhaps he had run out of resources with which to repair his understanding.

Several weaker readers were aware of comprehension break-down, but did little to clarify their comprehension. Vic was often aware that he had mis-read words or missed phrases, but rarely tried to clear up difficulties. He sometimes re-read an incorrect word, but rarely worked to clear up problems in phrase or passage comprehension. As difficulty increased, he showed a slight decrease in all except decoding strategies. This was a pattern similar to most grade four readers. Mary was often aware of mis-read words, but rarely attempted to clear them up. She placed little importance on comprehension, sometimes asking for help with difficult words, but making no effort to understand the passage.

Poor reader Katie was rarely aware of break-down in comprehension; when she was aware, she rarely attempted to clear up her difficulties. She tended to offer opinions, pointing out what she considered to be incorrect text structure rather than her own difficulty in comprehending. Her main focus was decoding with little other strategy use, although she sometimes tried to re-read or asked for a word.

Paralleling younger students, these two poor readers, Mary and Katie, did not recognize the 'aha' of comprehension break-down; their focus was on decoding, rather than comprehension. Good readers at this age were aware of difficulty with comprehension, and typically persisted in their use of favourite strategies in order to remedy the situation.

Grade ten readers. All grade ten students were aware of most incidents of comprehension difficulty, and generally applied some strategy to clarify the problem, although effectiveness of strategy use was not consistent. At this level, the difference

in awareness was not based on reading ability; good, moderate and poor readers were all able to recognize comprehension break-down most of the time. The strategies used to deal with these did vary, although again this variation was not related to reading ability.

Good readers were generally aware of comprehension break-down, but their reaction to difficulty varied. Meg used a variety of strategies to clear these up; occasionally, she disregarded some difficulty after acknowledging the problem. Although Beth rarely misunderstood material, she too applied a variety of strategies. At the most difficult level of text she was unaware of error. Amy was generally aware of comprehension difficulty, but demonstrated few attempts to clear up problems. Her comments indicated that she found complex sentence structure or unusual word order confusing, but she did little to work these phrases out. Much like Katie at the grade seven level, Amy blamed the text structure rather than her own error for comprehension break-down.

Moderate readers at the grade ten level were consistently aware when they did not understand clearly; their responses to comprehension break-down varied. Lawrence persevered in strategy use for all passages; on several occasions when noting confusion with a mis-read word, he did little to clear it up. Ryan tried to repair decoding errors, but made no attempt to clarify comprehension problems in larger chunks of text, such as sentences. Ralph was often aware of difficulty with sentence meaning and worked to apply strategies. Occasionally he paraphrased incorrectly, leading to inaccurate understanding, but showed no awareness of this problem.

Poor readers also demonstrated awareness of comprehension break-down. Saul often recognized difficulties, but rarely did much to clarify them. He occasionally re-read a word or phrase or asked for help, generally working to deal with an isolated word rather than difficulties with phrases or sentences. Fred too was aware of difficulties and responded to them in a variety of ways. He either made no attempt, asked for help, guessed or re-read the word or phrase. His comments indicated a great deal of effort; despite making many errors he was able to comprehend much of what he read.

All grade ten students were commonly aware of difficulties with

comprehension; the ways in which they reacted depended on the individual and on difficulty of the passage. Students indicated in their comments that they persisted with strategy use, although not all strategies were effective in improving comprehension.

Summary. In conclusion, awareness of comprehension break-down seems related to reading ability *and* age. Younger readers noticed comprehension difficulties far less frequently, and when they did, carried out repair strategies based mainly on decoding. Competence at dealing with comprehension break-down is related to age *and* ability or age *times* ability. Younger students may sometimes recognize difficulty in comprehension, more students are aware by grade seven, and by grade ten all are aware of comprehension problems and apply some strategies to clear this up. Very good readers of all ages and older readers persevere at strategy use; they are able to apply more than one strategy if their first attempt is not successful.

Differences in Strategy Use According to Text Type

The third question in this study concerns whether readers implement different strategies according to type of text. Again, this discussion is presented according to grade level, and includes examples to illustrate individual differences.

Grade four readers. When comparing strategy use with each of the two text types, it was noted that five of the six readers in grade four did not demonstrate a difference in strategy use. Only good reader James demonstrated a difference in strategy use when type of text changed, using many more and varied strategies with expository text and relating what he read to his past knowledge and prior experience.

All other grade four students did not switch type of strategy, maintaining a preferred strategy for all passages of both narrative and expository text. Several of these young readers did supplement their preferred strategy with other strategies, depending on text type. Michael's preference was prediction with both types of text; however, when reading expository text he added linking to prior knowledge. Ann's preferred strategy was visualization, but she also used accurate prediction with

narrative text. Paul mainly worked on decoding; he did venture some predictions with narrative text, but made no attempt to use any except decoding strategies with expository text. Will maintained prediction and re-reading with both types, although comprehension was noticeably better with narrative text. Sam also preferred prediction for both narrative and expository text. He frequently made incorrect predictions and rarely went back to repair these, which influenced comprehension of both types of text.

Grade four readers seemed aware that a change of strategy was needed, but were not sure how this could be implemented. This awareness indicated that conditional knowledge was beginning to emerge, although was not yet solidly in place. These students held declarative knowledge as indicated on the questionnaire. They responded that if they were uncertain of the meaning of a sentence, they would think about the other sentences in the paragraph. However, these students tended to treat each sentence as an individual idea and rarely considered the passage as a means of clarifying comprehension.

Grade seven readers. Good grade seven readers were able to switch strategies to suit change in text type. Ruth used many more links to personal experience, prior knowledge and paraphrasing with expository text, while she preferred prediction with narrative text. Bernie used prediction and linking to personal experience with narrative and re-reading with expository text. Louise used links to personal experience for both types of text, with many examples of links to prior knowledge with expository and more use of visual imagery with narrative text.

Moderate readers Vic and Joseph each demonstrated some variability according to text type. Vic frequently used links to personal experience with narrative text, while relying on re-reading and grapho-phoneme cues with expository text. Joseph preferred prediction with both types of text, and added links to personal experience and re-reading with narrative text.

Poor readers Katie and Mary used few strategies besides decoding. Mary used similar decoding strategies for each type of text; Katie several times made predictions and related text to personal experience with expository text.

By grade seven, as reading ability develops students are able to apply

conditional knowledge, becoming more sophisticated in selecting strategies which are suitable for a specific type of text. The response of Bernie is typical of good readers in this age group – she stated on the IRA questionnaire that, when she came to a word she did not understand, she used the words around it to figure it out. In practice, she was able to do just that – "Nefarious purposes: no idea what nefarious means, I think they used his hair in ways he doesn't know." and "I guess emulated means they liked it." This strategy of using context to infer meaning is useful; less experienced readers in this situation focused on decoding words, and not on attaining an understanding of them.

Grade ten readers. All grade ten readers appeared aware of the suitability of strategies related to text style, and some switched strategies with varying types of text. Several were able to maintain strategies that they found useful for both types of text, and supplemented these with a variety of other strategies.

Good readers demonstrated some strategy selection according to passage type. Beth applied a wide variety for both types of text, using her preferred strategy of visualization with both, adding prediction with narrative, and links to personal experience and prior knowledge with expository text. Meg made more predictions and disregarded difficult words with narrative text, while links to prior knowledge and opinion were used more frequently with expository text. Amy preferred visual imagery with narrative text, and while continuing to use visual imagery for expository text, she also used links to prior knowledge and personal experience.

Moderate readers showed some indication of strategy variation depending on text type. Lawrence preferred prediction and paraphrasing, which he was able to use effectively with both types of text, adding several other strategies based on text type. Ryan preferred visual imagery for both, and again was able to supplement with various strategies. Ralph preferred prediction and paraphrase for both, although he did use some variety in repair strategies.

Poor readers also demonstrated differences in strategy use according to type. Fred, a learning disabled reader, used a wider variety of strategies with narrative text, making predictions and using visual images; with expository text he relied mainly on decoding by using grapho-phoneme cues and re-reading. Saul mainly demonstrated

decoding strategies with narrative text, with use of grapho-phoneme cues and re-reading; with expository text he was able to link text to personal experience and prior knowledge as well as opinion.

In conclusion, grade ten readers are aware of the effectiveness of using particular strategies according to type of text, resulting in better comprehension for some students. An interesting note observed in this analysis is that some students used more strategies, or comprehended more clearly with narrative text, while others had better success reading expository text. This seemed to contradict other research (e.g. Garner, 1981) which says that expository text is more difficult for readers due to text structure. Rather, personal preference and knowledge of a subject area or topic seem to be the contributing factors. This may link to the notion of 'personalization' which has already been discussed: by this age, readers are able to connect to text that is personally more meaningful. For example, if their background had been one that included sciences or history, they were more interested in expository text and they were able to connect personal knowledge, prior experience and motivation to read.

Conclusion. In conclusion, ability and experience are important factors in determining whether readers are able to select effective strategies from their repertoire. Grade four readers commonly used similar strategies with both types of text, and in addition seem to be trying out other strategies. Grade seven readers applied different strategies, as they tested what worked with a particular type of text, and grade ten readers have refined strategies that work well or with which they feel comfortable.

There was a "best practice" pattern demonstrated by good readers - they could relate expository text to personal experience and prior knowledge, and make predictions and visualize with narrative text. They were able to switch strategies so they were using the most appropriate for a particular type of text and perhaps particular topic. This can be illustrated by Ruth's statement, "Is that word unparalled? Unparalled wisdom? Okay, older – wisdom, young – brat, I guess." and "Objectionable – I can't remember if that is acceptable or unacceptable. The worst ones something to do with a god named Marsyas... Oh what he's saying is that it's the worst one."

Experienced readers also are able to read on and leave a difficult word or phrase until a greater understanding of the whole sentence or passage makes it clear. For example, Meg was able to disregard difficult vocabulary, to 'read around it': "Physiognomy - never heard that word before... the sentence doesn't make sense because of that word... phys- means health or being. Physio- prefix means physical." Ann disregarded Indian names (e.g. "Iroquois") or asked about them, recognizing that pronunciation was not important to understanding. Fred also disregarded difficult names, demonstrating that by grade ten, even poor readers realize names may not be essential to the story. This indication of tolerance of ambiguity is an important characteristic of the mature reader.

Motivation to Use Metacognitive Strategies

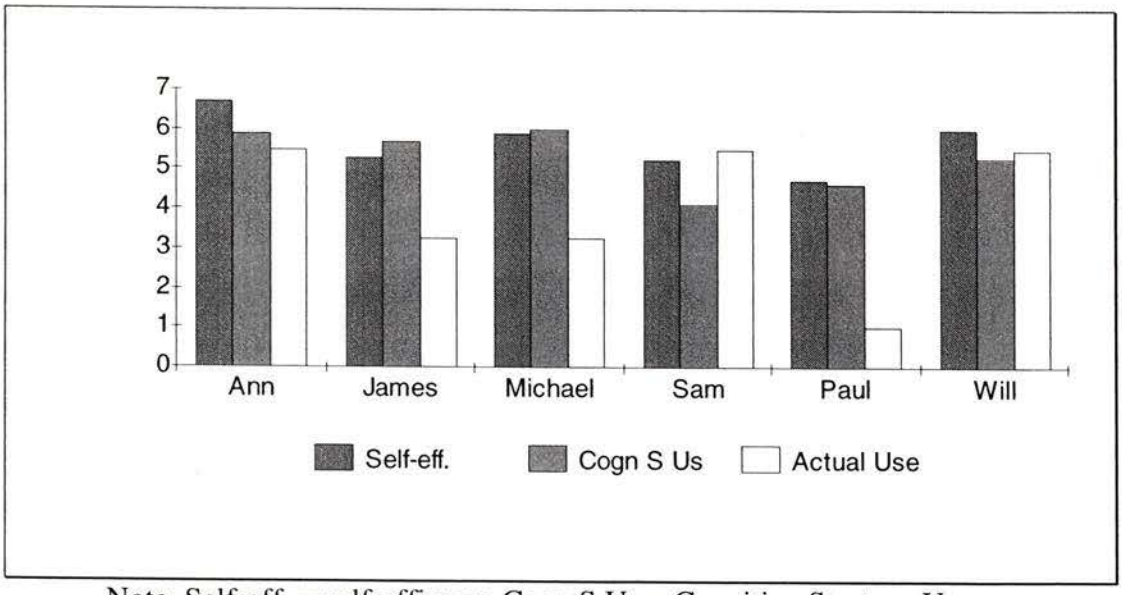
The fourth question considered in this study involves motivation to implement metacognitive strategies. The factors considered in this discussion include reading ability and age or experience of the reader. The discussion includes a comparison of motivation as reported on questionnaires with actual use of strategies. Grade level comparisons are followed by a discussion based on reading ability.

Responses to the MSLQ were examined to determine how motivated students were to use metacognitive strategies. Scores for self-efficacy and cognitive strategy use were compared with that student's actual strategy use, to determine whether reported strategy use and actual practice corresponded.

Grade four. As indicated in Table 5a, only two of the six grade four readers reported strategy use consistent with their actual use. One of these, Ann, was a good reader while the other, Will, was a low-moderate reader. Three other students in this age group reported much higher use than they actually demonstrated in the think-aloud process. The sixth reader used more strategies than he had reported on the questionnaire.

When considering the scores for self-efficacy, it was noted that all grade four students in this study reported feeling positive about reading abilities; even poor reader Paul scored relatively high scores on this section of the MSLQ.

Table 5a
Differences Between Good/Poor or Novice/Expert Readers
In Their Motivation to Use Metacognitive Strategies – Grade Four

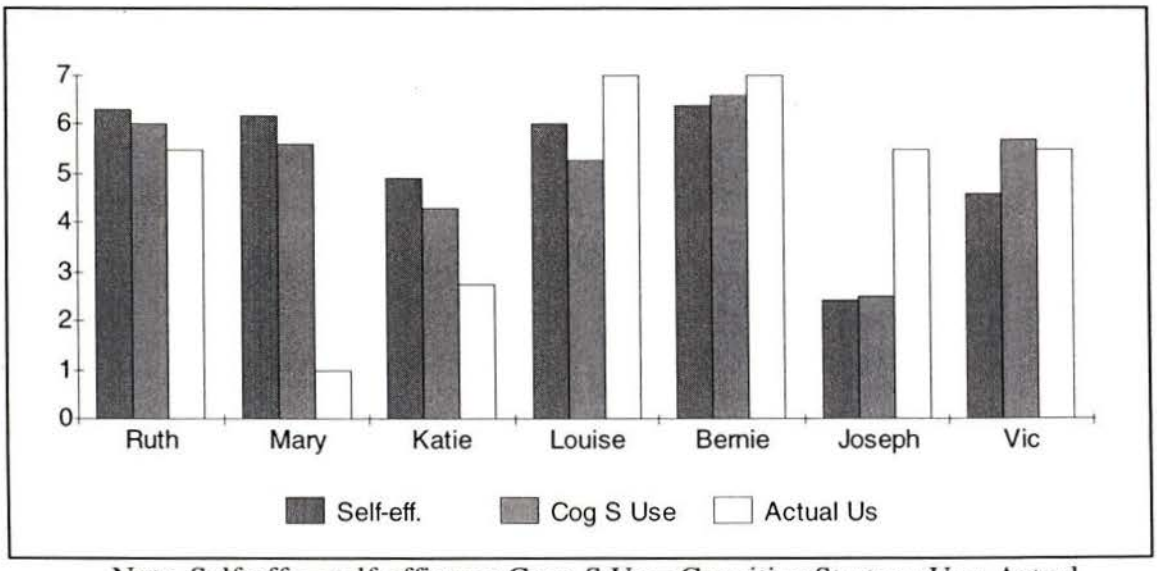


Note. Self-eff. = self-efficacy; Cogn S Us = Cognitive Strategy Use

Grade seven. Three of seven grade seven students (see Table 5b) reported strategy use consistent with actual use, while the other four had scores well above or below actual use. The two poor readers responded to the questionnaire much more positively than their actual use, with Mary's score for reported use almost six times higher. Two other students indicated lower scores on the questionnaire than they demonstrated in actuality, with moderate reader Joseph actually using more than twice his reported score. Self-efficacy scores for this group were consistently high, with the exception of moderate reader Joseph, who scored very low in this category.

Table 5b

Differences Between Good/Poor or Novice/Expert Readers In Their Motivation to Use Metacognitive Strategies – Grade Seven

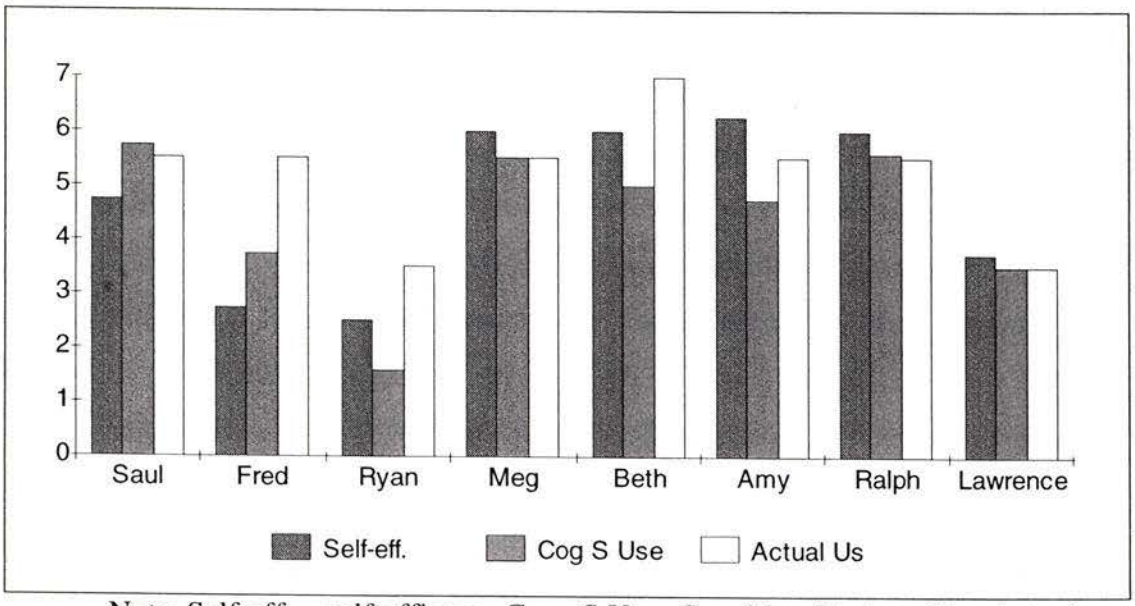


Note. Self-eff. = self-efficacy; Cogn S Us = Cognitive Strategy Use; Actual Us = Actual Use

Grade ten. Four of the eight grade ten students (Table 5c) reported strategy use consistent with actual use. The remaining four students all had higher actual use than they indicated on the MSLQ. Poor reader Saul, good reader Meg, and moderate readers Ralph and Lawrence reported strategy use very similar to actual use. The other poor reader, Fred, moderate reader Ryan and two good readers indicated far less strategy use than they actually put into practice. Self-efficacy scores for this group varied, with one poor reader and one moderate reader showing low scores, one moderate reader showing a relatively moderate score and all other readers, including one of the poor readers, scoring high.

Table 5c

Differences Between Good/Poor or Novice/Expert Readers In Their Motivation to Use Metacognitive Strategies - Grade Ten



Note. Self-eff. = self-efficacy; Cogn S Us = Cognitive Strategy Use; Actual Us = Actual Use

Ability Grouping. All eight students who read at or above grade level, decoded well and comprehended well consistently reported high or moderately high use of strategies and consistently demonstrated frequent strategy use. This pattern was maintained with all three age groups; six of the eight students in this group were female. These students had positive self-efficacy and evaluated their skills positively.

Five readers reported high use but didn't actually use many strategies. Within this group, all students were efficient decoders, but didn't seem to place much value on comprehension. They did report high values of self-efficacy, indicating confidence in their reading skills. Several reasons could be suggested for this: having an unrealistic view of ability, or basing self-efficacy solely on decoding skills. No older readers fit into this group; all were in grades four and seven; both males and females fit into this category.

Four readers reported low use but did actually use quite a few strategies. These students were diverse in how they actually used strategies. Several were very able decoders, who tended to use one type of strategy with both types of text, usually

ineffectively. Another was a grade ten student who read below grade level, but worked very hard to make meaning of text, and used a variety of strategies. All students reporting low use of strategies were males.

This comparison of reported to actual use indicates that motivation to use strategies does not always match actual use. Good readers at all ages indicated high motivation to use strategies, and demonstrated that they did frequently use strategies. Poor readers at grades four and seven reported low use of strategies, while poor grade ten readers reported moderate use. Students whose comprehension was poor but who were able decoders showed mixed responses on the questionnaire; some presented high values while other reported low strategy use.

Not every poor reader indicated low self-efficacy; some felt that they were not effective readers while others demonstrated a positive view. Those who scored low in this category did not expect to do well, did not believe they would understand ideas, did not consider themselves good students, and did not think they would be able to learn the material. Three students with weak decoding skills stated that "sounding out the hard words" was the hardest part about reading. This pattern did not appear to be age-related. Rather, it seemed to be linked to factors such as personality type, school history, or other factors not in the scope of this study.

Reports of declarative knowledge on this questionnaire varied. In general, poor readers seemed to know what the right answer was - what they *should* be doing. They may have been reporting accurately what they do, or they may have reported that they know they should do these procedures, although they were not putting them into practice effectively.

Reports by moderate students varied. The factor that influenced each student in this group appeared to be word recognition and/or decoding ability. Students who were able to decode had higher self-efficacy values than those who stumbled, although this latter group may have had better comprehension. However, in their view, comprehension did not appear to be as important. These students seemed to have an understanding of text structure in a declarative sense, although as it was not put into practice, conditional knowledge was lacking.

CHAPTER FIVE

Discussion

Differences in Use of Metacognitive Strategies Between Age Groups

In this chapter, explanations for the results described above are presented. A discussion of the relationship between the results of the study and the expectations raised by the literature review is included. Comments on limitations of the study regarding both the sample and the instrumentation are made.

Garner and Reis (1981) among other researchers concluded that grade four students did not use metacognitive strategies. However, more recent studies by Cox (1992), Brenna (1995) and Juliebo, Malicky and Norman (1998) have demonstrated that students as young as five years old do use them. The results of the present study provide evidence that students at the grade four level did implement strategies, and some of them showed preferences for particular ones.

This use of preferred strategies supports the findings of Meyers et al (1990) who suggested individual variations in strategy use. In the present study, even the youngest readers demonstrated a preference for particular strategies.

The ways in which metacognitive strategies were utilized, rather than frequency of strategy use, played a crucial role in reading comprehension at all ages. Those readers from all three grades who rarely used strategies or selected those which were not appropriate or adequate had more difficulty comprehending text. Younger and poorer readers appeared to use them fairly randomly, as if they were trying out the strategies that they knew should be used. Declarative knowledge of strategies was in place for all; the difference between good and poor comprehension appeared to be conditional knowledge. This was supported by students' reports of strategy use on questionnaires: all students knew what should be done, but only some of them actually applied this knowledge.

With increased reading experience, students become more adept at selecting appropriate strategies for text style, from their repertoire of personal preferences. This supports Bjorkland's (1990) discussion of the student as an active agent: with

experience, a reader takes some action toward a goal. Younger students are developing awareness that they can chose an action that will take them toward a goal. As readers become more skilled in selecting and implementing strategies, their comprehension improves. These experienced readers not only recognize their knowledge of strategies, but also work to implement strategies that move them closer to their goal of understanding what they read.

Differences in quantity. In this study, it has been demonstrated that frequency of strategy use was not linked to good comprehension. Grade ten students who were poor readers used strategies more frequently than did good readers. For these poor readers, merely using strategies was not sufficient for comprehension. Other factors such as selection of strategies or text type played a part in determining whether passages were understood.

Some readers who were poor decoders made few comments, while others made many. The same variation was evident for good decoders: some made many comments while others said little. Several readers at the grade seven and ten levels who were skilled decoders did not implement many strategies. Comprehension was poor for these readers, again demonstrating that use of metacognitive strategies is crucial. An interesting point to note was that on questionnaires these students reported that they used strategies, although in practice they did not. Perhaps this was related to extrinsic motivation: these students wished to be seen as good readers. However, their goal in reading well was based only on accurate decoding, rather than comprehension.

Recognition of comprehension break-down. Awareness of comprehension also develops with experience; many students at grade four do not realize that they have experienced comprehension break-down. Perhaps this was why few strategies were implemented: the concept of what Bjorklund (1990) calls 'moving toward a goal' was unclear. Some students at this age didn't recognize that their goal should be comprehension, and therefore did little to rectify a break-down in comprehension. The same could be said for those older readers who focused on decoding - they were unclear as to the purpose of reading. Readers who are considered to be poor readers,

but who persevered in metacognitive strategy use, were clearer about their purpose in reading: they worked hard to comprehend, despite huge difficulties in decoding.

There was evidence that by grade seven many readers have developed awareness of comprehension break-down. These more experienced readers have begun to see themselves as actively moving toward the goal. By grade ten, all were aware of comprehension break-down, and implemented strategies to repair understanding. For some of these more experienced readers, practice was still required at selecting the optimal strategy to assist in comprehension.

Selection of strategies. In this study, an important descriptor emerged of a skilled reader: personalization of text is a significant factor at all levels. Even at grade four, some readers are able to relate what they are reading to personal experience and past knowledge. This ability to "own" text is an important descriptor of an expert reader. This factor equates with motivation; if readers feel 'ownership', they will also be motivated to actively strive for comprehension.

The selection of strategies that suit the type of text has been demonstrated to be a significant factor. In Kletzien's (1991) study, she found that all participants used the same strategies for all levels of difficulty of expository text. Kletzein found that the difference between good and poor readers was that good readers were able to control and switch strategies when difficulty increased, especially at the Frustration level of text difficulty. A significant observation of the present study is evidence that skilled and experienced readers were able to select strategies that were most appropriate for the level and style of text. Some grade seven and most grade ten readers were able to switch from one preferred strategy for narrative text to another strategy for expository text. Although several younger readers did use some different strategies according to text type, they appeared very uncertain about their selection, and in general stayed with one preferred strategy for all passages.

The influence of motivation on comprehension. When analyzing how often students used strategies in this study, three groups emerged: those who read well and applied strategies frequently, none of whom had learning disabilities; those who read less well but did utilize strategies, some of whom did have learning disabilities; and those who read well but used few strategies and had difficulty comprehending, most

of whom did not have learning disabilities. This grouping corresponds to the groups suggested by Pintrich (1994b). He was also able to sort readers into three groups, based on comprehension, metacognition and motivation. He also found that differences in metacognitive use and motivation "cut across" children with and without learning disabilities.

Some readers accurately described motivation to implement strategies. Readers who were good decoders, and who implemented strategies in skilled ways, accurately reported on questionnaires that they did so. Their motivation to implement such strategies was high. The second group who accurately described strategy use included poor readers at the grade four and seven level, including those with reading disabilities. This group reported that they had little motivation to implement strategies, and in practice they used few strategies. However, by grade ten, despite reporting little use, poor readers used a variety of strategies to aid in comprehension.

Metacognitive strategy use is crucial to active engagement with text and through this to comprehension of print. Further research is required to determine how and why readers develop this skill, why certain strategies are favoured, and what impels students of all ability levels to implement strategies.

Limitations. One limitation of this study is the set of questionnaires used: the Index of Reading Awareness (Paris & Jacobs, 1987) was designed for students in grades 3, 4 and 5. The level of language and the concepts may be inappropriate for the older participants in the current study. Inversely, the MSLQ was designed for college students, and may use terms or language that is too difficult for many students in this study. As well, reviews of these studies have indicated that there is some question as to their reliability. Mayer McLain, Gridley and McIntosh (1991) state that this instrument has only "acceptable adequacy". The Motivated Strategies for Learning Questionnaire (MSLQ) of Pintrich and De Groot (1990) has been described as seeming "to show predictive validity". More appropriate measures would examine the same concepts in more age-appropriate terms.

Assessment of level of comprehension could have been ascertained more clearly with implementation of a set of questions at the end of each passage. This would have added a great deal to the amount of time spent by each student. As it

was, comprehension was determined through student summaries and comments.

The think-aloud is recognized to be a record of what students say they are doing, rather than an accurate portrayal of what they actually do think as they read. The difficulty of accessing the processes used by students as they read are acknowledged. Many of the limitations of this method have been described previously (Chapter Two), summarizing Garner's (1992) outline of the problems inherent in verbal report methodology.

The numbers of students at each grade level who participated in the study was limited by the location. A wider range of abilities and types of students would allow some quantitative analysis of data and add depth to this study.

The limitations of a small-n study mean that breadth of information is lacking; however, the in-depth information obtained from this study did provide valuable description. The results of this study can not be generalized to other populations of students. As Kazdin (1982) states, "the number of subjects included in an uncontrolled case report can influence the confidence that can be placed in any inferences ..." (page 91)

Some Areas for Further Investigation

What is the personal motivation that moves readers toward the goal of comprehension of text? Some poor readers, who have difficulty decoding, are still willing to implement a variety of strategies and are able to comprehend, despite reading at the 'Frustration' level. These students have positive motivation and persist despite the great effort required to make sense of text. Understanding why and ensuring that these students continue to be motivated requires more study.

Other students are able decoders, but appear to give little value to comprehension. These are students who may be considered, by themselves and their teachers, as good readers. However, as they do not appear to value the importance of understanding what they read, comprehension may be limited. Further research is necessary to study the numbers of students for whom this is typical, and ways in which comprehension can be valued by these readers. For example, Cattell (1999) recently found that teaching metacognitive strategies to high-, medium- and low-

achieving fourth grade students was effective. Students of all three ability levels showed improved comprehension after training sessions.

Although most theorists state that the use of metacognitive strategies develops at around grade four, some studies (e.g. McGuire & Yewchuk, 1996; Brenna, 1995) provide evidence that readers are using strategies at a much earlier age. More research is needed on the question of when and how metacognitive strategies develop.

Another question related to early use of strategies is preference in strategy use; this appears to be an individual matter, influenced by many factors. Is it shaped by early instruction or modeling, or could it be related to temperament or to self-concept?

This study demonstrates the importance of 'personalization' of text; good and mature readers are able to relate previous experience and past knowledge to new material. What factors are involved in this personalization, and at what age or reading level does this occur? Is this a skill that can be acquired?

Responses on questionnaires did not consistently match actual performance. This calls into question the accuracy of responses on questionnaires, and the effectiveness of much of the research that has been based solely on questionnaires. Research comparing questionnaire responses with actual performance could provide insight into extrinsic versus intrinsic motivation.

Assessment of reading must take into account the metacognitive strategies that are being used – this gives a much clearer picture of what is going on in the student's mind and thus a better focus on remediation required. Basic reading inventories commonly used to assess reading only look at part of the skills – the decoding and the comprehension. They do not give information as to why comprehension is or is not occurring. Using a think-aloud process as part of assessment would provide valuable information. This is an important area for further research.

Implications for Practical Use

Encouraging students to be active and engaged when they read is essential. As demonstrated in this study, readers have preferences and capabilities in strategy type as well as in text type. These results have some implications for practical use.

Each student has preferences in strategy type, and preferences in how these are applied to both narrative and expository text. These personal preferences should be built upon and supported.

The ways in which metacognitive strategies are presented in the classroom is another area for consideration. These should not just be incidental, they should be emphasized in any reading program, through discussion, modeling or training.

Results of this study reinforce the theory that metacognition is a "hot" process – that motivation or will is combined with knowledge of strategies and skill to use them. Important in the practical sense is how we support existing motivation. This is especially important with students who have reading disabilities; those who persevere in making meaning of text despite difficulties must be supported in using their strengths.

Assessment of metacognitive strategy use is a practical aspect of this research: the value of including the think-aloud as part of the assessment of reading would provide insight into skills and capabilities of the reader. Valuable information would be gained, which would in the remediation of reading difficulties.

In summary, implications of this research into metacognitive strategies provide us with suggestions of ways in which to access the metacognitive knowledge of students, as well as ways to support the skills of students.

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Appendix I: Metacognitive Reading Strategies: McGuire & Yewchuk

Evaluation - refers to a "reader's assessment of his or her current state of understanding while reading," comments which indicate that the student is or is not satisfied with their understanding, their progress, the skills they have for the process and whether they are finding it easy or difficult to understand.

Paraphrase - outlining or re-wording information from text; M & Y say that "the exact words from the text or synonyms may be used."

Regulation - monitoring and making a judgment about progress, so that adjustments may be made, such as a desire to re-read or look at another part of the passage.

Planning - speaking of some strategy which will be carried out later to aid in comprehension, such as an intention to re-read, skim or review part of the text.

Expansion - adding information or making some connection or association of their own, relating to what is read.

Inference - providing an expansion of information given in the text, from implications of the text.

Repetition - repeating or recalling information from text "in its exact form or with minor variations."

Synthesis - combining items of information in order to make a general statement or idea.

Opinion - expressing an idea or belief of one's own in relation to the text.

Miscellaneous- any response or comment that does not fit into another category.

Appendix II: Metacognitive Reading Strategies: Brenna

I. Awareness of Errors

II. Repair Word-Identification Strategies

a. reread
b. asked someone
c. sounded out the word
d. predict word from context
e. disregarded problem and read ahead

III. Active Reading Strategies

a. utilized semantic, syntactic and grapho-phoneme cues simultaneously
b. led with semantic and syntactic cues
c. led with grapho-phonemic cues
d. linked text to personal experiences
e. liked text to prior knowledge
f. used pictures to build context prior to reading
g. made accurate predictions

Appendix III: Metacognitive Reading Strategies: Burles

1. Awareness
   (a) evaluation of error – recognition that some sort of error or misunderstanding occurred.
2. Repair Errors:
   (a) re-read – repeated a word, phrase or sentence to correct or reexamine print
   (b) asked – requested assistance with a word
   (c) sound out - worked to decode a word by using phonics
   (d) predict word from context – was able to determine word from context
   (e) disregard problem when read – recognized difficulty with a word, but willing to leave it unsolved
3. Active Reading:
   (a) link to personal experience – comment relating text to own situation or events
   (b) link to prior knowledge – comment relating text to personal knowledge
   (c) visual imagery – comment that reader could picture the scene or setting
   (d) paraphrase – stated meaning in own words
   (e) planning – comment that reader would later carry out some strategy to clarify or check
   (f) accurate prediction – comment postulating future events of passage
   (g) opinion – comment stating personal feelings about passage

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