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METACOGNITIVE PROCESSES IN READING

A thesis in fulfilment of the requirements
for the award of the degree

DOCTOR OF PHILOSOPHY

from



THE UNIVERSITY OF WOLLONGONG

by

WILLIAM N. WINSER, M.A., M.ED.

**FACULTY OF EDUCATION
1992**

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ABSTRACT

How learners gain an understanding of and control over the task of reading is the question that was examined in this study, by reference to the notion of metacognition. When this notion is applied to reading it is possible to explore readers' knowledge of and control over their reading processes. A related question is whether there is any pattern of development over a broad age range, from early school years to adulthood. A final issue that was investigated was the effect metacognitive processes may have on reading processes.

To examine the development of metacognition in reading forty readers were studied, with equal numbers of 2nd, 4th, 6th, 8th grade and adults; each of these subgroups was divided equally according to reading proficiency. All readers read a complete narrative text orally; this reading was taped and their reading analysed using the Reading Miscue Inventory. They were asked to 'think aloud' about their processes in correcting miscues, and were asked to do the same at five points during a silent reading of a similar text.

The correction patterns and the protocols were analysed and revealed extensive evidence of readers' awareness of and control over their reading. Younger readers were not significantly less aware than older readers, but the less proficient were less flexible and less capable of utilising appropriate strategies to remedy comprehension problems. It was shown that there was an important link between metacognition and reading. Finally, there was a significant change over time in readers' understanding of language and this was strongly related to their reading proficiency.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

William N. Winser

CHAPTER ONE

INTRODUCTION

Studies in memory processing and development have drawn attention to the way the learner not only processes the sub-routines involved in a task but also relies on a control mechanism to oversee all the activities being carried out (Flavell, 1970). This study is concerned with the operation of the control mechanism in a specified domain, namely, the task of reading (Niemi, 1990), and focusses on the possibility of its developmental progression over time. Such an overseer has been described as operating in a second order fashion, above the first order cognitive processes; hence the term metacognition has been introduced to refer to 'individuals' ability to understand and manipulate their own cognitive processes' (Reeve & Brown, 1985). Metacognition encompasses the notion of awareness on the learner's part, an awareness of one's own functioning, and the ability to regulate this functioning. It has been proposed as a major factor in the study of complex cognitive processes, having been described as 'the main focus of developmental learning theories in the next decade' (Brown, in press). This prediction, however, has not proved to be accurate, although it remains true that metacognition has been established as a significant and widely used aspect of reading studies (Resnick, 1986; White, 1988; Niemi, 1990). Metacognition focusses on the learner's processing of the variables that are involved in any task where cognitive functioning takes place, and includes knowledge states and control procedures which are strategic, that is, involving processes or rules that underlie performance on those cognitive tasks. These procedures include many activities necessary for success on problem solving tasks. Thus, understanding what is required in a task, appreciating one's own capabilities, planning strategies so as to reach a goal, and monitoring these activities, are all activities that seem to be involved in a construct such as metacognition. An understanding of how all these processes work when an individual is faced with a problem solving task is the goal of much metacognition research. Poor performance in problem solving is thought to be related to inability to control one's own processing (Reeve & Brown, 1985). The task that is the focus of this study is reading, which is particularly appropriate as a domain for the investigation of metacognition, since it lends

itself to analysis as a problem solving task in which the reader must crack the code of the written medium.

One of the main trends in the study of complex human learning in recent years has been a reduction in the separation between learning theorists and cognitive development theorists (Brown, 1982a). As a result there has been a move towards a cognitive theory of learning that acknowledges the centrality of the changes that take place in processing skill over time. Learner characteristics, learning activities, critical tasks and learning materials are all seen as interactive factors in the learning model itself (Brown, 1984). When we focus on learners' characteristics attention is paid to the acquisition of academic skills, those capabilities that are typically acquired at school, and on how learners develop the ability to learn deliberately, which includes the possibility of learning self-consciously. In particular there is an emerging interest in children's knowledge bases (Schneider et al, 1987) and their repertoires of learning strategies. Self-knowledge is an aspect of particular concern in metacognitive studies that will require attention.

The competent learner must not only possess appropriate knowledge and strategies, but be able to put them into play in the service of effective learning. To become expert, learners must become aware of the way all of the factors sketched out here interact, by developing insights into what is involved in contexts where the learning is under the control of a teacher (Brown, 1982). What is involved in becoming expert, any trend or pattern of development in the acquisition of learning skill, will be a main area of concern in the present work, and will take up the call made by Brown (1982, 108) for a map of the developmental progression of task acquisition within a specific domain. A major issue in developmental progression is the extent to which development should be seen as an increase in conscious awareness and control over one's cognitive processes.

A further major trend in the study of complex cognitive tasks, as it is carried out by cognitive psychologists, is the referencing of performance of these tasks to an information processing model. This approach has been described as the chief means we have for the study of cognition and development (Siegler, 1983). The model proposes the existence of a central processor operating on information fed in through the senses,

relying on memory to carry out processing and producing an output that can lead to action. It is postulated that the activity works smoothly because there exists an executive that monitors the whole activity, controlling the various processes and ensuring that there are no holdups along the way. It is the activity of the executive control system that provides the conceptual framework for this study.

However it must be noted immediately that there are some problems with taking a metaphor from the computer too seriously insofar as the modelling of human functioning is concerned. We run the risk of forcing the complexity and subtlety of our own behaviour into the narrowing and over simplifying constraints of the relatively simple machine we ourselves have built; we must continually remind ourselves of its limitations as a machine using a small set of logical principles and a relatively simple input and retrieval model of memory. Furthermore there seems to be no way of describing growth within the framework of the computer metaphor. On the other hand, the alternative models of functioning and of development provided by the intelligence/ IQ theories do not seem to be able to assist us in characterising development and provide very few insights into the learning tasks that feature in the classroom (White, 1988). It has been argued that it is more useful to reanalyze concepts of intelligence in terms of cognitive processes, with metacognitive abilities to be included here (Resnick, 1986).

One of the major tasks facing the learner at school is learning to read. This task can be seen as a problem solving process in which the reader must learn how to construct meaning through interaction not with a speaker but with a written text and, as we have suggested, seems to be a most appropriate domain for a study of metacognition.

Reading itself has been conceptualised in many ways: a schema view (Rumelhart, 1980); a reader model-based view (Collins et al, 1980); an eye-fixation theory (Just & Carpenter, 1980); a transactional-psycholinguistic approach (Goodman, 1981, 1984); and a mental models approach to reading comprehension (McNamara et al, 1991). However the monitoring of one's own processing activities (ie., by a process of executive control) while reading seems to be an activity that is, to a greater or lesser extent, common to all of these models. There is increasing evidence that novice and less capable readers are

deficient at monitoring text while they are reading (Baker & Brown, 1984a; Markman, 1979; Garner, 1980; Paris & Myers, 1981; Zabucky & Ratner, 1990). These studies either examine the differences between expert and novice readers of one age group or simply compare the mature adult reader with beginning readers. What is lacking is a model of the overall pattern of metacognitive development as it relates to reading proficiency, a deficiency noted by the respondent to a recent monograph (Flavell et al., 1981). The present study aims to provide insights into this developmental pattern and should allow elaboration of some of the major issues in learning and development already canvassed here. It will also take up the problem already raised about the need for a developmental map of learning in a task domain, namely, the task of reading.

A working model of metacognition

Metacognition may be taken to refer to individuals' 'ability to understand and manipulate their own cognitive processes' (Reeve & Brown, 1985, 343). There are two interrelated clusters of activities that are involved: knowledge about cognition, and the regulation of the cognitive processes themselves (Flavell et al., 1981; Cornoldi, 1990). Knowledge about cognition involves an awareness of the processes that one uses while carrying out a task, is probably late in developing (McLain & Victoria, 1991), and can be expressed verbally. However the self-regulatory or control mechanisms used while cognitive phenomena are in operation are not likely to emerge slowly in a developmental pattern, nor are they likely to be susceptible of verbal expression (Brown, in press).

These two processes are closely interrelated aspects of metacognition - learner self-knowledge and the self-regulation mechanisms that enable a reader to oversee and control a cognitive activity - and will be used as a framework for the question to be investigated in this study ie., the role played by metacognition in reading. Both aspects are attributed to the executive component of the information processing model that has the task of overseeing and controlling the various subroutines used in any task. This model is not itself under examination in the present study, however. The approach to be taken in this study is to use the constructs of self-knowledge and self-regulation as the main

aspects. Thus a child faced with a task such as reading would use self-knowledge and the self-regulation mechanisms to oversee and control the processing activity involved in this task. A central issue in this study is how well this model, at the level of processing, matches with the perceptions of the learner. While the model posits the existence of self-knowledge and self-regulation operating together, it will be important to examine whether these two aspects are separable for the purposes of study or in the experience of the learner working at the task of reading.

Goodman's reading theory: a working model.

Goodman's theory of reading has been adopted as a working model here because it matches the information processing approach taken in this study. His model takes both the reader's processing and the text itself seriously, and focusses on meaning making rather than 'comprehension' as the central task in reading, the latter being in some way set up as a separate variable in reading. Thus the goal of reading is actually seen as the construction of meaning as the reader interacts or transacts with text (Goodman, 1984). The process of understanding in this theory is compatible with the explanation of comprehension in information processing terms, where the constructivist position is based on a hypothesis testing model. The reader's existing knowledge and the text interact, the former as concept driven and the latter as data driven processes, to facilitate the activities of forming, testing, modifying and confirming the concepts and meanings involved in the initial hypothesis (Lachmann et al., 1979). Goodman sees the reader as actively involved in the cycle of sampling the graphic display, predicting meaning by focussing on grammatical patterns, confirming the hypothesised meaning using semantic and syntactic criteria and correcting where necessary, with comprehending occurring when the reader's prior knowledge is integrated with the result of the text processing (Goodman, 1981). Here the reader must coordinate the various linguistic cueing systems while manipulating hypotheses in what is essentially an enquiry process using verification strategies. Corrections that are made during oral reading show how the semantic system functions as a verification strategy (Allen & Watson, 1976). In this reading model there

are a number of condition-action points where the reader must monitor the activities involved in reading, but it must also be noted that Goodman quite specifically refers to the need for an oversight of processing in reading at two points in his cycle, known as 'confirmation' (of the predicted meaning) and 'correction' (of an inadequate construction) (Goodman, 1975). Cambourne discusses the sorts of inferences that can be made about the processing routines underlying the correction of a miscue, and suggests that they consist of: reader awareness, inability to correct, lack of awareness, and silent correction (Cambourne, 1976/77). These references to awareness and to various control strategies are all consistent with and open to the concepts of metacognition.

Metacognition in reading

There are significant knowledge factors involved in the task of reading, such as text structure and reading strategy knowledge, and these are aspects of the reading task that are likely to emerge in a study of metacognition and reading. There will also be an examination of the second main stream of metacognition, the control and regulation of reading. Self-regulation in reading is here seen as a goal-directed process in which readers oversee their own comprehending as they read by keeping track of their success in constructing meaning and taking any remedial action necessary. It must be noted that at this point the distinction between knowledge and regulation (discussed more fully in ch 2) may be seen to be breaking down, as it could be questioned whether one could control the reading process without some knowledge of what the process is. Whether this knowledge is conscious or not is another question that may be answered in this study.

In the model of reading we are using here, knowledge of text and of one's own strategies, and self-regulation of these factors, can be seen as coming into play during the confirmation cycle, when the reader is using graphophonic, semantic and syntactic systems to check any meaning tentatively constructed - that is, to monitor one's own comprehending. The corrections that are made (or not made) can thus act as a 'window' into the reader's processing during the act of reading, and will provide an important data source in this study.

In the discussion thus far it has been implied that there is some relationship between metacognition and reading. Most of the evidence suggests that this is the case (Schmitt, 1986), with certain correlational support for a link with comprehension, but it is important to note that there is no evidence of a causal relation between the two (Baker & Brown, in press). There have been questions raised about the overlap of comprehension and the monitoring of the task of comprehending text, the need to study these two phenomena together rather than separately, and about the need for a model of the development of the way in which comprehending is monitored. (Raphael et al, 1981; Wagoner, 1983; Flavell, 1981). It is not the purpose of this study to explore the issue of causation; rather it is to clarify further what is involved in the metacognition and reading relationship and to examine the pattern of development of these two phenomena.

Research questions

1. Is there a pattern of development, from the early school years to adulthood, apparent in metacognitive aspects of reading? How can this pattern be characterised?

A pattern could take the form of increasing self-knowledge or consciousness of one's own processing or greater facility in the control or monitoring of the processes, over a given time span. Another aspect of development is the gradual increase in flexibility in utilising strategies for efficient reading. The younger reader is likely to be less able in this respect, a difficulty that may be related to a weakness in the knowledge base. It would be necessary to take into account the likelihood that knowledge of processing develops but that control processes are not developmentally sensitive. Finally, the question of an examination of these aspects of metacognition over a long time span must be borne in mind.

2. What contribution does metacognition make to proficiency in reading?

Here we are concerned about the association between the first order activity (of reading) and the second order or superordinate activity of metacognition. We can test the proposition that metacognition is an executive control process overseeing other cognitive activities by examining the possible effects of metacognition on reading activities.

3. What light does the data gained from a study of metacognition shed on the concept of metacognition itself?

If these notions about metacognition have any validity then question two would, *ipso facto*, act as a test of that validity. Light could be shed on some of the definitional problems concerning metacognition. (These will be developed at greater length in chapter two). Of particular interest is the match of the model of metacognition, with its components of self-knowledge and self-regulation, and the perceptions of the learners concerning these two aspects. However any conclusions concerning the issue will not be over-generalised, as the matter under examination is primarily one about the validity of metacognition.

Significance of the study

This work focusses on what Brown has called 'academic cognition' (Brown et al, 1986) where deliberate and effortful activity is involved in tasks that are characteristic of school and educational institutions. The notion of deliberateness is related to questions of awareness that continue to crop up in any treatment of metacognition, as well as the need for learners to be strategic in coping with learning tasks. To be a competent learner one must learn more and more how to learn, that is, to be flexible in adjusting to task demands and to learn to be reflective about the whole business of learning. Such consciousness seems to be an indicator of a significant human capability and an understanding of it enables us to enlarge our understanding of cognition itself (Resnick, 1986). There are major problems in dealing with the complex and difficult concept of consciousness, but current approaches to cognitive psychology are breaking out of the older strict behaviourism and more readily accept the importance of intention in human functioning and the need for an adequate explanation of it to explain our behaviour comprehensively. In this study, intention is defined more specifically as individuals' understanding of what they are trying to do as they perform a task.

The acquisition of the ability to learn how to learn frees the learner from over-dependence on the teacher and carries with it very far reaching implications for the

learner's development. Any clarification of how the learner gains increasing control over the complex task of reading will have substantial implications for this central task of the school curriculum, and will also shed light in a more general way on learning across the curriculum.

CHAPTER TWO

REVIEW OF LITERATURE

The concept of metacognition.

a. Current research

Metacognition, a second order function whereby one knows about and controls one's own cognitive system, can be said to have emerged as a significant construct in psychological research in the early seventies. The term itself appeared as a result of the work that was being carried out on memory functioning and development, but the idea of a superordinate function in human behaviour had been extant well before then.

It can be traced back to the work of Dewey (1910), who views reading as a reflective activity and to Thorndike (1917), where reference is made to the need for the mind to "select, repress, soften, emphasise, correlate and organise, all under the influence of the right mental set or purpose or demand" (p.329). The latter is also credited by Brown (1984) with the invention of the now popular error-detection paradigm in reading research ; she also points out that one of the older issues presupposed by the idea of metacognition is that of reflection and access. This is the capacity to distance oneself from one's own functioning and to step back and reflect on the thinking that is taking place. She also refers to late nineteenth and early twentieth century German psychology (the Wurtzburg school) where verbal reports obtained 'on-line' were used as data in a way now characteristic of contemporary work (e.g. Collins, 1977). Schmitt (1986) argued that the concepts we have already referred to have been discussed for much of this century.

The distinctively modern notion represented in the expression metacognition emerged as a result of studies in memory. Particularly important was Flavell's pioneering developmental work in which he developed the notion of production and mediational deficiencies in children's memory functioning (Flavell, 1970). This work proposed that children were capable of carrying out the target activity but simply failed to do so spontaneously, even though they could have carried it out. These mnemonic skills were described as 'planful' and 'instrumental' (p. 208) and it was suggested that they emerged rather late in a child's development. In the same year Flavell and his colleagues reported another developmental study of nursery, kindergarten, second and fourth grade children's

memorisation processes and found age related differences in production activities and in their knowledge of their own memory (Flavell, Friedrichs & Hoyt, 1970). They concluded that the 'nature and development of S's knowledge and awareness of his own memory system is a particularly important and timely research problem' (p. 324), thus setting the scene for more intensive examination of these phenomena.

The term metamemory was used by Flavell (1971). He pointed out again the planfulness and emphasis on intention that was inherent in memorisation activity. He concluded that children's growth brings with it increasing awareness of 'the what and the how of their own memory', the 'development of ... intelligent monitoring and knowledge of these storage and retrieval operations - a kind of "metamemory", perhaps'(p.277). It can be noted that the idea of monitoring as well as knowledge has been included in the notion of metamemory; these two related but distinct notions were to be seen in subsequent discussion as bearing an uneasy relationship to each other. Metamemory studies then began in earnest, perhaps being typified by an interview study by Kreutzer and Flavell (1975). Twenty children in kindergarten, grades one, three and five answered questions about memory problems. It was found that the older children had a more detailed and comprehensive understanding of memory functioning than the younger, who nevertheless could use ordinary terms to discuss the concept and could see the value of memorisation at school.

Brown (1975) had also referred to metamemory in terms of metamemorial knowledge, described as knowing about knowing within the context of deliberateness and planfulness in the exercise of memory functions. She developed this notion further in a discussion of the growth of knowledge and control of memory skills (Brown, 1977). The discussion focussed on the aspect of metacognition that involved executive control and conscious processing, distinguished clearly from knowledge and related structural issues. The idea of executive control arose as a part of the computer metaphor that was important for the information processing model of learning (Neisser, 1967). It has been used to model cognitive processing in which a central processor or system can evaluate its own operations by predicting, scheduling, planning and monitoring these operations. A

related notion was that of automated and controlled processes, the former being fast and effortless and the latter slower and requiring more deliberate control (Schneider & Schiffrrin, 1977). Brown pointed out that this was a matter of choice on her part, not because of any belief in the separation of knowledge and process. As well, it was made clear that some sort of awareness of self, a knowledge of one's own knowledge was inevitably involved here. She also referred to this approach to metacognition as her 'bias' (Brown, 1978, 79), that is, that she had adopted the approach that focussed on the skills attributed to the executive in her own research, with a special interest in the role of conscious control of activities. This, however, was set within the framework of metamemory that was clearly defined as 'knowledge concerning one's own memory abilities and strategies' (p. 81).

A review of metamemory studies by Flavell and Wellman (1977) proposed a taxonomy of metamemory, including (1) sensitivity to memory activity and (2) knowledge variables about memory, related to the person, task and strategies that might be used. This was seen as a 'preliminary mapping of a new and little explored area of memory and memory development' (p.24). The link between metamemory and memory performance was seen as an important problem area. It was assumed that such a link existed, but its precise nature was seen as problematic in view of a paucity of data and because development change could result in automation of memory skills and thus render any investigation of the connection difficult. However the issue concerning the connection between the superordinate metabehaviour and the performance allegedly under its control is another major aspect of this area that needs to be borne in mind. Flavell (1978) went on to point out that this connection was unlikely to be a simple, unitary or one-way one, would be likely to vary from task to task and between individuals, and in some cases might not be apparent at all.

Around this time, the term metacognition came into the literature, being described by Flavell (1976) as 'one's knowledge concerning one's own cognitive processes or products or anything related to them...' (p. 232). Brown (1978) outlined some skills involved in metacognition, attributing them to the executive aspect of human memory

theories; these included predicting, checking, monitoring and deliberate control of learning activities. She defined metacognition as 'the deliberate conscious control of one's own cognitive actions' (1980, 453), and outlined the activities associated with control of cognition- realising that there is a problem, knowing the extent of your knowledge, knowing what is needed and knowing the value of being strategic.

Some of these activities could be applied to specified cognitive processing, such as language, and two seminal studies brought the notion of self-understanding in language processing into clearer focus. The first was a study of awareness of comprehension failure in first, second and third grade children who were presented with incomprehensible instructions needed to perform a task (Markman, 1977). The younger children failed to notice the problem unless urged to complete the task, while the older children picked up the inconsistencies more readily. It was concluded that the children's insensitivity was due to a lack of processing of the task. In the second study (Markman, 1979) worked with third to sixth graders and again presented them with inconsistent information, but used various means to highlight the inconsistencies. Once again most of the children, including the 12 year-olds, failed to notice spontaneously their comprehension failures, although were quite capable of carrying out the hypothesised processing that was involved in the task. Flavell later commented that what was involved here was a lack of understanding of their own failure to comprehend until more overt activities engendered the 'metacognitive experience' that he had earlier postulated; he also defined metacognition more comprehensively as 'knowledge and cognitive activity that takes cognitive phenomena as its object' (Flavell, 1981, 3).

One of the first critiques of metacognition as a concept was made by Feibel (1978). He directly located these studies within the framework of studying consciousness, with all the attendant problems of methodology. The next problem was the possibility that there is no difference between cognition and metacognition, in that the phenomena processed may or may not be different, or in that the type of processing may vary. This raised questions about the idea of a hierarchy in processing. The question of metacognition as a unitary set of processes was also raised, that is, whether person, task

and strategy variables needed to be differentiated, and whether metacognition involved general skills across all domains, such as memory, and comprehension. Questions about metacognitive development concerned whether it developed structurally or as a mix of skills that appear contingent upon the circumstances of the child, and of course the question of when it develops, as well as the course of development. Are there any adult-child differences in the operation of a metacognitive process? Feibel called for more conceptual analysis and for more research in domains outside of memory and finally for the development of a theory of metacognition itself. We shall see how these criticisms were taken up in subsequent research studies.

Related to this discussion is the distinction made between procedural and propositional knowledge. The former has been described as knowledge about processes, how to perform the cognitive activities involved in problem solving, while the latter constitutes knowledge about facts and entities (Anderson, 1985). Procedural knowledge may be readily seen to focus on problem solving in its organisation, and is a significant construct for the present study, related to the self-regulation or control processes already discussed. Propositional knowledge can be related to what has been called the knowledge state in metacognition, taken up more fully in the work of Flavell.

Flavell referred to the new study of comprehension monitoring, this being the term applied to Markman's work. Flavell provided detail in an article entitled, significantly, 'Metacognition and Cognitive Monitoring' (Flavell, 1979). There was a fuller reference to metacognition as knowledge of cognitive phenomena, and to a related process of children's 'monitoring of their own memory, comprehension, and other cognitive enterprises' (p. 906). Monitoring of cognition was seen to depend on four phenomena: metacognitive knowledge, metacognitive experience, goals and actions.

The first consisted of knowledge about the factors affecting cognitive processes, and fell into three categories: person variables, the beliefs you have about yourself; task variables, the information about a process including task demands; and strategy variables, concerning the relevance and use of the strategies available for the task. Such knowledge is not different in kind from any other knowledge that is kept in memory and may or may

not enter consciousness. It can also be fallible and ineffective, and finally, can lead to a metacognitive experience. The second phenomenon was an awareness of or sensitivity to the processing requirements of a task. Such experiences partially overlapped metacognitive knowledge, but some experiences do not have knowledge as their content; they also add to the knowledge base of metacognition, and finally, can activate metacognitive and cognitive activity. Goals and actions (or strategies) are the normal stock in trade of cognitive processing and are affected by both knowledge and experiences. Flavell stressed that these four phenomena function interactively as we monitor our cognitions, and made the important distinction between using cognitive strategies to *make* cognitive progress and metacognitive strategies to *monitor* that progress. In some cases the same strategy can be a cognitive or a metacognitive one, because the store of metacognitive knowledge can contain both cognitive and metacognitive strategies. It might be thought then, that for Flavell metacognition refers primarily to the individual's meta-knowledge. Any metacognitive activity - described as metacognitive strategies - would come under the umbrella heading of monitoring, which feeds off and adds to this knowledge, but involves other phenomena as well.

Nevertheless the concept of metacognition is essentially a unitary one in Flavell's thinking. He has clearly defined metacognition as both knowledge and processes concerned with cognition itself (Flavell et al., 1981, 3) in his monograph dealing with comprehension monitoring. There it is made clear that metacognitive development is the development of both knowledge about learning and of the ability to monitor this learning. The distinction is important because of one of the major issues about the concept of metacognition crystallised by Fischer and Mandl (1982). They characterised Flavell's model of metacognition in terms of two components: the process oriented executive operations like monitoring and the less process based but more central component concerned with a knowledge base. They argued that Brown's approach was focussed on executive regulation, and referred to her training studies with retarded children as rule based. As her approach was focussed on strategy training they concluded that she was not concerned with metacognitive knowledge but only with rule acquisition. They also

raised the fundamental question of the means we have to distinguish between metacognitive and world knowledge, an echo of Feibel's comments earlier; this is essentially the issue of the necessity for the notion of metacognition at all. Finally, they reported on two studies testing Flavell's knowledge-based model and Brown's executive control approach. They concluded that their data was compatible with both models, characterised in Flavell's case as an executive that knows a lot but does not do much and in Brown's case the reverse position. The major issue they raised was the weakness of metacognitive theory, the discussion before that time being seen as heuristically promising, especially with regard to the training studies carried out by Brown.

Thus Fischer and Mandl had raised some key issues which were to remain on the agenda of the metacognition debate, while some further problems were clarified in a major review of the work on metamemory (Cavanagh & Perlmutter, 1982). They argued that all approaches to metamemory assumed that it involves knowledge about memory, but that there was disagreement about the inclusion of executive processes, and asserted that it was only memory knowledge that needed to be included in the meta category. They pointed out that Flavell had accepted that knowledge was important for memory performance, but had not detailed how this actually worked in the individual's processing. Brown, it was claimed, certainly showed how knowledge can be used effectively, and was right in stressing that it was important to show how the knowledge is actually used. But they then asserted that naming both the knowledge and the ways of using it 'metamemory' results in confusion that makes it more difficult to explain in terms of performance. It became necessary to define metamemory more clearly by distinguishing sharply between memory knowledge and executive processes, and regarding only the knowledge as metamemorial. The processes would thus be seen as feeding into the knowledge base. Cavanagh and Perlmutter concluded by calling for an improvement in research procedures, especially by the use of multiple methods of assessment and for closer examination of the metamemory and performance relationship. They stressed the need for examination of the role of knowledge in determining the automatization of processes, and for a closer study of the developmental questions

involved in metamemory. This review clarified areas that were important for subsequent research in metacognition itself, and the issues raised received attention in the ensuing research and reporting. The questions of the metacognition and performance relationship and of the development of metacognition are central ones that need examination and will be given attention in the present study.

Wellman (1981) pointed out that a major difficulty in discussing metacognition was that it was a 'fuzzy' concept. He also wished to limit the term to self-knowledge so as to clarify its extension, and noted that at its periphery many activities were not clearly metacognitive, while the central activities were much clearer. Finally he noted that the various processes arising out of the original knowledge/control distinction were not themselves clearly related to each other.

Thus the problem areas that had emerged by this time were:

1. How could metacognition be distinguished from cognition itself?
2. Was metacognition a unitary concept? In particular, was the executive control aspect a necessary part of the concept?
3. Does metacognition develop? If so, when and how?
4. What are the most appropriate methods for studying metacognition?
5. How can the theoretical base of metacognition be improved?

Many of these questions were addressed by Brown in major papers that appeared around this time. Her Heidelberg paper of 1980, from which quotations are presented here, was a key source, and was incorporated in her joint chapter in Flavell & Markman (1983) and later published in German (Brown, 1984). In it she comes out clearly with a twofold model of metacognition, fundamentally seen as an 'understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question' (p.2). Thus metacognition 'refers loosely to one's *knowledge* and *control* of one's own cognitive system' (p.4). She points out that metacognitive functions are interchangeable, as Flavell had explained earlier (Flavell, 1979). Thus asking yourself questions as you read could function as a cognitive strategy (looking for main points), or a metacognitive one (to monitor the task). As well, this activity could be

a reflection of the knowledge that this is a useful strategy, ie., another metacognitive process.

A second major issue concerns the two types of psychological research that have contributed to the term, ie., knowledge concerning cognition and regulation of it. She argues that these are two forms of metacognition, closely related and tied recursively to each other, although easily distinguishable. The first is a stable, declarative form of knowledge that can be verbalised, although of course it is accepted that there may still be a knowledge state even though there is no verbalisation. Such knowledge is also fallible and is usually thought to be late developing. The second is concerned with the regulation and oversight of processing - planning, monitoring and checking outcomes. These activities are not necessarily stable, that is, are likely to appear at any point in one's development, and are often not stable because they appear to operate at a level below that of conscious awareness.

Brown then goes on to argue that these two forms of metacognition have become 'incestuously related' in the literature (p. 8), but that in fact they have very distinct roots, so that confusion is bound to arise when questions about the blanket term are asked. The answer is bound to be, "it depends", ie., on which of the two aspects is the one under consideration. Thus Brown's survey goes on to outline four problem areas in psychology that she believes have contributed to metacognition.

The first concerns verbal reports as data in cognitive processing. Here we are concerned with issues of accessing one's own processes, of reporting accurately on these and how the actual reporting influences the processing. To access one's own processing there is a requirement to step back and to distance oneself from the processing that is going on, a reflective, formal operational skill that Piaget called 'reflective abstraction' (Piaget, 1976). Such access is usually regarded as conscious (e.g., by Rozin, 1976). However there are serious problems with using verbal reports as data, and we will discuss these in a later section dealing with methodological issues (Chapter 3).

The second area Brown mentions is that of executive control, a computer metaphor that concerns the central processing of the whole system, and the associated

notion of automated and controlled processing. The latter involves the distinction between fast, parallel processing that is relatively effortless and requires little control, and controlled processing that is slower, serial, effortful and requiring more control by the subject (Schneider & Schiffrin, 1977). Thus in skilled reading we can process print rapidly and effortlessly, until comprehension failure forces a slow down and the allocation of extra processing to the problem, with more deliberate and planful effort being involved. Yet the real problem here is how the controlling is actually carried out. The problem of the homunculus now emerges; whether hierarchical and unidirectional or whether more heterarchical in form and with control more widely distributed throughout the system. Most central here is the way in which planning is carried out, an aspect usually investigated by means of computer modelling (e.g., Hayes-Roth & Hayes-Roth, 1979). A major distinction made is between pre-planning and planning in action, forms of planning that indicate that allocation and monitoring functions are central and "metacognitive".

Brown's third problem area concerns the Piagetian notion of self-regulation, which seems to be related to the notion of executive processing. We are concerned with the adjustment and refinement of one's own actions throughout growth and development; a concept arising from developmental studies and receiving considerable attention in Genevan research. Piaget (1976) postulated three types of regulation: autonomous, which is inherent in any processing; active, in which one's current thinking is tested out; and conscious, in which the learner can work with mental constructs and reflect on alternative hypotheses. Thus the latest and highest level is a conscious one where reporting on one's processing becomes possible. This raises the question of degrees of consciousness and self-regulation. Brown points out that there is an important distinction to be made between conscious awareness and control of thought (e.g., metacognitive awareness) and regulation that operates below this level (e.g., error detection). The former is developmentally sensitive (ie., late emerging) while the latter occurs at any time. This is for Brown a most important distinction and the source of a lot of conceptual confusion in the literature of metacognition:

"Confused in the metacognitive literature, even lost in some versions of the concept, is this essential distinction between self-regulation during learning and mental experimentation with one's own thoughts. Whatever distinctions must be made in order to render metacognition a more malleable concept, this one is a fine candidate for inclusion in this list". (Brown, 1980, 60).

Brown's fourth problem area is called other regulation, concerned with how learning takes place with the help of others. Here the work of Vygotsky (1978) provides the framework. It is postulated that all processes are initially shared and social, and over time become gradually internalised. Thus regulation of one's thought is first other-regulated and becomes more self-regulating through social interaction, particularly through the interaction of parent and child. The process involves the more mature interactant taking the monitoring role in the initial stages, making the activities explicit and overt, so that the child or learner can then gradually take them over in the process of internalisation. In the later stages the adult becomes a critical but supportive audience, and can generally be described as a mediator of learning throughout the whole process.

In her conclusion Brown points out that there are multiple background variables involved; a 'loose confederation of topics included under the blanket term of metacognition' (p. 78). She canvasses the possibility of working with the separate concepts, of discarding the term itself, or of limiting it to the knowledge aspect, as Wellman (1981) had proposed. However the third possibility she believes is not a limitation at all, since knowledge can be both procedural and declarative. This review sums up the position by arguing that there is a pressing need for more conceptual precision and that particular problem areas need to be investigated more fully so as to formulate a more complete theory of metacognition. She also recommends that some of the controversies could be resolved by researchers making reference to the subordinate

processes (e.g., error-correction) more explicitly in their work, rather than using the more superordinate terms.

Thus we can see that there are significant problems of a conceptual nature in the literature concerning metacognition. One major issue concerns the need to disentangle metacognition, the second order concept in cognitive functioning, from the first order concept of cognition itself. It has proved to be important to establish that metacognition involves processing activities that themselves operate on what are accepted as cognitive activities. Cognitive activities are summed up in the information processing model which posits the use of perceptual and attentional procedures as the basis for the representation of knowledge in the system, the operation of processes for storing information in memory and for its retrieval and use in reasoning, problem solving and decision making. What is at issue here is the self-knowledge and self-control that subjects possess and deploy while they are engaged in the processes outlined above.

It will also be important for subsequent research to be careful in defining the areas of research, to be sensitive to the difficulties in the use of blanket terms and particularly to consider the problematic nature of the knowledge/control distinction that now seems to be inherent in the fundamental notion of metacognition. The idea of a second order, hierarchical model of cognitive functioning remains as a fundamental one, but we can see that hierarchies within the concept itself are also evident. Thus, while metacognition remains the general or superordinate term, it can be subdivided into domains in which it can operate viz., in learning, memory, language (or comprehension) or in communication.

More recently metacognitive research and theorising have focussed quite sharply on the problem of clarifying the concept, on the differences found in research results particularly with reference to performance, and on appropriate methodology for investigations (Lawson, 1984). Thus Lawson argued that conflicting results in metacognition studies were due to failure to acknowledge the distinction between knowledge and control in metacognition and followed Cavanagh and Perlmutter (1982) in proposing that these two aspects, being logically distinct, should be kept strictly separate.

While the knowledge one possesses may affect one's control, it is only one source of influence on and is not synonymous with executive control (Lawson, 1984). Thus metacognitive knowledge is the product of the executive process, although, as Brown had earlier pointed out, not all control processes operate at the conscious level. An emerging issue here is the question of what is involved in the idea of levels of consciousness, and why it is that being able to report on a process is an indication that it is operating at the conscious level. Lawson also argued that the control processes are highly general but that knowledge, e.g. metalinguistic knowledge, is domain specific. This distinction is one that he believed gives rise to differences in research results. He suggested that there are three differentiating factors involved in the distinction:

1. Is the construct conscious and reportable?
2. Is it domain specific or transferable?
3. Does it operate automatically or is it deliberate? (1984, p.94).

So Lawson's position is that reflection on one's cognition is what is involved in executive control, a very general proposition which fails to refer to the usual processes that have always been part of the computer metaphor of control. However he explained this potentially confusing position by adding that planning, modifying and evaluating cognitions are concepts included in the notion of reflection. He proposed that reflection results in knowledge, which is the outcome of the executive processes. This rather linear model has the advantage of neatness and clarity, but may at the same time not be capable of accommodating the recursiveness of some processing. It is possible, for instance, that some control processes may emerge from an existing knowledge base. Thus both Donaldson (1978) and Reeve and Brown (1985) argued that control processes imply that the individual possesses certain knowledge about themselves. The former pointed out that it is impossible to control one's thinking while one remains unaware of it, as part of her argument that thinking develops from the unconscious, sense-embedded to the disembedding that is involved in 'learning to move beyond the bounds of human sense' (p. 123). Reeve and Brown pursued the issue of conscious control as a touchstone for metacognition. They stated that metacognition involves a number of coordinating

activities that are needed to solve problems, including understanding the task and their own capabilities (ie, knowledge factors), as well as planning, monitoring and coordinating activities. They summed up by stating:

"Collectively these problem-solving activities define what has been referred to as metacognition; that is, metacognition involves separable processes each of which could, in principle, be studied by themselves" (Reeve & Brown, 1985, 345).

This seemed to suggest that metacognition was a control process which involves knowledge factors. However they went on to point out that the earlier work of Flavell (1970, 1971), already discussed here, was based on the view that young children were not effective in their processing because they did not possess the relevant knowledge that would enable them to control it. It was only during middle childhood that relevant knowledge emerges. Thus it was essential to Flavell's position that 'control of cognitive processing is contingent upon one's metacognitive knowledge and the ability to reflect on that knowledge' (Reeve & Brown, 1985, 346). This viewpoint they saw as arising from developmental studies of memory. A second source of the conceptualisation of metacognition came from the information-processing approach, where the central executive's functions were seen as comprising the self-regulation of the cognitive system, which they described as metacognitive processes. They concluded that what distinguished these two sources of influence on metacognition was that the former (ie. Flavell's view) implied that control of processing must be conscious, while the latter viewpoint held that metacognitive processes, which operated at all stages of development, were apparently initially unconscious. Growth in problem solving skill depended on the child's ability to gain conscious control of and regulate metacognitive processes.

It appears therefore that Flavell's account of metacognition does allow for both knowledge and control as part of metacognition. He has in fact made it clear that some

knowledge is procedural and some declarative (Flavell, 1985). In a recent discussion of his work Garner (1987) suggested that there is a modal sequence of operation of metacognition: metacognitive knowledge serves as a basis for metacognitive experience which in turn can trigger strategy use. However this modal sequence is not the only possible one. Metacognitive experience can feedback into knowledge, as can strategy use, while cognitive strategies themselves can also prompt revision of the knowledge base.

It appears, however, that Brown's concern with metacognitive processes tends to obscure or underplay the knowledge base that she accepts as part of the concept. When she first mentioned the term metacognition in this later article it is described as the 'ability to understand and manipulate' one's own cognitive processes (Reeve & Brown, 1985, 343); here there was an indication that knowledge is an aspect of the concept, and in fact knowledge had been mentioned quite regularly in the general definitions of the earlier sources cited in the present review. It seems reasonable to conclude that the criticisms of Brown's position are warranted. Her orientation towards the self-regulation approach (ie., Piagetian inspired), and to the executive control aspect (ie., the information-processing model) has resulted in a position that puts major emphasis on metacognitive processes, as she called them. She mentioned 'individuals' abilities to understand what is required, to understand their own capabilities' (p. 344), which Flavell would label metacognitive knowledge ; however she then went on immediately to add to the list planning, monitoring and coordinating one's activities. These activities she saw as separable processes (no mention is made of knowledge states) which taken together constitute metacognition. It does not seem to be sufficient to develop a position which emphasises control processes derived from the executive control model, and then to add on the notion of knowledge in stating the general definition. There does appear to be a lack of complete articulation of the knowledge base component into Brown's model of metacognition.

One evaluation of this problem of difference of orientation amongst researchers in metacognition has concluded that the different positions here canvassed are differences in emphasis only. Garner (1987) proposed that there was an emphasis on the knowledge learners bring to their tasks in one case, while in the other there was an emphasis on

control of the processing which is inherently the orchestration of the knowledge base. Another recent discussion (White, 1988) also drew attention to the need for clarification of the central notion of metacognition, arguing that it could refer to propositional knowledge about metacognition itself, to awareness of one's own thinking, to the ability to regulate thought, and/or to the readiness to apply this to tasks themselves. White also raises the question of the metacognition-performance relationship.

It certainly seems to be the case that there is overlap of conceptualisation, since both Flavell and Brown include some reference to knowledge ('awareness', reflection or 'knowing about knowing' in Brown's case), with Flavell having given it a clearer articulation and rationale. Brown, however, gave a much more detailed explanation of the control processes; yet these were not neglected by Flavell with his treatment of cognitive monitoring and the associated notion of comprehension monitoring. Certainly recent studies applying metacognition to reading have tended to accept the awareness/control distinction quite readily (Cornoldi, 1990).

b. Summary of research on metacognition

There is sufficient homogeneity in this concept for research to continue to be able to use it in at least a heuristic fashion. However there does not appear to be sufficient data in the knowledge base to justify labelling it as a body of theory, from which testable hypotheses may be derived. It seems best to conceive of the notion as a loosely related set of ideas, a superordinate cognitive process that is posited as an essential aspect of the efficient performance of any task. The problem areas that remain include:

1. The relationship and distinction between cognitive and metacognitive processes. This is the issue about differentiating metacognition from cognition itself, and therefore concerns the fundamental matter of the need for a concept of metacognition at all.
2. The need to include control processes in the general notion of metacognition, and their relationship with the learner's knowledge base. The concern here is about the unitary nature of metacognition.
4. Whether metacognition varies between task domains.

5. The need for a distinction between levels of consciousness (unconscious, spontaneous and unreportable, or the reverse).
6. The relation between metacognitive aspects of behaviour and performance in cognitive domains. Here there are questions concerning the effect metacognitive processing has on cognitive processing in general.

Metacognitive development.

It has been pointed out that studies of the development of metacognition are now essential to further development of research in this area (Brown, 1982; Flavell, 1979; Reeve & Brown, 1985). At the very least a picture of the developmental pathway from childhood to adulthood would contribute to the clarification of some of the disputed issues already discussed. Lawson (1984) observes that we lack detail in the description of the developmental path of both the knowledge and control aspects of metacognition and that there is a pressing need for studies with a strong developmental component.

Essential to much of the research on the development of metacognition is the influence of Piaget and Vygotsky. Piaget's model of cognitive development postulates a series of qualitative, age-related and discontinuous changes in thought that result in increasing awareness of one's own thinking and the ability to reflect on and operate on these (Piaget, 1963, 1976, 1978). For Piaget childhood egocentricity gives way slowly to increasing self-awareness of the how and the why of one's actions and their results, although he did not believe that the individual was conscious of the mechanisms of thought. His notion of 'cognizance' (1976, vi) envisaged that it emerged late in development, ie., at the beginning of formal operations, and went beyond the simple act of reflection to full awareness of one's own cognitive processes. There does not seem to be any place in his model for executive processing, although, as Lawson points out (1984, 99), there appears to be ample evidence from his subjects' protocols of this phenomenon.

Vygotsky (1962) claimed that development moved from the social to the individual through a process of internalisation of what is acquired from models and other components of the culture, with a major contribution to development coming from

schooling and by means of the influence of language. He suggested that children's cognitive development involves the movement from the use of external speech ('speech' appears to mean language in this translation) to true inner speech which parallels the movement to true conceptions. Parallel to this shift from social to individual is the movement from a phase where knowledge is acquired unconsciously to a second phase where more active and conscious control of this knowledge is acquired.

The two theories of Piaget and Vygotsky therefore suggest that development involves a shift from other-regulation of one's development to self-regulation by means of increasing ability to muster and deploy appropriate learning strategies. This may be seen as an increase in flexibility or in control of the available strategies that are needed for performance of any task. Such control processes plainly relate to the metacognitive processes already discussed here.

In information processing terms the model of development is not necessarily age-related but does involve three stages of skill acquisition (Anderson, 1985). In the first, cognitive phase, the focus is on declarative knowledge in which facts and general procedures about the skill domain are acquired. In the second, the associative phase, this knowledge is embodied in the procedures needed for adequate performance of the task. In the third, autonomous phase, the procedures become more and more automated and rapid. Related to this is the novice-expert model of skill acquisition, which examines the nature of the skill acquired by experts (often, but not always adults) and takes this expertise as the goal for skill acquisition or development by the novice (often younger) learner. Experts are considered to have the advantage of a more substantial knowledge base, including strategic knowledge and flexibility in the use of these, and they are also likely to possess better metacognitive knowledge and control (Lawson, 1984). Novices are considered to be lacking in skill and in the ability to regulate these skills initially, but then become more deliberate as they master a skill, finally automating the skill as they become expert (Brown & DeLoache, 1978). This approach implies that adult novices will have more flexible metacognitive skills than younger ones, a point confirmed by Chi

(1978) who compared expert child chess players with novice adults, and found no differences in memory predictions between the two.

It seems therefore to be important to identify the ways in which children are novices in specified tasks so that what is to be learned and how it is learned might be determined. The present study will be concerned with the specifically metacognitive capabilities and requirements of such tasks.

There are at least two possibilities for the general model of development: a stage-based approach stressing qualitative and discontinuous changes in an invariant pattern associated with age, or a more continuous and less abrupt pattern of change with the possibility that new acquisitions are simply mapped against age changes. In neither case, of course, is age to be seen as anything but a convenient descriptive marker of changes in performance. Developmentalists tend to define mature behaviour and see growth as progression towards this goal, while information-processing theorists use the novice-expert dimension as the chief defining concept.

Brown (1981) makes different developmental predictions for the two aspects of metacognition already discussed. She has argued consistently (e.g., 1980, 1982a, 1984) that knowledge about cognition and conscious direction of thought is late emerging while its regulation (in the sense of non-conscious control) is age-independent. Others have also presented evidence in support of this view (McLain, 1991; Paris et al, 1991). We have already noted Brown's view that it is vital to keep the distinction between these two capabilities in mind. It also must be borne in mind that she does not regard the younger child's capacities very highly, for they are seen as being tightly constrained by their context of learning and competence even when they do gain expertise (1982a). She links this to the view that young children's skills are patchy and not covariant, and also that they are not stable and conscious (cf. Rozin, 1976). Thus her general model of development involves a gradual increase in flexibility and reflectiveness over time, regardless of any specific cognitive capabilities which might be acquired quite early. It is not only the flexible use of cognitive skills that is needed for efficiency, but also the ability to monitor these. Lawson (1984), however, objects that this would deny most

adults recognition as self-regulating individuals. He considers that such competences vary in any situation.

The mechanisms of development in Brown's model have been based on the notion of social interaction (Reeve & Brown, 1985; Brown 1982a, 1984). The approach was derived largely from Vygotsky's work in which it was posited that the young are regulated in their behaviour by adults but gradually take over the task of regulation for themselves, through modelling and explicit instruction of the requirements of the tasks involved. Brown's study of classroom interaction patterns in learning to read supported these claims (Brown, Palincsar & Armbruster, 1984). She argued (1982b) that supportive experts (mothers, master craftsmen and experienced peers) at first adopt the monitoring role, and gradually cede it to the learner as proficiency in regulation is perceived. Much of this thinking has been more fully developed by Wertsch (1978) who sees the interaction as a process of shared responsibility in which the child acts as if it had a strategy which it began to master more fully, becoming more and more aware of what was already going on under the direction of others.

When we look at the developmental framework from the point of view of Flavell's three dimensions of knowledge, experience and strategy use some trends emerge clearly. Beginning with the knowledge dimension, the prototype study here was that of Kreutzer, Leonard & Flavell (1975), which focussed on metamemory development in elementary children using an interview procedure. These researchers found that the younger children (kindergarten and first grade) knew much less than the older about the factors in memorising. The older ones possessed extra knowledge, and were much more planful in general. Their study was followed up by Myers & Paris (1978) but was applied to reading. Myers and Paris studied eight and twelve year old children and noted that the younger ones attended mainly to decoding rather than comprehension and possessed far fewer reading strategies overall. The authors concluded that these younger readers' understanding of reading was very limited. Other interview studies took reading achievement into account in their design. Forrest & Waller (1980) examined three reading levels in each of their grade three and six groups in individual,

standardised interviews. Their findings were similar to those of Myers and Paris (1978) : grade level and achievement in reading were related to an increase in the range of strategies possessed and to decoding emphases, with the younger and older poorer readers showing up badly in these aspects of reading.

Good and poor fourth grade readers were studied by Paris & Myers (1981) in an investigation that required children to read a passage and recall excerpts as well as answer questions about their understandings of, and value attributed to, various reading strategies. The poorer readers were less aware of appropriate strategies and of disruptive influences on their reading, it was found. Knowledge and performance were also linked in a study by Garner and Kraus (1981-1982) who examined the strategies of good and poor grade seven readers in an interview and error-detection study. Poorer readers again focussed on decoding and pronunciation while the better readers attended much more to meaning and to text characteristics. These authors suggested that the poorer readers' attitudes seem to have been produced by emphases on the part of teachers; it may even be the case that readers receive differential treatment that supports the strategies implicitly adopted by the better readers but inhibiting these in the poorer ones (Allington, 1983). Gambrell and Heathington (1981) studied adult good and poor readers' understanding of reading in an interview study and found that the less proficient saw reading as a decoding task and were aware of fewer strategies. Narang (1990) found that good readers' monitoring strategies included ignoring the problem incomprehension, suspending judgments already made, forming tentative hypotheses and rereading. It is appropriate to finish this section with a discussion of a major study which encompassed both knowledge and performance variables in reading. Forrest-Pressley and Waller (1984) studied 144 children in grades three and six who were working at three reading levels. They gave them a series of tasks designed to measure their reading performance, by means of a series of questions asked after a passage had been read. They also used an interview format to assess metacognitive knowledge of strategies. These two measures were combined to ensure that empty verbalisations would not be used as a measure of metacognition. They found that the 'younger/poorer reader tended to do less well on

performance and verbalisation (traditional "meta") measures in all of the areas with which this study was concerned' (page 115), and stated that:

"In summary, it seems reasonable to conclude the following: (1) Both cognitive and metacognitive measures of decoding, strategies, and comprehension increase with grade and reading ability. (2) Both cognitive and metacognitive measures of language, attention, and memory increase with grade and reading ability..." (p.115)

This is strong support for the view that younger and poorer readers have difficulty not only with the use of reading skills but also with their ability to monitor their reading and correct failures.

There is evident a marked trend for younger and poorer readers to lack knowledge and to possess misconceptions about reading and associated cognitive processes. However there are major problems with the interview as a procedure (Brown, 1984) which we shall discuss in detail in a later section.

Under the other headings of metacognitive experience and strategy use it is convenient to examine the ability to monitor cognitive activities and the development of strategies in learners. We are concerned with those activities that arise when automatic, routine processes break down and the learner is faced with the task of dealing with this situation more deliberately and in a more controlled and planful fashion. Such behaviour has been examined more systematically; the 'lookback' or rereading strategy in particular has been carefully studied, as well as other types of strategy. The main approach to detecting the 'lookback' capacity has been the error-detection paradigm, which has also been criticised (e.g., Baker & Anderson, 1982) and which will be reviewed in a later section. Some early work in the area was carried out by Markman (1977,1979) where oral instructions for the performance of a task were distorted and the children's ability to detect these was examined. The younger children were less able to detect the garbled

instructions, even where attempts were made to alert them and to encourage them to criticise adults involved.

The monitoring of reading, where the reader's metacognitive experience and use of strategies are the focus, has been examined in a similar fashion. One of the earliest of these studies, Smith (1967), compared good and poor readers and found that the former were more aware of their own processing and more likely to use specific strategies, of which rereading was one. In 1976-77 Olshavsky examined the strategies of tenth grade readers using a think aloud procedure in which readers stopped regularly during the reading to report on their own processing activities. She found that they could identify problems in comprehension at word and clause levels and that numerous strategies could be identified. Of the ten strategies identified three were found to operate at the level of the word (use of context, synonym substitution, failure to understand), while the rest were found at clause or story level. These latter strategies included rereading, inference, adding information, personal identification, hypothesis, and failure to understand at the clause level, and using information about the story at the whole text level. In a later study (1978) Olshavsky repeated this approach with eleventh grade good and poor readers to investigate their strategies but found that neither group used more strategies as the difficulty of the material increased. It must be noted that the conception of reading competence that is used in these and subsequently reported studies varies from study to study, often being based on the results of standardised tests, which, of course vary from study to study. In other cases teacher judgement was used to make the decision. This makes it difficult to assess the value of the range of studies that have used the good/poor reader distinction as an organising principle, and highlights the need to avoid circularity in the form of the argument. What will prove to be important is to establish a clear, operational distinction between any differentiated reader groups that are selected for study.

Baker (1979) had undergraduates read texts where the information was inconsistent. They were asked to identify any 'confusions' and to explain (retrospectively) how they detected the problems. Only 38% of these problems were

reported by readers, even after they were required to search for them after the reading was completed. It was suggested that the scores were depressed because readers did notice the errors but attended to them covertly, or regarded them as trivial. Two studies by Garner (1980, 1981) examined older elementary and junior high students. In the first, expository texts had inconsistent information inserted and readers were asked to rate them for ease of understanding. The better readers could see the differences more readily than the poorer ones. This was followed up in the second study where it was found that the poorer readers attended to single lexical items and to single sentences rather than to consistency between sentences. Thus these readers overuse single word understanding and fail to see the larger stretches of text as relevant to comprehension.

Allesi, Anderson and Goetz (1979) carried out a study which used undergraduates and incorporated questions in a textbook reading. When these readers were induced to look back in the text (by means of branching in a computer presented text) it was found that performance in target questions was better for the trained group than for a control group. This was taken to indicate the value of this strategy when the reader lost important knowledge.

Owings, Petersen, Bransford, Morris, and Stein (1980) had better and poorer fifth grade students read stories with unpredictable behaviour in the characters. They were asked to rate each story for ease of recall and found that the better readers identified inconsistencies more often than the poorer students. Baker and Anderson (1982) assessed the time spent on inconsistencies and on each sentence presented in a computer display, in a study with adults. More time was spent on main point inconsistencies, and these inconsistencies were reread more often. However a third of these were undetected i.e., missed, ignored or attended to without reporting. Winograd and Johnston (1982) used probes and error detection procedures with good and poor readers and found that practice improved both groups but that the better readers still performed above the other group, even though both groups had schema preparation beforehand. They raised major questions about methodology, such as failure to deal with other causes for poor

performance, and particularly argued for prior establishment of comprehension criteria and for better use of probes.

A variation of the methods used was provided by August, Flavell and Clift (1984) who worked with fifth grade readers and set up an error at the page rather than the word or sentence level, using a computer presentation. Time spent reading and rereading were examined, and errors detected and resulting strategies were also measured. The better readers detected more errors and reported more effective repair strategies than the poorer readers, while few of either group reread their texts. Many of the readers repaired the inconsistencies by inference so as to make the piece acceptable, however. Vosniadou, Pearson & Rogers (1988) point out that readers may have difficulty in detecting errors in text because they find it difficult to make a general representation of the meaning of the passage.

There is a highly consistent pattern of results from this work in the error-detection studies. A high proportion of the errors were missed by all readers, even where they were encouraged to be careful, and the more experienced and better readers reported (though not necessarily detected) more errors than the less mature or capable readers.

Garner and Reis (1981) examined good and poor middle school readers using texts with inserted questions, some of which had been shown to require a rereading if they were to be successfully answered. Important differences were found in the way these readers reread the texts, with the better, older readers more likely to reread than all others. In a follow up study (Garner, Wagoner & Smith, 1983) a different approach was used, by having upper and lower level sixth grade readers tutor younger students. The better readers encouraged more lookbacks, and differentiated instances when this was a relevant strategy. It was concluded that the good readers were more aware of the value of the strategy. A closer analysis of strategic performance was carried out in a third study (Garner, Macready, and Wagoner, 1984) which investigated the components of the 'lookback' strategy using the same tutoring procedure, with fifth and third graders at two achievement levels. The poorer readers were found to display fewer of the hypothesised components than the better readers. Gambrell and Bales (1987) attempted to assist poorer

readers in fourth and fifth grade by using mental imagery to improve processing as they read. They found that these students gained in comprehension as a result.

Once again it is apparent that older readers and certainly older, more proficient readers are more capable and flexible in their use of the rereading strategy. It may be that the younger and poorer readers' failure lay at the level of decoding and comprehension, although Garner (1987) notes that there were few failures in word recognition in her own studies, suggesting that the deficits were strategic, and not at the decoding level.

Another approach to the study of strategies is to be found in a miscue analysis study (Beebe, 1980). Fourth grade boys read aloud a short text and their substitution miscues were examined. It was found that there were spontaneous corrections of substitutions related to comprehension ability, because syntactically-semantically unacceptable miscues were regularly corrected while those that were acceptable tended not to be. Di Vesta, Hayward and Orlando (1979) studied strategy use in high and middle school good and poor readers by means of a cloze activity. This involved the ability to scan an entire paragraph for comprehension. All readers used rereading strategies but the better and older readers also used the strategy of reading on through the following text. It was concluded that the younger readers were less flexible and active in their use of reading strategies. A study of monitoring strategies by Pace (1981) with second, fourth and sixth grade students using familiar and unfamiliar materials found that an unfamiliar story induced more strategic behaviour such as looking back and correcting errors spontaneously; there were clear developmental trends shown, with older readers using a wider range and greater number of these strategies. Finally, Thomas (1980) examined senior elementary good and poor readers' strategies in reading, finding that there were major differences between groups in their orientation toward meaning or toward decoding as an approach to reading strategies.

It is now apparent that there is a marked, convergent trend in the research that exactly parallels that of the metacognitive knowledge studies already discussed. The younger children, particularly those below fifth grade level, and the less proficient of all ages, were not as capable as the older and the more proficient, respectively, at engaging

in deliberate activities to monitor and control their own processing. There seems to be a lack of resourcefulness and of flexibility in the young and the less proficient that has been revealed by these studies (cf. Garner, 1987; Wagoner, 1983). In the case of both knowledge and experience/strategy variables in metacognition, there is a quite clearly marked pattern of development over time, with proficiency differences also correlating markedly. It seems likely, as Brown, Armbruster and Baker (1986) argue, that the lack of understanding shown by these younger and less competent learners is at least one source of their failure in monitoring and controlling their own processing.

However, it must be pointed out that very few studies attempted to examine the pathway of development over a longer time span than three or four years. At present, to get a clearer perspective on a broader age span it is necessary to compare studies of different types, using different samples, procedures and in varying task domains. It is therefore appropriate that there be an examination of the development of metacognition over a longer time span and reaching through into adulthood. Such a study could encompass the processes normally involved in mature behaviour, towards which developmental pathways may be shown to point. It would also have the advantage of making clear what it is that younger learners do and might be expected to do as they develop skill and competence in learning how to learn. Such studies should be carried out in specified domains so as to clarify whether there are domain and task specific aspects of metacognition. It is to the domain of reading that we will turn, after an examination of one other aspect of development that appears to impinge on reading behaviour.

Metalinguistic development.

In a study of good and poor readers, Menyuk and Flood (1980) claimed that 'reading is *essentially* a metalinguistic task' (cited in Wagoner, 1983, p. 337). They concluded that a substantial basis in linguistic knowledge is necessary for one to read competently. Their study highlights a notion that is closely related to metacognition and that appears to possess striking similarities to it. If metacognition refers to knowledge and control of one's cognition, then the various domains of cognition- for example,

perception, memory, communication, comprehension - are likely to be fields where metacognitive processes operate. Thus the language processing area of cognition becomes an issue for a study of reading. As Slobin points out (1978), 'the general development of language awareness is, of course, part of the general development of consciousness and self-consciousness' [p. 132].

At the outset it must be noted that there is a terminological problem here. Although we have the term 'metalanguage', there is no nominal expression parallel to metacognition that can be used in the language domain. The modifier 'metalinguistic' (ability, awareness etc.) is available, so we are forced to develop nominal groups that incorporate varying meanings if we are to describe adequately and explain this phenomenon. This constraint in fact mirrors the issues we have already canvassed concerning metacognition itself.

The notion of a metalanguage seems to have been developed in philosophy and linguistics, and it is here that there emerged a focus on an important aspect of language behaviour that was to be taken up in later discussion and research. Linguists, for instance, have used the expression 'metalinguistics' to refer to the relations between the language system and the culture of the language users, while others have preferred to limit it to the notion of a metalanguage, ie., the technical terms used to describe language itself (Yaden & Templeton, 1986). Roman Jakobson seems to have introduced the idea of metalinguistic behaviour by referring to the practice by speakers of checking with the addressee whether the message they are presenting is being understood (cited in Yaden & Templeton, 1986, p.7).

As Halliday has pointed out (1984), linguistic categories lie in the realm of things that we need to name, just like any other aspects of our experience. When we name such abstract categories as are involved in the phenomena of language we reify them, sometimes naming them by reference to their semantic function: 'noun' is the grammatical term and 'name' the semantic expression. However many terms do not come from a folk semantics but have to be brought in from outside language altogether; this comes about when we become more aware of language as an object.

This brings us to the need for a metalanguage, which at first sight could be easily created out of natural language. Halliday (1984) discusses the problems of using natural language as a metalanguage for any natural language, pointing out that it has not been designed for the task and that the real problem lies in the nature of language as an object. The new categories that we create so we can 'talk about talk', once reified, are probed for their meaning and the resultant definitions are then used to define the metawords, the terms for the new metalanguage. Thus the definition of 'singular' as 'one of a thing' is simply a definition of the *word* 'singular'. So whenever we use such terms arising from extralinguistic experience we are faced with the problem of interpretation and labelling : we must interpret a symptom (the linguistic phenomenon) and then label this interpretation. The ideal source of a metalanguage is at one remove from the reality we are concerned with - since we are concerned in a metalanguage with symbolising a phenomenon that is at one remove from observation. But linguistics is a special case in the sciences since it is 'language turned back on itself', in Firth's terms (quoted in Halliday, 1984, 32). Language is simply not good for being glossed, Halliday concludes, declaring that its categories, particularly at the grammatical level, are ineffable. Thus any language user who is attempting to operate at the metalinguistic level may choose to work 'parasemiotically', by choosing a parallel semiotic within the same language as that being used, or metaphorically, by using more theoretical models.

For the reader, more specifically, written language can be viewed as an object, becoming visible and above all, for our purposes, something that can be reflected on. While it is true that speech can to some extent be objectified, as in ritual expressions and formulaic utterances, it nevertheless does not in everyday life possess the properties of writing, particularly those types of writing that are more reflective and removed from the activity of the field involved. Thus oral language is usually much more closely linked with the activity with which the language is associated, while written language tends to be removed from the activity, as is the case with most reflective writing. And speech has the peculiar characteristic of invisibility, being transparent to the user, whereas writing can appear to the user as an object, open to examination, while it lies on the table. Finally

speech is at its most effective when the speaker is entirely unconscious of it, as Boaz long ago pointed out (Halliday, 1984). More conscious language - more properly, conscious discourse - gets closer to the characteristics of written language and the latter achieves its force by the use of lexical rather than grammatical means. And Halliday (1984) claims that lexical items are semantically much closer to experience than grammatical ones, because lexis corresponds to the content of language which is a representation of experience of the world. The grammar has no such immediate point of contact with the representation of experience.

In other recent work the idea of a mental state has been added, probably to make explicit the notion mentioned by Jacobson, while retaining the original idea of a metalanguage. To overcome the terminological problem the expression 'metalinguistic awareness' has been used to indicate this mental state. Cazden (1972, 1975) used it when referring to the tendency for speakers, including quite young children, to speak about language itself, thus rendering it in some way an object for discussion. To do so requires the ability to make the actual structures or forms of language opaque or explicit, an activity which is not very common or necessarily even functional to a communicative act. These forms become the object of cognition, thus introducing the second order notion. The primary function of language is to communicate meaning, and it is to meaning that we attend when using language. Whenever attention is given to form, the second order function comes into operation (cf. Bowey, 1988).

A focus on the form of language is perhaps necessary when it is first being acquired or when communication breaks down (Saywitz & Wilkinson, 1982), but it remains to be demonstrated whether it is essential to the process of communication. In another early study Gleitman, Gleitman & Shipley (1972) refer to 'metalinguistic reflection' (p. 141) and also to the question of whether young children 'can also contemplate the structure of the language, whether they know that they know' (p. 138). Gleitman, Gleitman & Shipley (1972) claim that more deliberate, reflective 'talk about talk' is not a peripheral linguistic issue but central to competence with language and its development. There is an implicit claim that such reflectiveness is part and parcel of

language competence and development. We find here yet another parallel with the problem, already discussed in the metacognitive literature, of the link with cognitive performance.

It is important at this point to note that awareness can easily be confused with what has been called 'linguistic awareness' (and defined variously). Linguistic awareness has been seen as the ability to perceive and segment the characteristics of speech (Liberman et al., 1977). This ability is a performance that language users can carry out when requested to do so, and has been studied under experimental conditions, that is, by requiring children to produce evidence of discriminations deliberately (Downing & Oliver, 1973-74; Zhurova, 1973; Holden & MacGinitie, 1972). However these studies indicate that such deliberative behaviour emerges late in development. Yet under naturalistic conditions infants and young children have regularly been observed to exhibit great sensitivity to phonology, in their sound repetitions and use of rhyme (Weir, 1962; Venezky, 1976). An obvious issue of importance here is the deliberateness of the behaviour, in contrast to its spontaneous manifestations. We will continue to observe this distinction, already raised in the review of metacognition itself, and reserve for indisputably metalinguistic behaviour that which is deliberate (and therefore controlled) (Hakes, 1982). The more spontaneous examples of activities concerned with speech seem best to be regarded as first order language behaviour or linguistic awareness; these manifestations we will regard as tacit knowledge.

Note that the discussion has been limited to speech perception and performance. It is likely that speech processes are behaviours that operate with no conscious, deliberate control over production and comprehension activities, at least under normal circumstances (Laberge & Samuels, 1974; Posner & Snyder, 1975; Schneider & Shiffrin, 1977; Hakes, 1982; Clark, 1978; Ryan & Ledger, 1984). They are therefore to be regarded as first order performances that are potentially subject to second order behaviour.

This appears to be the position of Mattingly (1972) who used 'linguistic awareness' to refer to a reader's awareness of the primary linguistic activities of speaking and listening. He did not view linguistic activity as something that was generally

accessible to the user's awareness, but claimed that literacy involved some access to language behaviour. It is this accessing that for Mattingly constitutes metalinguistic awareness. In a later paper (Mattingly, 1984) he refined his position by pointing out that his distinction between primary linguistic activity, speech and listening, and secondary activity, literacy, which depends on awareness of the first, was not the essential one. Instead he proposed that metalinguistic awareness consists of the ability to access knowledge of grammatical structures. He argued that written language foregrounds these abilities to access grammatical knowledge, and that such access is crucial to success in literacy. A problem with this position is that it tends to overemphasise the mode differences (speaking/listening as against writing/reading) at the expense of the single, underlying language system itself - a point that is made by some linguists (Halliday, 1985). We therefore need to be careful to avoid setting up distinctions at a linguistic level that are actually differences at a psychological level; the essential difference we are concerned with here being that between the first and second orders of linguistic and metalinguistic behaviours.

We will also need to consider the developmental questions. It seems likely that comprehension processing, and possibly also speech production, do not develop from controlled to automatic, as seems to be the case for the development of many other skills. Rather, controlled processing seems to be inessential at any point in language development, quite possibly because it would be disruptive to the comprehension of speech. We are efficient in listening to speech simply because we do not consciously attend to it (Hakes, 1982). Leontev (1981) formalises this in a model of speech processing which has users unaware of their language choices, except momentarily and below the level of awareness. It might be objected that the sort of infant language play described above is a form of controlled processing. That may be the case, but it seems more likely not to be so, the behaviour being embedded in solitary circumstances where the infant is recapitulating and exploring daytime experience rather than engaging in normal communication with others. Another way to get at the important developmental

distinctions is to distinguish between perceiving language and judging it (Hirsh-Pasek et al, 1978), only the latter being regarded as metalinguistic.

Nevertheless both production and comprehension can break down, and it is then that repair strategies are called into service, at a point when we become more deliberate and controlled. It may be that the essence of metalinguistic development is the ability to reflect deliberately on speech. We will need to consider whether this analysis still applies when the focus of attention is written rather than spoken language (Olson, 1977; Mattingly, 1972). Whatever the answer, the implications for a study of reading will be important.

To begin with spoken language, we shall review studies that examine young children's ability to treat language as an object in a reflective way, thus satisfying the deliberative criterion already discussed. It might be better to use an expression like metalinguistic reflectiveness or ability rather than awareness so as to capture this essentially second order activity. Eve Clark (1978) begins her paper with the claim: 'Children begin to reflect on certain properties of language at an early age' (1978, 17), pointing out that two year olds can report their awareness of their own ability to vary their speech according to audience. She argues that their awareness is the product of their reflective abilities, which begin to appear at about age two and include spontaneous self-corrections of speech, queries about the choice of language and comments on others, play with language units, judgements about structure and function and questions about language generally. She also points out the problem of distinguishing between the use of language and the making of judgments about it, a problem we have already referred to. Judgements about language itself, in terms of appropriateness, complexity and form are clearly evident from age two, with explicit comments on language appearing about age three. Very young children can also apply rules to new types of productions by adding appropriate inflections (Berko, 1958) and of course spontaneously correct themselves and others (Scollon, 1976). The ability to analyse language into units is related to reading development in many cases, and this material will be discussed later, but some children can segment morphemes or syllables spontaneously (Leopold, 1949). We have already

referred to the common tendency for young children to play and practise with language, where repetitions and variations of phonology are carried out, as well as puns, rhymes, riddles, and figurative language. As a result of her survey Clark developed a taxonomy of types of awareness which she regarded as metacognitive skills ie., monitoring, checking, testing, deliberate learning, predicting and reflecting, listed in order of development . Thus her position is that 'with age, children show increasing awareness of language' (p.35), and she speculates on the degree of individual differences that may exist amongst children during the course of development.

One aspect of the problem of definition of metalinguistic awareness is the fairly common tendency for language users to develop concepts of what Downing has called the 'features of language' (Downing & Valtin, 1984, 40). After referring to the tendency we have already discussed for young children to be unable to segment speech easily, he points out the important psychological difference between using language (the first order activity) and making judgements about it. He cites Gleitman and Gleitman (1979) who refer to the cognitive processes involved in any linguistic performance as the object of a higher order process that involves reflecting on the performance - a reflective activity that constitutes the metalinguistic performance.

Related to this approach is the study of children's awareness of technical linguistic vocabulary. A start was made with Reid's study (1966) which showed that beginning readers misunderstood many of the terms used in the classroom, such as 'word', 'sound', and 'letter'. Downing (1970) replicated this study, and added technical terms used to refer to speech in reading instruction. The notions of sound and word have also been closely studied (Downing & Oliver, 1972-73; Papandropolou & Sinclair, 1974; Clay, 1972; Meltzer & Herse, 1969). These studies indicate that children find it difficult to segment words from the flow of speech at first, then begin to identify units using semantic cues, and only later are able to segment into phrases or topics. They often confuse words with noun phrases and generally focus on functional attributes of discourse as part of their concept of what is spoken. It is only under the influence of school that the concept changes. School age children tend to transform these notions into

a unit of written language. One important study (Francis, 1973) of children's awareness of language units found that spelling, reading and writing dominated school children's perceptions of language in their first few years of schooling. Francis concluded that the new experience of dealing with the written language seemed to be the main reason for these perceptions, as though the children never seemed to think of words as part of spoken language. Hall (1976) followed this up with a study of segmentation of speech and writing, finding that children performed better with written than oral language, and that both abilities correlated with time spent at school. It ought to be noted that while the influence of schooling is obviously important here, there is also evidence for the importance of preschool experience. Ferreiro and Teberosky (1982) have shown that concepts of written language emerge well before school age.

The ability to perceive and manipulate sentence structure has been the subject of a number of studies. Grammatical awareness in children was examined by Gleitman, Gleitman & Shipley (1972), who found that two year olds could correct reversed word-order and telegraphic sentences. DeVilliers and deVilliers (1972) asked young children to judge the acceptability of correct and ill-formed sentences and found that although all could detect anomaly only some could correct certain types. Hakes (1980) followed up this work by requiring children to justify their reasons for rejecting sentences, and found an improvement with age in their ability to judge well-formedness independently of semantic considerations. Similar results were obtained by Smith and Tager-Flusberg (1982), and Vogel (1975). Such individual differences were also found in school age children (Bohannon, 1975). Changes occur during the early school period and also have been found amongst older schoolchildren (Scholl & Ryan, 1975; Hakes, 1980; Forrest-Pressley, 1983; Hirsh-Pasek, Gleitman & Gleitman, 1978).

Note that there are no reasons for necessarily concluding from these studies that young children could not reflect on grammatical acceptability or make corrections in other contexts. What is shown is that young children can, with varying success, interpret sentence judgement tasks as adults do (cf. Bowie, 1988). The heavy reliance on experimental designs in this work led to task requirements that were decontextualised;

children's failure on the tasks were interpreted as an indicator of their inability to reflect. However, reliance on decontextualised language tasks has been heavily criticised (e.g., Donaldson, 1978; Bowey, 1988), because it has been shown that children *can* carry out these tasks in a meaningful context.

What we have reviewed so far concerns the knowledge that children have of language itself, their ability to manipulate it, and their use of a metalanguage, the language used to describe language. While the mere use of these terms in itself may not appear to be significant, we can say that the appropriate use of the terms is an indicator of metalinguistic awareness. Knowledge of the terms themselves, or rather awareness of the instantiations of them, is a sign of this awareness. Metalinguistic awareness involves 'the ability to treat language itself objectively and to manipulate language structures deliberately' (Ryan & Ledger, 1984, 165). We have seen that there are differing demands placed on children as they process oral and written language, because the latter makes additional demands on the language user.

What is emerging here is support for the view that the significant gain made during the early school years is the ability to control, in a deliberate fashion, the processing of language, both written and oral. We conclude that children (and adults) are probably capable of becoming more aware of language as an object and not only a means of communication, and that part of this awareness is an ability to reflect on language in its own right and to manipulate it in some sort of intentional and a deliberate fashion. This may be summed up as an ability to control language processing, perhaps arising from the earliest tendency to play spontaneously with and reflect on language. Thus we can concur with some definitions of metalinguistic ability, and support, for example, Yopp and Singer (1985) who define it as follows:

'Metalinguistic ability consists of knowledge about one's own language and ability to direct, regulate, monitor, and evaluate. As children develop their metalinguistic and linguistic awareness abilities, they are increasingly able to

judge, analyse, and eventually remedy faulty sentences...'
(p. 135)

It is likely that interaction with written language, which stands relatively free of immediate context, is an important stimulus to children's metalinguistic functioning. Their earliest experience with language is likely to be in a dialogue in which the interactants and the immediate context provide considerable support to the communicative act. When the child first encounters print there is also likely to be support from the context, so that the print on food containers and restaurant logos, for example, can be interpreted from situational cues with minimal input from the graphic display. However the more rigorous demands made by the school are likely to bring about further development of metalinguistic abilities. As Yaden and Templeton point out (1986), interaction with writing may contribute to the development of metalinguistic awareness because it freezes aspects of speech in the new visual medium, thus creating a second order of symbolism which the reader must learn to separate from the first order symbolism of speech. Because print is static it becomes more likely that the child will be able to reflect consciously on it.

Mattingly (1972, 1984) argued that written language places demands on the reader's grammatical knowledge, accessing of which is essential for neophyte readers. As we have seen, he regarded this capability as a form of linguistic awareness. The essential point at issue is how far such awareness is a prerequisite for reading competence, or whether the relationship is an interactive one. Mattingly also held that reading was not parallel to listening, and argued that reading was much more deliberately acquired and was essentially a language based skill that depended on users' awareness of their own linguistic activity. Ehri (1979) pointed out that there are several possibilities for the awareness/reading relationship: awareness can be a prerequisite, so that progress without it is impossible; a facilitator, in which progress is faster with it; a consequence, whereby it is irrelevant to progress; or a correlate of reading achievement, emerging independently but directly related through a common source.

Downing (1979) refers to his work with the Technical Language of Literacy Test, which examines the featural concepts of reading. He points out that it correlated highly with reading readiness tests. Evans, Taylor and Blum (1979) also obtained high correlations between a battery of tests that examined children's featural understanding and their reading achievement. Hall (1976) too, found a significant correlation between children's abilities to segment print and their early reading progress. This correlation also held for the number of terms spent at school. Both Liberman (1973) and Helfgott (1976) studied children's ability to segment speech into phonemes and its relation to reading achievement. There were strong indications that children who performed well on these tasks were making better progress in reading. Similar results are reported by Zifcak (1981) and Treiman (1976). Gleitman and Rozin (1977) argued that to learn to read one must access phonological processes which normally operate at an unconscious level; however during instruction, it is claimed, these processes can be made conscious. However when a large scale trial of teaching reading based on their theory was carried out it was found that the procedures were no more effective than conventional instruction. As Singer (1984) points out, the hypothesis concerning access to phonological processes has not been confirmed and an alternative is that a precondition for reading is the ability to become aware. Ayers and Downing (1982) report a major study in which one of their subtests (testing featural concepts about print) was shown to be a strong predictor of reading achievement in grade one.

Phonemic awareness and its relation to reading development has been studied extensively. Lundberg, Frost and Peterson (1988) worked with preschoolers on the phonological patterns of language and found that there were significant improvements in segmentation skills which persisted for some years. Juel, Griffith and Gough (1986) found that phonemic awareness correlated highly with word recognition scores in first grade, while longitudinal studies have revealed relations between preschoolers' ability to detect phonemic similarities in words and reading ability four years later (Bradley & Bryant, 1983). A substantial longitudinal study of children's awareness of reading examined phonemic awareness, graphic awareness, word reading and concepts of print

(Lomax & McGee, 1987). They found that there were dramatic gains in knowledge by about the age of four, with slower development later. They also argued that there was a developmental framework in which concepts about print and phonemic awareness played an important part in the later development of reading.

Thus we see indications of some relationship between metalinguistic awareness and ability and learning to read, although it seems that much of the evidence is correlational. Valtin (1984) does not accept the prerequisite hypothesis, after a lengthy review of these issues, and argues that phonemic awareness in particular is likely to be the result of learning to read. Goodman (1980) cautions that we must be careful not to draw instructional conclusions too readily from this correlationally based research, pointing out that the relationship is bound to be unclear; she also argues that it is possible that print awareness, understandings about writing and talking about written language all interact with metalinguistic awareness and then with reading development. The most appealing position to take here is to set up the relationship as a reciprocal or interactive one (Ehri's 'facilitator': 1979, 64). We conclude, with Ehri, that awareness is likely to interact with reading achievement, as a consequence of what occurs during learning to read and as a further stimulus to progress. Thus knowledge about print and the language of instruction result from and contribute to reading development (cf. Johns, 1980).

How then can we describe the framework for the development of metalinguistic abilities? Slobin (1978, 45) provides a pattern for development as movement 'from the dimly conscious or preconscious speech monitoring which underlies self-correction to the concentrated, analytic work of the linguist'. This shift in levels of consciousness is echoed in Chomsky's (1979) view, in contrast to Mattingly's paper (1984), that linguistic awareness does entail consciousness on the part of the speaker, resulting from the ability to reflect on language and view it objectively. The ability to reflect develops slowly in children, and it is far easier to raise linguistic consciousness in adults than it is in children' (pp. 1-2). There seems to be agreement that another important aspect of metalinguistic development is the ability to shift attention from the meaning of the text to the forms of language, linguistic knowledge about which grows in concert with this

ability (Ryan & Ledger, 1984). We have seen that Lomax and McGee (1987) have argued for print phonemic and awareness as prior requisites for later reading development. Hakes (1982) sums up most of the discussion by referring to early understanding of utterance acceptability, and the ability of young children to repair and monitor speech spontaneously, and a growing awareness of phonology and grammatical patterns that is still emerging in school age children. He describes the endpoint of development as:

"an adult who, in addition to being able to produce and understand an enormous variety of utterances easily and automatically, is also able to interrupt such normal, everyday activities to focus attention and reflect deliberately upon a variety of properties of language per se." (p. 177)

The same author (1980) concludes that older children differ from the younger in several ways: first in terms of their awareness, which is more deliberate and less spontaneous; next, with regard to the frequency of experience of metalinguistic awareness; and finally, with respect to the variety of metalinguistic abilities. Tunmer and Herriman (1984) discuss three possible global models of metalinguistic development. The first proposes that it develops concurrently with language itself (cf. Clark, 1978), a view that conflicts with the observed major differences in metalinguistic development by school age, particularly bearing in mind that differences in language development itself are nowhere near as pronounced. The second states that metalinguistic development becomes most pronounced in middle childhood, along with more general information processing skill (cf. Karmiloff-Smith, 1979); this is the view they are inclined to accept as most likely. The third position holds that metalinguistic awareness develops after entry to school and is largely the result of learning to read (cf. Donaldson, 1978). Finally, they refer to the many studies we have already reviewed that indicate high levels of metalinguistic functioning in proficient readers, but point out that correlational evidence only suggests that such capacities are necessary, but not sufficient, for reading

achievement. There is therefore good reason why such awareness is a prerequisite for learning to read, since this is still consistent with the possibility that reading instruction increases metalinguistic awareness.

Finally, Bowie (1988) sets out a general pathway for the acquisition of metalinguistic functioning. The earliest manifestation seems to occur in speech monitoring processes, with repairs focussing on phonemic form, and possible inputs into general language development. Language play may also be facilitative of development. With increasing age greater control over metalinguistic functioning takes place, and thus speech segmentation becomes possible, so that by the age of four children can manage relatively decontextualised tasks in a principled way. Bowie concludes with a call for more data on spontaneous - presumably non-experimental- metalinguistic functioning, so as to clarify the importance and contribution of metalinguistic functioning in children.

The main issues that emerge from this review appear to be:

1. Metalinguistic behaviour occurs as part of language development in the preschool and early school years.
2. It consists in an ability to focus deliberately on the language code and to control its operations.
3. There is an important relationship between metalinguistic functioning and reading skill; this is probably a reciprocal one.
4. It is likely that interaction with written language is an important milestone in metalinguistic development.
5. It is readily apparent that these principles and issues sit comfortably within the framework of metacognition that we have already reviewed, namely, that both processes consist of knowledge and control over cognitive processes. Thus metalinguistic functioning is a special case of metacognition, operating within the language domain.

Metacognitive and metalinguistic processes applied to reading.

As Paris, Wasik and van der Westhuizen (1988) point out, between 1980 and 1987 more than 200 articles were written on the relation between metacognition and

reading. Many of these were conceptual papers or suggestions to teachers about teaching methods, but less than half dealt with the empirical issues we have been canvassing here. It is clearly important to examine empirically this important relationship, within the framework of an increasingly widely accepted view of the importance of metacognition in reading (Niemi, 1990; Resnick, 1986).

The approach to reading we therefore take is to view it as a cognitive process, a problem solving activity (with language as the domain) that is a form of information processing (Olshavsky, 1976; Kolars, 1970). The readers' task is to construct meaning from written language, and to do this they must take into account visual and non-visual information that is both linguistic and paralinguistic, by transacting with both the text and the developing meaning (Goodman, 1984). A language-based model of reading, a 'psycholinguistic guessing game' as Goodman describes it (Goodman, 1976), puts an emphasis on the reader's cognitive abilities and on their language capabilities. As the goal of reading is comprehension, the construction of meaning, the reader must use appropriate strategies to reach this goal. The demands made on the reader to control the language system during this task add another dimension to the processing. Typically such strategies involve: sampling and selecting from the text, choosing relevant data and ignoring what is not needed or is redundant; predicting and inferring, at varying levels of confidence, with implicit and explicit information that is the norm in natural language; confirming or disconfirming, according to the information received through self-monitoring; and finally, correcting, where the reader becomes aware of a comprehension problem and acts to recover meaning. The language system also makes demands on the reader, so that the cognitive strategies interface with the typical strata of language, called by Goodman the cueing systems (Goodman, 1969). The graphophonic system (ie., graphic, phonological and phonic), the syntactic (grammatical) system and the semantic system provide the cues from which the reader processes meaning. The studies that use these principles have characteristically examined good and poor readers' errors or miscues, and their self-corrections, and have found that the miscues ie., any deviations from the expected response, provide important information about the reading process.

The miscues reveal the strategies that are being used and the effectiveness with which the reader is processing while reading. The different use of graphic and phonic cues and the syntactic and semantic acceptability of the miscues have been examined qualitatively (for a useful review, see Gollasch, 1982).

What makes models of reading such as Goodman's particularly relevant to this study is that they provide for the metacognitive processes that we have detailed. In particular they allow for the notion of monitoring during the process described above as 'confirming', and postulate that the reader becomes aware of a comprehension problem at the point of confirming or disconfirming. Both Goodman (1981) and Clay (1973) have pointed out that the ability to self-correct is an important part of the repertoire of good readers that is lacking in less proficient readers. It must be noted that Goodman's position is a qualified one in that he distinguishes between necessary and unnecessary corrections. The former are corrections of unacceptable miscues (ie., deviations from the expected meaning), which detract from the meaning being built up by the reader, while the latter are corrections of miscues which make no substantial difference semantically. Nevertheless he agrees that the ability to correct is an important part of the reading process that reveals a good deal about the reader's perceptions of the task and general proficiency. Rousch and Cambourne (1979) also found that better readers were much more likely to correct miscues where the meaning was most seriously distorted, whereas the less proficient were far less sensitive to semantic aspects and tended to be locked in by graphic and phonic considerations. This type of study, while not investigating metacognitive processes directly provides an insight into the problem. It ought to be possible to utilise better the indirect information about metacognition through the Goodman Taxonomy of Reading Miscues (Gollasch, 1982) in order to focus on correction behaviour and reveal more adequately what monitoring behaviour is taking place in the reader. The Taxonomy has four correction categories: 1. where the miscue is successfully corrected, 2. where the reader fails to correct, 3. the abandonment of a successful correction and 4., an unsuccessful attempt to correct.

It is important to note that a significant aspect of the taxonomy is to be found in the notion of the semantic acceptability of a miscue, a criterion which will have an important effect on the interpretation of any correction. Semantic acceptability must be understood in the context of the interaction between texts and readers, which itself can be viewed as a transaction (Rosenblatt, 1978) in which participants make their own contribution and have their own concerns and interests that affect their part in the activity. The present study is focussed on the reader's side of the reading transaction with a concern for the description of metacognitive processing that may be involved in the transaction. There is a need for more research on the text side of the transaction, although recent work on stylistics using a functional, systemic model of language seems to carry with it the promise of a clear description of reading that will be compatible with Goodman's model (Halliday 1978, 1985).

The semantic acceptability of a miscue is not a notion that can be determined independently of the grammar of the language. Goodman has recognised this by insisting that semantic acceptability be made dependent on syntactic acceptability, in that a miscue cannot be scored for the former if it is not syntactically acceptable. In this sense Goodman's system relies on the important linguistic principle that the semantic structure of a text is related to its syntactic structure, although some non-TG theories (e.g. Halliday, 1985) would broaden the notion of syntactic structure to a lexico-grammatical stratum.

Semantic acceptability is determined by asking first whether the miscue can be construed as meaningful in any sense; it may, for instance, be a non-word, which cannot be accepted as semantically acceptable at all. If it is meaningful it can be judged according to the extent to which it is semantically consonant with the context, that is, the intra-textual context. The miscue taxonomy scores semantically acceptable readings according to the extent to which the miscue maintains the semantic structure of the text at varying levels, from the phrase (a sub-clause unit), the sentence (ie., the punctuated sentence, which may be either a clause or clause complex) or to the narrative as a whole. There seems to be a sense here of the text making its own context and therefore it is possible to

see the reader as demonstrating a concern for this unfolding text structure as a central task in reading. By using their world knowledge and awareness of language, readers are concerned with building up the semantic structure of the text as actualised potential, an instance of a path through the language system.

The reader is therefore relying on a pattern of semantic structure that is emerging in the text as a result of the process Goodman describes. This pattern is not built up in a linear, uninterrupted fashion, however, because predictions are not always confirmed and so hypotheses must be revised in the light of incoming data. Inconsistencies in the semantic structure being built up can be detected by the monitoring mechanism that we are concerned with in this study. The monitor would have to deal with these inconsistencies, its fundamental task being to watch for inconsistencies in the reader's developing interpretation of the text, where an item fails to match up with the expectations derived from the predicting mechanism. Following the maxim that any change in the wording involves a change in the meaning, the monitor would be concerned to detect deviations and correct them.

The evidence from continuing miscue studies (Goodman, Watson & Burke, 1987) suggests that proficient readers correct unacceptable miscues more than the less proficient, but that they discriminate in the way that they do correct them. Thus we find that the more proficient do not always correct, but are more likely to do so when the miscue is unacceptable at the text level. They appear, therefore to be rethinking the comprehension problem as they go on, gathering new information and reconstructing meanings along the way. Other studies (Allen & Watson, 1976) have shown that some proficient readers make 'silent corrections', by ignoring a semantically unacceptable miscue initially but showing later in the reading that they have corrected by producing a reading that corresponds to the text. Thus failure to correct may be due to inability to use the cueing systems effectively or because the reader believes that the miscue they have produced is an adequate one.

As with Goodman's model of reading, other studies of oral reading are important sources of evidence for the monitoring of reading (Clay, 1972; Isakson & Miller, 1976;

Kavale & Schreiner, 1979). Clay's work follows similar lines to that of Goodman, and has shown that young, less proficient readers make more errors and correct less. Weber (1970a) also studied oral reading errors and found that weaker readers corrected both grammatical and ungrammatical errors in fairly equal amounts, while the better readers were more likely to correct only the ungrammatical errors. He therefore concluded, in support of Goodman, that the less proficient reader fails to use grammatical information as well as the better reader. However it must be noted that poorer readers may be even more seriously handicapped, because they may not be able to repair an error despite being aware that they have made one. Thus Beebe (1980), Isakson and Miller (1976) and Kavale and Schreiner (1979) all found that substitutions used by weaker readers in the course of reading were often inappropriate ones.

Nevertheless, it must be noted that there is not strong agreement about general trends emerging from oral reading studies. Leu's (1982) summary of oral reading studies highlights the differences by pointing out that while one group of studies (e.g. Goodman, 1973; Smith, 1971) argue that better readers use contextual information more and graphic information less (conversely with the less proficient), there is another group of studies that proposes that better readers:

"...use equal or less amounts of contextual information compared to less proficient readers (Allington & Strange, 1977; Biemiller, 1970; Cohen, 1974-75; Juel, 1980; Stanovich, 1980; Weber, 1970a, 1970b)...[and] proficient readers use equal or greater amounts of graphic information when compared to less proficient readers (Allington & Strange, 1977; Biemiller, 1970; E. Burke, 1976; Clay, 1968; Cohen, 1974-75; Weber, 1970a, 1970b)." (Leu, 1982, 424)

The point of contention here concerns the value of contextual as against graphic information in proficient oral reading. The issue does not seem to be resolved at present. Leu (1982) points out that text type and level of difficulty are treated differently or not at all in many studies. Where text difficulty has been examined it appears that poorer readers tend to increase their use of phonic cues as difficulty level rises (Goodman & Burke, 1973). Blaxall and Willows (1984) found that syntactically and semantically acceptable errors decreased as text difficulty increased, and that the less proficient readers showed less change in their utilisation of differing strategies as they encountered more difficult text. This suggests that they are less flexible in their ability to change strategies as the material becomes more difficult to read.

Oral reading, a common practice in schools as a means of evaluating reading, may make different processing demands on the reader to silent reading. It seems clear that it is necessary in oral reading to utter each word in serial order, by locating words in a mental lexicon and then using appropriate articulatory information to pronounce them, while at the same time meeting the comprehension demands that can only be met through attending to context (Danks et al, 1983). However the need to pronounce words satisfactorily seems to be an overriding consideration in oral reading that is not present in silent reading. As well, it seems readily apparent that silent reading is a skill that is functional in a wide range of contexts, well beyond the narrow evaluation activity of schooling. It must therefore be seen as fundamental to any study of monitoring in reading.

Danks et al (1983) found that all levels of text are processed by the reader while reading aloud. This finding, that word, sentence and text structure all play a part in oral reading, also supports the view that context plays an important part in reading. It is in contrast to the finding that oral reading (Danks & Hill, 1981) may force the reader to allocate fewer resources to comprehending and more to articulation, especially for beginning readers. Note also that in silent reading skilled readers may not access every word, especially very predictable ones (Danks & Hill, 1981; see Zola, 1979 for contrary evidence). We must also note that oral reading provides the reader with aural feedback which may be a source of monitoring not available in silent reading (Danks & Hill,

1981). Finally Goodman (Gollasch, 1982) points out that a single process underlies all reading, whatever the mode that is involved, and that the miscues found in oral reading have close parallels with cloze replacements that are non-identical with the original. He also points out that oral readers may be more conscious of their audience and therefore spend more time regressing to correct miscues already silently corrected and generally take fewer risks than they would when reading silently.

We conclude by once again raising the question of readers' ability to use appropriate strategies after they have discovered that they need to correct, or to attend more deliberately to print. We have already reviewed the work that has examined the strategies readers use when they become aware of a comprehension problem, and it would be as well now to sum up and to define more explicitly what is involved in the very notion of being strategic. As Paris (1983) has pointed out, a strategy is to be contrasted with a skill because it is intentional, effortful and deliberately selected as a means to an end - it is a skill made deliberate, involving an agent, action and a goal.

We have seen how a good deal of attention has been paid to rereading and error detection in this respect, but we have also noted strategies involving reading on, inference, hypothesising, adding information and using story level information. And of course the more general category of correcting must be considered here as well. What is apparent is that the ability to be aware of one's own state of comprehension ie., the construction of meaning through the text and context, and the ability to deploy appropriate strategies when such awareness prompts that a repair is needed, are clearly to be seen as part of metacognition as it is applied to reading. The knowledge factors that we have reviewed and the strategic capacities that are involved provide us with the basis for studying metacognition as it applies to both oral and silent reading within a developmental framework.

CHAPTER THREE

DESIGN

It will be recalled that the following were the research questions for the study:

1. Is there a pattern of development, from the early school years to adulthood, in metacognitive aspects of reading? How can this pattern be characterised?
2. What contribution does metacognition make to proficiency in reading?
3. What light does the data from this approach shed on the concept of metacognition itself?

Overview of design

An overview of the research design is first presented to summarise the way in which the study has been operationalised.

A small sample of forty readers, from five age levels (second, fourth, sixth, eighth grades and adults) was used to provide the data. The age levels constituted an age range that was chosen to provide data concerning question 1. Each age group was split two ways according to proficiency levels, as determined by the teacher. This was to ensure that question 2 could be answered.

The research procedures were developed within the framework of the problem solving model of cognition. They utilised an enquiry technique typical of cognition studies where the data were in the form of verbal reports of processing activity concerned with problem solving; in this study the problem task is the construction of meaning in reading. First, a procedure for collecting verbal reports was prepared. In this readers were interviewed while they were reading two short narrative texts, and were then asked to report about their own processing during an oral and a silent reading. The reader was asked to 'think aloud' during the task. In the case of the oral reading, this was done at the point where a correction was made, while the report was solicited five times during the course of the silent reading.

Next, a small scale pilot study was conducted to ensure that the readers in each age group were able to respond and that the recording procedures were adequate. It was found that there was a tendency for the response to focus on speculation about possible interpretations rather than on processing activity. This resulted in some changes to the

procedures, by ensuring that the question asked of the readers was limited to their processing activity.

The protocols collected in the interviews were transcribed and coded for their exchange structure to enable the development of analytic instruments, as outlined below, especially for this study. Exchanges were identified by the opening moves that the interviewer made in initiating discussion with the question about the readers' processing, and by the readers' making no further moves concerning the stretch of text under consideration. The corrections made during the oral reading were categorised in a Miscue Corrections Taxonomy that was derived from the various correction types used in the Goodman Miscue Taxonomy (Gollasch, 1982). The protocols that resulted from the interviews were examined for categories of response, and two new taxonomies developed from them. The first, a Think Aloud Taxonomy, was used for analysis of the strategic behaviour that emerged in the protocols. The second, a Metalinguistic Taxonomy, focussed on knowledge states concerning language applicable to reading. Both were checked independently for reliability, the first by a graduate student who was supplied with the criteria for allocation of responses to each taxonomical category and the second by an independent researcher provided with the same information (see further, p.108).

Subjects

The possible pattern of development being investigated in this study has been described as beginning from the 'early school years' (ch 1, p.8). To answer the first research question it was decided to select a cross-section of school aged readers and to include an adult group to represent mature readers. As the main concern was to examine the readers' ability to control their reading processes, it seemed essential that the youngest members of the sample should be capable of relatively independent text processing. For this reason it was decided to select the youngest readers from the second grade, where it was likely that there would be children who have mastered the requirements of reading to the extent that they could process some texts independently. It seemed likely that there

would be competent readers amongst such a group while there would also be those who were still acquiring reading competence.

So as to investigate the association between metacognitive ability and reading competence - research question two - it was decided to segment each age group to be studied into two according to reading proficiency and development. Such an intragroup division would make it possible to examine differences in metacognitive functioning between the proficiency groups.

With the selection of second grade as the developmental starting point of this sample the next step was to take groups from grades four and six, thus providing a significant representation from the primary age range, where it is most likely that there is a good deal of reading development taking place. Next, one group from the secondary school was selected, at grade eight level where, it was believed, there was still a possibility that some reading development could still take place. There has already been a concentration of studies of metacognition amongst this age group so there did not appear to be any reason to proliferate the study of this segment of the school population. The final group selected would have to be reasonably representative of mature reading ability. Adults from a university and nearby Technical College were asked to volunteer for the study, on the assumption that these two groups were likely to be significantly different in reading ability. The university group consisted of students enrolled in a Bachelor's degree in Education in the second year of their three year course. The Technical College students were enrolled in various vocational trade courses and were all voluntary participants in a learning centre that provides assistance to students experiencing difficulty with literacy or numeracy skills. Thus the university students may be expected to be proficient readers while the other adults were clearly defined as less proficient according to the criteria of the learning centre involved.

The groups at each school grade level were divided equally into two according to reading proficiency, with each of these groups being equally divided further by gender, although there was no assumption that this constituted a matching of boys and girls in each group in terms of reading ability. The question of the determination of reading

proficiency was decided by the use of teacher assessment of development. There is evidence that teachers possess a rich fund of information about their own students' development and that this information is at least as valid as information derived from standardised tests (Hoge & Butcher, 1984; Pedulla et al, 1980). For this reason teachers were asked to select students from the top and bottom thirds of their classes, in the case of the primary classes (which were themselves not grouped in terms of student ability). In the case of the secondary group students were placed in classes according to ability. Subjects were therefore selected by teachers from the middle class in the upper three classes of the form (the total population of the age group) and the middle class in the bottom three.

Since the readers were to be individually interviewed it was decided that a group of eight students from each age cohort would be used, giving a total of forty in the sample. It was anticipated that the individual interviews would generate rich and extensive data sufficient to provide adequate evidence for answers to the research questions. Any larger group would possibly have provided too much data to be manageable within the scope of this study. As we shall see this judgement proved to be an accurate one,

This sample was thus selected to be generally representative of good and poor readers of different levels of development within the educational system. The sample size was not sufficiently large to lead to findings that could be generalised widely, but was sufficient to provide a data base of some substance. Conclusions from this study can therefore only be applied to groups of similar background to those participating in this study.

Instruments

a. Verbal reports from oral and silent reading

Reading has been conceptualised in information processing terms as a problem solving task in this study, so it was appropriate to adopt as one research procedure a device for investigating cognitive processes that has emerged from the literature of problem solving studies in cognition. Newell and Simon (1972; cf. Neisser 1967)

developed an approach to problem solving within a cognitive framework in which the individual interacts with the task environment using strategies to achieve goals. The processes involved in such cognitive processing were examined using a verbal report procedure, typically involving subjects in problems arising from areas such as physics (Simon & Simon, 1978). These verbal reports generated protocols which were then analysed as evidence for the processing that was taking place at the time. Subjects were not asked to account for their responses but only to report them, as they proceeded with the task. This distinction is very important as it minimises the possibility that subjects will provide an interpretation of their responses, rather than a report of them.

This procedure must be sharply distinguished from those earlier studies where introspection was the procedure used. An example of the former is the classical study by Huey (1908) who presented subjects with words and asked for introspections about associations readers may have with these words. These readers were encouraged to theorise as they talked about the activities they were engaged in, rather than to limit themselves to reporting the processes they were using. As Nisbett and Wilson point out (1977), subjects can report processes but cannot provide explanations of how the individual produced these reports. The task of explaining these verbal reports is not given to the subject involved in the study but remains the responsibility of the researcher (Afflerbach & Johnston, 1984). This is an important distinction that is observed in the present study.

Following criticisms of verbal reports as a data source (Nisbett & Wilson, 1977; Cavanaugh & Perlmutter, 1982; Nisbett & Bellows, 1977; White, 1980; Kellogg 1982) there has been a review of their validity as data sources (Afflerbach & Johnston, 1984; Ericsson & Simon, 1984; cf. Zabrucky & Moore, 1989). Ericsson and Simon's major study has shown conclusively that it is possible to derive valid data from verbal reports. The reports are to be seen as verbal behaviour, and are to be accounted for like any other behaviour within the framework of an information processing model of human functioning. The central proposition is that verbal behaviour is to be understood within a general framework of cognitive structure and processes - 'a cognitive process can be seen

as a sequence of internal states successively transformed by a series of information processes' (Ericsson & Simon, 1984, 11), information being stored in several memories, either short term, where access is direct, or long term, where access is indirect, with information having to be retrieved before it is reported.

The issues that arise here are:

1. Does verbalisation affect task performance?
2. Are verbal reports necessarily incomplete?
3. How valid and reliable is this form of data?

The first problem can be resolved by attending to the characteristics of the task and of the types of instruction to verbalise. Where an experimenter asks for a report after the task has been carried out, as was the case in the present study, it will be important to note that recoding must take place before verbalisation. If the information was originally encoded in a nonverbal form, it will have to be recoded verbally for reporting to take place (Werner & Kaplan, 1963). It is important to avoid asking for motives and reasons, since bias is very evident in reports of this type (Wright, 1980). However if these problems are avoided then the information that the subject attends to remains in an intact form so that no extraneous information will be provided in the report. In this way the experimenter can ensure that verbalisation does not change the course or the structure of the processing. What must be borne in mind is the need to avoid telling the subject how to verbalise.

The second objection can be met by carefully delimiting the framework for reporting in relation to the task. It is clear that subjects cannot report the cues that are needed to recognise the stimuli in the task. What is attended to is the actual result of the process of recognition; this result can be reported, but not the intermediate steps in the process. Many of the criticisms of verbal reporting fail to make this distinction (e.g. Reber & Lewis, 1977; Smedslund, 1969). It is therefore argued that the information that is attended to during the task is the information that is reportable, with the information reported being that which is attended to. The objections to verbal reports do not address this model of reporting.

The last of the three issues concerns the matter of the objectivity and validity of the encoding process within the processing model. Three criteria have been set up to assess whether verbalisations are able to be used to infer underlying processing: relevance to the task, consistency with preceding verbalisations and a memory criterion, which assumes that sections of the information attended to during a task will be remembered (Ericsson & Simon, 1984, 173). Bearing these criteria in mind, it can be shown that perceptual information (e.g. Geiselman & Bellezza, 1977) and information that is retrieved (e.g. Newell & Simon, 1972) are verbalised in a form that is consistent with the subjects' responses to instances and are thus pertinent to the processes themselves. We can assume that high level encoding of verbal information is possible on the basis of fundamental information processing principles: that there is a sequence of information processes that are attended to during processing, that attending to information takes time, and that the number of symbols attended to and held in short term memory (STM) - itself of limited capacity and short duration - is highly constrained. There is ample evidence of long term memory (LTM) encodings and representations and the related limitations of STM (Miller, 1956; Ericsson, Chase & Falloon, 1980; Chase & Ericsson, 1981). Studies of predictions of response latencies (e.g. Hamilton & Sanford, 1978; Anders & Lillyquist, 1971) have shown that it is possible to predict the sequence of processes in given tasks, and this can be specified even where not all subjects use the same sequence of responses (Newell & Simon, 1972; Baylor, 1973). It is also possible to encode verbalisations on a more global basis, in terms of processing strategies employed (Egan & Grimes, 1979). It is clear that this evidence shows that verbal data is not merely data that is generated independently of the cognitive processes that produce nonverbal behaviours. Thinking aloud data, including retrospective reports (the type used in this study), are therefore highly relevant to and informative about individuals' processing of high level tasks.

It is important to make clear that there are some significant implications for research design from this discussion and review of verbal reports as a source of data. The considerations that are to be taken into account include:

1. using retrospective rather than continuous reporting, but keeping the reporting interval to a minimum, to avoid interference and memory effects, which are likely to induce a reader to report what they habitually do rather than what they were doing at the time;
2. using non-specific and bland questions when probing to avoid cueing effects;
3. emphasising to subjects that the task itself (in this case, reading the text) is the primary focus of attention, rather than the verbalisation; and
4. using other data to confirm the validity of conclusions drawn from the verbal reports.

Subject to these requirements verbal report data is likely to be particularly useful and appropriate for an investigation of the present problem. The information gained in this study is likely to be intuitively compelling and uniquely valuable in its insights into cognitive processes, because we have subjected the design of this study to all four requirements.

The assumptions on which the claim about the validity of verbal reports is based need to be made explicit, however. The basic assumption is that of the information processing model which underlies the notion of protocol analysis, namely, that a verbalisation is the reflection of information that is being attended to while held in short term memory. Thus verbal information is to be accounted for in the same way as any other behaviour, is as objective and valid as other data types, and is also subject to the same encoding and interpretative conditions. To support this assumption Ericsson and Simon's (1984) major review of the empirical evidence has shown that there is no evidence that verbalisation changes the course or structure of thought processes, and that reports (concurrent or retrospective) provide a nearly complete record of information that is heeded during any performance. They also indicated that the following more specific assumptions apply:

1. that vocalised information is a verbal encoding of information states corresponding to short term memory.
2. that verbalisations are initiated as cognitions are attended to.
3. that verbalisations are direct encodings of heeded thought.

They also found that concurrent reporting by readers produced serious incompleteness in the reports, with readers simply vocalising the text (Ericsson & Simon, 1984, 252). To overcome this problem the present study used retrospective reporting by allowing the readers to read silently large portions of text without interruption, and to question them at random intervals during the course of the reading. While other studies had used linguistic units, such as T-units or sentences (Olshavsky, 1976/77; Marr, 1983), to determine the time for reporting, there seems to be no reason why there should be any significance for reading in such markers, since these studies failed to produce results that varied according to the unit that was chosen. As well it is clear that interrupting a reader as often as every clause is likely to be highly disruptive of their processing activity. For these reasons it was decided to stop the silent reading for a report five times, at random, but ensuring that there were generally equal intervals between reports, with one report to be at the end of the reading.

It was also decided that verbal reports could be sought from readers who had read a text orally. Data gained from an oral reading could provide an alternative form of data to that gained from a silent reading, and could triangulate with other data from the silent reading. A report about comprehension after an oral reading had been completed was therefore sought. Since there is an extra processing load while reading orally - the reader must comprehend and also produce the oral output - it was decided not to interrupt the oral reading during its course. To avoid the problem of access to short term memory the oral reading would be videotaped and sections of the reading replayed to the reader with the text available as well. These replayed sections would contain those elements of the oral reading where the reader corrected a miscue and would be the target of the probes. It was assumed that corrections could be taken as signs of monitoring and remedying processing breakdown. We have already discussed the importance placed in miscue studies on the monitoring of reading and have shown how metacognition is inherent in this model of reading.

The analysis of these protocols would have to be based on a response classification scheme that was derived from the data itself. As Ericsson and Simon (1984,

312) point out, the task of analysis is to infer the information that was heeded (attended to) as input for the verbalisation that constitutes the report itself. To ensure access to this information it is important that the original coding should reflect as closely as possible the verbalised information, by extracting the coding categories and procedures from the protocols themselves. This would be done by ensuring that the coder did not make inferences about the protocols and that each coding was independent of the others. Thus the coding scheme should 'capture the units and structure of the verbalisation as directly as possible' (Ericsson & Simon, 1984, 309). The taxonomy developed in this way is described at the end of the section on data coding.

b. Oral (miscue) reading analysis

The further advantage, mentioned above, of an oral reading is that it will provide an alternative data source to the reports presented in the protocol material. Such a data source would also be used to triangulate on the research question. However it must be noted that there is no assumption that an oral reading necessarily constitutes the same process as a silent reading, since we have already pointed out (ch 2, p.56ff.) that there are likely to be different processing demands made during the course of an oral reading to those made during a silent reading. If we find that the data from the two sources provides evidence of similar strategies then we will be able to conclude that there is some underlying common process in reading.

Since the reader's corrections are likely to be indicators of some type of monitoring activity it is possible to infer from the correction types of the Goodman Miscue Taxonomy (Gollasch, 1982) what sort of monitoring activity is likely to be involved in each type of correction. Such a framework can then be used to code and analyse the corrections that the readers make and provide a means of examining trends in their monitoring of their own reading.

As we have pointed out (ch 2, Metacognitive and metalinguistic processes applied to reading) Goodman has referred to 'monitoring' in an incidental way in his discussion of the reading cycle. He postulated that it took place when a reader was engaged in 'confirming' the interpretation of the text after sampling of the text and predicting of

meaning had taken place. To confirm an interpretation a reader would have to consider whether the text items currently receiving attention were in tune with the meaning being built up from earlier portions of text; this seems to be the essential point of the predicting-confirming subroutine. To maintain some sort of equilibrium in this task the reader must exercise an executive control over the whole task through monitoring what is going on, as hypothetical interpretations are successively set up, tested and confirmed or disconfirmed.

It is in this sense, therefore, that the reader's correction activity appears to be an appropriate way in to an examination of the monitoring process during an oral reading. There is overt behaviour from which can be inferred the reader's concerns about the text's semantic structure at the particular point in the reading cycle where monitoring is most likely to be evident. Corrections have the great advantage of being spontaneous so that they cannot be seen as artifacts of the experimental task. In the Goodman Taxonomy there are four classes of correction: successful corrections, where the reader produces the expected item after having first miscued; non-corrections, which are miscues where no attempt at correction is made; attempted corrections, where the item produced does not match the expected item; and abandoned corrections, where the reader first successfully corrects and then replaces this correction with one that deviates from the text.

When these types of correction are set against the various categories of semantic acceptability inferences can be made about the likely monitoring processes that may be involved in the reader's processing repertoire. These have been set out in the Taxonomy for Miscue Corrections and consist of eight categories. Note that in these categories a reader's awareness and the associated use of a reading strategy are combined and cannot be considered separately.

FIGURE 1.
TAXONOMY FOR MISCUE CORRECTIONS

CORRECTION TYPE	SEMANTIC ACCEPTABILITY	COMPREHENSION MONITORING ACTIVITY BY THE READER
1. C	NO	Aware of comprehension problem. Uses effective strategies to get meaning where deviation is great.
2. C	YES(Text [b] or sentence[a])	Aware of problem. Uses effective strategies to minimise deviation from whole text by correcting at sentence level or below, thus showing awareness of global structure. May 'overcorrect' at text level, or be concerned with finer shades of meaning. Or reader may be dissatisfied with response.
3. N	NO	Unaware of problem, or has no strategy other than to not correct, or unable to use a strategy. May be aware of loss but is waiting for additional information before confirming or disconfirming, or chose not to correct because the problem had been resolved.
4. N	YES(Text [b]or sentence [a])	May be aware of need to construct meaning. Willing to accept variation from text either because miscue is considered insignificant, or because of a decision to ignore the miscue. May be unaware of miscue because prediction fits story context well.
5. A	NO	Aware but has no confidence in strategy where deviation is great. Or unaware of extent of deviation.

6.	A	YES	Aware, but lacks confidence in own strategy. Or considers miscue insignificant.
7.	U	NO	Aware, but strategy used is ineffective. Or lacks strategy.
8.	U	YES	Aware, but strategy used is ineffective. Or considers miscue insignificant, or is not satisfied with response.

Category 1 - Correction of semantically unacceptable miscue: aware of loss of meaning and able to produce alternative reading of text.

A correction at a point in the text where the semantic structure being built up has been called into question is clearly an indicator that the reader is aware of this problem in comprehension. The ability to self correct implies that the reader is sensitive to the emerging story line as well as to specific text items. There may be presumed to be some sort of monitoring routine that has been triggered by the failure of the predicted text to match the text as the reader is at the moment construing it. This inconsistency in meaning may be set up by the reader as a hypothesis that has not been confirmed. Essentially the reader may be described as having an awareness of the disconfirmation and the ability to deploy an appropriate strategy to generate the expected item which we hear as the correction.

Category 2a- Correction of miscue semantically acceptable at phrase or sentence level : aware of significant meaning loss at text level, able to use appropriate strategy.

Category 2b- Correction of miscue semantically acceptable at text level : aware of loss, over concerned with detail or concerned with fine shade of meaning, or dissatisfied with original response.

Miscues that are semantically acceptable are categorised according to the extent to which the meaning so constructed is consonant with the rest of the text. This is done by

accepting the meaning contained in the miscue and examining its implications within the semantic structure of the phrase and sentence in which it occurs, as well as in the whole text. It is quite common, particularly with younger and less proficient readers, for a miscue to be acceptable only at phrase or sentence level; at the level of the whole text, however, the meaning relations that are set up at the phrase or sentence level no longer apply due to the constraints of the much wider and fuller semantic structure. Thus the miscues that are semantically acceptable only at the lower levels indicate inadequate processing on the reader's part, because they have not taken into account the wider context. Therefore monitoring activity which can be inferred from correction of these must take the local/global distinction into account: correction at or below the sentence level implies that the reader is aware that the meaning that has been constructed in the miscue is only partly adequate when the broader text structure is taken into account, while correction at text level reveals a reader overly concerned with exactness or else one who is aware of fine differences in meaning, the shades of meaning that are possible in all interactions with text. Finally, it is possible that the reader is not satisfied with the production effort, even if it is the expected one, and has decided to correct with a view to establishing a better meaning relation. Note that this possibility applies to category 8 as well.

Category 3 - an uncorrected semantically unacceptable miscue : unaware of loss, or unable to use strategy, or aware but waiting for further confirmation

This category relies on the evidence of miscues that are semantically unacceptable and are uncorrected. We know that proficient readers tend to correct low quality miscues more than the less proficient, and also that the more proficient have fewer to correct (Goodman, Watson & Burke, 1987). They also do not always correct miscues because they consider them unimportant or else show in discussions retrospectively that they were perfectly aware of the miscue and had good reason not to correct. There is evidence that, when there are many unacceptable miscues located contiguously in a text, readers tend not to correct but to rethink the problem as they proceed with the reading, picking up further

information and refining meaning in the process. Another source of evidence for silent correction is to be found in retellings where it is found that the miscue has been reconsidered by the end of the reading (Goodman, Watson, Burke, 1987). It has been well substantiated that some proficient readers feel that correction at some points is not needed but instead make silent corrections as they read. Evidence for this comes from miscues which are initially uncorrected but are read correctly later in the text (Allen & Watson, 1976). Finally we must note the possibility that older readers, especially adults, may not correct or attempt to correct because they are not confident that the correction they have in mind is adequate and they are not willing to risk making an error publicly or to highlight a miscue by drawing attention to it through a correction.

Thus this category, although based on an overt behaviour (a semantically unacceptable miscue), does not carry with it a clear cut inference that the reader is unaware of the miscue simply because the miscue has not been corrected. The reader may either be unaware or aware but unable to use a strategy or deferring judgement while further evidence is collected from the text as they continue to read (see ch 2, Metacognitive and metalinguistic processes applied to reading). This bifurcation in the inferences to be drawn from category 3 means that it must be interpreted with caution insofar as evidence about awareness is concerned; the reader in these cases may or may not be aware, and a much more detailed analysis than this taxonomy can afford would have to be made to resolve this uncertainty.

Category 4a - an uncorrected miscue semantically acceptable at sentence level.

Category 4b - an uncorrected miscue semantically acceptable at text level.

This category refers to the possibility that readers *might* be aware (rather than a definite statement that they are aware) because it is possible that they realise the miscue is semantically acceptable and so do not see the need to correct it; alternatively they may be seen to be unaware of any semantic disturbance altogether.

The first sub-category here involves the more serious disturbance of semantic structure mentioned in category 3 where the miscue is only acceptable at sentence level or

below. Such a miscue might be taken to imply a lack of awareness on the reader's part that the miscue is only acceptable at sentence level, and thus indicates a failure to appreciate the whole structure of text.

Category 4b may be taken to indicate a reader's awareness that variations from the text level of the story are not significant, and that perhaps the reader decided to ignore the miscue for this reason. It is quite possible that the miscue has made a satisfactory fit with the overall context and so no correction has been made. While this is useful information about monitoring it is subject to the limitations that the reader is not necessarily aware of the need to correct at all. There is therefore an element of uncertainty applying to this category, as in category 3.

Category 5 - abandoning a correction of an unacceptable miscue.

When readers make successful corrections they occasionally retract them by immediately producing another attempt at correction which is not successful. This suggests that readers are aware of the miscues and are concerned to remedy them because of the serious semantic implications involved, but have no confidence in the particular strategy used or in the resultant corrections. Alternatively the readers may simply be unaware that the miscues are so serious.

Category 6 - abandoning a correction of an acceptable miscue.

This category has not been divided according to the level of text structure involved since there are so few examples of the category available in the data. It suggests that, while readers are aware of the comprehension problem they lack confidence in their strategies (more probably at sentence level or below) or, at the text level, simply consider the miscue to be unimportant, because it does not seriously disturb the semantic structure of the text as a whole.

Category 7 - an unsuccessful correction of a semantically unacceptable miscue.

A reader may produce a correction of this type of miscue but fail to generate the expected item in the text. In this case we may infer that the reader is aware of the problem in comprehension but does not possess an appropriate strategy to remedy it, or possibly lacks a strategy altogether. However the level of awareness here seems to be different from that in categories 1 and 2, and possibly 5 and 6, since the reader may be taken to be unaware of a failure. Thus we cannot be certain what it is that the reader actually knows in this case: there may be realisation that the miscue is unacceptable, but a decision is taken not to expend further processing effort on another correction on top of the unsuccessful one; alternatively the unsuccessful correction may be thought adequate.

Category 8- an unsuccessful correction of a semantically acceptable miscue.

Once again the small data base for this category means that it is impractical to subdivide it according to level of miscue. It involves the production of a correction which does not match the expected item in the text, where the miscue has itself been acceptable. In the case of sentence level miscues it can be inferred that the reader is aware of the problem in comprehension but does not possess or utilise an appropriate strategy; this is more significant for the reader's monitoring capabilities than a text level miscue where it may be inferred that the reader considers the miscue to be insignificant and so does not become too concerned at the lack of success of the correction. The caveat in category seven applies here also: the readers' awareness may not be so marked since they may not realise that they have been unsuccessful. In common with category 2 this category includes the possibility that the reader may not have been satisfied with the response even if it is the expected response.

There have been indications throughout this taxonomy that the strength of awareness in the reader appears to vary throughout these categories. Thus categories 3 and 4, although potentially useful as evidence of a heightened sense of awareness in the reader, are in fact weakened as data because of the problems associated with non-

correction already discussed. They must therefore be assigned a low place on any possible hierarchy.

Categories 7 and 8 as indicators of awareness are to some extent limited because of uncertainty about the reader's knowledge of the success or otherwise of the attempt at correction, so they may be placed a little lower. Category 5 must be qualified too because of the possibility that the reader is unaware of the seriousness of the miscue. This may not be such a serious weakening of the data, so perhaps category 5 may be placed higher in the hierarchy.

At the top of the hierarchy of awareness must therefore be categories 1, 2 and 6 where it has not been found necessary to qualify our ascription of awareness to the reader. These are the data sources which are the most likely to yield the most significant evidence for monitoring on the part of the reader.

FIGURE 2. HIERARCHY OF AWARENESS

1, 2 & 6.

5.

7 & 8.

3 & 4.

Finally it must be noted that there is a major problem in any procedure that draws inferences from negative data. It would be all too easy to conclude that failure to correct an unacceptable miscue is due to the reader being unaware of the miscue, or that the reader was unable to use an appropriate strategy or that the reader lacked a strategy

altogether to deal with the situation. However we cannot draw this conclusion with anything like the sort of certainty applying in 1 or 2, for in the former cases we had an example of the occurrence of a specific language behaviour, whereas here we have no overt behaviour at all. The reader may have made a silent correction, preferring not to express this orally, or may even be waiting for additional information from more of the text before making a decision about meaning. The essential point is that we do not have any overt behaviour on which to base this category, so the inferences mentioned here are operating at a further remove than those in all other categories. They are the least certain, and so conclusions drawn from the data here must be the most tentative of all in the taxonomy.

Data collection procedures

a. Preparation for collecting the verbal reports.

The usual form of question used to solicit verbal reports has been to ask subjects to discuss what they were thinking about as they carry out a task. We have mentioned that this can be a continuous process in the case of tasks where the reporting does not interfere with the task itself. However, since it was decided not to seek continuous reporting the question could only be asked at intervals, as already discussed. We may note here Ericsson and Simon's distinction (1984, 222ff.) between 'talking aloud' and 'thinking aloud'. The former refers to a report which says out loud what the respondent is saying silently. The latter, however, implies that the respondent will recode verbally before reporting. In this study we are therefore concerned with thinking aloud rather than talking aloud (cf. Meyers & Lytle, 1986).

The wording of the question to be asked of the readers would have to be carefully framed to ensure that it was understandable across the wide range of readers in the study. It would also have to indicate clearly that the response sought was based on the reader's processing of the text itself, within the context of an ecologically valid act of reading. It was therefore decided to ask all readers to read the text carefully by informing them that they would be asked to retell the text to the researcher after the reading was completed.

This was done to make it clear to the readers that they were to apply themselves to the meaning of the text. This would also ensure, where the text was read aloud, that they would not merely produce a well rendered oral reading. It was further decided not to use a training session to familiarise readers with the task, as it seemed likely that such training could bias responses (Afflerbach and Johnston, 1984). The readers were told to read the text with a view to retelling, and were informed that they would be asked to explain what they were doing to comprehend the text as the reading proceeded, or, in the case of the oral reading, at the end of the reading. The question was to be asked with reference to the section of the text just read, and was prefixed by a question that was designed to focus the reader's attention on any comprehension problem with that portion of the text. The first question was a general one about whether the reader was having difficulty with any part of that section of the text. If readers indicated that this was the case, they were asked to indicate where the problem lay in the text. They were then asked the key question. The initial form of the question to be asked of the readers was:

'What were you thinking about as you were reading that (difficult) part?' - in the case of
the silent reading,

or,

'What were you thinking about as you corrected that part?' - in the case of the oral
reading when the video of the correction was replayed.

b. Pilot study of the form of the question

As the framing of the question to elicit the verbal reports was critical to the success of the study a short pilot study was carried out with one second grade, two fourth grade, three sixth grade readers and one eighth grade reader to check the usefulness of this form of the question.

The youngest reader responded readily to the question after reading a portion of a short narrative text silently. He interpreted it as a request to give an interpretation of the text as it was unfolding, and provided highly embroidered accounts of what he considered the likely meaning of what he had read, often basing his imaginative

renderings on one or two details from the actual text itself. The older readers tended to respond by giving a summary of the plot that they had read, in some cases adding a discussion of particular sections of the text with which they were having difficulty, without explaining what the problem was.

As a result of these responses the main question was reframed:

'What were you doing (to resolve the difficulty) at that part?' in the case of the silent reading

or,

'What did you do to correct that part?' in the case of the oral reading when the video of the correction had been replayed.

It can be seen that the revised form of the question has shifted the emphasis to the processing activity in terms of a more specific action, rather than the mental state which seems to have occurred with the use of the expression 'thinking'. This form of the question was much more effective in eliciting responses that focussed on the readers' processing activity with reference to their own comprehension. While this form of the question was used as the main framework for the interview format, small variations inevitably occurred in the wording, particularly with the younger readers, as may be seen in the examples to be provided in section d. On occasion the readers were asked to report on what they were 'thinking about' but expressions such as 'what you were doing' or 'what you decided' were also used in each segment, and in all cases the interviewer ensured that the responses were being framed in terms of actions rather than states.

c. The texts read

One of the readings was to be an oral one, to be analysed in terms of its miscues and their correction, so it was decided to use a set of readings taken from the *Reading Miscue Inventory* (Goodman & Burke, 1972), *Readings for taping*. These texts were all fictional material, in narrative or fable form, without pictures, and were intended to be within the grasp of first to eighth grade readers. They were likely to be suitable for most of the readers in the school group. They were all complete texts that had not been

modified in any way for the purpose of research. They were graded for difficulty level with reference to grammar, vocabulary, length and the interests of the reader, and were short enough to be read in a single session by these readers. Those texts used were:

- *A day at home* (pp. 1 -2)
- *The old man, his son - and the donkey* (pp. 3 - 7)
- *The line down the middle of the room* (pp. 8 - 11)
- *Bill Evers and the Tigers* (pp. 12 - 15)
- *"War on Small Deer"* (pp.16 - 19)
- *Name of the tree* (pp. 20 - 24)
- *Space pet* (pp. 25 - 29)
- *Zoo doctor* (pp. 30 - 36)
- *Why the parrot repeats man's words* (pp. 37 - 42)
- *Anita's gift* (pp. 43 - 49)
- *First kill* (pp. 50 - 58)

For the more proficient sixth and eighth grade readers and the adults a number of texts were selected that were also fictional in type and capable of being read in a single session by older readers. Some of these were used for the silent reading. Any pictures were removed from these texts also. They included:

- From Ewers, J. K., *Modern Australian Short Stories : Young woman in a wimple; Trees can speak; The letter; High Maharajah*
- From Aaron, I. E., *et al, Reading Unlimited: The wild and free; The other inhabitant; I catch the bank robber*
- From Martin Jr., Bill & Brogan, P., *Sounds freedomring: The buck and the old man.*
- From Murdoch, W. & Drake-Brockman, H., *Australian Short Stories : John Price's bar of steel.*
- From Poe, Edgar Allan, *Tales of mystery and imagination :Ms found in a bottle*

For the silent reading by younger readers the following complete, short fictional texts were selected:

- From Bryning, F., *Journey into orbit*
- From Krok, L., *At the creek*
- From Blaxell, G. A., & Winch, G., *Reading Rigby: Bushfire*
- From Clymer, T., & Jones, V. W., *We like to laugh: The little boy with the big name* (These texts are reproduced in the Appendix.)

It should be noted that readability was assessed in this study using the following procedures. The oral reading texts were already available in the Reading Miscue Inventory, and matched to the known reader grade level. There was also a trial reading period in which it was possible to abort the reading if the text proved to be too difficult or too easy (see next section). Readability formulae were judged to be inadequate for the task of matching a text to a specific reader whose background was known, because it has been shown that these formulae are only adequate for the task of making general decisions about whole groups at the various grade levels (Rush, 1985; Klare, 1984). Fry's widely used formula in particular has been shown to be inadequate because of its reliance on lexico-syntactic measures (Goodrich, 1989). Goodrich shows that there are major weaknesses in Fry's view of what constitutes both a word, particularly a proper noun, and also what is a sentence. It is also not at all clear how Fry characterises what is representative about a passage that may be selected for analysis. One major problem lies in the assumption that meaning lies in a text irrespective of its reader. Goodrich concludes that 'as long as they [Fry's supporters] continue to calculate readability in terms of numbers of words, syllables and sentences, their capacity to assess or predict difficulties with any degree of adequacy, sensitivity and accuracy appears to be almost fortuitous' (1989, 119).

d. Collecting the protocols and the oral reading

The research sites consisted of a Wollongong city primary (elementary) school and its associated secondary schools (which were gender segregated), together with the University and Technical College. At the primary school, teachers were asked to select

the groups already described and to make each child available for interview in the school library. The researcher visited each classroom to collect each child and accompany them to the library, where a short session took place in which the task was explained, as follows:

- I have come from the University and am finding out how children learn to read at school. I would like you to help me today by doing some reading. It is not a test and the teacher won't be told about it.
- I want you to read a story out loud and I will tape it, and ask you to tell me as much as you can remember of it when you have finished. Then I will ask you some questions about it.
- Try your best, I won't be able to help you as you read, so just keep on if there is something you can't read. Is there anything you want to ask about this?

The child was then given a text to read aloud from the *Readings for Taping*, the level of the text being matched to the reader's grade level. If it was found that the reader was making too many miscues (more than twenty per hundred words) or long pauses, and/or showed behavioural indications of stress (such as long pauses, looking away from the text, looking at the researcher, repeated gross motor activity or making a verbal complaint) it was concluded that the text was too demanding and a substitute text at a lower level of readability was used. Where the reader made fewer than five miscues per hundred words the next level of text was substituted for the original.

This method of coping with the level of readability proved to be adequate. The most dramatic example of a mismatch was provided by an adult low proficiency reader, who was first presented with a short story *The letter*, but was found to be reading at about fifth grade level and actually read "*War on small deer!*". This reader indicated some embarrassment during this episode, by referring to some health problems with his throat, and implying that this would inhibit his ability to read aloud. In all other cases there were no difficulties with matching texts to readers.

During the oral reading the reader's corrections were noted with reference to the video recorder's counter. After the reading the reader was asked to retell the piece, and then was shown the corrections in the order that they were made during the reading. The text was opened to the place in question and the reader's attention drawn to it. Then the video segment for the correction was replayed to the reader. After this came the question, 'What were you doing there?'. The response was then tape recorded for later transcription. In all but one case the readers volunteered a response indicative of some monitoring activity. The only exception amongst the primary readers was a second grade reader selected for her high level of proficiency whose response in virtually all cases was to say 'I don't know'. She was replaced by another reader who provided a range of responses that were similar to other readers. In most cases this session lasted for about fifteen to twenty minutes, depending on the age of the reader.

The same procedure was used for the secondary and adult readers. The protocols in these cases were collected in classrooms not in use at the time, with the University readers' responses being collected in a university staff office. The reference to the teacher was omitted in the case of the adult readers, but each was invited to examine the results of the Miscue Analysis after the analysis was completed and a reading profile drawn up, so as to give them an indication of their reading proficiency.

In a second session carried out within a few weeks of the first the silent reading activity was carried out. The same rooms were used and the following explanation given:

- For this reading I want you to read the story silently to yourself.
Once again I will not be able to help you, so try your best.
- As we did before I will ask you to tell me all that you can remember of the story after you have read it. I will also stop you a few times to ask you some questions.

The reader's level of proficiency having already been established during the first reading, a short text at a similar level of difficulty was selected for the second, silent reading. Difficulty level was assessed with reference to the overall text structure of the narrative genre, and to the cultural or background knowledge implied in the vocabulary of

the text (Anderson & Freebody, 1985). This text was of the same genre, with no pictures and of approximately the same length. Readers were observed closely so as to monitor the amount of text read, and were interrupted randomly at four points during the reading. Each time they were asked to indicate the point in the text they had reached, and were then asked to retell that segment just read silently. They were then asked to report on their reading of that section. In most cases, readers provided a response spontaneously and freely. If this was not the case they were directed to an expression (a word or phrase) in that segment that seemed to be more difficult, and then asked if they had experienced any problems with that expression. In many cases this produced a response. If there was no further response the reader was directed to continue reading. The final response was sought at the end of the reading.

In many cases readers were probed after the initial response was provided. The probing took an open-ended form that built on the nature of the response already provided by the reader. Very commonly a reader was simply asked whether there was anything else that they had done at that point, and the probing continued until there was nothing further to report, as in the following example from an adult reader:

Interviewer: 'It was that bit there. Do you remember what you did?'

Reader [name]: 'Yes, I must have, as I said it, I realised that it was "when" rather than "wan".

I: 'So what happened then?'

R: 'I went back and said it again' (Rosemary, Miscue T A, adult, p.1,2)

A similar example is provided by a second grade reader:

I: 'Do you remember what you were doing when you worked that one out?'

R: 'I was trying to say the word and I just couldn't get the word right and I had another look at it and I said I don't know that word , I'd better just go on to the other part'

I: 'You started saying "which is" then you changed it and you said...'

R: 'Well, I saw that "which" was a far way from the first part, I looked down and then I just looked up again and then I saw "which" and I thought it was

the first part of the sentence, then I went, then I looked back and then I saw this other writing'

I: 'Oh, which other writing was that?'

R: 'Um, "now you'll"'

I: 'Right, so what did you decide then?'

R: 'That I should go back and read on' (Stefan,

Miscue T A, second grade, p. 1)

It can be seen that each segment is marked off quite clearly by the interviewer's question and then the response or responses, with the segment concluding with the final response from the reader that indicates the end of the segment, often by the falling tone of the speech or by the reader's indication that this was the last activity engaged in while reading.

In the silent reading protocols a similar approach was taken to the asking of the question and to follow up probing. There were no significant variations in the way readers responded to this phase of the study, and their responses were similar in quality to those from the oral reading. Some examples of the way in which this phase was conducted are set out below:

I: '...OK. What about this word up here - "the Australian Space Centre at...?"'

R: "'Woom-eeera'"

I: 'What happened to that? What did you do when you got to that?'

R: 'Oh, I just thought where Woom-eeera was.'

I: 'Oh, did you? OK. And what did you decide?'

R: 'Somewhere down the coast.'

I: 'Oh, I see. And was that all right? That seemed to be OK to you, did it? OK.

R: 'Or in...'

I: 'Somewhere else?'

R: 'Yes, Perth or something. Like that.'

I: 'Oh, I see. And that's where you thought it might be? Did you decide?'

R: 'Well, I don't know where it is, but I thought it would be down in Perth, or far away somewhere, in Adelaide or something.'

I: 'Oh, I see. OK. Why did you think it might be so far away?'

R: 'Because we don't have space stations down here, in Wollongong or Sydney.'

I: 'Oh, OK.'

R: 'And it's in Australia, so...'

I: 'Right.' (Joshua, T A, second grade, p.3,4)

A lower proficiency fourth grade reader provided the following example, where the response was actually volunteered at the end of the preceding segment:

R: '...and then there was that word, "Space borne"'

I: 'Oh. And what did you have to do when you got to that one?'

R: 'I had to see if I could figure it out'

I: 'I see. It's a pretty tough one, is it?'

R: [attempts to articulate the word quietly] "'Space". "borne" is "b-o-r-n", isn't it?'

I: 'Mmm'

R: 'And it's got an "e" on it, so it's "bornee" - "space-bornee" - whatever that means!'

I: 'So that's a pretty strange word, you think, do you?'

R: 'Yes. And then I found that I didn't know what "s -b" meant, until I read the rest of this and found out "space-bornee" - that's what it meant, "s-b".'

I: 'I see, OK.' (Mark, T A fourth grade, p.7,8)

Here we see that the reader is able to map out the report arising from his reading quite comprehensively, with the interviewer acting as a relatively neutral stimulus and prober to keep the report flowing.

The following lower proficiency sixth grade reader's report illustrates how the reader can be prompted to report after initially seeming to be uncertain:

I: 'Were there any other parts you had to think about, [name]?'

R: 'One more' [pause as reader searches text]

I: 'It wasn't this part around here, was it?'

R: 'Yes.'

I: 'It was that part? "Perhaps it was the..." Now that is an unusual word. What did you do when you got to that?'

R: "'Intution'"

I: "'Intution'". Right, and what did you do then?'

R: 'Well, I did more words and I got up to "tension", with an "e".

And I went back to "tution" and that bit "tution in the air". I thought...'

I: 'You thought it was a thought? All right.

R: 'Yeah. Imagination.

I: 'Oh, good. OK. Why did you think they were good words to get the meaning of that, [name]? Why did you think they fitted in?'

R: "'Tension in the air", and there.'

I: 'OK. Very good.' (Susan, T A, sixth grade, p.6)

There were no occasions during this phase of the study where readers showed any signs of misunderstanding or uncertainty with reference to the task requirements. In fact all readers in both phases of the study, with the one exception already mentioned, responded readily to the task and provided verbal reports with very little or no hesitation. This readiness to respond included a willingness on the part of several readers actually to comment on their own feelings with reference to the task of oral reading. Thus two eighth grade readers commented:

'I was a bit nervous, sort of shaky 'cause I'm not usually reading like that...having to read in front of all that...the tape recorder' (Dimetra, Miscue TA, p.1)

'Oh, I was feeling nervous at first and then I started getting knotted up with all the words and stuttering a bit' (Matthew, Miscue TA, p.2)

One adult reader commented in like vein:

'Well, if I was reading it out in some of the classes, I wouldn't correct meself' (Gianna, Miscue TA, adult, p.3)

Another adult reader (Paul, Miscue TA, p.1) reported that he was:

'trying to sound it out and then like, on the video, I was a bit nervous so I sort of tried to skip it',

referring to his actual reading behaviour as portrayed on the video replay. There were no other comments of this nature by other readers.

There seems to be little doubt that oral reading is a more stressful activity than silent reading in that it involves a display of the reader's ability that is observable and therefore open to the threat of assessment. These readers have indicated this and no doubt the same experience was undergone by other readers, particularly the older ones for whom the task of oral reading has not been recent and was likely to be associated with very early school experience. Thus we can conclude that the experience of reading and reporting was taken seriously and as a result produced some feeling of demand in at least some of the readers, although it is equally clear that this feeling did not inhibit them from responding at all.

The two questions asked of this diverse group of readers did not appear to be at all anomalous or inappropriate to their experience as readers in the contexts in which the data was collected. This quality of response to the task on the part of virtually all the sample suggests that the interview procedure was tapping in successfully to their processing and providing them with an opportunity to report validly on their experience as readers.

Data coding

a. Identifying the exchange structure of the protocols

The protocols gained from these interviews were in two forms. In the first, miscue-based protocols, the protocol began with the reader being asked to attend to the correction. Thus an adult reader was introduced to the question about a correction as follows:

I: 'I just want to know what you were thinking you were doing, how you actually tackled it when you came to it'. (Miscue TA, Rosemary, Adult, p.1)

This was taken to be the beginning of a segment in the exchange, and because this was the first correction it constituted the beginning of the whole protocol for this reader. Succeeding segments therefore began with a similar, though often shorter instruction, such as:

I: 'That one, just next to it (same protocol, p.1)

The reader then responded and, if necessary, probes were introduced to ensure that the report was as complete as possible, as explained above (3 d).

In the second type of protocol, those derived from the silent reading, the framework was determined by the pattern of interruptions and requests for a brief retelling and report on comprehension problems. The protocol segment thus began with an interviewer question such as:

I: 'OK, [name], now would you tell me where you're up to now?'

I. B.: 'There' [pointing]

I: 'There. OK. Now what's been in the story so far? What's happened in the story?'

I. B. : [retells story]

I: 'Right, that's very good, [name]. Now, tell me, were there any parts of that there, or on the other page, where you had to look at it especially and stop and think about the word or a part of it, to see what it meant? Any strange parts, or funny parts, or new words, or ...?'

I. B. : 'Yeah, um.' [reader then indicates section] (T A, Ian, second grade, p.1.)

Segments, or exchanges within the protocols, whether from the oral (miscue) or silent reading, were clearly marked off by the initial question and instructions from the interviewer followed by the response and, in most cases, the probes, and finished with the reader's final comments and/or the interviewer's final contribution to the exchange. Typical examples of final turns in the exchanges, marking off the end of segments, are:

Example 1

I: 'And what about the "Australian Space Centre ...", when you got to that word?'

A: 'No, I knew that, "Womeera", I just couldn't pronounce it' (T A, Amy, second grade, p. 1)

Example 2

I: 'So you had to slow down a bit, did you, when you got to that bit? Any other sections of it?'

K: 'No'. (T A, Kylie, eighth grade, p.1)

b. Transcription of protocols

The protocols were transcribed from tape using the following principles:

- i. Interviewer to be designated as B, reader to be designated by initial of first name.
- ii. Short pauses (up to three seconds) marked by ..., long pauses by a bracketed note to that effect.
- iii. Where identification of an expression is uncertain it is to be enclosed within parentheses and identified with a ?.
- iv. Double speech marks to be used to identify quotations from the texts read.

There were very few sections where the voice quality was so poor that the task of transcription was rendered problematic. In virtually all cases the recording levels were within acceptable parameters.

c. Coding the data from the Miscue Taxonomy

In the Miscue Taxonomy data coding was carried out by an examination of the frequencies of the various categories of correction types. For this purpose the shorter

version of the Goodman Miscue Taxonomy, the Reading Miscue Inventory (R. M. I) (Goodman & Burke, 1972) was used, because it provided sufficient information about corrections to enable frequency data to be obtained. Each reader's oral reading was analysed using the R. M. I. *Coding sheets*. The essential information provided by this coding system consisted of the correction type and the semantic acceptability of the miscue. This made it possible to extract from the coding sheets the four types of correction - successful, unsuccessful, uncorrected and abandoned, and to recategorise these into those that were concerned with semantically acceptable and unacceptable miscues. This final recategorisation provided the data for the various Miscue Corrections Taxonomy classifications.

d. Coding the verbal reports (Think alouds: TAs)

Data coding for the verbal report protocols was carried out by extracting the coding categories from the protocols themselves, a 'bootstrap' operation that was designed to avoid forcing responses into preexisting categories (Fareed, 1971). This allowed for responses that might be either common or idiosyncratic, and also left open the possibility that protocols that varied in their terminology might still be coded together since they could be shown to refer to similar processes of monitoring. No minima for category types were prescribed, because it seemed to be important that sensitivity to variety and difference in the response types be catered for. A basic principle for data coding was that the categories to be derived from the protocols should be in a form that reflects as closely as possible the protocols themselves. The segments we have already referred to were developed in this way so as to capture the units in the protocols as directly as possible.

The protocols were first examined for the exchange structure and segments already mentioned, and marked off and numbered, using a vertical line on the typescript to indicate the scope of the exchange. When the response classification categories were being developed it became clear that very many responses were expressed in a strategic form. Thus there were expressions like:

- 'I *looked back* to where I was going from' (Jennie, Miscue T A, second grade, p.1)

- 'I *kept on* reading the words' (Dean, Miscue T A, second grade)
- '... but when you get to a thing like that, *you look on*, just a line ahead or something...' (Matthew, Miscue T A, fourth grade, p.3)
- 'No, I just *separated it into syllables*, so I could read it better' (Eva, Miscue T A, sixth grade, p.1)
- 'I just tried to *put it as two words ... break it up* as two words' (Julie, Miscue T A, eighth grade, p.1)
- 'I tried to *pronounce it* - I knew there was sort of "six" "ous" something and I was trying to *pronounce out the pronunciation*' (Paul, Miscue T A, adult, p.1).

Note that these expressions are all indicative of strategic activity, where there is an indication of a means that is being carried out to achieve an end, the reconstruction of meaning from the act of reading. Note also that those examples quoted above are all from Miscue TAs. It was found, however, that the same strategic cast was evident in the silent reading TAs. Some examples are:

- 'I was thinking what it meant and I couldn't think what it meant and so *I just went on* to the next word. While I was reading there, I said ... I was trying to think what it was, but I can't' (Ian, T A, second grade, p.5)
- 'I stopped and *I sounded the word out*' (Cathryn, T A, fourth grade, p.1)
- 'I was reading it and *I went back again*' (Susan, T A, sixth grade, p.1)
- 'Oh, *I just read it about once or twice* and I thought, Oh I might as well just keep on going. And that's about it.' (Fahmiya, T A, eighth grade, p.1)
- 'I read it two times, you know, I went back to read it twice, and *I was trying to think what it ... you know, what it meant. It's got something to do with, um, a flame raced towards his face* - it's um ...' (Sylvia, T A, adult, p.4)

It became evident that the protocols derived from both the oral and the silent reading were capable of being coded in the same way, by reference to the strategic activity that was evident in virtually all protocols. In fact the strategic cast of the reports is highlighted when we note the few occasions when a reader reported that there was nothing to report - as in Ian, Second grade, p.3: 'I didn't do anything'. The fact that such

a young reader could both report at length on his own processing - here, in eight pages of typescript - and then feel free to mention that he was not engaging in any processing suggests very clearly that young readers are capable of accessing and reporting their own monitoring of reading and are not hindered by any developmental limitations.

Once it became evident that the reports were largely oriented to strategic aspects of monitoring in reading the protocols were examined for possible trends in the strategy types. The basic coding principles used were (1) to ensure that categories arising from the protocols were discrete and therefore not overlapping other categories and (2) that the coding criteria for each category were sufficient to clarify the decision making involved in assigning data from the protocols to that category.

The elements in the responses that were not regarded as relevant to any coding judgements were those where the reader simply paraphrased the text itself, as in the following example:

M: "'salaam". No, I thought that just meant "I suppose we could just ask him - just fly it until he came and that would satisfy him".

(Matthew, Silent TA, fourth grade)

Another important judgement that was made concerns those responses where the reader clearly indicates reporting of a habitual practice believed to be carried out regularly; this is to be distinguished from the type of report which indicates that the reader is referring to the processing believed to be carried out at the time of the interview. An example is:

I: 'Is there some other way, perhaps - if the sounding out doesn't work - that you use?'

P: 'Oh, usually, if you look it up in the dictionary, even sometimes if you can't pronounce the word and sometimes I don't even... I still can't pronounce the word that I've looked up...'

(Paul, Silent TA, Adult)

Here the reader is referring to an habitual practice rather than the actual processing that applied at the time of this reading event. Such responses were not coded as part of the analysis.

This constraint was applied to the coding procedure to ensure that the rubric laid down by Ericsson and Simon (1984) concerning retrospectivity was observed. Here we are concerned to ensure that readers are reporting as close to the target reading event as possible.

e. Categories resulting from the TA data

One of the earliest indications of an emerging category that could constitute a taxonomical classification was found with the large number of expressions referring to 'sounding out', 'pronouncing', 'syllables', 'splitting it up', 'spelling it out' and the various expressions for graphemes ('letters', 'parts', and named letters). These had in common the notion of decomposition, a concern for the analysis of expressions by referring to phonemic or graphemic attributes or criteria. Thus one second grade reader referred to 'acc-u-luration, and then you put it all into one word...' (Joshua, p.3) while Paul (Fourth grade, p.1) said 'I just took it to pieces' and Marilena (Sixth grade, p.2) reported that 'I tried to sound the word out'. Older readers mention 'you break it up into syllables' (Paige, Eighth grade, p.2), or 'I can sound out the syllables' (Paul, Adult, p.2). This category was summarised under the title *Sound out*, because *Sound out* was the most common of the expressions used to indicate the notion of decomposition.

Another category that emerged in the development of the coding instrument involved the reader's strategy of making inferences about the text by using logical deduction. Logical deduction functions on the basis of the reader's own world knowledge or language knowledge, operating on the internal or external context of the text. Thus Joshua (Second grade, p.1,2) uses his world knowledge when he says 'I thought it meant "stomach" ... and then you can't do this part - "you push your stomach up when you breathe in" ... it doesn't breathe, your lungs do'. Language knowledge is evident in the comment by Mark (Fourth grade, p.4) - 'I matched it up with the other words so it made sense' and context is implied in this report: 'You just kind of remember what you've read before so you can understand the next part' (Kathleen, Sixth grade p.1). An eighth grade reader (Fahmiyah, p. 2) worked out '...what a "45" was... 'cos they said

"pistols"', while an adult reader (Sylvia, p. 2) comments 'because it says "high speed" and that's sort of a flight'. This category was called *Inference* since the fundamental processing activity involved here seemed to include the essential notion of using one's judgement on the basis of world or language knowledge to deduce or infer a possible meaning.

The notion of rereading parts of the text emerged quite readily in the development of the coding. A second grade reader (Stefan, p.2) says 'Well, firstly I looked at the word and I thought I was going too fast, and I made an "in" instead of "on", and then, um, I thought that I should go back on to the word...'. Paul (Fourth grade, p.3) reports that 'I just kept on looking at it, trying to work it out', while Susan (Sixth grade, p.6) says that 'I did more words and I got up to "tension" with an "e". And I went back...' and Chris (Eighth grade, p. 1) reports: 'I just went back and read it over again'. Adult readers use similar expressions: 'Then I thought, I'd better read it again...' and 'I read it two times' (Sylvia, p. 1, 4). This category was called *Reread*.

There was one category of response that followed the interviewer's question and that occurred towards the end of a dialogue, after the reader had reported some effort to get meaning. Questions like: 'what did you do then?' (Jennie, second grade), 'And then what did you decide to do?' (David, second grade), 'So...did you stop or did you keep going?' (Mark fourth grade) inevitably are followed by the response, 'I just kept going', where the reader has decided that no more processing can usefully take place. Perhaps this sort of response was simply an artifact of the interview, for the reader was aware that there was an implicit expectation that the task required by the interviewer was expected to be completed. So when asked what did they do 'next' or 'then', a question that was designed to uncover any further processing on the part of the readers, they indicated that they were on task by reporting that they were continuing on with the reading. Such a report cannot be regarded as a reading strategy in the same sense as are the categories discussed so far, where there is a specific goal and plan of action to reach that goal.

However, there was a category of report couched in a genuinely strategic form, where the reader used an approach we might call 'reading on', to tackle and in most cases

to solve, the comprehension problem. The reader did this by searching the following section of the text to pick up more information from the context. There were only twenty-four instances, so they are listed in full:

Silent reading examples

1. Joshua, 2nd. (the first case where comprehension was not achieved)

'Then I keep going on.

What did you decide...about it?

I found it, I found out what it said, but I don't know what it means'

2. Jennie, 2nd.

'I decided it looked like ... "research"

What did you do then?

I read the rest of it'.

3. Kathryn, 4th.

'Oh. I thought about it and I read the paragraph right to the end and then I thought the word might have been "she was very thankful to him" because along here it says ... and that's why I thought she might have thanked him a lot and was wishing him luck and all that.'

4. Susan, 6th.

a. 'It was sort of like I knew and I didn't know it and so I just kept on going.

And then what did you do?

I decided to keep on going and then I was up to where he was ... and then I found out that ...'

b. 'Well I did more words and I got up to "tension", with an "e".

5. Kathleen, 6th.

'Did you have to think of ... anything...?'

Well, sort of. But then I read on and I could see a kind of ...

Did you? And you read on a bit further to check? Right.'

6. John, 6th.

'I just thought it meant ...

OK. What was it about those in particular ...?

Oh, I just kept going and it said, "drained of ..." and so on, and that meant there was ...'

7. Peter, 8th.

a. 'I didn't understand the word "cudgel".

What did you do when you decided you didn't understand it?

I just read on to see if I could...

To get some more? I see. OK. And ... did that help at all...?

A bit.

What was it that helped you?

I don't know. Probably the point of a spear or something with a sharpened end.'

b. 'What did you do when you got to that one?

I just read on just to find out what it was about.

OK. So you just went on? Did you go very far on...?

Yes, probably to the end of the paragraph.

8. Paul, Adult.

a. 'I sort of read on again and thought that I might be able to pick it up and I did, it was just the same sort of thing ... he was just expressing what sort of danger he was in.'

(The second response where there was no understanding)

b. 'I looked at it and I sort of even glanced back to here - the dark ... - and then I sort of read on a little bit further... '

c....I read straight through it and sort of reading through this other sentence

9. Liz, Adult.

'I read that twice, ... and then when I read on and realised that that's just the way he sees it ...'

10. Jackie, Adult.

'I just ... read over it again and read a bit further, just to gather what the author meant and just to pick up the general description of it'.

Oral reading examples

1. Mark, 4th.

'I thought it doesn't ... [make sense] so I read the whole line down and I thought it doesn't sound right ... and I went back ... and it was "since"'.
'

2. Matthew, 4th.

'Oh well, there was a new paragraph and they were getting on to a different thing...
'

So you were thinking about the new paragraph ...

No, well I was really thinking about the words, but ... but when you get to a thing like that you look on, just a line ahead or something, and then you just take a rest...'

3. Peter, 8th.

'I was just thinking I was making a mistake and I just ... went back, and then I went forward a bit to look what the sentence was going on and I must have skipped out "was" I think ...'

4. Diane, Adult.

a. 'I think I prelooked on ... because I read on .. I must have looked ahead or something.
'

b. It is not normal English and I thought the child might have said ...but then I read on I sort of realised that was ...'

5. Liz, Adult.

'I looked at that next word and then I sort of read the next line, more or less, to see what was going to follow, to see how it fitted.
'

You were actually reading on a fair way ...

About half of that sentence ...'

In all cases, these reports indicate clearly that the readers are reading on further into the text so as to clarify the comprehension problem, in some cases explicitly stating that they are doing so in order to seek further information and build up their grasp of the context. Thus the reports themselves cannot be regarded as mere artifacts of the interview. It also should be noted that this is a highly efficient strategy because it is based on the notion that the reader's task is one of building up progressively the schematic structure of the narrative, by setting up hypotheses and testing them against the data, and by being open to the new information that comes in with further searching through the text. It was decided to categorise these responses as *Read on*.

However there was another large class of responses which only occurred as a result of the interview situation and which should be seen as a secondary consequence of another, primary action on the part of the reader. Here the readers used a strategy, sometimes defined in the terms of the present taxonomy, and sometimes undefined (e.g., '... couldn't work it out', PD, 4th lower). They either (1) believed that they had succeeded and decided to go on, (2) felt they had failed and decided to proceed (the largest group), or (3) reported uncertainty, while there was also a small group of responses from which it cannot be concluded that they believed that they had succeeded or failed. In most cases, readers seemed to be indicating that they had done their best to deal with the problem, and so must read on. In all cases the action of reading on was simply the end product of the task at hand and a signal that they were prepared to resume the task that had been set them. Thus the first type of response is exemplified by:

'First I sounded it out ... take another breath ... Sounded each word.

What ... then?

Kept on reading.

You were happy with that? [nod] OK then.' (Theodore, 6th)

An example of the second is:

'I couldn't understand what it meant.

What did you decide to do then?

I just went on.' (Jennie, 2nd)

The third is shown in:

'And then what did you think?

'Oh, "searing", I don't know much about it so I just kept on going'. (Theodore, 6th).

'Oh I just read it and just kept on going.

And what did you decide...?

I don't know. I just kept on going'. (John, 6th).

I just went on but I wasn't sure of it.

You felt you hadn't got it completely worked out?

Yes.' (Sylvia, Adult)

Examples from the last group are:

'I just spelled it out a bit.

What happened then?

I just kept on going.' (Paul, 4th)

'I just said "gees". And then what did you do. I thought it must be about three "gees" now, and I just kept going on.' (Mark, 4th).

'... I couldn't really decide.

What did you do.

I just thought about it and just went on.' (Timothy, 4th).

'I just read it and just kept going.

What did you decide?

I don't know. I just kept going.' (John, 6th)

The totality of these responses is now presented, using the expressions of the readers, to demonstrate the unitariness of this category:

1. 'I kept on going/kept going on' - 19 instances

2. 'I just went on' - 18 instances
3. 'I kept on reading/reading on' - 12 instances
4. 'I had to go on' - 2 instances
5. 'I had to go past it'
6. 'I just skipped it' - 4 instances
7. 'I read on'
8. 'I just carried on'
9. 'I went straight through' - 4 instances

It seems necessary therefore not to include these three types of responses (1 to 3 above) in the category Read on of the taxonomy. Instead these other categories provide useful information about the monitoring of comprehension, particularly by the less proficient readers who tend to dominate here, and so can still be considered as part of the taxonomy. However, they are placed under another heading which we have called *Resume task*, so as to distinguish it clearly from Read on.

The category Resume task does have one other important characteristic: it is often reported as secondary to the operation of other reading strategies, whether explicitly reported or not, so that it only occasionally stands alone. It usually occurs in the data as the secondary result or end product of the functioning of another activity which is the one directly designed to bear on the comprehension task before the reader. In this sense it is a procedural strategy that is an indication that the reader is aware of the nature of the reading task and is proceeding with it to the best of their ability, according to the demands of the experimental situation.

The relation between the use of this strategy and success in comprehension can be seen from the following table, which summarises the data discussed above:

TABLE 1
RESUME TASK IN RELATION TO OTHER STRATEGIES

	Succeeded	Failed	Uncertain	Undetermined
<u>2nd</u>				
Lower		6		1
Upper	1	12		
<u>4th</u>				
Lower		1		3
Upper		1	1	
<u>6th</u>				
Lower	3	5	2	3
Upper		1	1	
<u>8th</u>				
Lower		6		1
Upper		1		
<u>Adult</u>				
Lower		9		
Upper	1			1
<hr style="border-top: 1px dashed black;"/>				
TOTALS	5	42	4	9

Note: only six of these cases came from the miscue responses, all but one such being where comprehension failed and the exception being one where uncertainty was reported.

One strategy that was rarely used involved statements by the readers to the effect that they were concerned with their state of comprehension and had decided to proceed on with the reading with the intention of clarifying the situation by examining more text. One

of the youngest readers to be aware of this strategy actually then disclaimed the use of it - 'It was on the page before. This one. That word, there. I thought about it and I was going to go on and come back to it, but I decided not to.' (Timothy, Fourth grade, p.4). This reader appreciated that this was a possible strategy, but claims not to have used it in this case. An older reader (Susan, Sixth grade, p.7) says that 'It was sort of like I knew it and I didn't know it, and so I kept on going. I decided to keep on going and when I was up to "he was to act as a decoy" then I go (unclear) and then I found out that "the male knew immediately"'. An eighth grade reader says 'I didn't understand the word "cudgel". I just read on to see if I could...['To get some more?' Nods in reply. 'What was it that helped you?'] I don't know. Probably the point of sharp (unclear) It reminds me of a spear or something with a sharp end'. An adult says '... I didn't know what that was. ... I just went on and I thought I might be able to pick up what it said by reading down here.' (Paul, , p.5), and another, in reference to the difficulty she was having says: 'I was. I looked at that next word and I then I sort of read the next line, more or less, to see what was going to follow, to see how it fitted...' (Liz, p.10). What is important to note here is that these responses include an indication that the reader is both aware of the comprehension problem being experienced and is deciding to move on into the text so as to remedy this problem, if possible, by seeking further information from it. The combination of two aspects of processing is what distinguishes this category from Read on. The category was called *Defer judgement*.

The final major category to emerge from the reports involved an indication by readers that they were aware they that were or were not comprehending. Thus a young reader (Joshua, Second grade, p.5) says 'I couldn't read it, ... I didn't know what it means, so I just went on', while Paul (Fourth grade, p.5) reports 'I got stuck a bit with that sentence...' while Amanda (Sixth grade. p.4) says 'But I still couldn't make out what it meant' and an Eighth grade reader (Matthew, p.2) says 'Oh, I didn't know what that meant either...'. A much fuller statement is provided by an Adult reader (Liz, p.4) - "'very just" seemed odd to me because I hadn't read ahead really, and then I sort of stopped myself because I realised that it was right', and '... I don't know why, I just read

it and then I thought, Oh, have I got that right...' (p.1). This category was called *Aware*, to indicate that the readers understood that they were focussing on an aspect of comprehension of the text, whether they were successful or otherwise. There is no way of determining from this data whether awareness in the readers is operating at a high level of consciousness as they read or whether the request for a report by the investigator provokes or stimulates awareness that is actually more covert. The widespread and almost universal ease with which these readers were able to report concerning their comprehension suggests only that there is awareness in reading, at whatever level it operates. What is meant by awareness and its relationship to consciousness is not dealt with very directly by this study, dependent as it is on readers' reports. The operational definition here arises from the reader's report: awareness is therefore defined as an explicit reference by the reader to the task of comprehending, or to difficulty or failure in comprehension, in their report.

There were a number of other categories that emerged from the protocols, as they were examined with a view to ensuring that all possible response types were categorised. It must be noted in this respect that there was an attempt to exhaust the categorisation of all strategic responses in the protocols. Thus there was noted a response type where the readers indicated that they were not inclined to apply themselves seriously to the task of getting meaning by interaction with the text. No young readers reported this approach, however; there was some use of this category by an eighth grade reader (Fahmiyah, p. 2,3), who said 'Well I read it and I thought - oh, I didn't really think what it was, so I kept on going - I didn't actually bother about it', and also comments 'I just read it - I didn't really bother about it'. An adult reader (Shirley, p.2) reported that '... I just sort of took it as saying - I didn't really know, and I didn't think it mattered'. These were the only appearances of this category, which was called *Don't bother*.

Another minor category that appeared was one where the reader made reference to guessing as a means of coming to terms with the text. Again this category was not used by younger readers, the first occurrence appearing in sixth grade readers. Thus Theodore (p.5) says 'I had a guess, "whimpering vary vaguely", and I said, Oh, it might be feeling

sorry for him, or something', and Craig (p.1) simply says, in reply to the question about what he do, 'Have a guess'. There were no other uses of this category, and it was labelled *Have a guess*.

The last category observed in the data consisted of a reference to the reader's not engaging in any activity at all. Here we have already referred to Ian (Second grade, p. 3) who says 'I didn't do anything'. An adult reader says 'It's just a blank in me mind at the moment' (Paul, p.1). These were the only examples of this type of response, which was called *Not thinking anything*.

Having outlined the way in which the categories of the think aloud protocols were determined, we list below the complete set of categories that constitute the Think Aloud Taxonomy that was used to analyse the protocols for frequency data concerning readers' metacognition.

TA Taxonomy statements

A - READ ON

Taxonomy statement: An indication is given that the reader has moved further on into the text beyond the target word/phrase, so as to clarify a comprehension difficulty, often with an indication of the point in the text to which they read on.

Elaboration: while this category bears some resemblance to I, 'Suspend judgement', it differs from it in that it does not involve the explicit expression of the decision to make a link between a concern about meaning being lost and the need to defer making a judgement. In the case of A the *observer* might infer that the reader has decided to suspend judgement while further text is examined, but category A does not contain an explicit reference to this on the part of the reader. The reader who uses this strategy is concerned to exploit the text's structure by searching it beyond the initial point where the comprehension problem first occurred so as to build up a fuller picture of its meaning. This is an efficient strategy because the reader uses it to develop a picture of the structure of the narrative on a broader scale. Both categories A and I refer to the reader's perception

of the need to read on, but I bases this decision on an expressed need to defer the decision about meaning while A merely expresses the decision to read on further into the text.

CATEGORY B : 'SOUND OUT'

Taxonomy statement: 'Reference to graphemes or phonemes (including letter names) or the expressions 'sound out', 'pronounce' or 'syllables'.

Elaboration: this is the only category that raises the issue of metalinguistic awareness. There is reference to the reader's awareness of language itself in that letter names, individual phonemes or graphemes or syllables are mentioned as part of the report. In this sense the category is unique. However it is still consistent with the main theme of this study in that the reports are all expressed in strategic terms and are not simply references to how the reader understands language itself as a phenomenon.

CATEGORY C : 'INFERENCE'

Taxonomy statement: 'Any indication of using logical judgement from prior knowledge or context (whether specific and local or general and at discourse level).

Elaboration: a more cognitively oriented category in which the reader makes a judgement whether context or prior knowledge are factors in getting to meaning. Prior knowledge refers to a context outside the particular text being read, the 'context of culture' and 'context of situation' in which meaning and the reader's meaning potential is embedded. Context here refers to the more specifically literary notion of context within the discourse, the degree of specificity or generality depending on the orientation of the reader, who may either operate within a fairly narrow and restricted portion of the text ie., within the span of a few words or with an eye to the whole schematic structure of the piece. The reader therefore makes a connection either between prior knowledge now considered relevant to the meaning being built up or makes a connection between portions of the text itself so as to illuminate the meaning of the target expression.

CATEGORY D: 'RE-READ'

Taxonomy statement: 'A reference to repetition in the act of reading so that the same section of text is read more than once.'

Elaboration: having decided that there is a difficulty in establishing meaning in a particular portion of the text the reader decides to reread it in an attempt to get clearer about the meaning.

CATEGORY E: 'HAVE A GUESS'

Taxonomy statement: 'A reference to guessing'

Elaboration: while this may at first be seen as a strategy where the reader predicts from world knowledge and language knowledge so as to build up semantic structure, close examination of the protocols shows that it is seen by the reader as an admission of defeat. There is an indication that the readers have failed to be accurate in their reading and that they see this category as an admission of this failure which to them is serious.

CATEGORY F: 'DON'T BOTHER'

Taxonomy statement: verbatim.

Elaboration: this category is connected with the level of task orientation of the reader. It is an indication that the reader is prepared to report honestly, since it shows that the relationship with the interviewer is positive enough to allow a candid observation to be made.

CATEGORY G: 'NOT THINKING ANYTHING'

Taxonomy statement: verbatim.

Elaboration: this is another expression of genuineness in response to the task by the readers, again showing willingness to be honest and candid in responding that they were not on task at the time.

CATEGORY H: 'RESUME TASK'

Taxonomy statement: Having made some attempt, successful or not, to clarify the problem, there is an indication of an intention to resume the task by continuing to read.

Elaboration: there is an indication that an attempt has been made to come to terms with a comprehension problem, sometimes by reference to a strategy defined in this taxonomy, or else undefined. Often an indication of success or otherwise is given and the reader finally reports that they have decided to resume the task. This category is secondary to the essential task of comprehension and indicates that the reader is on task and ready to continue, but does not carry with it any notion that the reader is exercising a strategy that will result in the furtherance of the task of reading.

It can readily be seen that the large majority of these responses categorised as H came from readers who showed in their response that they had not understood what they were reading, whether or not they reported another strategy that had been used. Characteristically this response is then made as an indication that readers had exhausted their repertoire of strategies and because they were on task, reported that they were left with only the choice of continuing with the reading activity - to 'just keep going'. Thus resuming the task in nearly all cases is the consequence of the reported attainment of success or failure in comprehension (which, for 70% of the cases means failure). This analysis shows clearly that such a strategy is qualitatively different from the preceding group (A to D) in that it is not geared directly to the task of comprehension. It is in this sense that it can be called a procedural strategy that is unique in the strategies revealed in this study.

CATEGORY I : DEFER JUDGEMENT

Taxonomy statement: A reference to the need to await further data from subsequent text.

Elaboration: This is the second of the two categories that bear directly on the question of awareness. In it readers indicate that they have decided to defer making a decision about meaning at a given point in the text in favour of continuing to read with a

view to gaining further information about the problem area from subsequent text. It differs from J because in it readers do not indicate that they are having difficulty in constructing meaning, but rather that they do not want to commit themselves to a certain construction of meaning that they had been building up as they were reading the text, because they are aware that this semantic pattern is not proving to be very adequate in the light of the particular portion they are focussing on at the time of the report. It is a strategy that links up directly with awareness because it shows that the reader is using prediction, which involves setting up broad hypotheses about the meaning being developed and then refining these as they are confirmed or disconfirmed. This is not simply a statement of awareness, as in J, but a linking of awareness about comprehension with a strategy, that of searching on through the text.

CATEGORY J : AWARENESS

Taxonomy statement: any reference to the fact that the reader is concerned with their ability to comprehend.

Elaboration: in this category readers reports indicated that they were aware that they were not comprehending, or were experiencing difficulty in getting meaning, or that they were successful in establishing meaning at a point where initially they were unsure about it. This category does not deal with readers' awareness of what could be done if they were unsure of meaning.

The Think Aloud Taxonomy is now presented in summary form:

FIGURE 3.
SUMMARY OF THINK ALOUD TAXONOMY

A. Read on

Any indication that the reader has moved further on into the text beyond the target word/phrase, often with a reference to the point in the text to which they had read on.

B. Sound out

Reference to graphemes or phonemes (including letter names) or the expressions 'sound out', 'pronounce' or 'syllables'.

C. Inference

Any indication of using logical judgement from prior knowledge or context (whether specific and local or general and at discourse level).

D. Re-read

A reference to repetition in the act of reading so that the same section of text is read more than once.

E. Have a guess

A reference to guessing.

F. Don't bother

Verbatim, or reference to it being of little consequence or not being treated seriously.

G. Not thinking anything

Verbatim

H. Resume task

Having made some attempt, successful or not, to clarify the problem, there is an indication of an intention to resume the task by continuing to read.

I. Suspend judgement

Reference to the need to await further data from subsequent text.

J. Awareness of loss of comprehension

Any reference to the fact that the reader is concerned with their ability to comprehend.

Checking the reliability of the TA taxonomy

All decisions to assign a response to a category were checked by a second rater who was provided with the taxonomy statements shown above in which the categories were defined and elaborated. The rater was asked to assign the marked exchanges in the protocols to one or more of the taxonomical categories by marking the appropriate taxonomy letter (A to J) on the protocol next to the relevant exchange. The number of agreements was divided by the number of disagreements in the case of each of the categories, and converted to a percentage (see Biemiller, 1970; Weber, 1970a).

The results of the reliability check are shown here:

A - Read on	98%
B - Sound out	90%
C. - Inference	87%
D - Reread	97%
E to G	100%
H - Resume task	86%
I - Suspend judgement	79%
J - Aware	92%

Most categories were coded with a high degree of reliability. In the case of I, Suspend judgement, we find that the figure drops below 80%. There is no doubt that this category is not easy to code and that there is probably some instability in the categorisation of this type of response. Because this was a relatively minor category (14 responses) it was decided to accept the somewhat lower level of reliability and to exercise some restraint in the interpretation of this particular category.

Metalinguistic categories in the TA protocols.

A number of TA protocols have some characteristics that differentiate them from the strategic cast that is distinctive of the majority of responses discussed so far. In most protocols there have also been found comments about the nature of language and text itself as well as (in most cases) the responses indicating readers' beliefs about their own processing of text. Thus there are comments both about language and responses that refer to the reader's own processing i.e., to strategic behaviour. The distinction to be found in those responses indicates an orientation of the respondent toward language itself as an object.

The responses from these readers appear throughout nearly all the protocols and were not explicitly sought in the interview, where the focus question was intended to elicit responses that would illuminate the readers' repertoire of strategic behaviours. However numerous references to both language and text were found scattered through the readers' responses. These references, being unsought by the investigator, may be seen as data less likely to be prone to the types of error that can apply to the responses that were more overtly and deliberately sought. In this sense they are highly significant and important evidence for reader awareness.

What we have here is evidence of a sense of awareness of language itself, using terms which are reflexive in that they are attempts to 'talk about talk'. References to language appear in the course of referring to processing of the text and explaining how it was being done where there was a difficulty with comprehension. While we have argued that these references were not explicitly sought by the interviewer and may therefore be

seen as incidental to the task of describing their own processing, they are presumably necessary to that task. The fact that readers themselves introduce these references into the discourse is significant. It indicates that they feel the need to refer to language as part of the task of processing. These references to language and text are therefore to be seen as part of these readers' perceptions of what is going on as they process text. It can be argued that this is a metalinguistic phenomenon. These readers were not asked to talk about talk and they do not behave like a pair of linguists talking shop. On the other hand, they are being more self conscious about language than would be expected in ordinary conversation. The context of course is a school and the interviewer an adult, teacher-like figure. The younger readers may therefore have seen the situation as akin to a classroom setting and behaved accordingly, while the adults may well have seen the interviewer as an authority figure - 'someone from the University' - and responded as though it was a school-like situation. At school they are used to some sort of highly attenuated talk about talk, in the context of learning to read, so perhaps this has resulted in the responses provided. Probably more important than this, however, is the influence of text itself. Written text, we have argued, has object-like characteristics so that it seems that the stimulus provided by these characteristics of written language might have resulted in these readers indicating their awareness of language itself, which now has been objectified and made more concrete in their experience. It has been driven up (the metaphor may not be the most apt) into consciousness and, as a result, these references emerge. What seems to be really important is that these readers freely and spontaneously associate such descriptions of language with the task of reading: for them language is now something that is more apparent in their experience and they experience a need to gloss language. We conclude that the framework in which these responses can be understood is metalinguistic.

Readers with metalinguistic awareness refer to language in two ways: first, by describing it using whatever descriptive terms are available to them, thus indicating their knowledge of language as a system where a language about language is involved. That is, there is an attempt at linguistic description. In the second, they refer to language more

indirectly by simply quoting from the text itself, thereby focussing on the structure of language, the output from the system - the text. On the protocols the first type is coded L1 and the second, L2.

a. Linguistic description (Type I)

The first type of response - describing language - is shown in its clearest form by one adult reader (Dianne, p.1) who refers entirely to language in the response:

'the way it's written where it's got little «sections» with all «commas» and things like that...there seemed to be «comma after comma after comma».'

These references to 'sections' and 'commas' are attempts to describe aspects of language, largely those that are relevant to the written mode. Sometimes the readers use conventional terms and at other times they improvise as best they can, but it is evident that their linguistic terminology is derived from the school's culture. They all show concern with language itself, the abstract system that underlies text (itself an instance of the system) and are attempting to describe it as best they can. This seems to be a quite well developed sense of awareness, the reader appearing to be able to see through the transparency of the actual text to the underlying system. In the case above, the reader never refers to her own processing, whereas in most other cases the reference to text itself appears in the context of the readers' references to their own processing.

b. Quoting from text (Type II)

The second type of response, to instances of language as text (ie., quotations) is exemplified by the following (JW, Second grade, p. 2):

'oh, I thought it said, "*having you multiplee*".

Here the reader is attending to the actual instantiation of the system in the text that stands before a reader. It is likely to be a more concrete and perhaps easily manageable aspect of language, because it is obviously observable to the reader.

The distinction between the two types of text reference (ie., metalinguistic) and processing reference (ie., strategic) is coded below: 1. by the use of underlining, to refer to processing on the part of the reader, 2. by the use of italics, to indicate a quotation

from the text itself, and 3. by the enclosures «», to indicate the use of a linguistic term used to describe language itself.

Category B (Sound out) of the TA taxonomy bears on this issue, but it has been more narrowly defined and linked much more closely with strategic activity in reading, where reading is perceived as the task of decoding the graphic display to sound. Thus with B the essential focus is on the reader's own processing activity and, since this processing activity is processing of language, inevitably there is some reference to language itself. It is not surprising to see some overlap between the two categories. It can be said that we are approaching the same phenomenon from two different directions; one the processing end, the other the language knowledge end. The difference is accounted for in orientation and focus of attention.

Some examples are here listed :

Miscue responses.

Second grade

JW, upper - "Well I thought I was seeing things and it looked like *there was an 'e'... the 't' wasn't there and there was an 'e' after it. I was seeing things.*"

SL, lower - "I thought it was 'cannot'... I thought, that wasn't «a word»."

Fourth grade

MW, upper - "Oh well, there was a new «paragraph» and they were getting to a different thing...a new «paragraph» 'cause it was getting on to a different «subject» in the story... I was really thinking about the «words» but when you get to a thing like that, you look on, just a «line» ahead or something..." [scored as 'read on']

Sixth grade

MP, lower - "I was trying to figure out what the «word» was... I was trying to put it in «syllables»." [scored as 'sound out']

AF, lower - "I crossed off the 'ness' and that made it '*conscious*' '*ness*'."

- "I was thinking that I've seen the «word» before."

Adult

DP, upper - "Because of the way its written where it's got little «sections» with all «commas» and things like that, yeah... there seemed to be «comma after comma after comma»."

- "Trying to get the «word» correct so I could fit it in somehow to have it make «sense». Because if I'd read 'pallable'... and left out the 'p' when I read on it wouldn't have made «sense»."

- "Maybe it was because it wasn't «English»... it's not «normal English»... and I thought the child might have said, '*carelessly speaking*'... but then... I realised that was «the way he spoke»."

LW, upper - "Because a lot of these «sentences» seem, you know, very long and they've got sort of bits - his thoughts- in it as well..."

Silent responses.

Fourth grade

MMcK, lower - "*It says, 'Testing, Jenny whispered to herself'* [text: "Testing!" Jenny whispered to herself.] I don't understand that one.

What did you do...?

I just told myself, that's «what they've got down here» so «it must be OK»."

Adult

DP, upper - "As you're reading it, you're looking for the «meaning» in it - like, if you were reading it aloud, you'd be trying to get expression into it, but because it's not aloud, you're sort of reading on, looking to link up «separate parts» all the time as they «make sense»."

PD, lower - "I read straight through it and sort of reading through this other «sentence» and just mainly sort of thinking that in a way they're trying to sort of trick me, but they're not because it's just the way it's «worded»."

c. Developing a taxonomy for the analysis of the language awareness responses Type I.

Examination of this first group of responses revealed that they were largely the types of description of language that derived from the culture of the school and to some extent from everyday life. "Word family" in particular is a good example of a description in use by Infants teachers. The predominance of terms used to describe words is typical of the model of language held by teachers, and of most people. So language is understood to be largely constituted with the word as the basic unit.

FIGURE 4.**SUMMARY OF LANGUAGE AWARENESS RESPONSES
TYPE I - LINGUISTIC DESCRIPTION.**

letters

capital letter

attempts at phonemic/morphemic analysis

word(s)

word family

name of a place

endings, end

this other writing

paragraph

line

sections

commas

sentences

what they've got down here

hyphen

page

term

expression

italics

printed

split word

syllables

way he spoke

pronunciation

sounds

vowels

way it's worded

English

to get the word correct

they've got sort of bits - his thoughts- in it as well

it must be OK

the meaning, sense, meant

expression

the context

the subject

way they sort of put it

phrase

other languages

usage

flow along ...easier

term

general description of it

text

story

parts

beginning

end

passage

context

way it's written

The individual categories that emerged were formulated by using the terms that the readers themselves used. Not all categories were linguistically distinct, however, so a

number were capable of being collapsed into a single category. This was mainly the case with the category 'word', which included the descriptions 'term', 'split word' and 'word family', and with the category 'letter', where the term 'letter' was used as well as attempts to describe phonemes or morphemes, either by sounding out ('ac-el-er-ash-un') or by naming the letters ('oh - double u'). The coding of occurrences of 'letter' was carried out by including all the descriptions mentioned above, while the discrete formulations for 'word' were scored separately. Not all categories were easily interpreted, however, and reference was made to the context provided by the interview and by the section of text that was being read at the time to decide on an interpretation of the more ambiguous categories.

When these expressions were examined in their own contexts in the reports it was found that they fell into a series of three categories focussing particularly on language understood in a hierarchical sense. This hierarchy had its basis in a conception of language consisting of very small sub-units that were constantly referred to, with larger and larger units emerging as the other components of the system. A larger unit can be seen as incorporating the smaller one immediately below it, although it is not being claimed that this notion of incorporation is necessarily held by the readers. Theirs is a rudimentary and linguistically unsophisticated model; at the base of the hierarchy is the word and its components, with the logic of the hierarchy to be seen in the movement from smaller to larger units, as set out in Figure 5, part I. These readers seem to see language from a perspective focussing on small parts, with larger and larger units building on. This is shown in this first section of Figure 5.

FIGURE 5

**A TAXONOMY FOR THE LANGUAGE AWARENESS RESPONSES -
TYPE I, LINGUISTIC DESCRIPTION**

**I LANGUAGE AS A HIERARCHY FROM MICRO TO MACRO
COMPONENTS.**

1. FOCUS ON THE WORD & ITS PARTS - SMALLEST COMPONENTS

Includes 'letter', reference to 'part' (of word) or attempts at phonemic or morphemic analysis of a word, 'syllables' and 'sounds' (of words), 'ending' and 'capital letter'; 'word', 'term', 'split word', 'word family', 'name of place', 'vowels' (in a word), 'pronunciation' (of a word), and 'this other writing' (referring to words).

2. FOCUS ON THE CLAUSE COMPLEX AND ITS PARTS - LARGER COMPONENTS

Includes 'phrase', 'expression' (referring to a phrase), 'sections', 'part' (of sentence), 'sentence', 'usage' (referring to grammatical organisation), and 'way they sort of put it', 'way it's written', 'way it's worded' (where speaker indicates a focus on grammatical organisation of the text).

3. FOCUS ON DISCOURSE AND ITS PARTS - LARGEST COMPONENTS

Includes 'part' (of 'story'), 'beginning' (of the text), 'passage', 'story', 'paragraph', 'context', 'subject' (seen as part of the 'story'), 'text' and 'dialogue' (contrasted with a section of text that is comprised of monologue).

II GRAPHIC ASPECTS OF LANGUAGE

Includes 'line', 'page', 'hyphen', 'commas', and 'italics'.

III BEYOND LANGUAGE - SEMANTICS AND STYLE

'Meaning', 'what it meant', 'sense', 'what they've got down here', 'bits' (referred to as his thoughts), 'general description of it' (in context of a reference to the meaning of the section being read).

'Not normal English' (in the context of discussing the flowery language of Victorian prose), 'foreign language' (Greek, French), 'the author', 'it seems to flow along' (in reference to the narrator's monologue in comparison to the previous dialogue).

The frequency of occurrence of each of these three major aspects of the responses was then calculated, with analysis carried out in more detail in respect of I.1, I.2 and I.3.

d. Analysis of language awareness responses Type II- quotations from the text

The second major grouping of responses where language is the focus of attention consists of the quotations made by the readers directly from the text itself. Here the readers provide a verbatim section of the text as a part of their response; the indication in the reader's response that there is an actual quotation is provided by intonation, or by direct reference to the text being read. For example, I. B. (2nd), in response to the question about the place in the text where he was having difficulties ("On the other page was it?"), says: 'Yes. When they were "all side by side on separate couches", that one'. This last phrase, 'that one', is a clear indicator of the fact that he is quoting, although throughout the protocols intonation itself has been sufficiently clear for the transcription to pick up quotations even in those cases where the reader has indicated a quotation.

The quotations were examined for any variations in their grammatical structure. Marked variations were found. The major criterion used was the ability of the reader to reproduce the text in a grammatical unit corresponding to that provided in the text read. The actual units used were examined with this in mind. A simple constituent structure model of grammar was used, consisting of single words (orthographic words, including hyphenated words such as 'space-borne'), phrases (a cluster around a head noun), clauses (in the Subject/Verb/Complement pattern, with at least one verb appearing), and clause complexes where at least two dependent and/or independent clauses are linked grammatically.

Examples of quotations of words are:

'...and I said I think there was such a word but it wasn't and so I just said

"couches" and went on to the rest' (I.B. 2nd)

'No, "approving" just means they could do it' (M. W., 4th)

'Well, I did more words, and I got up to "tension", with an "e". (S. G., 6th)

'Mostly that word 'tragicomedy'" (K. S., 8th)

'Actually it was the "proper" that threw me, because I thought "proper" and... ' (L. W., Adult)

Phrases were quoted in the following ways:

'Oh, I just go, start again, start the sentence again, and then I go "new acceleration in twenty five seconds"' (J. W., 2nd)

'I read the rest of the ... well, I sounded this out a bit and then "in twenty-five seconds acceleration", is it? (M. M., 4th)

'I still can't understand this bit, "more than the pup"' (T. V., 6th)

""of these two brushes"" (G.W., 8th)

'Or I read it, but I just got to "the useless salt water" and ...' (S. K., Adult)

An example of an incomplete phrase is:

'Yes, there's a word here: "a yellow..." (S.D., Adult)

Some examples of clauses are:

""prepare for nil gravity" - I was looking sharply at that' (I, B., 2nd)

'... down here this says, up here it says "We separate from the booster ship in twenty seconds" and that line helped me to get this word down here' (M.M., 4th)

'And I had to go back and where it says, "Her muscles were hard from long hunting expensions across her wide desert range"...' (S. G., 6th)

'I read it over a few times, and back here, when he said, "My absence at right tackle would have left no gaping hole in the line"...' (F. H., 8th)

'Um, "the silence had no expectancy", I think - I'm not sure' (S.D., Adult)

Incomplete clauses were less common"

'Yes, 'cause then I read, "The old man said...", then I quickly went back..."

(P. G., 4th)

'When I got to "accomplished nothing" I went back to "useless sacrifice of her life would have accomplished nothing"...' (S.G., 6th)

'There were more instances of clause complexes:

""She stopped as the man in the seat in front of Jenny turned around and spoke to them"" (J. W., 2nd)

'...and up here it says, "I still have to practise my cartwheel to get the jerkiness out of it, and the class is learning the whipturn as well"" (M.M., 4th)

""As they drove the mile or so back to the ranch house under the midday sun, the dry brush country stretched behind them, dreary and deserted"" (S. G., 6th)

'Er, I do understand it, but the sentence, "like a gopher, the bandit ducked down in the hole and tragi-comedy was galvanised", I didn't know what that meant' (K. S., 8th)

""He called and it was as if a tree had spoken". Maybe he was glad that he had some rescue or something' (S. D., Adult)

There was a much smaller number of incomplete clause complexes:

"Um, yes. "He pointed a heavy finger at the narrow roof which formed a di- ... " Oh, I couldn't pronounce it' (S.D., Adult)

""pieced", sort of "pierced", "canopy of branches and spangled out the shoulders with leaf patterns"" (P. R., Adult)

These patterns within the protocols were then examined for frequency and calculated according to type and their frequency in each grade.

vi. Checking the reliability of the language categories in the Type I taxonomy - Linguistic description

The development of the hierarchy itself was checked by asking an independent rater to check the allocation of the base categories (numbers 1 to 43 as set out below) into the framework provided by the three broad categories, and the subsections of three levels within the first of these. This was done by presenting the checker with a randomly ordered list of all 43 base categories together with one or more exemplary selections from the protocols so that the meaning of the base categories was clear, and discussing each category with the checker to ensure adequate understanding. The checker was then asked to consider how they considered the base categories could be grouped together into larger, superordinate groupings, for the purpose of data analysis. The instructions were open ended and left the checker complete freedom to operate, within the parameters already set up by the formulation of the base categories themselves.

The checker produced the following framework for analysis:

1. Terms dealing with sound.
2. Terms dealing with within word units.
3. Words
4. Within sentence terms.
5. Sentences.
6. Paragraphs and other units within the text.
7. Text.
8. Meaning.
9. Style.

What is interesting here is that the formulation proceeds from smallest to largest units in almost exactly the same fashion as that used in the original formulation. There is a very clear parallel in the development of a hierarchy which begins, in this case, with sound units, then moves to sub-word, word, sub-sentence, sentence (= 'clause'), through to larger text units in paragraphs and the text as a whole. Discussions with the

checker indicated that his conception of text was the same as that of many linguists, and corresponded to the present formulation, namely, a cohesive and semantically unitary stretch of language. Meaning and style were also described in conventional terms that corresponded to the formulation already propounded. This response would be almost identical to the present formulation if 1 to 3, 4 and 5, and 6 and 7 were each collapsed into a single category. Thus the considerable agreement with the present formulation constituted a substantial reliability check of the hierarchical framework.

FIGURE 6.

LIST OF READERS' CATEGORIES FOR LANGUAGE USED IN THE RELIABILITY CHECK.

1. **letters** - '...I didn't look at the last letter...' (SD, 2nd) and "I started by saying, 'I'll take off the *s* and I'll end up with *g* '" (PD, 4th). One reader (IB, 2nd) refers phonetically to 'ow' and then spells out, letter name by letter name, 'ow' and 'ou'; in another protocol he attempts an analysis of 'acceleration': "it's got 'ac' and then it's got 'celeration'. An adult reader, when discussing 'MS' (for manuscript) says: 'but I know it wasn't M - S because there was no dot between the *m* and the *s*...' (LW).

2. **capital letter** - 'Well I saw the *capital letter*...' (PG, 4th), in reference to the word 'Woomera'.

3. **this other writing** - 'Well I saw that "which" was a far way from the first part I looked down and then I just looked back up again and then I saw "which" and I thought it was the first part of the sentence then I went then I looked back and then I saw this other writing.' (S. D., 2nd)

4. **word(s)** - sometimes with the word involved being quoted e.g., "... just say it's that word... 'acceleration'" (I.B., 2nd), "...and then I found the word 'mystery'" (SG, 6th), "I put the word 'because' there" (VP, 8th), "I know the word 'relentlessly'" (RW, Adult).

5. **paragraph** - 'a new paragraph, they were getting on to a new thing'; 'a new paragraph because they were getting on to a new subject in the story' (M.W, 4th)

6. **line** - 'that third line, I didn't get that quite' (P.G. 4th)

7. **sections** - 'the way it's written, where it's got little sections with all commas and things like that' referring to: 'The System put under it's knife the material which, under other conditions, wielded as a sword against the nation's enemies, would have formed a general of inspired audacity, a leader of dauntless courage, and an administrator of unerring prescience.'" (L. W., Adult)

8. **commas** - see next above

9. **word family** - 'Cause we've had a word family - Words in Action book - and that's got these same endings, these word families in it and it's got 'ow' and 'ou' '[each letter named, not sounded]' (J. W., 2nd)

10. **sentences** - 'I read straight through that sentence as, "There was no hostility in his look"... '(PD, Adult); 'I started back to that sentence again' (GW, 8th); 'I just read it a couple of times - that sentence.' (JM, 6th); 'Well I looked at the word properly and I said to myself, that doesn't look like "picture" and then it sorta looked like the word "pocket" so I said "pocket" and it made the sentence right' (SD, 2nd).

11. **what they've got down here** - MM (4th) talks of 'what they've got down here', in the context of his failure to understand: 'Oh, I just told myself that's what they've got down here so it must be OK'.

12. **hyphen** - 'I think it was the hyphen thing, in the middle' (L. W., Adult)

13. **page** - '... and that was the last thing, on the last page' (IB, 2nd); 'so probably that was the man that turned around on the other page' (MM, 4th); 'oh, down at the bottom of page 50, the last paragraph' (MD, 8th).

14. **term** - a reader refers to 'term', in the context of discussing the expression 'lead' in 'heaving the lead' (LW, Adult) - 'It didn't mean anything to me until I read on, because I'd just not heard that term before and I was just wondering - you know, I was expecting it to be "heaving the..." - I don't know, something like rope or something like that...'

15. **expression** - an adult (LW) says: '...something that I knew and "heaving the lead" to me - I realise, that, you know, it's something to do with boating but it's not an expression I'm familiar with',

16. **italics** - 'umm... it's in italics' (CB, 4th)

17. **split word** - referring to 'split word', a reference to the breaking of a word at the line break: 'No, it's probably because it's a split word on the page, so you don't look at the whole word' (RW, Adult)

18. **parts** - of story : 'in the story, in the other parts'

- of word : 'Yes, well I said the first part first then I thought "no" was "a" [letter name], because I was looking at the same line.' (SD, 2nd).

- of sentence : 'that doesn't make sense with the next part of the sentence'

19. **written** - 'the way it's written where it's got little sections with all commas and things like that...there seemed to be comma after comma after comma' (D.S., Adult)

20. **syllables** - 'No, I just separated it, the word, into syllables, so I could read it better' (EH, 6th), and PD (8th) said what she did to a problem word - 'you break it up into syllables'.

21. **pronunciation** - 'What I was doing, I was trying to pronounce it, and I just couldn't get it out'(SW, Adult).

22. **sounds** - 'I was trying to figure out if I could sort of understand 'em, but I couldn't get the er, "instead of", that word and the other one. I couldn't understand imagining the sounds of "he heard", but I couldn't understand imagining the sounds of "he heard", but I couldn't' (TG, Adult)

23. **vowels** - 'and I was trying to pronounce out the pronunciation; I knew there was a certain amount of vowels in it' (PD, Adult)

24. **way it's worded** - "I read straight through it and sort of reading through this other sentence and just mainly sort of thinking that in a way they're trying to sort of trick me, but they're not because it's just the way it's worded'. (P. D., Adult)

25. **English** - 'no, but maybe it was because it wasn't Eng... it's not normal English... but when I read on I realised that was the way he spoke.' (DS, adult).

26. **bits**- 'I looked at that next word and I then I sort of read the next line more or less, to see what was going to follow to see how it fitted. Because a lot of these sentences seem, you know, very long and they've got sort of bits - his thoughts- in it as well, and you know some of them are a bit hard to work out exactly' (P. D.,Adult)

27. **the meaning, what it meant, sense** - 'When it said,"and their mother lay painting" I thought, "painting", I didn't know what it meant...' (AS, 2nd); 'I'm looking at the next word while I'm saying that one, and I missed it out, and it didn't make sense...' (EH, 6th); 'Well, this word, I didn't know the meaning of it' (JM, 8th); 'Yes, I was thinking the meaning was quite different to what it actually is...' (RW, adult)

28. **the context** - '...some words... I hadn't come across, where I tried to work out what they were in the context' (JI); '... I don't know the word, I've heard it before, but I don't really know what it means, but I just assume, by the context, that it means, you know, the sort of still but awesome scene...'

29. **way they sort of put it** - an eighth grade reader refers to a clause complex by quoting its beginning and end - ' from "Mr McKay " down to "parents"' - and then goes on to say that she was having problems not with any particular word (a question asked by the interviewer) but 'it was just the way they sort of put it'

30. **phrase** - A sixth grade reader says 'Oh, I didn't get that phrase either' (AF), referring in fact to a clause 'venison was our staple diet' ; an adult (JI), discussing "the fissured and perilous pavement" says: '... I remember seeing that phrase...'

31. **other languages** - RW mentions that there are Greek and French words in her piece: I was just trying to sound it out - "Veneezeelos", "Zeelos". I would say it's the only way to ...I wouldn't know how to pronounce it, it's a Greek word' ; 'That's just umm, I said *chateau*, I suppose it's a French word, but I didn't look at it, I mean it could have been *chateau*' ;; and JI says '...and a few of those seemed to be , oh, foreign words I hadn't come across'.

32. **usage** - 'I found that a bit funny, I think, "scanned the me" is a bit of an unusual usage'; 'I was going to say, "her elegance were now..." but I realised it was "elegances" rather than "elegance", because I think that's, I suppose that's a bit more

commonly used, to describe someone, her "elegance" rather than her "elegances", it's a bit sort of, a funny usage, and I expected "elegance", and it wouldn't have made sense, I'd read it, I'd noticed the "s-" on the end, and you couldn't have said "elegance were now angularized...", you would have had to have said "was", wouldn't you. (R. W., Adult)

33. **flow along ...easier** - 'but it's much easier to read and get the meaning and it seems to flow along a lot easier and you can sort of read it quickly and get the meaning'. (L.W., Adult)

34. **general description of it** - 'I... read over it again and read a bit further, just to gather what the author meant and just to pick up the general description of it' (P. D., Adult)

35. **text** - 'I corrected it. Instead of saying, I was going to say "I really didn't", instead of doing that I said "it didn't really", as it said in the text'; 'Yes, I saw the , I suppose I saw the meaning as one, then I realised that I'd said it the wrong way, it doesn't really mean the same thing, doesn't it. But then I just corrected it from the text.' (R. W., Adult)

36. **story** - 'because that's what they were calling him in the story in the other parts'; MM, says '... and just then I realised that Jenny was in the story and Jeff was in the story...'.

37. **subject** - 'I had to do a new paragraph because it was getting on to a new subject in the story' (M. W., 4th)

38. **beginning** - '...when I remembered the letter... the beginning of the story, I had to look back to see whose son it was from...' (D.S., Adult))

39. **end, endings** (of words) - 'but then there was no *le* on the end and there was a y' (JW, 2nd), and 'that's got these same endings...' (IB, 2nd),

40. **passage** - an adult reader (SD) who used 'passage' confirms that she reread about three quarters of a page, after she said that 'I started reading the passage again'.

41. **what they've got down here** - MM (4th) talks of 'what they've got down here', in the context of his failure to understand: 'Oh, I just told myself that's what they've got down here so it must be OK'.

42. **dialogue** - An adult (DS) refers to 'dialogue' with reference to the two major characters in her story: 'And it's got a lot of dialogue in it - most of it's of the two ladies and the man's just sort of in there...'.

43. **name of a place** - linked with 'capital letter', in a discussion of the target word "Woomera": 'Well, I saw the capital letter so I thought, well it must be the name of a place or something. Then I just thought of some places and then I just spelt it out.' (J. W., 2nd)

Analysis and use of statistics

In the present research, because the approach taken has been to connect a number of different studies across the areas of metacognition and reading, it was decided to use descriptive statistics as part of the analysis of data. The cell sizes that resulted in many cases made it impossible to use inferential statistics. Most data will therefore be presented in the form of percentages of readers' responses. As a result technical application and use of significance tests has been avoided. Therefore whenever the term 'significance' is used in the ensuing discussion of results it must not be taken in the technical, statistical sense, but should be equated generally and interchangeably with the expression 'importance'.

CHAPTER FOUR

RESULTS AND DISCUSSION

The results and discussion are presented in three parts, corresponding to the three main data sources of the study: the first derived from the oral reading corrections and based on the Miscue Corrections Taxonomy (Section I), the second arising from the strategic aspects of the protocols as interpreted by the Think Aloud Taxonomy (Section II) and the third arising from the metalinguistic dimension of the protocols and analysed according to the Metalinguistic Taxonomies, a language awareness response framework (Section III). The results and discussion are then summed up in Section IV. Before discussing these results we raise the issue of triangulation of the data from the various sources.

Triangulation of the data sources.

The sources of data for the study were chosen because they appeared to represent equally important and valid ways of tackling the problem of operationalising a study of metacognition and reading. Both sources, the Miscue reading and the TA protocols, have been used within a framework of a model of reading construed as a meaning-getting and hypothesis-testing process, taking the Goodman model as their basis. In the case of the TA material, the first data source, this was done by developing a research procedure derived from the problem solving literature in cognitive psychology but using whole, unaltered texts (some derived from the Goodman research) and minimising the interruptions to the natural flow of the reading. The interview question was developed in order to elicit a response in strategic terms to allow the possibility that results could be analysed within a general framework of reading strategies compatible with the model of strategic reading behaviour involved in Goodman's approach. However another data source also emerged from the TA protocols; this material was not strategically oriented but consisted of the language awareness responses which provide another insight into metacognition. The second data source, the Miscue material, was collected by means of a direct development from the standard taxonomy using the framework of corrections already available, and adding the inferred metacognitive activity so as to construct the

monitoring taxonomy to aid interpretation. Thus all the presuppositions of the underlying model were retained.

The two independent sources of data, mentioned above, bear on the same question, along with a third source, the metalinguistic material, derived from one of the major data bases. Taken separately each is likely to yield useful information, but the validity of the study will be greatly strengthened if it is found that the data from these various sources converges. This triangulation procedure has therefore provided a means for checking the validity of the major data types.

SECTION I - MISCUE TAXONOMY DATA ANALYSIS : RESULTS AND DISCUSSION.

The oral readings were analysed using the Goodman Taxonomy of Reading Miscues (Gollasch, 1982) by coding all miscues and extracting the four correction types according to category of semantic acceptability. Analysis of this material consisted of a frequency count that is set out in a series of percentage/frequency tables that have been constructed using the four correction types and the three categories of semantic acceptability. Correction types consisted of: corrected, not corrected, abandoned correction and unsuccessful correction, while semantic acceptability is judged in terms of phrase or sentence level (one category for the purpose of this study), text level, or as unacceptable by any interpretation.

The frequency of all corrections is shown in Table 5. This information is needed to show how correction rates themselves vary across the groups. Note that there is a fairly uniform pattern of corrections in the data, with a rise in eighth grade and a significant fall in the adult group. The latter will have to be taken into account in any interpretations of the data. The other tables constitute the data base for discussion of the Miscue Monitoring Taxonomy categories from which inferences will be drawn concerning these readers' metacognitive abilities. Thus Table 2 shows the frequencies of miscues not corrected and provides information regarding categories Three and Four of

the taxonomy, while Table 3 sets out frequencies for corrections that are used for the discussion of categories 1 and 2. Table 4 shows the unsuccessful corrections, thus providing information for categories Seven and Eight, while the small data base for Abandoned Corrections is discussed *seriatim* in the relevant section that follows. These tables need to be read and interpreted cautiously. Identical raw scores for given groups or subgroups, shown as N in the tables, can nevertheless result in percentages that differ substantially. These percentage differences can be spurious, so some attention is given to their interpretation in the following discussion. The fact that there were no major differences between individual subjects occupying each cell, as far as percentages were concerned, means that judgements about trends in the data could be made without violating fundamental statistical principles unduly.

Note that, in Tables 2 to 4, the data has been selected from the total number of miscues that were corrected (as shown in Table 5), so as to highlight the different types of correction. These types are: not corrected, corrected, and unsuccessful corrections. Thus Table 5's rows total to 100, while those in the other tables do not total in this way as they represent a selection from the total number of miscues that were corrected.

TABLE 2

**MISCUES CLASSIFIED AS NOT CORRECTED, BY SEMANTIC
ACCEPTABILITY AND GRADE (PERCENTAGES)**

GROUP	NOT ACCEPT. %	N	ACCEPT. SENT/ PHRASE %	N	ACCEPT TEXT %	N
2 LO	26.6	30	6.3	8	38.1	43
2 UP	10.4	11	14.8	16	50.3	53
GRADE	18.5		10.5		44.2	
4 LO	29.4	52	6.5	11	37.6	44
4 UP	24.2	25	2.6	4	49.1	54
GRADE	26.8		4.5		43.3	
6 LO	37.9	95	10.6	53	29.6	130
6 UP	22.0	77	11.6	33	36.6	98
GRADE	29.9		11.1		33.1	
8 LO	13.7	102	8.0	45	41.4	155
8 UP	7.0	16	14.2	42	39.6	105
GRADE	10.3		11.1		40.5	
A LO	37.7	108	9.8	28	31.0	75
A UP	14.1	77	10.7	15	52.4	97
GRADE	25.9		10.3		41.7	

TABLE 3

**MISCUES CLASSIFIED AS CORRECTIONS, BY SEMANTIC
ACCEPTABILITY AND GRADE (PERCENTAGES)**

GROUP	NOT ACCEPT. %	N	ACCEPT. SENT/ PHRASE %	N	ACCEPT TEXT %	N
2 LO	15.7	16	9.9	12	0.6	1
2 UP	13.5	13	10.9	11	0.0	0
GRADE	14.6		10.4		0.3	
4 LO	13.5	27	7.5	12	2.6	3
4 UP	10.7	12	10.5	11	0.0	0
GRADE	12.1		9.0		1.3	
6 LO	13.5	32	6.0	18	0.0	0
6 UP	10.1	28	9.5	23	3.4	7
GRADE	11.8		7.7		1.7	
8 LO	12.9	40	13.0	41	5.4	8
8 UP	11.9	35	14.9	9	11.1	29
GRADE	12.4		13.9		8.2	
A LO	4.7	15	3.3	9	3.1	7
A UP	8.0	17	5.5	19	4.4	7
GRADE	6.3		4.4		3.7	

TABLE 4

MISCUES CLASSIFIED AS UNSUCCESSFUL CORRECTIONS, BY
SEMANTIC ACCEPTABILITY AND GRADE (PERCENTAGES)

GROUP	NOT ACCEPT. %	N	ACCEPT. TEXT/ PHRASE %	N
2 LO	0.8	1	1.8	2
2 HI	0.0	0	0.0	0
GRADE	0.4		0.9	
4 LO	2.5	6	0.4	1
4 HI	0.8	1	0.0	0
GRADE	1.6		0.2	
6 LO	1.0	8	1.5	12
6 HI	2.8	7	1.5	5
GRADE	1.9		1.5	
8 LO	2.6	14	1.9	8
8HI	0.8	3	0.5	2
GRADE	1.7		1.2	
A LO	6.3	17	4.8	11
A HI	1.1	2	0.4	1
GRADE	3.7		2.6	

TABLE 5.

ALL CORRECTION TYPES OF MISCUES, BY GRADE
(PERCENTAGES)

GROUP	CORRECTED		NOT CORR.		ABANDONED		UN-SUCCESSFUL	
	%	N	%	N	%	N	%	N
2 LO	26.2	29	71.0	81	0	0	2.6	3
2 HI	24.4	28	75.5	80	0	0	0	0
GRADE	25.3		73.2		0		1.3	
4 LO	23.6	42	73.5	107	0	0	2.9	7
4 HI	21.2	23	75.9	83	2.1	3	0.8	1
GRADE	22.4		74.2		1.1		1.8	
6 LO	19.5	50	78.1	278	0	0	2.5	20
6 HI	25.0	58	70.2	208	0	0	4.3	12
GRADE	22.2		74.1		0		3.4	
8 LO	31.3	89	63.1	302	0.4	2	4.5	22
8 HI	37.9	103	60.8	163	0	0	1.3	5
GRADE	34.6		61.9		0		2.9	
A LO	11.1	31	78.5	211	0	0	11.1	11
A HI	21.9	43	77.2	189	0	0	1.5	1
GRADE	16.5		77.7		0		6.3	

For easier reference the Miscue Corrections Taxonomy is reproduced below.

FIGURE 1
TAXONOMY FOR MISCUE CORRECTIONS

CORRECT-ION TYPE	SEMANTIC ACCEPTABILITY	COMPREHENSION MONITORING ACTIVITY BY THE READER
1. C	NO	Aware of comprehension problem. Uses effective strategies to get meaning where deviation is great.
2. C	YES(Text [b] or sentence[a])	Aware of problem. Uses effective strategies to minimise deviation from whole text by correcting at sentence level or below, thus showing awareness of global structure. May 'overcorrect' at text level, or be concerned with finer shades of meaning. Or reader may be dissatisfied with response.
3. N	NO	Unaware of problem, or has no strategy other than to not correct, or unable to use a strategy. May be aware of loss but is waiting for additional information before confirming or disconfirming, or chose not to correct because the problem had been resolved.
4. N	YES(Text [b]or sentence [a])	May be aware of need to construct meaning. Willing to accept variation from text either because miscue is considered insignificant, or because of a decision to

ignore the miscue. May be unaware of miscue because prediction fits story context well.

- | | | | |
|----|---|-----|--|
| 5. | A | NO | Aware but has no confidence in strategy where deviation is great. Or unaware of extent of deviation. |
| 6. | A | YES | Aware, but lacks confidence in own strategy. Or considers miscue insignificant. |
| 7. | U | NO | Aware, but strategy used is ineffective. Or lacks strategy. |
| 8. | U | YES | Aware, but strategy used is ineffective. Or considers miscue insignificant, or is not satisfied with response. |

Discussion of categories

a. Category 1 (corrected miscues that are semantically unacceptable) (Table 3)

There is a slight tendency for a decline in this category after fourth grade, with a larger drop in the adult group, but there cannot be said to be any significant developmental pattern here. The smaller proportion amongst adults may be due to the possibility that they are correcting silently. Also, the more proficient adults have fewer semantically unacceptable miscues than all readers except eighth grade (Grade upper/lower groups: second- 23.9/43.1 fourth- 35.7/45.4, sixth- 34.9/52.4, eighth- 19.7/29.4 and adult 22.6/48.7). So awareness of comprehension and the ability to deploy an appropriate strategy are as important for beginning readers as for the more mature. The possession of monitoring skills appears not to be developmentally constrained but is part of the strategic repertoire of readers of all ages, so far as this category is concerned. It is

significant that all the more proficient readers (except adults) have a lower proportion of responses in this category, not because they are less aware or less strategic but because they have far fewer semantically unacceptable miscues than the less proficient. Thus the less proficient, by their higher scores on this category, might be mistakenly considered to be more aware and strategic, when in fact they are spending more time correcting because of their higher proportion of semantically unacceptable miscues. We will need to examine categories 3 and 4a to be more certain of proficiency differences.

b. Category 2a. (corrected miscues acceptable only at sentence level or below) (Table 3)

There is a fairly steady decline in this category with age, with a rise at eighth grade and a considerable decline at adult level. Note that the correction rates of eighth grade and adult readers are respectively higher and lower than other groups, thus accounting to some extent for these differences. Here is further evidence supporting the view that at least some novice readers are aware of the need to maintain the semantic structure of the whole text, ie., beyond the clause, and thus have some awareness of the meaning relations that take place on a large scale. Once again it must be noted that adult readers are not as active in this respect, although their actual miscues in the category are as numerous as the second graders' miscues (Second grade group- 55.5, adult group- 49). It appears that the younger readers are more sensitive to this type of miscue, perhaps because of their emerging sensitivity to the significance of the semantic structure of text. Proficient readers uniformly and consistently have higher scores in the category, indicating that they are somewhat more aware of the need to monitor this type of miscue. It is therefore surprising to see that the more proficient, mature readers are not giving a clearer indication of such an important reading competence.

c. Category 2b. (corrected miscues acceptable at text level) (Table 3)

There is a steady developmental rise in this category, with a very sharp increase in eighth grade and a considerable decline from the eighth grade level amongst adults. The trend is to some extent the mirror image of 2a, suggesting that there are differential concerns and priorities about text structure amongst younger and older readers. Young readers are more concerned with correcting at those constituent levels of text up to the

sentence because of the implications for global meaning, and less concerned with fine tuning at the more global levels; in fact such exactness is not so important in terms of getting to meaning in a global way. This tendency on the part of the young readers cannot be due to their lack of awareness of the fuller ramifications of the global text structure, or because they find it too demanding to manage. We have seen that their willingness to correct at this level indicates precisely the opposite. Older readers, on the other hand, seem to appreciate the finer and more delicate semantic distinctions operating at a larger remove at text level and that there is no need to make minor changes to a miscue at this level. Whatever the explanation may be, the reversal of the pattern between younger and older readers is clear in the data and constitutes a significant finding insofar as developmental differences are concerned.

None of the second or fourth grade upper proficiency groups corrected at text level, and their lower proficiency peers did so at a very low rate, making comparisons here impossible. The rates of correction were higher in the older groups, and the more proficient readers corrected more, suggesting that they are more aware of the finer details of semantic structure at text level. Thus the young readers emerge from the analysis of both 2a and 2b as being in possession of important and fundamental understandings and capabilities about the various levels of text structure, while the data from the older readers is not entirely consistent concerning their awareness of text structure at local and global levels.

d. Category 3. (uncorrected semantically unacceptable miscues) (Table 2)

The developmental pattern here is varied, with an increase to sixth grade, a decline at eighth and another increase in the adult group, largely due to the TAFE students, who have the highest proportion (48.7%) of semantically unacceptable miscues of all groups. The eighth grade group have a very low proportion of these miscues. The overall trend of the pattern is slightly downward, but the variations between groups are very marked. It does not seem appropriate to draw any developmental conclusions from this data.

All of the more proficient groups have a very clearly lower proportion of response in this category, supporting the view already outlined that proficient readers are more aware of the need to maintain the semantic structure of a text. This is an important trend.

e. Category 4a. (uncorrected miscues semantically acceptable at sentence level or below) (Table 2)

There is a rise from second to sixth grade and then a flattening, and a decline in this category amongst adults. It is puzzling to see the older, school readers showing an increase of responses in this category although we note that the tendency to correct does decline in adulthood. It is also significant that the trend is consonant with that in 2a and 2b where the older readers were less concerned about corrections at sentence level. There are no clear proficiency differences here either, with the less proficient second and fourth grade and adult groups more prominent in the use of this category while the upper groups favour it in sixth and eighth grade.

f. Category 4b. (uncorrected miscues semantically acceptable at text level) (Table 2)

In this category there is virtually no developmental trend. However all but eighth grade upper group readers score higher here, with large differences in the younger groups. The result confirms the pattern from other categories where the more proficient were more aware of the larger text level structure. Such a confirmation enables us to be more confident of this category's significance in view of the point noted earlier concerning the usefulness of inferences derived from uncorrected miscues.

g. Categories 5. (abandoning a semantically unacceptable miscue) and 6 (abandoning a semantically acceptable miscue) (Both Table 5).

The abandonment of a miscue is generally unusual in reading and has proven true of the present study. Only two groups were involved, a fourth grade upper group (3 instances of a miscue semantically acceptable at sentence/phrase level, 2.1%) and an eighth grade lower group (2 miscues, one semantically unacceptable, one acceptable at sentence/phrase level, 0.2%). No conclusions can be drawn from such a small base.

h. Category 7. (unsuccessful correction of a semantically unacceptable miscue) (Table 4)

There is a slight upward trend in this category through to the adult groups, with a slight decline in eighth grade. This may perhaps be accounted for by the increasing demands on older readers from the texts to be read. However the higher scores amongst eighth grade and adult readers come largely from the less proficient groups, who fairly regularly use this category regardless of age. (The exception is sixth grade.) The trend is explicable in terms of the strategic inadequacies of the less proficient groups, concerned as they are with the establishment of meaning in their interaction with text but lacking the means to do so. They are aware, but unable to resolve satisfactorily their comprehension problems. This is an important pattern of reading behaviour which will need to be borne in mind in other analyses.

i. Category 8. (unsuccessful correction of a semantically unacceptable miscue) (Table 4)

The two categories of sentence/phrase and text have been combined here because separately their frequencies are so low. There are very few occurrences in second grade and in fourth, while there is a slight increase in sixth and eighth grades. The adult readers score the highest, almost entirely due to the lower proficiency group, although most of this group's use of the category comes from miscues acceptable at the text level. Once again we may conclude that older, less proficient readers are aware of their difficulties in reading but lack relevant strategies, or, in the case of text level miscues, consider that miscues at this level are insignificant.

Summary of results

The most important categories of the taxonomy are categories 1 and 2 and 5 to 8, because categories 3 and 4 are limited in their usefulness, as already indicated. Category 1 has revealed very little support for a developmental thesis about monitoring: the youngest readers seem to be actively concerned to monitor their comprehension and to use appropriate strategies. While the more proficient groups do not use this category very much the lower groups are fully engaged in correcting and therefore appear to be aware of their problems of comprehension.

Category 2a supports the argument against a developmental rise in awareness. Indeed there is, if anything, an actual decline, supporting the trend from category 1. Younger readers are concerned to grapple with problems of comprehension that occur when miscues at sentence level occur, with all the implications for text structure as a whole. The pattern is matched by the steady rise evident in category 2b, complementing category 2a and supporting more strongly the argument about younger readers' concern with general and global aspects of text and older readers' orientation to issues of delicacy in interpretation. The proficiency differences in categories 2a and 2b are not very marked however.

While categories 5 and 6 provided insufficient data for analysis, categories 7 and 8 yielded some interesting trends. Although there was a slight rise in the use of category 7 across the age groups, the higher use occurred amongst the less proficient of the older readers i.e., amongst eighth grade and adult lower proficiency groups, suggesting that the less proficient were aware of their comprehension problems but unable to do anything effective about them. Once again in category 8 we find an interaction between developmental and proficiency differences: the older, less proficient readers are aware of their problems but lack the strategic capacity to deal with them.

The categories derived from the negative data (3 and 4) have had to be interpreted with caution; while the developmental trend from category 3 is not clear and there is none in category 4b, the pattern in category 4a is consonant with that in categories 2a and 2b, thus providing some support from another source for this trend. The proficiency differences in categories 3 and 4b are both in line with the trends from other categories: the higher proficiency groups in category 3 are less likely to not correct while those in category 1 corrected less, and those in category 4b were also more likely not to correct, in agreement with categories 2a and 2b. Thus the caution that was mentioned initially in interpreting these two categories may now be seen in a different light, as we have been able to support the conclusions drawn from these two categories by the trends from others.

There is no clearly significant evidence from this data for a developmental pattern of comprehension monitoring in which older readers are more aware of their own processing while reading. The tendencies shown here support another view: younger readers are actively concerned to construct meaningful interpretations of their texts from the beginning of their experience as readers. The interesting pattern of development from categories 2a and 2b does reveal differing preoccupations among older and younger readers in their awareness of the patterning of a text at local and global levels, and their priorities in interaction with it. There is some support for the view that older readers are more likely to concern themselves with the fine tuning of their interpretation of a text as they read, while younger readers have a concern for the whole text's structure but do not make a more delicate adjustment to its semantic structure. What is very clear is that the more proficient readers have a stronger sense of the need to maintain the semantic pattern of a text and are able to use appropriate strategies to do so. The less proficient seem to be aware of their comprehension difficulties but lack the means to remedy these problems; this is particularly the case with adult readers. It will be important to see whether this trend is supported by our other data sources.

SECTION II - DATA FROM THE THINK ALOUD TAXONOMY : RESULTS AND DISCUSSION

There are two issues that must be discussed before these results can be examined. The first concerns the characteristics of the oral reading TAs in comparison with the TAs from the silent reading and whether the difference between them is important. The second arises from the categories of the TA Taxonomy and whether these categories can be grouped according to some overriding principles so as to clarify what is involved in metacognition and reading.

Oral - Silent reading protocols: data differences in the TAs.

It will be recalled that the TA protocols were collected under two conditions: the first, when the reader had corrected a miscue (and that correction had been replayed to the reader), and the second, when the reader was interrupted a number of times during a silent reading. The question now arises whether these two types of protocol ought to be analysed separately or combined into a single table of results.

The oral reading did not involve any direct intervention by the interviewer and so can be seen as a spontaneous (and therefore relatively unconscious) correction by the reader on the basis of awareness of the miscue. Awareness here seems to have been triggered by the monitoring process Goodman hypothesised as part of the process of reading. The spontaneity of the correction itself seems to be important for the validity of this data, as it cannot be claimed to have been induced by the investigator. The resultant report therefore derives its validity from the spontaneity of the report.

The reader in the case of the oral reading has been able to read the whole text, with corrections made wherever desired, before being interviewed and reports sought. The reader had the opportunity to construct the whole meaning pattern before being asked to report, and was not constrained by being asked to report while only having read a part of the text. The report given in the protocol was, however, delayed until the end of the whole reading, and therefore was memory dependent, with prompting being provided by the replay of the video. As well, the readers would have had to reconstruct the immediate context of the problem section where the correction was made each time they were questioned. Finally, there are some affective issues that influence oral readers: they may well decide to take fewer risks (by correcting) than silent readers, as their corrections are overt and perceptible to an onlooker.

The silent reading, on the other hand, involved an intervention by the interviewer at arbitrary points during the reading and so was less spontaneous, although there is still some element of spontaneity because the reader is given the option not to respond. The interval before the report is shorter than in the oral reading; because readers were able to

report at a point closer to the problem in the text, they could reduce the demands on memory. There would also be a lighter processing load insofar as smaller portions of the text were under review, although this may have been counterbalanced by the need for the reader to recall earlier portions of the text so as to report on the section under consideration.

Only part of the text may have been read here, as there were five reports per reading, so earlier reports would occur in a situation where less intratextual context had been built up, with the consequent possibility that the reader would have less certainty about some aspects of meaning.

Perhaps there is a tradeoff between these two data sources, as between:

- a. spontaneity and intervention
- b. more memory load and less memory load
- c. the whole text being read and part of the text possibly having been read
- d. the need to reconstruct context and the possibility of a smaller portion of text being processed, and,
- e. more or less threat to the reader.

If we value the spontaneity and whole text orientation of the oral material then we would weight it accordingly, but this has to be set against the greater processing load on memory including the reconstruction of context. But if we consider the motivational and affective aspects already discussed, where the oral reader may concentrate resources on production rather than on comprehension, then we have to put somewhat greater weight on the silent data.

The two sources might be of equal value but are to be judged according to their distinctive characteristics, which seem essentially to consist of textual factors and spontaneity versus processing and memory demands. However there is a practical constraint that limits the usefulness of examining these data sources separately: there is very little data available from the oral reading for many of the categories of the taxonomy. If the data can be collapsed the resulting patterns of development and proficiency differences are much clearer and will facilitate the drawing of conclusions. Finally, the

quite specific issues canvassed here do not seem to bear very strongly on the essential questions involved in the study, although they do raise other questions of importance in other contexts.

Finally, it must be noted that there are more general and overriding issues at stake here. It does not seem to be the case that the differences between the oral and silent reading are anything more than superficial in the light of the basic, underlying reading processes involved in the cycle of reading, a fundamental principle in the model of reading used in this study (Goodman & Goodman, 1977). Thus oral and silent reading both draw on the same, single, language based process that has been used as the basis for a model of reading in this study.

Differences between oral and silent data could also be an artifact of the methodology used. The oral reading TAs were sought at clearly defined correction points obvious to the observer and presumably also obvious to the reader. It is likely that the reader was more conscious of their miscue and the correction, since the correction was replayed to the reader and attention thereby drawn to it. Drawing attention to a correction may generate awareness in a reader by drawing attention to the strategy of correction itself. As well, the oral reading, because it is a public display of the reader's performance, may well be perceived by the reader as a threat to self-concept and esteem. To older readers this threat may be quite serious, since they have had sufficient time to build up a strong self image and in social terms they will have learned that reading skill is taken for granted amongst adults. Having to admit comprehension failure is likely to be threatening and inhibiting to adults, and we will see that this group of TAFE readers, who must necessarily have a long history of reading weakness, since they are receiving assistance in a remedial centre, are a particularly interesting group. Children, however, being neophyte learners and not having had as long a history of failure as adults, seem less likely to feel this threat or sense of inhibition.

Alternatively we may see correction as an intuitive or subconscious process which, when highlighted by the demands of the research task, is brought to the reader's attention at a conscious level. Either way it seems reasonable to conclude that this

methodology will have an undetermined effect on the reader that could not be controlled in this study.

The silent reading data was not gained by referring to corrections explicitly, but by inviting the reader to point out parts of the text where difficulty in comprehension was being experienced. This was a truth test and the willingness of virtually all readers to respond is significant itself in terms of the validity of the data. But the data may not be strictly comparable to the oral data because there was no observable correction taking place, and in some cases the protocols reveal that the readers were not able to satisfy themselves about meaning. In miscue terms, these cases were unsuccessful, silent corrections. However the essential difference is that the reader voluntarily drew attention to and reported on this material. While less threatening to the reader the situation was also one where the reader could avoid reporting altogether (a scenario chosen by only one reader out of 40).

The voluntariness of the silent data and the fact that a correction was not necessarily involved seems to put it in another class to the oral material, but it is difficult to specify exactly what this quality might be. Perhaps it ought to remain tied to the truth test already discussed: in the silent reading the readers are less constrained and therefore more likely to be providing valid material. It has been recognised in this study that oral and silent reading may make different demands on the reader. It would be easy to overstate this difference, however, as the reader in both cases was focussing on comprehension and reporting what turned out to be the same range of strategies to get meaning. This congruence in the strategy types that were reported is important evidence that answers the question about the validity of the triangulation process in this study, a question already raised (p.

If the differences we have just enumerated were significant for the purpose of this study it is clear that the two data sources would have to be examined separately. However we have seen that the reports for the two types of reading, oral and silent, were presented by the readers within a very similar response framework, that is, in terms of strategies that were identical. Thus it cannot be said that the two data sources represent

different processing on the part of the readers. This being the case, the two sources have been combined for analysis. Where there are substantial differences between oral and silent frequencies these will be discussed, however. The tables of frequencies for the two types of reading are presented below. These were calculated as proportions of total responses across each grade group and expressed as percentages.

TABLE 6

**TA FREQUENCIES FROM THE SILENT READING: TAXONOMY
RESPONSE TYPES BY GRADE (PERCENTAGES)**

GRADE	2ND		4TH		6TH		8TH		ADULT	
	%		%		%		%		%	
GROUP	U	L	U	L	U	L	U	L	U	L
STRATEGY										
A READ ON	3	0	2	2	3	1	6	0	5	2
B SOUND	5	34	11	28	4	22	5	2	0	6
C INFER	14	8	28	15	22	6	16	27	16	18
D REREAD	1	0	3	4	9	3	7	12	7	4
E GUESS	0	0	0	0	2	0	0	0	0	0
F BOTHER	8	0	0	0	0	2	4	0	0	0
G NOTHING	0	2	0	0	0	0	0	0	0	0
H RESUME	17	16	2	8	10	16	2	18	0	18
I SUSPEND	0	0	3	2	2	0	2	0	4	4
J AWARE	8	4	2	0	0	4	3	2	4	3
N	48	28	34	36	39	38	25	26	17	43

TABLE 7

TA FREQUENCIES FROM THE ORAL READING: TAXONOMY
RESPONSE TYPES BY GRADE (PERCENTAGES)

GRADE	2ND		4TH		6TH		8TH		ADULT	
	%		%		%		%		%	
GROUP	U	L	U	L	U	L	U	L	U	L
STRATEGY										
A READ ON	1	0	2	0	1	1	2	0	3	0
B SOUND	1	30	15	15	24	12	5	16	4	20
C INFER	20	2	10	15	12	14	12	5	20	4
D REREAD	13	0	5	11	9	17	23	12	17	4
E GUESS	0	0	0	0	0	0	0	0	0	0
F BOTHER	0	0	0	0	0	0	0	0	0	0
G NOTHING	0	0	0	0	0	0	0	0	0	0
H RESUME	3	4	0	0	2	2	0	0	0	4
I SUSPEND	6	0	3	0	0	0	0	6	8	0
J AWARE	0	0	14	0	0	0	13	0	12	12
N	6	2	10	25	11	13	20	8	22	23

It can be seen from these tables that there are some marked differences in individual strategies at different grade levels, most notably in B (fourth and sixth grade), in C (sixth, eighth and adult) and in D (eighth grade). In many cases the number of responses per grade is much higher in the silent protocols, particularly in the case of second, sixth and eighth grade (where many of the differences in the data are apparent). However such differences could only be explained by much more detailed and possibly larger scale studies than the present one, so as to obtain higher frequencies of response in those categories that are low or empty. It must also be noted that the overriding principles are those mentioned above, particularly that concerning the low frequency of response of the oral protocol, and most importantly, the issue concerning differences and similarities between oral and silent reading. To draw conclusions about oral and silent reading as separate activities from such small numbers of responses cannot be justified. For these reasons it was decided to carry out the main analysis on the combined TA data, as shown in Table 8.

Grouping the Taxonomy categories

While the categories of the taxonomy have all been described as being based on strategic knowledge or action on the part of the reader, a basic division amongst them is to be found by considering the degree to which they reveal evidence of the readers' awareness of what is going on as they read. It is argued that Categories I and J are two categories that differ from the rest on two dimensions: first they indicate more directly the awareness of the readers about their own comprehension and hence their own cognitive functioning and second they do not include as clearly any notion of strategic action on the part of the readers. Categories A - H on the other hand provide only indirect evidence for reader awareness, but are also distinctive in that they all provide clearer indications of strategic behaviour on the readers' part. Category A refers to the moving ahead through the text strategy, B to the phonic analysis activity, C to a procedure involving judgement and prior knowledge, D to the strategy of repeating the reading, while E, F and G are

minor devices of the reader and H refers to the readers' concern to continue with the task itself.

These strategies are therefore best seen as providing indirect evidence for monitoring. This is because they do not contain any direct reference to awareness of comprehension loss on the part of the subject, but nevertheless can be connected with such awareness indirectly. When the reader reports a strategy that is directly concerned with remedying loss of comprehension but does not refer to any awareness of loss we may infer that there is an indirect sense of loss from the very fact of the deployment of the strategy. But, more important for our purposes, these strategies demonstrate an awareness on the part of the reader of what to do, ie., a strategic awareness. That is a central concern of metacognition studies, which have included not only the awareness dimension but have postulated that related to awareness is a movement into action of a strategic sort to remedy the loss of comprehension. Strategic awareness is seen as a secondary form of awareness that arises in relation to the primary experience of comprehension loss; it is the 'knowing what to do' aspect of metacognition as against the 'knowing that' aspect. However there is no suggestion in this data of a connection between the two forms of metacognition in the actual processing of the reader: thus the fact that strategic awareness is demonstrated cannot *ipso facto* be seen to demonstrate primary awareness. Nevertheless, this connection could be clarified by examining the trends of awareness in categories I and J and the possibility that the more aware readers have a higher sense of strategic awareness as measured by categories A - D.

We can postulate a continuum of awareness, with the grouped categories located at differing points on the line:

Awareness continuum

(Indirect) LO----->HI(Direct)

(Categories) A - H IJ

A further division of the categories can also be made insofar as categories E - H are less concerned with strategic activity connected to reading comprehension. They are, as we shall see, quite incidental to the task of reading for meaning and therefore can be described as task incidental strategies. We can recategorise the taxonomy categories into three groups:

A - D : reading strategies (indirect awareness)

E - H : task incidental strategies (indeterminate awareness)

I - J : awareness categories (direct awareness)

The data from categories A- D is significant when we consider the second question in this study - the relationship between metacognition and reading competence. While they only indirectly bear on the issue of metacognitive functioning itself the fact that they provide information about the readers' perceptions of their own strategy use sheds light on the way in which metacognition is related to reading competence. It may be possible to show that greater awareness and control in the use of reading strategies goes along with greater proficiency generally in reading, by comparing scores of proficient readers in categories I and J with the less proficient and then carrying this comparison through to the other categories, with the expectation that high scores on awareness and effective use of the other strategies correlates with greater proficiency.

TABLE 8

TA FREQUENCIES FROM THE COMBINED ORAL AND SILENT
READINGS: TAXONOMY RESPONSE TYPES BY GRADE
(PERCENTAGES)

GRADE	2ND		4TH		6TH		8TH		ADULT	
GROUP	U	L	U	L	U	L	U	L	U	L
	%		%		%		%		%	
STRATEGY										
A READ ON	4	0	4	2	4	2	8	0	8	2
B SOUND	6	64	26	43	28	34	10	18	4	26
C INFER	34	10	38	30	34	20	28	32	36	22
D REREAD	14	0	8	15	18	20	30	24	24	8
E GUESS	0	0	0	0	2	0	0	0	0	0
F BOTHER	8	0	0	0	0	2	4	0	0	0
G NOTHING	0	2	0	0	0	0	0	0	0	0
H RESUME	20	20	2	8	12	18	2	18	0	22

I SUSPEND	6	0	6	2	2	0	2	6	12	4
J AWARE	8	4	16	0	0	4	16	2	16	16
N	54	30	44	61	50	51	45	54	39	66

Results and discussion: categories A - H

a. CATEGORY A: Read on.

1. Developmental pattern: there is a consistent and steady rise in the age groups, with 8th and adult readers having scores that are above younger readers. The very low frequencies here make inferences from the two data sources, oral and silent, rather precarious. This developmental trend only emerges relatively clearly when the scores are summed.

2. Proficiency differences: all lower proficiency groups use this strategy far less than upper groups, whether oral and silent data is considered separately or together. The frequencies are in a ratio of about 2:1, with the second and eighth grade lower groups not using it at all. This is a strongly marked pattern, particularly as seen in the totals - 28 : 6.

Conclusion: this category provides us with evidence of both developmental and proficiency differences in an important reading strategy, although the low frequencies suggest caution in drawing conclusions.

b. CATEGORY B: Sound out.

1. Developmental pattern: there are very few signs of a developmental trend in the oral data, with younger grade groups being a little higher. In the silent reading however

there is strong evidence of a decline in the use of this strategy, one of the clearest trends in the data. When the data are viewed as a whole this trend is particularly clear.

2. Proficiency differences: all lower proficiency groups (except sixth grade in the oral and eighth grade in the silent reading) use this strategy more than upper groups: in the oral reading, upper groups total 49, lower 93, while in the silent reading the figures are 25 and 92. Overall totals are 74:185, revealing a very marked trend indeed for the less proficient readers to use this strategy.

Conclusion: the evidence for a developmental trend in strategy use is very strong with this strategy, and the marked proficiency differences in nearly all groups support the view that, in terms of the proficiency groupings in this study, sounding out is a strategy used largely by the less proficient. While it may be necessary for the younger readers, it does not appear to be a very useful reading strategy generally.

c. CATEGORY C: Infer

1. Developmental pattern: there is no developmental trend in the oral data, and a slight rise in the silent data is not very marked.

2. Proficiency differences: in the oral reading, except for fourth and sixth grade, upper groups use this strategy more; the same applies to the silent reading, with the eighth grade and adult groups being the exception. Once again the differences are most noticeable when all scores are summed - upper groups 170, lower 114.

Conclusion: there is virtually no developmental trend here, suggesting that younger readers are just as likely as older to use this rather more cognitively oriented reading strategy. There is no reason to suggest that this strategy is less likely to be available to younger readers (perhaps because of a supposed heavy demand on cognitive processing capabilities). Its use is fairly clearly favoured by upper proficiency groups and not in line with any developmental trend. It appears that this strategy is quite central to effective reading.

d. CATEGORY D - Re-read

1. Developmental pattern: there is a rise and then a decline in the oral scores, while the silent data shows a fairly steady rise.

2. Proficiency differences: in the oral data there are big differences in second grade and fairly large differences in eighth and Adult groups, all showing a preference for use by the upper groups. Thus there is some tendency for upper groups to favour this category. In the silent reading data the pattern is mixed, with reversals of trends between sixth and eighth grades and Adult groups. When scores are summed we find the ratio is 94:67, in favour of the upper groups.

Conclusion - a moderate developmental trend appears again in the silent scores (cf. category B), while there is a quite clearly marked pattern of proficiency differences.

e. CATEGORIES E - H

The data for these categories comes from the silent reading only, and occurs at a very low rate of frequency.

E. GUESS - this response occurred twice in the protocol of an upper ability sixth grade reader, and consisted of the use of the expression 'guess' in 'have a guess'. The reader did not regard this as a desirable strategy on subsequent questioning, and finally explained that it was a follow up strategy to the 'break it up into syllables' strategy. It appears to refer to the making of a judgement about phonic analysis ie., the recoding to sound procedure. There does not seem to be any reason to confuse this category with the prediction strategy that we have associated with category I.

F. BOTHER - this response occurred in upper level second grade, eighth grade readers, and in one lower sixth grade reader. It consisted of the expression 'didn't bother' or a reference to the respondent's view that they either did not consider their response to the item being read to be a significant one or that they did not take the comprehension problem at hand very seriously. The essential issue here seems to be the readers' attitude

to the target word or phrase: they do not consider that there is a significant comprehension loss, or else they did not believe that there was any need to treat the problem seriously.

G. NOTHING - one lower level second grade reader reported that she was not carrying out any processing as a result of an encounter with a difficulty.

H. RESUME TASK - there is a tendency for second graders to use this category most, with little developmental trend in the whole sample. The category is used more by nearly all of the less proficient readers; the second graders are the exception here. Its high use by *all* second grade and the lower sixth grade, eighth grade and adult groups suggests that these groups have a common approach to reading: they are preoccupied with staying on task but do not necessarily have the means to deploy an effective strategy. The other indicators of strategic competence (A - G) must be examined with this pattern in mind.

Summary of A- H data

DEVELOPMENTAL PATTERN

STRATEGY	INCR/DECREASE	STRENGTH	COMMENTS
A. READ ON	Increase	Moderate	Awareness of an important strategy
B. SOUND OUT	Decrease	High	Awareness of the limits of a weaker strategy
C. INFERENCE	Nil	-	* (see note)
D. REREAD	Increase	High	Awareness of an important strategy
E. GUESS	Nil	-	+ (see note)

F. BOTHER	Nil	-	+
G. NOTHING	Nil	-	+
H. RESUME TASK	Decrease	Weak	Commonality between youngest & oldest

Note * This category is the most widely used of all (see discussion below) and is part of the repertoire of the youngest readers in the study. There is a slight rise in its frequency of use from second to fourth grade in the silent reading data, but this rise then flattens out amongst older readers. There is no developmental trend in the oral reading data. The awareness shown here amongst younger readers suggests that awareness associated with this strategy is not developmentally constrained, but rather is evident from the beginning of reading proficiency development.

Note+ The paucity of data in these categories means that no definite conclusions about developmental trends can be drawn.

PROFICIENCY DIFFERENCES

STRATEGY	UPPER/LOWER	STRENGTH	COMMENTS
A. READ ON	Upper	High	Clear trends
B. SOUND OUT	Lower	High	Interaction with dev't
C. INFER	Upper	Moderate	Fairly clear trend
D. REREAD	Upper	Moderate	Complex patterns
E. to G.	Nil	-	Insufficient data.
H. RESUME	Lower	High	Clear trend

With regard to the pattern in category A, there is a clear tendency for upper groups to use this strategy is an important finding, as is the low frequency of its use overall, even amongst the older readers.

When category D's pattern is examined, there is some preference for the use of this strategy by upper groups, as seen in the overall totals. In the oral data there is a consistent preference for it in the case of the upper groups, especially in second grade, and to a lesser extent in eighth grade and adult groups. The silent scores show a very mixed pattern: lower groups favour category D in fourth and eighth grade, but upper readers do so in sixth grade and adult groups. However the silent reading totals demonstrate a stronger trend toward upper group use than the oral data. Once again the trend for upper groups to use this strategy is only apparent in the totals.

Results and discussion: categories I and J

a. Relation between I and J

Whatever triggers category J is connected with and involved in category I - the common factor being the failure of comprehension in the reader. All this data is derived from readers' reports that have arisen from either overtly demonstrated comprehension failure or voluntarily reported failure. So category J provides the most direct and strongest evidence for awareness, because it is directly reported by the reader in unequivocal terms. Category I is different because awareness is only implied in the report, not directly affirmed. This is weaker evidence, but it is stronger than that from A - H categories because awareness is not implied by the reader in any of these reports.

What all reports (A - J) have in common is that they have been triggered by the reader's comprehension failure. It is easy to conclude that they all demonstrate awareness of comprehension failure, and this is partly true insofar as the ability of the reader to make a report can itself be taken as evidence of awareness. Perhaps category I is best seen as a bridge between the other two categories. It is independent of category J insofar as it lacks any explicit report of awareness, and is independent of the others (A - H) because

awareness is implicit in category I. In categories A - H awareness is neither explicit nor implied. Category I is therefore not a precursor of J, but J could be a precondition for I.

Thus category J represents the strongest, most explicit evidence for awareness and I is associated with but independent of it, being less strong and implicit evidence. Categories A - H are the most indirect evidence for awareness, representing more directly and strongly an awareness of what to do, a strategic form of awareness. Such strategic awareness may be seen as a secondary form of metacognition, with the primary form exemplified in categories I and J.

b. Results and discussion: Category I

i. Developmental pattern

Oral scores were higher in the younger and older groups. If the sixth grade group (who did not report this category at all) were excluded, no trend would be evident. The same is evident in the silent reading, although a slight rise in usage is apparent among adult readers. The high rate of report by second and fourth grade oral readers is the one aspect of this data to counter a possibility that older readers use this category more. Once again there is no clear developmental pattern, at most there being a slight rise in oral readers and no difference in the silent reading. The differences between the trends of the two modes are therefore not very strong here, but there is a higher frequency of use in the oral scores. As already suggested, it may be that the demands of oral reading provoke a higher level of awareness amongst readers. The fact that second graders do not report this strategy at all in the silent reading, although they are the heaviest users of category J, is quite surprising. Perhaps the youngest readers are not encouraged to predict, with its attendant requirement to adopt flexible patterns of text construction, but believe that accuracy and a single line of meaning are essential in learning to read. The only support for the developmental thesis is to be found in the silent reading scores, and this is mainly located in the gradient between second grade and adult groups, examined separately from the others. This weak trend is in line with category J data and supports the notion of patterns of development found earlier in the miscue data.

ii. Proficiency differences

Here the pattern is once again very marked, with all silent reading scores of the upper groups being higher or equal to those of the lower groups. The differences between groups is less marked at fourth grade and with the adult group, but nevertheless the trend is clear. In the oral scores all upper groups except the eighth grade are clearly much higher. The reversal of the trend with the eighth graders stands out against a strong pattern as an isolated case that is not easy to explain.

The strength of these trends is very evident in the case of this category. Proficient readers appear to exhibit the awareness associated with the ability to suspend judgement to a much greater degree than the less proficient.

c. Results and discussion: category J

There is no way of determining from this data whether awareness in readers is operating at a high level of consciousness as they read or whether the request for a report by the investigator provokes or stimulates awareness that is actually more covert. The widespread and almost universal ease with which these readers were able to report suggests only that there is awareness in reading, at whatever level it operates. What is meant by awareness and its relationship to consciousness is not dealt with very directly by this study, dependent as it is on readers' reports. The operational definition arises from the readers' reports: awareness is therefore defined as an explicit reference by readers to difficulty or failure in comprehension in their reports. Beyond this rather circumscribed notion we would have to deal with the distinction between knowledge held by a person and that person's awareness that they know. In the present study the think aloud reports were designed to explore the latter, second order knowing, as directly as possible, in a context as near as possible to the normal reading situation. Thus the fact that readers were able to report and also the explicit references to awareness in this category may be taken as an indication of consciousness in the readers of their own cognitive operations. This does not mean that the present study has tapped into the complete profile of any of the readers studied as far as their own consciousness is concerned. The use of report data is a constraining factor here.

i. Developmental pattern

Oral scores show a rise only in the adult group, especially in TAFE. Can we simply say that adults are more aware? Or that the demands of oral reading are more threatening (in the sense of indicating to the reader that their weaknesses are on display) and that this heightens awareness? Certainly the TAFE readers will have had a long history of failure and presumably are well aware of it. The second grade readers are not so aware, perhaps because they are not so vulnerable to threat at their stage of development and because they are more confident as learners. It may be that the second grade readers were not strained enough by the difficulty level of the text.

When we make a comparison between the oral and silent data we find a stark contrast in the second grade results. According to the inhibition hypothesis discussed above, these young readers should be equally ready to admit error. Perhaps they were strained too much on the silent reading. It remains difficult to explain why they were more aware in the silent reading, and less in the oral reading. There is a possibility that the demands made in processing the two modes of language have contributed to these results. In the oral mode the novice reader has the dual task of processing for meaning and processing an oral presentation; the demands of monitoring all this cause an overload in the system so that the reader is forced to focus on either comprehension or speech production. The demands of the situation where the young reader is asked to read aloud to an adult may result in a decision by the reader to concentrate on the production of a text rather than its comprehension. This may lead to less emphasis on comprehension with a resulting reduction in awareness. There are interesting implications for the miscue analysis system which relies on the oral source of language for its validity. At any rate, the differences between the oral and silent results raises a big question about the possibility of drawing conclusions about developmental trends.

There are peaks and troughs throughout this data, and the rough trends that are discernible are in conflict, with some trend towards a rise in the oral material, and no trend in the silent. Perhaps these two trends can be accounted for by the inhibition view: oral reading is public and exposes the reader, who, if inhibited about failure will be more

threatened by an oral reading where the correction is highlighted. As a result, awareness level is raised in the person concerned. A silent reading masks the threat because the reader can deny problems or any awareness of them.

However if the oral-silent scores are combined, on the assumption that the commonality between the two forms is more important than the difference, then we have a clearer trend. What is now apparent is a quite clear distinction between primary school readers and the remainder of the readers: there is a much higher awareness amongst the older readers, with the division occurring after sixth grade and with very high scores on the part of the adults. Awareness does not rise uniformly so much as disjunctively; almost suggestive of a Piagetian concrete operational to formal operational shift. The difference is so marked that we must either take it seriously, on the basis of little difference between the two data sources, or discount it because it is an artifact of the oral scores that have produced it. The difference is also apparent when category I and J scores are combined, although these differences are not so great.

The foregoing explanation highlights a problem with the methodology, and suggests that some caution is needed in drawing conclusions. As well, silent reading is the most common type of reading performance in our culture. We ought to be able to draw more substantial conclusions from the silent reading section of the data, particularly among the younger readers who are less likely to be concerned about themselves when reporting. In this study we have a high proportion of young, competent readers reporting awareness, with a decline in awareness in the middle school years. This pattern is not contrary to the Miscue Taxonomy data which is also not developmentally patterned.

To date the literature on automaticity supports the view that skilled adults, having gained competence, drive any awareness of this competence out of consciousness, and are thus not likely to be able to report. Younger readers, however, are still preoccupied with the mastery of the new cognitive strategies and thus are able to report them more readily. The demands of an oral reading may trigger off awareness amongst the less competent, older group who consequently report higher levels of awareness than might be expected. It is sometimes argued that novices possess a smaller repertoire of reading

strategies than more expert readers. The older reader, however, even if not very expert, has a greater knowledge and possibly a greater range of strategies, even if not all are equally effective. This study has revealed something about the range of strategies readers report using, and does not support such a view. But of course the present study does not address the question of the totality of strategies actually available or used.

Whatever explanation there might be, the lack of a strong, uncomplicated pattern supporting a developmental trend is important. This conclusion is supported by the Miscue Taxonomy data where there is no trend toward an increase in awareness with age and thus provides some triangulation on the issue of development of awareness in the task of reading. It appears that young competent readers are shown here to be as aware as older readers and this alone suggests that such competence is associated with awareness; however the proficiency differences data provides further supporting evidence, as can be seen below.

ii. Proficiency differences.

In the oral data the younger upper level groups score higher but in the Adult readers this is reversed. Both Adult groups are aware, but the greater proportion among TAFE readers can again be explained by the demands of oral reading and their history of failure. The younger readers' awareness is possibly confirmed by their successful use of the more effective strategies elsewhere (e.g., inference, re-read); there is a link between awareness and the use of successful strategies, and this is consonant with the view that both self-knowledge and control of strategies are needed for successful reading (see discussion of categories A - H).

In the silent data there are large differences in the second and fourth grade groups, where the Upper readers are more aware. This is reversed in sixth grade and evens out after that. Perhaps in the younger groups the more successful readers are less concerned about error, while the sixth grade readers approximate more closely to the adult pattern where awareness is evenly distributed across groups. Here the older readers are not showing such awareness differences, perhaps because they have long since automatised their reading competences and find it difficult to access their own consciousness. Once

again we may infer that TAFE readers have not reported awareness for this reason and because they are not here under the threat of public demonstration of their weakness.

To sum up the differences between proficiency groups we note that there are more definite signs of proficiency differences amongst readers as far as awareness is concerned. In the oral reading, there is an interesting interaction between proficiency and developmental level, with no differences among the second grade readers, but increasing differences in the other groups, especially the adults. In the silent reading the main differences are seen in the younger readers. This disparity among the trends rules out any simple conclusions, although it is the disparity among the adult subgroups that is one source of the irregularity. Thus, discounting the TAFE scores in the oral reading (for the reasons already given), there is a clear trend for the more proficient readers to be more aware. However this trend is not strongly supported in the silent reading, except among younger readers.

Some of this data is constrained by the methodology. While there are no strong trends in the developmental material, there are significant aspects concerning younger and older readers that shed light on the role of awareness in reading, and there are important suggestions about the effects of failure in inhibiting the acquisition of reading skill.

The evidence for the importance of awareness in acquiring reading skill is stronger. Once again a focus on younger readers, as well as the interaction effect of proficiency level and development, yields significant and interesting information about the contribution of awareness, as measured by this TA procedure, to reading competence.

d. A comparison of category I and category J results

Developmental pattern:

	Oral	Silent
I	Slight decline	Slight rise
J	Strong rise	Flat

There is virtually no support for a developmental trend in the silent data, and this is supported by the oral data in category I. In three cells out of four of the categories bearing most directly on awareness, therefore, we have no evidence of a developmental trend in awareness. The exception to this trend found in the oral data from category J can be accounted for by the demands of oral reading and by the inhibition factor already discussed.

Proficiency differences:

	Oral	Silent
I	All Upper higher (except 8)	All Upper higher or equal
J	All Upper higher (except Adult)	All Upper higher or equal (except 6)

There is solid support from all data sources to indicate that more proficient readers show a greater awareness, as defined here. The link between awareness and proficiency is especially strong among the younger readers.

How can this increased incidence of awareness amongst younger, more proficient readers be explained? According to information processing models of the acquisition of skill there is an increased cognitive load placed on learners at the beginning stages of their acquisition of the skill. The learner must concentrate processing resources on the unfamiliar task, and, in this case concentrate directly on language itself in the written mode. The young reader must develop strategies for getting meaning in the encounter with print, and in the process the young learner may become more aware of the sorts of strategies that are being developed and so can report them more readily to the observer. Support for this view comes from informal linguistic studies (Halliday, personal communication) where it is proposed that neophyte readers are faced with the task of dredging up from their subconscious the sorts of strategies that they used much earlier in their development when they were developing oral language. Once again this demand may generate in children a higher level of awareness of their own functioning, as they endeavour to apply to the written mode the strategies used earlier in the oral mode.

Older readers, however, have automatised their reading strategies to such an extent and for such a period of time that they are no longer as aware of them as the young readers. Perhaps we may see this as a process of driving an awareness of the strategies down into the subconscious. To dredge this awareness up again may require the investigator to make very heavy demands on the reader's comprehension, perhaps by providing reading material that is very novel and unfamiliar. Older less proficient readers present a different case. They have not acquired adequate reading strategies and have not therefore had the opportunity to automatise them. Instead they are likely to have had a long history of reading failure and to be conscious that they lack these socially expected skills. They are more likely to be aware of their deficiencies and, where they cannot avoid reporting awareness of loss, they do so at a high rate (ie. in the oral reading - where

their score in category J is the highest of any group). Where they can avoid reporting (in the silent reading) they appear do so, to avoid loss of self esteem.

Examining results according to strategy use

These results can be examined from a different angle, by focussing on the sum of the instances of each of the various strategies across all grades and noting the range of use of the strategies by each group, the rank order of use and the heaviest and lightest users of each strategy. Table 8 and the table below provide the information relevant for discussion.

TABLE 9

**TOTAL FREQUENCY OF USE OF EACH TA STRATEGY, RANK
ORDER AND HIGHEST AND LOWEST USERS**

Group-	U	L	TOTAL	RANK	HI USE	LO USE
STRATEGY						
A READ ON	28	6	34	7	2nd	4th
B SOUND	74	185	259	2	4th	adult
C INFER	170	114	284	1	4th	2nd
D REREAD	94	67	161	3	8th	2nd
E GUESS	2	0	2	9	6th	-
F BOTHER	12	2	14	8	2nd	-
G NOTHING	0	2	2	9	2nd	-
H RESUME	36	86	122	4	2nd	4th
I SUSPEND	28	12	40	6	adult	6th
J AWARE	56	26	82	5	adult	6th

a. Frequency of use

The first aspect examined was that of frequency of use, within and between the groups.

INFER (C) is the most heavily used (284), being the most commonly used strategy in all groups except second grade. This is one of the more significant findings in the data. INFER is most frequently used by fourth grade, with the differences between other groups not being very marked, although there is a larger interval to the second grade group. All readers show their perception of it as a key strategy in comprehension, although the lower frequency amongst second graders suggests that they have not yet learned its importance. The perception amongst readers of the need to make inferences has been examined in reading studies which emphasise the importance of the knowledge the reader brings with them to the task of reading, as well as the need for readers to understand the constituent structure of text so that they are able to exploit to the full its meaning potential. These twin foci of world knowledge and language knowledge are two important variables under the control of readers that are demonstrated here.

SOUND OUT (B) is the next most frequently used overall (259), being the most common of all second grade strategies, but dropping in frequency amongst older users to whom category C is consistently the most important. Most heavily used by fourth grade and second grade, it is the second most used of all strategies by fourth and sixth grade, but is third for eighth and fourth for adult readers. This strategy is most important to younger readers who are still coming to terms with what they apparently perceive as the dominant aspects of reading, the grapho-phonetic. Older readers demonstrate their awareness of the limitations of this strategy, although there seems to be a long learning curve, as sixth grade usage is still high.

A similar interval separates the third most common strategy overall (161) REREAD (D), from B. It is most heavily used by eighth and sixth grade, with fourth and adult groups being fairly similar in usage, but with second grade using this strategy a

good deal less. For fourth and sixth grade groups this strategy ranks third in use, while it is second for eighth and adult and fourth for second. The tendency for younger readers to use this less (both in terms of frequency and rank) suggests that they may believe that reading consists in focussing one's attention on a limited portion of a text so as to get the correct response before moving on further into it : rereading would be seen as an admission of incompetence because it suggests that the initial fixation and interpretation was inaccurate. As well, to report that one has reread something may be seen by the reader as an admission of incompetence and might have led to reduced frequency of report. Apparently eighth grade and adult readers, who use this strategy more, have become more aware of its value and less inhibited to report it.

There is a large interval between D and READ ON (A), which is by far the least used (34) of the categories A - D and H, and is overall the seventh most used category. It is more heavily used by the older readers, but the differences are not great and all the frequencies are low. Although the seventh most commonly used of all the strategies by fourth, eighth and adult grades, it is fifth for sixth grade and only eighth for second grade. Why is this category reported so little? While second graders use it least and rank it the lowest, even eighth grade and adults only rank it marginally higher. It may be that the belief in readers that they must satisfy themselves about a correct interpretation before moving is important. If readers focus on individual words, or shorter phrases, and assure themselves that they have got clear meaning from them before moving further on, they will have to exclude this strategy from their repertoire. It appears that even the more experienced readers have not fully developed the idea that a text is more than a string of separate words, with a structure that needs to be fully appreciated by the reader before all its semantic potential can be explored. Full appreciation can only be achieved if the reader is willing to wait for further information to be provided by the wider context. There is also the possibility that all readers are unwilling to report this strategy because it may be seen as an admission of their failure to achieve accuracy on their first encounter with the lowest constituent structures of text, the words (and their phonemes) and phrases.

Strategies E to G were all used very little and none were used by all grade groups, with E and G only being used by one group. They were ranked consistently between seventh and ninth overall. E (Guess) is potentially a very important strategy, if it is interpreted as the ability of the reader to predict from prior knowledge and language knowledge what meanings are being built up in the text. However it appears that this is not the interpretation of the few readers who reported category E - it is the second least used of all the categories. Apparently, to guess is seen as an undesirable strategy that implies a failure to attain accuracy, a virtual admission of defeat that is only confessed to by a tiny minority of readers. F (Bother) occurs in low frequencies amongst all readers except fourth grade and adult. It seems to be an expression of level of task orientation among readers, or perhaps of confusion about the requirements of the task that the interview has demanded of them. Its appearance may be seen as a genuine expression of these readers' states of mind during the study and an indication that they are prepared to report honestly, with a statement that is not particularly flattering to them or to the interviewer. It is the eighth most used overall.

Nothing (G) appears to be another expression of a genuine response to the task, one that is quite possible and predictable under the circumstances. It is the least used of all categories.

RESUME TASK (H), the procedural strategy, was more heavily used, with a frequency approaching that of D (122); it is the fourth most common strategy overall. It can be seen that second and sixth graders use this strategy most, and fourth graders use it least. It is more important to the youngest readers (third in rank) than to sixth (fourth) or eighth and adult for whom it is fifth and for fourth grade, sixth. This fourth most popular category is used quite widely and indicates the task orientation of all readers and their awareness of the need to stay on task while reading.

The strategy SUSPEND JUDGEMENT (I) is one of the least used (40), being the sixth most used overall and having a fairly even distribution through the grades, although sixth grade use it less than most (as is the case with J). This is another important strategy that demonstrates the reader's ability to use text structure thoughtfully so as to improve

comprehension. Once again an important strategy is only being used at a low frequency and is ranked low in use generally. The same issue of an inability to search flexibly through text so as to exploit its structural characteristics is apparent.

There is also a fairly even distribution of scores for AWARE (J), except for the lower usage by sixth grade. This is the fifth most used strategy overall (82), but its importance for adults (third most used) is noticeable. There is a higher frequency of use and a consequent higher ranking for this category. The adult group place greater importance on it than all the others, although, as has previously been discussed, this is largely due to the lower proficiency group.

b. Beliefs about reading

A consideration of the way the strategies are used by the various grade and proficiency groups reveals some interesting evidence about these readers' beliefs about reading. All readers use INFER a good deal and so seem to have grasped the importance of using existing knowledge in the interpretation of a text. The limitations of SOUND OUT, however, are only understood by the oldest readers. The exception here is the very high use of this category by TAFE readers, which indicates that even at this late stage in reading development there may exist the belief that reading consists in decoding the written text to sound.

Another assumption about reading is evident when it is seen how little REREAD and READ ON are used. This involves a belief that a reader must operate strictly linearly in making an adequate and complete interpretation of a text item, usually seen as a single lexical or grammatical item, before the next stretch of text is processed in the task of reading. It implies a very atomistic understanding of text, incorporating a strong desire to come to closure about meaning within the confines of a limited stretch of text and without regard to its extra-clausal features. It seems to imply that a text is simply a list of relatively unrelated items, each of which can be interpreted separately from the context. An associated belief that appears to be related to this is the notion that the reader must formulate a correct interpretation of such a localised item of text before proceeding to

examine further stretches of text. There seems to be an intolerance of error or even an inability to accept that a judgement about meaning may be tentative and could be modified later in the reading cycle. Such a belief is extraordinarily limiting in dealing with text where the semantic potential can only be realised by holding tentative judgements in memory while the full pattern of linguistic choices made by the author of the text is examined. The low use of SUSPEND JUDGEMENT is related to this belief held by readers; the strategy involves the reader in making only tentative judgements about meaning in the belief that further exploration of the text will clarify a judgement. Such assumptions are contrary to the ideas that many of these readers appear to hold about reading and no doubt account for the low usage of the category.

The high use of RESUME TASK by younger readers, especially the less proficient, may indicate that many of them have not yet learned that they must develop a range of appropriate strategies and learn how to put them into practice if they are to be successful in reading. Use of this category suggests that the readers concerned are not in command of the more appropriate strategies, although they are probably aware of the need to be strategic. Finally the moderately high use of the last category, AWARE, suggests that most readers are able to monitor their own comprehension, in the sense of checking their level of comprehension. However the younger, less proficient readers are very much less aware than their peers and the older readers; this is one of the more important lines of evidence from this work, carrying with it the implication that early mastery of reading capability is linked with the capacity to monitor one's own comprehension.

c. Grouping strategies by frequency

The most heavily used strategies are C, B and D in that order, with frequencies of 284, 259 and 161. Next are H and J, with 122 and 82. The least used are I, A, F, E and G, with frequencies of 40, 34, 14, 2 and 2.

This outcome has a certain logic to it, as the first three may be seen as important reading strategies so that there is little dispute about their importance in the reading process. H and J may be seen as indicators, in different ways, that the reader is actively

concerned to keep track of meaning during the processing routines, but the rest cannot all be allocated to a single function. I and A are important reading strategies that seem to have failed to develop very satisfactorily in these readers, while the others are not as directly concerned with the task of reading. This raises the question of alternative groupings of categories where function becomes the criterion for judgement.

d. Grouping by functional type

It is now evident that it is possible to group these strategies by their function in the reading process. An examination of each is required to see how it contributes to the task of reading.

Type I - Reading Strategies: those categories that are concerned with the reader coming to terms with meaning through text processing- categories A, B, C, D, I and J. To be strategic a reader must clarify a goal and select an appropriate means of getting there, and then put the means into operation.

Categories A - D are indisputably concerned with text processing, as already indicated; categories I and J tap much more directly into awareness which undergirds and possibly stimulates the processing activities involved in A - D.

Fourth grade have the highest frequencies here and second grade the lowest, while the older readers group together with similar scores. Thus the fourth graders emerge as a very efficient group in the terms set out here: they have to some extent concentrated their processing on the strategies that maximise effectiveness in reading, and, as can be seen below, minimise their dependence on the more peripheral strategies. However their limitations are seen in their heavy use of B (the highest usage of all groups). The difference between them and the nearer groups is not very marked, however, and certainly no far reaching developmental conclusions can be drawn from this sample.

The low score of the second grade group suggests that they are not yet able to concentrate their resources on effective strategies (none of the lower group use A or D) and are more likely to overuse the limited strategy, B; they tend to be preoccupied with

task incidental responses (see below). Note, however, that this overall result has been brought about by the highly inefficient approach of the lower group. When viewed separately the upper group are nearly as efficient as any of the older readers; their only difference is that they are more likely to use H.

Type II - Task Incidental Responses: those categories that are products of the reading task and situation - categories E, F, G, and H.

Categories E - G are all minor categories that result from the demands of the interviews and indicate a variety of ways of coping with these demands. category H is a particular example of task awareness and task orientation in readers.

As already indicated, there is an extremely high use of this group of categories by second graders. What is now clearer is that they are not so likely to *use* many of the most effective strategies (although they do use C a lot) and are more preoccupied with coping with the incidental demands of the task. There is a very strong differentiation between the proficiency groups amongst adults in H (upper 0, lower 22) suggesting that the adult scores, like those of the second graders, have been strongly influenced by the lower group of readers. In fact there are some interesting parallels between the youngest and oldest less proficient readers: both over-use categories B and H, and under-use category D, but there is an important difference between these two groups; the adults are much more aware of what is going on, with a category J score of 16 as against the second graders' 4.

e. Summary

There are no major grade differences in the use of these strategies in terms of their range, although there are differences in frequency. Categories that directly bear on the reading process are all heavily reported as being in use. This is a significant finding in itself, suggesting that all readers have access to the same knowledge base. It also supports the view that the major strategies reported are likely to be the actual ones being used, since there are none that are only used by one or a minority of groups.

If A - D, the generally accepted reading strategies are examined, it can be seen that fourth and sixth grade use this group most and second and adults use it least. Sixth grade in particular are interesting as they have a much lower frequency of use of categories I and J, thus accounting for the higher A - D usage already referred to. There does not seem to be any obvious reason for this result. Exactly the reverse applies to the adult group, the highest users of categories A, I and J, although they are not the highest users of the important category C. The differences between the older groups are not very marked, however. Nevertheless the trend for adults to use efficient strategies is quite clear and remains so despite small sample size. Eighth grade readers also emerge as effective readers with stronger use of categories A, C and D and fairly high category I and J scores.

The younger readers clearly tend to put more emphasis than older readers on the less useful strategy B and less on A and D, and their scores on I and J also tend to be lower. Sixth grade are reluctant to abandon reliance on B but have a higher use of D than the other young readers. The youngest readers are clearly more reliant on the less effective strategy B and have the lowest scores on A, C and D.

What emerges from this examination of this group of strategies is that the more experienced readers, eighth grade and adult, have learned to process text more efficiently than the younger ones. They do not rely as heavily on the limited strategies and exploit the full potential of the more efficient ones. They are somewhat more aware than younger readers, and are more effective in their ability to select and use appropriate reading strategies, probably as a result of their awareness. While younger readers are not lacking in awareness, as defined in this study, they are not however as capable of actually deploying the right strategy for the problem that lies at hand. This also applies to the older, less proficient readers, supporting the view that it is possible not to progress in reading development. The possibility of a connection between awareness and the likelihood of flexibly using effective strategies is an important issue that this study has generated. It also is supported by other findings that metacognitive development consists

of a gradual increase in flexibility in the use of reading strategies (Brown, 1980;1982a;1984).

There is a related question. Why do readers actually choose the particular strategy that they have been shown to choose here? There may be many reasons, not all (or even many) of which are likely to be explicated here. However it is important not to see the comprehension problem that underlies the reports which readers have given as a unitary phenomenon. From what we know about reading processes it is likely that the problem will be determined by two factors: the readers' current state of knowledge about the world and their language knowledge, more specifically their understanding of the schematic structure of text and their mastery of language at the lexico-grammatical level. This provides us with three sources of problems that the reader might have.

Having determined some possible sources for comprehension problems, it is necessary to identify the link between the problem type or source and the actual strategy chosen. To do this it is necessary to access the readers' perception of the problem itself. However there may be limitations on our ability to analyse reader responses to an interview, given our limited understanding of later language development. At best we may only be able to make some highly constrained inferences from the section of text the readers nominate.

Concluding discussion of TA results

a. Data source

This data consists of reports from readers in school settings who were engaged in an act of reading that was ecologically valid insofar as it consisted of whole, narrative texts read either aloud to the interviewer or silently, in the presence of the interviewer. The subject matter of the texts was likely to be of interest to the readers, and it was made clear to them that there was no suggestion of assessment demands being made on them.

The reports were volunteered to the extent that they either arose from a spontaneous correction or were freely reported during a silent reading. The demands on

readers' memory were minimised by keeping the requests for reports as contiguous as possible to the actual reading task.

The data therefore represents an attempt to get as close as possible to the readers' processing activities as they perceive them under conditions that are reasonably representative of a natural reading situation. Nevertheless it is possible that conclusions drawn from data of this sort may contain some distortions akin to false negatives. Because a reader did not report a given category we might draw the conclusion that such a category is not being used by them, whereas that reader may have chosen not to report usage, for whatever reason. On these grounds we ought to interpret the TA data conservatively.

A conservative interpretation does seem to reduce the danger of false negatives. The readers were not prompted during the interview except with reference to their own responses, and there seems to have been little in the way of institutional threat offered to them. The only possible danger here was the possibility that the younger readers, in their desire to please an authority figure, would have taken their cue from the focus on comprehension difficulties and concluded that it would be desirable to generate some positive responses by reporting difficulties that in fact were not extant at all.

It must also be noted that the indirect awareness categories in the TA taxonomy were developed on the basis of extensive protocol material in which there were numerous examples of responses that later came to comprise these categories, and that these categories were apparent in all groups, regardless of proficiency or age. In this sense the categories are universal and very strongly represented in the data indeed. Furthermore, the indirect categories are all typical of the sort of reading strategies canvassed and discussed in the reading literature generally, regardless of the theoretical basis of the research or practice. It may be inferred that such categories as 'Sound Out' are products of the teaching situation and of the beliefs that teachers hold about reading, but this does not deny their validity as important sources of information about the processing patterns of these readers.

b. Data types.

There were two types of data, the first from oral reading and the second from silent reading. The differences between these two types are not insignificant as are the trends of the data from each. The fact remains that both types are drawn from the same experience of language and so it would be easy to overemphasise the differences.

The small sample in this study has made it difficult to draw conclusions separately from the two types of data, in that the number of responses from the oral reading material was in many cases so small. When the two types of data were combined much clearer patterns emerged and it is these trends that have provided the major conclusions. It seems that any questions arising from the differences between the two types can only be answered satisfactorily by working with a larger sample.

c. The taxonomy

The categories were formulated by an examination of reader protocols that directly answered the question and that were not merely retrospective responses indicating that they were a customary way of processing in reading. All categories appear to have stood up to the test of independence and discreteness. The major pattern that emerged from the taxonomy as a whole was the distinction drawn between categories I and J together and the other categories. The former, I and J, were seen to be immediate and direct forms of evidence about the readers' awareness of their own processing while reading and in that sense important evidence for metacognition. The latter, A - H, were characterised as more indirect forms of evidence for metacognition while being important in their own right as evidence, obtained directly from readers, of reading strategies evident in studies of reading where the reader as data source is not directly investigated. Finally, the group A - H were subdivided into two types of strategy, those central to the task of reading (A - D), and those that were task incidental or secondary (E - H).

i. Individual categories.

So far as developmental trends are concerned, there was some evidence of an overall trend towards comprehension monitoring as a capability that emerges gradually with age in readers. The evidence was at its strongest in the indirect categories, but was

much more equivocal in the direct categories, I and J. Thus categories A and D both showed an increase in use over time, while B declined markedly; only C failed to increase or decline. However, of I and J, only the latter could be said to demonstrate a developmental pattern and this trend was largely determined by the oral reading data, and we have argued that this evidence may have been generated from constraints in the methodology. There is therefore at least some doubt about the evidence of a trend in the direct, awareness data.

The pattern in the indirect data, particularly A - D, is much more clearly supportive of a developmental thesis. However this is the material which bears less directly on the question of metacognition. The categories have been characterised here as examples of strategic awareness on the part of the reader; they indicate that the reader understands the need to plan and organise activity if an interaction with text is to be successful. It may be argued that these categories are more likely to increase in importance over time as readers become aware of their value; in this sense we can conclude that awareness is a capability that appears more strongly amongst older readers.

There is no firm case to be made from this data that the ability to monitor one's own comprehension is developmentally constrained, and there is certainly very little evidence of any abrupt, stage-like shifts in readers' competence in this respect.

An examination of proficiency differences showed that there was a much stronger trend, with patterns of much higher awareness amongst the more proficient readers in virtually all cases. The link between awareness and proficiency is particularly strong amongst younger readers, suggesting that awareness plays an important part in reading from the very beginning. It may be that the demands made on the younger child to come to terms with the written mode, with its characteristic differences from the oral mode, elicit a heightened consciousness on the young reader's part. This consciousness may be an important contributor to reading competence right from the beginning.

There has also been shown to be a substantial link between levels of awareness as indicated by scores on I and J and the use by proficient readers of the more efficient

strategies, A, C and D. This is further evidence of the contribution of awareness to the task of effective reading.

It can now be seen how this study sheds light on issues about the development of reading competence and models of performance that use the expert-novice framework. There has been no support for a conventional, stage oriented developmental view of the emergence of comprehension monitoring as a component of performance in reading, where qualitative differences between groups are marked and where there might be grounds for postulating invariant patterns of development. The widespread use of nearly all categories militates against any argument for an invariant framework of development or for significant qualitative differences. There is some support for a pattern of gradual, quantitative change in the use of strategies, and we have related this to readers' increasing awareness of the value of being strategic in reading. However the more important evidence comes from the data concerning proficiency differences. Here we can see that expertise in reading is a capability that is apparent in those who are also high in awareness, a capability that emerges in the youngest readers. The youngest, proficient readers have shown that they are both aware of their state of comprehension and are able to use effective strategies so as to construct meaning. They are therefore not limited by any developmental considerations in their mastery of these fundamental competences. Their less proficient peers, however, are much less aware and also less able to deploy useful and appropriate strategies. Older proficient readers differ significantly from the young proficient in one respect, the former's higher use of the effective but less used strategy, indicating quite clearly that younger readers realise the need to be strategic but lack mastery of the full range of available strategies. The older, less proficient demonstrate that while they are aware of their inability to comprehend they have still not acquired the capacity to deploy appropriate strategies that will allow them to process text better.

ii. Strategy use patterns.

A consideration of the way the strategies are used by the various grade and proficiency groups reveals some interesting evidence about these readers' beliefs about

reading. All readers use INFER a lot; it is ranked well above the other categories, suggesting that they have grasped the importance of using existing knowledge in the interpretation of a text. The limitations of SOUND OUT, the next most commonly used, are only understood by the oldest readers however. The exception here is the very high use of this category by TAFE readers, indicating that even at this late stage in reading development there may exist the belief that reading consists in decoding the written text to sound. More proficient, older readers do not exhibit this belief in that they have cut down their use of the strategy dramatically.

There has emerged another assumption (held by readers) about reading that underlies REREAD and READ ON, both categories that are not heavily used. It is that a reader must operate strictly linearly in making an adequate and complete interpretation of a text item, usually seen as a single lexical or grammatical item, before the next stretch of text is processed in the task of reading. This is a very atomistic understanding of text. It seems to imply that a text is simply a list of relatively unrelated items, each of which can be interpreted separately from the context. An associated belief that appears to be related to this is the notion that the reader must formulate a correct interpretation of such a localised item of text before proceeding to examine further stretches of text. There seems to be an intolerance of error or even an inability to accept that a judgement about meaning may be tentative and could be modified later in the reading cycle. Such a belief is very limiting in dealing with text where one can only come to terms with the semantic structure by holding tentative judgements in memory while the full pattern of linguistic choices made by the author of the text is examined. This description is parallel to the psycholinguistic model of reading used in this study where hypotheses about meaning are set up and predictions are made which are then tested against more text in a continuous cycle. The low use of SUSPEND JUDGEMENT is related to this belief held by readers; the strategy involves the reader in making only tentative judgments about meaning on the ground that further exploration of the text will clarify the judgement. Such assumptions are contrary to the ideas that many of these readers appear to hold about reading and no doubt account for the low usage of this category.

The high use of RESUME TASK by younger readers, especially the less proficient, indicates that many of them have not yet learned that they must develop a range of appropriate strategies and learn how to put them into practice if they are to be successful in reading. Use of this category suggests that these readers are not in command of these strategies, although they are probably aware of the need to be strategic. Finally the moderately high use of the last category, AWARE, suggests that most readers are able to monitor their own comprehension.

iii. Usefulness of the TA taxonomy

The categories of the taxonomy fell into three groups. Those that involve the reader in strategic activity in the service of text processing are A - D where the activities involved in each are widely accepted as being a necessary part of reading. Categories E to H differ from A - D in that they are the result of demands of the task readers were asked to carry out in this study or were incidental to reading or secondary in importance. Categories I and J are not strategic activities but indicators of readers' awareness in a more direct manner than any other categories. Grouping the categories in this way clarifies a number of issues in reading and monitoring, indicating that older readers do possess an advantage over the younger readers, in their ability to select and use more efficient strategies.

The categories in the taxonomy appear to be robust and to yield important information about readers' monitoring capabilities and strategic capabilities. They were formulated directly from readers' reports and it is important to note that they correspond to the commonly used descriptions of strategic reading performance that have been developed elsewhere in the literature (see Summary, below).

Their value in illuminating readers' ability to monitor their own comprehension is substantial. The notion of a continuum of awareness is a useful conceptual device for clarifying the role of monitoring in reading. It has the advantage of highlighting the role of monitoring throughout the reading process, because it suggests that monitoring is to some extent involved in all the categories, while also providing an indication that some of the categories illuminate more clearly the process of monitoring itself.

The two 'direct' monitoring categories have provided a clear picture of what the reader needs to do in this respect, and their relationship to a reader's ability to use strategies effectively has been shown to be significant. The patterns of use of the more indirect categories have shown that the ability to use effective strategies appropriately is one that does not emerge early in a reader's development.

This study has tended to support the expert-novice model of strategic performance in that it has demonstrated that young competent readers are aware of the need to monitor their own comprehension and are able to some extent to deploy a range of strategies in the service of effective reading. The proficiency differences shown here are very important indicators of the heightened awareness of the better readers, from which we have inferred that comprehension monitoring is a significant part of reading skill, as is the closely related ability to be strategic.

However there does appear to be a developmental aspect to reading competence in that older proficient readers are more likely to home in efficiently on the appropriate strategy and use it. We have concluded that there is no indication of some sort of invariant, stage-like sequence of the acquisition of competence in monitoring and strategy use; a gradual quantitative change with increasing experience is the most adequate way of describing the development of this group of readers. Perhaps one of the most interesting findings was in the similarity and differences between younger and older less proficient readers. The older readers appear to be examples of arrested development in that they have not acquired to any great extent the more effective strategies that their more proficient peers have, and are limited to the type of strategy the less proficient, younger readers use. This may not appear to be a very significant finding but it takes on a new appearance when we consider that the older, less proficient reader has acquired one thing that the younger reader has not: overwhelming awareness of their failure to comprehend.

d. Summary

The analysis has shown that there is a relationship between awareness as defined in categories I and J and the use of the more effective strategies, A, C and D. This has been seen in the proficiency differences: the upper groups consistently are more aware

(combined scores I and J) and use C and D more than B, which is the less effective strategy.

The conclusion is based on data which consists of readers' perceptions of their own awareness of comprehension and their reports of the strategies that they use as they deal with the need to construct meaning. The significance of the reports in their own right is an issue we will discuss in the last chapter. However it must here be noted that the strategies reported are widely accepted as relevant to the task of reading and all can be documented from the literature which has been developed from quite different data sources from this research. Thus Collins and Smith (1982) refer to a number of actions that a reader can take to deal with a comprehension problem, including reading on, rereading, and suspending a decision. Rereading, suspending judgment and ignoring a problem are also discussed by Narang (1990). The decoding notion involved in Sound Out is well known also (Myers & Paris, 1978; Gambrell & Heathington, 1981; Garner, 1987), while the strategy of inferencing is discussed in McIntosh (1985) and Dewitz, Carr and Patberg (1987).

The implication of this conclusion is that there exists a substantial link between awareness and effectiveness and proficiency in the task of reading. Whether the relation is a cause-effect one, and the direction of the relationship, cannot be readily established from this study, however. What is clearer, however, is that these three aspects of metacognition and reading - awareness, proficiency and strategic competence - cannot be separated. The patterns of awareness derived from category J, for instance, or I and J combined, are interesting in themselves, but become much more significant when set against the trend for greater awareness to be so clearly associated with greater proficiency in reading. And the clear tendency for these more aware and proficient readers to use the more effective strategies suggests that all three are interrelated and can only be separated for analysis. Certainly the data from this study do not make it possible to be any more explicit about the nature of the relationship. However they do fairly clearly support the view that knowledge states and control processes, while separable for analysis, are

closely linked in the actual functioning of the reader; while separable, they are not operating separately (Reeve & Brown, 1985).

It is possible to argue that awareness might be a necessary condition for proficiency in reading, but it cannot be said that it is sufficient. Perhaps what emerges as the more important finding is the notion of strategic awareness and competence, whether it is triggered by or the result of awareness in the more direct sense (Lawson, 1984). In this data we see that proficient readers not only know what is going on while they read but are able to deal with the task of constructing meaning by deploying appropriate strategies, in contrast with the less proficient (and to some extent, the novice) who are less aware and clearly are unable to use the better strategies in the construction of meaning. The clearest indication that awareness alone is not sufficient for good reading is to be found in the TAFE readers, who score very high in awareness (ie., in J), and also in H, thus indicating that they are definitely on task, but are unable to use appropriate strategies to make meaning and consequently are far less successful generally in the reading task. They can be usefully contrasted with their younger counterparts, the less proficient second grade readers, who, while being equally on task, are both less aware and less able to use appropriate strategies - but the resulting lower proficiency in reading is the same in both cases.

Thus the other essential aspect of effective reading is a knowledge of the various reading strategies and the ability to deploy them when needed. While we have found that there is quite a high incidence, among many of this group, of awareness about their ability to comprehend, it has become equally clear that their ability to bring a reading strategy into play at the right time is critical if they are to become competent readers. Once again we are driven to affirm the closeness of the relationship between awareness and the ability to use a strategy, the counterparts of self-knowledge and self-regulation at the more general level of metacognitive theory.

SECTION III - METALINGUISTIC ASPECTS

Issues involved in reporting about language

One of the problems faced by the developing user of a language is learning how to talk about talk, that is, in dealing with language experience by the use of language (Painter, 1991). Earlier (ch. 2, Metalinguistic development) we mentioned two options open to the speaker: either use the terms you already have, as parallel expressions, or make up new ones, as technical terms. We shall see that, in the present study, the readers have, not surprisingly, chosen to operate the first way. They seem to have been driven by the encounter with formal, teaching experiences and by their experience with using the new, written mode of language, to the point where they need to come to terms with this abstract and invisible phenomenon, language, that underlies the actual concrete text that is in front of them.

This last point provides us with a useful explanation for the reports that we have here. The focus in this study on the written text, with its emphasis on the lexical, achieved through nominalisation, means that it may have been easier for our readers to come to terms with the experiential meaning of the texts and thus to have been able to report in the way they have. The data, therefore, provides us with evidence of these readers' capacity to respond appropriately to one of the major characteristics of written language: unlike speech, which is fluid and dynamic, writing is chunked, objectified and static.

We will now examine the patterns of metalinguistic responses by means of the two types of language awareness discussed in the last chapter - Linguistic description (Type I), to be analysed using the taxonomy shown, and text quotations (Type II).

Language responses Type I: Linguistic description

The taxonomy used to analyse these responses is reproduced here for ease of reference.

LINGUISTIC DESCRIPTION TAXONOMY

I LANGUAGE AS A HIERARCHY FROM MICRO TO MACRO COMPONENTS.

1. FOCUS ON THE WORD & ITS PARTS - SMALLEST COMPONENTS

Includes 'letter', reference to 'part' (of word) or attempts at phonemic or morphemic analysis of a word, 'syllables' and 'sounds' (of words), 'ending' and 'capital letter'; 'word', 'term', 'split word', 'word family', 'name of place', 'vowels' (in a word), 'pronunciation' (of a word), and 'this other writing' (referring to words).

2. FOCUS ON THE CLAUSE COMPLEX AND ITS PARTS - LARGER COMPONENTS

Includes 'phrase', 'expression' (referring to a phrase), 'sections', 'part' (of sentence), 'sentence', 'usage' (referring to grammatical organisation), and 'way they sort of put it', 'way it's written', 'way it's worded' (where speaker indicates a focus on grammatical organisation of the text).

3. FOCUS ON DISCOURSE AND ITS PARTS - LARGEST COMPONENTS

Includes 'part' (of 'story'), 'beginning' (of the text), 'passage', 'story', 'paragraph', 'context', 'subject' (seen as part of the 'story'), 'text' and 'dialogue' (contrasted with a section of text that is comprised of monologue).

II GRAPHIC ASPECTS OF LANGUAGE

Includes 'line', 'page', 'hyphen', 'commas', and 'italics'.

III BEYOND LANGUAGE - SEMANTICS AND STYLE

'Meaning', 'what it meant', 'sense', 'what they've got down here', 'bits' (referred to as his thoughts), 'general description of it' (in context of a reference to the meaning of the section being read).

'Not normal English' (in the context of discussing the flowery language of Victorian prose), 'foreign language' (Greek, French), 'the author', 'it seems to flow along' (in reference to the narrator's monologue in comparison to the previous dialogue).

Most of the responses were to be found in I.1, with the frequency of responses dropping as we move through I.2 and I.3. The graphic aspects of language did not correspond to this hierarchical pattern and so were grouped separately, in Section II. Section III however, can be seen as an extension of the pattern shown in I; it represents a movement beyond the largest unit of language itself to the next stratum, and deals with largely semantic issues and other conceptions that are related to style, in the sense of preferences that language users may have in their use of language.

These readers show some alignment to the classical linguistic model in their approach, in which there is a tripartite stratal pattern - phonology, grammar and discourse. It is not being argued that this is the notion these readers have. The essential idea they seem to have is that of smaller and larger subunits, and of a hierarchy amongst these in which smaller and larger are loosely related. One reader actually referred to a number of units in a single protocol: "even sometimes if you can't pronounce the word you get the meaning of the word... so I can understand the phrase and the sentence..." (Paul, Adult). It is important not to import too much linguistic sophistication into these conceptions, because there is no evidence at all of anything but the most rudimentary thought about language itself.

The proportions in which the various taxonomy categories were used are set out below:

TABLE 10
TOTAL USE OF METALINGUISTIC TAXONOMY CATEGORIES
(PERCENTAGES)

SECTION I

WORD	64%
CLAUSE	10%
DISCOURSE	8%

SECTION II

GRAPHIC	8%
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SECTION III

SEMANTIC	10%
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a. The categories of the linguistic description responses

i. Category I.1 - Word

Perhaps the strongest evidence for the claim concerning a rough hierarchy of language levels lies in the predominance of responses assigned to section I.1, the word and its parts (64% of all responses). There seems little doubt that the notion of word held by these readers derives largely from the written language, with many protocol responses adopting the pattern in which the expression 'word' is used followed by a quotation of the word in question - "... just say it's that word... 'acceleration'".(I.B., 2nd), "...and then I found the word 'mystery'". (SG, 6th), "I put the word 'because' there" (VP, 8th), "I know the word 'relentlessly'" (RW, Adult). Of course in the modern written language

words are very clearly marked off by white space, so they are immediately apparent in the text, and perhaps this prominent characteristic of words in the written form has contributed to the popular idea that the word is the basic unit of language. The common school definition of a word (a 'proper noun') as the 'name of a place' (PG, 4th) occurs, plainly, through the influence of the teacher. Older readers refer to 'term', in the context of discussing the expression 'lead' in 'heaving the lead' (LW, Adult) while also referring to 'split word', a reference to the breaking of a word at the line break (RW, Adult). One young reader (SD, 2nd) refers to 'this other writing', one of the more ambiguous expressions that appears to suggest an aggregation of words, because, when probed, he quotes a part of a clause, 'now you'll'. For him 'writing' seems to indicate any combination of words, since he does not quote a grammatical unit. Other expressions used refer to the spoken language: the vowels and sounds in a word: '... and I was trying to pronounce out the pronunciation; I knew there was a certain amount of vowels in it' (PD, Adult); 'I couldn't understand imagining the sounds of "he heard" ...' (TG, Adult); and a word's pronunciation - 'What I was doing, I was trying to pronounce it, and I just couldn't get it out'(SW, Adult).

Words are also commonly referred to by reference to their component parts, mainly by the use of the expression 'letter' or by reference to a phonetic element, a phoneme or a morpheme. Thus we have '...I didn't look at the last letter...' (SD, 2nd) and "I started by saying, 'I'll take off the *s* and I'll end up with *g* '" (PD, 4th). One reader (IB, 2nd) refers phonetically to 'ow' and then spells out, letter name by letter name, 'ow' and 'ou'; in another protocol he attempts an analysis of 'acceleration': "it's got 'ac' and then it's got 'celeration'. An adult reader, when discussing 'MS' (for manuscript) says: 'but I know it wasn't M - S because there was no dot between the *m* and the *s*...' (LW). Quite a number of older readers refer to the 'syllable', within the context of a word they are focussing on: 'No, I just separated it, the word, into syllables, so I could read it better' (EH, 6th), and PD (8th) said what she did to a problem word - 'you break it up into syllables'. The expression 'part' is used also: 'Yes, well I said the first part first then I thought "no" was "a" [letter name], because I was looking at the

same line.' (SD, 2nd). Finally the 'ending' or 'end' of a word and the conventional term 'capital letter' are used: 'but then there was no *le* on the end and there was a y ' (JW, 2nd), and 'that's got these same endings...' (IB, 2nd), as well as 'Well I saw the *capital letter*...' (PG, 4th), in reference to the word 'Woomera'.

These constitute a wide range of expressions all with a reference to the notion of word, and as already mentioned, there is a substantial amount of the data to be found here. For these readers, then, the word is seen as a very prominent aspect of language in that they are mainly concerned with it (in a quantitative sense) when they do refer to language in their reports.

ii. Category I.2 - Clause

The next component of language that occurs in this loose hierarchy involves a focus on the clause and its components. While this is an important aspect of the linguistic system we cannot argue that these readers see it in any way other than a larger aggregation of words into a unit on its own. Here the amount of data drops off considerably (10% of all responses), making it the second largest component of the hierarchy. A sixth grade reader says 'Oh, I didn't get that phrase either' (AF), referring in fact to a clause 'venison was our staple diet', while an adult (JI), discussing 'the fissured and perilous pavement' says: '... I remember seeing that phrase...'. Another adult (LW) says: '...something that I knew and "heaving the lead" to me - I realise, that, you know, it's something to do with boating but it's not an expression I'm familiar with', a very clear indication of her understanding of a phrase. Another adult (DS) refers to the 'way it's written where it's got little sections with all commas and things like that' in the context of this part of the text: 'The System put under it's knife the material which, under other conditions, wielded as a sword against the nation's enemies, would have formed a general of inspired audacity, a leader of dauntless courage, and an administrator of unerring prescience.' Here the 'sections' are both clauses and phrases, of course. The expression 'the way it's written' also seems to be an expression referring to a clause complex, ie., the one quoted above. This illustrates the fuzziness of the linguistic ideas held by such a reader as this one, and many others. 'Part' is used once in the expression

'that doesn't make sense with the next part of the sentence' (VT), suggesting that a unit within the sentence is involved. This term is used elsewhere by other readers to refer to parts of words (as we have already seen) and of stories. Another adult (RW) refers to 'usage': ' "scanned the me" is a bit of an unusual usage', indicating clearly that she has a phrase in mind and is concerned about its grammatical structure. Elsewhere the same reader, in discussing the section of text as quoted by her (ie., a miscue) - 'her elegance were now' - indicates that she believes that this is a 'bit sort of a funny usage, and I expected "elegance", and it wouldn't have made sense...'. She seems to be aware of the concordance problem within this clause that her miscue has set up and uses the expression 'usage' to describe this issue. This seems to be one of the most sophisticated discussions of the grammar in the sample of readers, indicating an awareness of the need for harmony within the structure of the clause. Another adult (PR), in a discussion of a 'sentence' in which the phrase 'thin grass' occurs says: ' ...and just mainly sort of thinking that in a way they're trying to sort of trick me, but they're not, because it's just the way it's worded'. The 'wording' for him appears to be this sentence or a part of it. An eighth grade reader refers to a clause complex by quoting its beginning and end - ' from "Mr McKay " down to "parents"' - and then goes on to say that she was having problems not with any particular word (a question asked by the interviewer) but 'it was just the way they sort of put it', appearing to indicate the whole unit she has quoted in this way. The main term used to refer to this category is 'sentence': 'I read straight through that sentence as, "There was no hostility in his look"... (PD, Adult); 'I started back to that sentence again' (GW, 8th); 'I just read it a couple of times - that sentence.' ; (JM, 6th); 'Well I looked at the word properly and I said to myself, that doesn't look like "picture" and then it sorta looked like the word "pocket" so I said "pocket" and it made the sentence right' (SD, 2nd).

iii. Category I.3 - Discourse

The top level of the hierarchy is one that focusses on the unit we have called discourse, the largest unit within the language system. Only 8% of the responses occurred here. 'Part' is used by a second grade reader (JW) in his response 'in the story,

in the other parts', while an adult reader (SD) who used 'passage' confirms that she reread about three quarters of a page, after she said that 'I started reading the passage again'. 'Paragraph' is referred to a number of times, with MW (4th) indicating that 'there was a new paragraph and they were getting on to a new thing', while he later says 'I had to do a new paragraph because it was getting on to a new subject in the story', and he also supports his view by indicating what the change in the subject matter actually was, with reference to the plot in this narrative. This is one of the more precise conceptions held by these readers. An eighth grade reader (MD) merely refers to 'down at the bottom of page 50, the last paragraph'. 'Context' is used by adults: '...some words... I hadn't come across, where I tried to work out what they were in the context' (JI), possibly indicating a larger unit than words aggregated into larger groups like clauses, and from LW, '... I don't know the word, I've heard it before, but I don't really know what it means, but I just assume, by the context, that it means, you know, the sort of still but awesome scene...'. A fourth grade reader (MW) refers to 'subject: "... I had to do a new paragraph 'cos it was getting on to a different subject in the story', suggesting that it is a component of the story. An adult (DS) refers to 'dialogue' with reference to the two major characters in her story: 'And it's got a lot of dialogue in it - most of it's of the two ladies and the man's just sort of in there...'. 'Beginning' is used with reference to the whole story: '...when I remembered the letter... the beginning of the story, I had to look back to see whose son it was from...' (DS). There is one reference to 'text', by an adult (RW): '... instead of doing that I said "it didn't really", as it said in the text', indicating perhaps an understanding of the narrative as some sort of unit. 'Story' is a more widely used term in this section; in second grade JW says 'because that's what they were calling him in the story in the other parts', while a fourth grade reader, MM, says '... and just then I realised that Jenny was in the story and Jeff was in the story...'. Adults also use this term in the conventional sense, e.g., 'but to me, if it was simple words, I'd be able to pick up the story straight away' (PR). None of these expressions indicate anything more than a simple understanding of a large scale unit in the language system, one which goes well beyond the smaller scale units already discussed.

iv. Categories II and III

The two other aspects of language that have been discovered are not to be seen as part of the language system but are closely related to it. The first involves a small number of references (8%) to some graphic aspects of text. The most numerous of these are the references to a 'line'. AS (2nd) says: 'and just went on to not the next line after the first one but to the one after that...', while KB (4th) reports that '... and I thought it was "salmon" but then I looked back again at that line again', and PD (8th) says 'that third line, I didn't get that quite'. The term 'page' is also mentioned several times: '... and that was the last thing, on the last page' (IB, 2nd); 'so probably that was the man that turned around on the other page' (MM, 4th); 'oh, down at the bottom of page 50, the last paragraph' (MD, 8th). The other items appear far less: first 'italics', 'umm... it's in italics' (CB, 4th); next 'hyphen', 'I think it was the hyphen thing, in the middle'; and finally, 'commas', 'it leaves sort of long parts where there are commas and that' (DS, adult). It may be seen that more technical aspects of punctuation are described here, while the other aspects are very conventional terms for referring to print.

The last category of discussion about language refers to far less concrete descriptions that go beyond language as a system and deal with a cohesive series of references to the semantic system and to a number of loosely connected and more global and stylistic aspects that are associated with language. Taken together these aspects constitute 10% of the relevant responses. The terms 'meaning', 'what it meant' and 'sense' are the more commonly used expressions. Thus we have: 'When it said, "and their mother lay painting" I thought, "painting", I didn't know what it meant...' (AS, 2nd); 'I'm looking at the next word while I'm saying that one, and I missed it out, and it didn't make sense...' (EH, 6th); 'Well, this word, I didn't know the meaning of it' (JM, 8th); 'Yes, I was thinking the meaning was quite different to what it actually is...' (RW, adult). Another adult, JI, uses a much less technical description: 'I... read over it again and read a bit further, just to gather what the author meant and just to pick up the general description of it', which appears to be her attempt to refer to the gist meaning. LW (adult) talks about 'bits' - 'because a lot of those sentences seem, you know, very long and

they've got sort of bits, his thoughts, in it as well...'; here the reference to "thoughts" suggests an understanding of a semantic element. Finally MM (4th) talks of 'what they've got down here', in the context of his failure to understand: 'Oh, I just told myself that's what they've got down here so it must be OK'. This seems to be a reference to meaning, with his awareness that he himself has not been able to get to it.

The other expressions consist first of 'not normal English' - no, but maybe it was because it wasn't Eng... it's not normal English... but when I read on I realised that was the way he spoke.' (DS, adult). This expression is better understood when it is seen in the context of the reader's perception of the text (*John Price's Bar of Steel*, Price Warung, 1855 - 1911) as one written in a more flowery style very different from more modern prose, a point reflected in this reader's subsequent comment that 'I don't know what they're on about anyway' ! Reference is made by adult readers to foreign languages: RW mentions that there are Greek and French words in her piece, and JI says '...and a few of those seemed to be , oh, foreign... words I hadn't come across'. JI also mentions authorship, ...read a bit further, just to gather what the author meant...', while the final expression, 'seems to flow along' is mentioned by DS (adult), ' but it's much easier to read and get the meaning and it seems to flow along a lot easier and you can sort of read it quickly and get the meaning'.

v. Readers' concept of language

The major issue that emerges from this analysis is that readers seem to see language in a loosely formulated, hierarchical fashion in which units of the hierarchy are conceived as building up into larger and larger components of the system. And beyond this pattern there is a small amount of data indicating an awareness of other aspects associated with and beyond language, where the graphic and the semantic systems come into focus. We have seen that the expressions used are based on either schoolhouse lore about language or are derived from everyday conceptions, and that many are ambiguous and imprecise. Only a handful may be seen as significant technical terms - 'syllables', 'text' and 'usage', although the first may not have been used with much precision. We conclude that these readers have shown an emerging awareness of language in its own

right, apart from the actualised instances of language as seen in text itself - an awareness that does not seem to indicate a very substantial influence from linguistically informed sources, and one that has been heavily affected by conceptions of language derived from rather superficial notions that are biased, perhaps inevitably, towards the written language form. If these readers had been asked to reflect on oral texts there may have been quite different responses, however.

b. Analysis of developmental trends and proficiency differences

We now present the data in the form of percentage frequency of the responses of each of the Taxonomy categories by grade and proficiency group, together with raw frequencies of the same responses. This will enable us to examine trends in development of metalinguistic awareness and any proficiency differences.

TABLE 11

THE LANGUAGE AWARENESS DATA: TYPE I - LINGUISTIC DESCRIPTION

% frequencies of Type1 data by grade										
Group	Word		Cl/Comp		Discourse		Beyond		Graphic	
	U	L	U	L	U	L	U	L	U	L
	%		%		%		%		%	
	Grade									
2	54	19	7	0	3	0	10	0	5	2
4	25	42	3	0	5	3	0	3	5	14
6	40	34	6	0	0	2	4	0	10	4
8	23	28	7	2	9	3	12	4	0	12
A	20	24	11	7	10	2	17	3	6	0

TABLE 12

**THE LANGUAGE AWARENESS DATA: TYPE I - LINGUISTIC
DESCRIPTION**

frequencies of Type1 data by grade

Group	Word		Cl/Comp		Discourse		Beyond		Graphic	
	U	L	U	L	U	L	U	L	U	L
Grade										
2	36	13	5	0	2	0	7	0	3	1
4	18	30	2	0	4	2	0	2	4	10
6	20	17	3	0	0	1	2	0	5	2
8	13	16	4	1	5	2	7	2	0	7
A	21	25	11	7	10	2	17	3	6	0

One of the most outstanding features of this data is to be found in the adults' material. They have the highest frequency and the greatest range of responses by far, they have much the highest frequency of 'Beyond' responses and indeed of all the categories beyond 'Word', and they show the greatest and most consistent differences between upper and lower groups. This all suggests a far richer and more extensive language awareness with increasing age, and the increased capacity to go beyond the more

atomistic conceptions of the younger readers to an understanding of language that incorporates larger scale units.

It also supports the emerging thesis that such language awareness is related to proficiency in language use, as far as reading is concerned, as the proficiency group differences show; it is noteworthy that only in the more atomistic category 'word' does this difference between groups change to something approximating an equivalence. This trend alone seems to justify the inference that the development of language awareness in the group has been very slow, allowing of course for its cross-sectional nature.

Other trends can be seen as specific categories are examined. 'Word' is a category that is very predominant amongst younger readers, starting to decline after fourth grade, but rising again amongst the adult readers, as the raw frequencies indicate. While there is not such a developmental shift apparent in this category, there is a pattern amongst older readers of a greater awareness of the importance of the other aspects of language that are described in the other categories. We may conclude that there is a developmental trend here: the pre-secondary readers are more preoccupied with the smaller scale units of language, but increasing experience and maturity bring with it an opening out of these readers' perception of language.

The developmental decline in the use of 'Word' is complemented by a general trend for all other categories (except 'Graphic') to increase with age. This is most apparent in the category 'Clause complex' (CC), where there is quite a clear pattern of increase in use of the category, with the only exception being a decrease in fourth grade. It is also important to notice that the youngest, proficient readers are quite capable of using this category - although the lower proficiency group significantly are not. In fact this lower group do not use any of the essentially linguistic categories at all, indicating that they are locked in to an exceptionally narrow view of language indeed; but we have seen that this not need be the case, since the upper group are not so restricted.

The developmental trend for 'Discourse' ('D') is fairly clearly marked, with a pattern, like the previous 'CC', that is not so marked in the younger readers. While the trend to increase is clearer when comparing the youngest with the oldest, this pattern is

weakened by the drop in sixth grade, without a large rise at eighth grade. Once again what is clear is the large increase amongst the adults; again it is this oldest group that appears to be the only one that can readily move away from the limitations of the smaller scale units and appreciate the need for the wider ranging aspects of language represented by 'D'. However the proficiency differences are here quite marked, with all upper groups except sixth (where the difference is small) using this category more. Again we see how the more capable readers are more likely to be able to move out from the lower level aspects of the language hierarchy and report the broader aspects.

To complete the examination of the pattern of movement up through the hierarchy we next discuss the 'Beyond language' pattern. There is no trend toward a gradual, even ragged pattern of increase, but something approaching a dichotomy between the adults and all the rest. And, as with 'CC' and to some extent 'D', the nearest group to the adults is the eighth grade. Thus the further we move away from the basic units the more likely it is that the older groups will be the main respondents. These older readers are clearly to be seen as differing from the younger ones in their ability to see the broader and larger scale aspects of language. There is also here a quite clearly marked difference between proficiency groups, with all upper groups except fourth tending to use this category more; and once again the difference in the two fourth grade groups is not very great.

The category 'Graphic' ('G') does not fit the hierarchical pattern and so will be discussed outside of this framework. Here there is no difference of much importance between age groups, with the one variation being the increase in the fourth grade readers. There is also no clearly apparent pattern in proficiency differences; in fact when the scores for all upper and all lower groups are summed there is virtually no difference, the variations being cancelled out. What is apparent here is the irregularity of the patterns of difference.

c. Range of categories used

The range of language categories used - 'Word', 'Clause', 'Discourse', 'Beyond' and 'Graphic' - was examined for each group and the results of this analysis follow. Each of the categories is indicated in this table by its initial letter, and the number after each letter indicates the number of separate expressions used by all respondents to describe each category. Figures for each group indicate the range of expressions used by that group.

TABLE 13

RANGE OF LANGUAGE CATEGORIES USED IN THE LINGUISTIC
DESCRIPTION TAXONOMY

Category

	W/13	C/9	D/9	B/8	G/6	Total	%used
Grade							
2nd HI	6	1	2	1	2	12	39
LO	4	0	0	0	1	5	
4th HI	3	1	3	0	3	10	45
LO	5	0	2	1	2	10	
6th HI 3	1	3	0	1		7	27
LO	3	0	1	0	1	5	
8th HI 2	2	1	1	0		6	32
LO	3	1	1	1	2	8	
Ad HI	6	8	6	7	3	30	91
LO	4	3	2	1	0	10	

A major developmental trend that becomes apparent from this data is the clear tendency for the older grades to reduce their dependence on "word" and to increase their ability to use the other, larger scale categories, although this is not so apparent with sixth grade. The most important pattern here, however, is to be found in the adult data. Adults have by far the widest range of categories to describe language - they use 91% of them. The differences are very pronounced and support and further illustrate the dichotomy that is emerging with the awareness of language data, where adults are seen to have a much wider range of use and knowledge of language, while the differences amongst the other groups are not so great. We must note, however that the youngest readers are not so far removed from their school mates in this respect, and in fact use a wider range of descriptions of language than the sixth and eighth grade groups.

As far as proficiency differences are concerned, we note that the upper groups nearly always use a wider range of descriptions, and in the case of the one exception (eighth grade) the difference is not very great. If "Graphic" is excluded from this analysis, then it is even clearer that the upper groups have the greater range of descriptions available to them. Once again it is apparent that the more proficient readers are demonstrating what appears to be a strong grasp of language in the sense of being able to refer to it in a wider variety of ways that is linked in some with their general reading capabilities.

d. The language description results: conclusion

One of the fundamental issues is the way in which the pattern of responses is interpreted. We have argued that these readers possess an understanding of language that is fundamentally a part -to -whole one; they see it as consisting of small parts that aggregate together to form larger and larger wholes. All of them focus to a quite large extent on the smallest units, but there are significant developmental and proficiency differences when we examined the units beyond the smallest grouping.

We have already mentioned a very prominent feature of this data: the tendency for the adults to score higher in both frequency and range and for this group to predominate in the categories beyond the most atomistic. This led to the related phenomenon of the big difference between the adults and all other groups when the 'Beyond' category was

examined. When all categories are taken into account it becomes apparent that there is a marked developmental trend in this data. While all readers focus heavily on 'Word' it is only the older groups who move strongly out of this category and are able to report in terms of the categories that indicate a broader view of language. What is striking about this data is the strong parallel with the differences between the proficiency groups; here also there is a much greater awareness of the larger scale categories on the part of the more proficient. Thus there is an interaction with age here, as the older the upper proficiency group the more likely it is that they will use the broader categories. Finally the differences in the range of categories used also support these trends, with a marked developmental pattern and an equally strong trend for upper proficiency groups to use a wider range of categories. It is therefore very clear that awareness of language as defined here is an aspect of reading that is sensitive to development and that is also linked to reading proficiency.

Language responses Type II: quotations from the text

The second major grouping of responses where language is the focus of attention consists of the quotations made by the readers directly from the text itself. The reader provides a verbatim section of the text as a part of the response; the indication in the reader's response that there is an actual quotation is provided by intonation, or by direct reference to the text being read. For example, I. B. (2nd), in response to the question about the place in the text where he was having difficulties ("On the other page was it?"), says: 'Yes. When they were "all side by side on separate couches", that one'. This last phrase, 'that one', is a clear indicator of the fact that he is quoting, but throughout the protocols intonation has been sufficiently clear for the transcription to pick up quotations, in those cases where the reader does not point out that they are quoting.

a. Categories of quotations: words, phrases and clauses

The quotations were examined for any variations in their grammatical structure, and it was found that there were marked variations in this respect. The major criterion used was the ability of the reader to reproduce the text in a well formed grammatical unit,

after which the actual units used were examined. A simple constituent structure model of grammar was used, consisting of single words (orthographic words, including hyphenated words such as 'space-borne'), phrases (a cluster around a head noun), clauses (in the Subject/Verb/Complement pattern, with at least a verb appearing), and clause complexes where at least two dependent and/or independent clauses are linked grammatically.

Examples of quotations of words are:

'...and I said I think there was such a word but it wasn't and so I just said "couches" and went on to the rest' (I.B. 2nd)

'No, "approving" just means they could do it' (M. W., 4th)

'Well, I did more words, and I got up to "tension", with an "e". (S. G., 6th)

'Mostly that word 'tragicomedy"' (K. S., 8th)

'Actually it was the "proper" that threw me, because I thought "proper" and... ' (L. W., Adult)

Phrases were quoted in the following ways:

'Oh, I just go, start again, start the sentence again, and then I go "new acceleration in twenty five seconds"' (J. W., 2nd)

'I read the rest of the ... well, I sounded this out a bit and then "in twenty-five seconds acceleration", is it? (M. M., 4th)

'I still can't understand this bit, "more than the pup"' (T. V., 6th)

""of these two brushes"" (G.W., 8th)

'Or I read it, but I just got to "the useless salt water" and ... ' (S. K., Adult)

An example of an incomplete phrase is:

'Yes, there's a word here: "a yellow..." (S.D., Adult)

Some examples of clauses are:

""prepare for nil gravity" - I was looking sharply at that' (I, B., 2nd)

'... down here this says, up here it says "We separate from the booster ship in twenty seconds" and that line helped me to get this word down here' (M.M., 4th)

'And I had to go back and where it says, "Her muscles were hard from long hunting expansions across her wide desert range"...' (S. G., 6th)

'I read it over a few times, and back here, when he said, "My absence at right tackle would have left no gaping hole in the line"...' (F. H., 8th)

'Um, "the silence had no expectancy", I think - I'm not sure' (S.D., Adult)

Incomplete clauses were less common"

'Yes, 'cause then I read, "The old man said...", then I quickly went back..." (P. G., 4th)

'When I got to "accomplished nothing" I went back to "useless sacrifice of her life would have accomplished nothing"...' (S.G., 6th)

'There were more instances of clause complexes:

"She stopped as the man in the seat in front of Jenny turned around and spoke to them" (J. W., 2nd)

'...and up here it says, "I still have to practise my cartwheel to get the jerkiness out of it, and the class is learning the whipturn as well"' (M.M., 4th)

"As they drove the mile or so back to the ranch house under the midday sun, the dry brush country stretched behind them, dreary and deserted" (S. G., 6th)

'Er, I do understand it, but the sentence, "like a gopher, the bandit ducked down in the hole and tragi-comedy was galvanised", I didn't know what that meant' (K. S., 8th)

"He called and it was as if a tree had spoken". Maybe he was glad that he had some rescue or something' (S. D., Adult)

There was a much smaller number of incomplete clause complexes:

"Um, yes. "He pointed a heavy finger at the narrow roof which formed a di-..." Oh, I couldn't pronounce it' (S.D., Adult)

"pieced", sort of "pierced", "canopy of branches and spangled out the shoulders with leaf patterns" (P. R., Adult)

b. Analysis and discussion of text quotation responses: developmental trends and proficiency differences

The frequencies of occurrence of the various grammatical forms of quotation were then calculated and are shown below.

TABLE 14

FREQUENCIES OF TYPE II DATA (QUOTATIONS) BY GRADE
(PERCENTAGES)

[illegible]

TABLE 15

FREQUENCIES OF TYPE II DATA (QUOTATIONS) BY GRADE

Grade	2nd		4th		6th		8th		Adult	
	U	L	U	L	U	L	U	L	U	L
Form										
Word	69	28	12	50	25	16	28	16	31	16
Phrase	11	2	8	11	6	12	12	9	12	7
Inc Phrase	3	0	0	0	0	2	0	0	0	2
Clause	24	4	4	7	1	15	6	3	13	7
Inc Clause	2	2	0	3	0	12	0	6	0	2
Cl Complex	1	0	1	3	3	4	2	0	3	1
Inc Cl Com	0	0	0	0	0	0	0	0	0	1
TOTALS	146		99		96		82		95	

It can be readily seen that 'word' emerges as the most predominant category throughout these groups. There is a decline through the grades in its use, with the youngest readers being the most preoccupied with it. Again we see that there is a reliance on this most atomistic aspect of language on the part of all of these readers, and also that

this tendency does tend to decrease with age. In fact the second grade readers largely report in terms of words and clauses and make far less use of all other categories; when we examine their use of 'clause' it is noteworthy that it is the upper proficiency group who are much more predominant here. The lower second grade group has a tendency to quote very little and when they do they are restricted to the smaller scale constituents of grammar, largely words; they do not quote a clause complex at all. The younger readers here might be seen as having less ability to refer to their texts beyond the word level, but this is largely due to the influence of the less proficient. It must be borne in mind that there is a much higher frequency of clause complexes in the older groups' texts, however, so this observation cannot be seen as indicative of some deficiency in the young readers. As well it must be noted that the youngest readers have the highest frequency of usage of quotations. The pattern is not a simple one, but there is nevertheless a moderate trend for the older readers to work with language in a way that appreciates and respects its larger scale units.

There are proficiency differences between these groups and they are quite marked, but there is no clear pattern of difference here. Thus while the second, eighth and adult upper groups quote more, this is reversed with the remainder. The most important proficiency difference is found in the second grade group, as already discussed. One other difference emerges here, however. In all groups except the second all the grammatically incomplete quotations are made by lower groups. It appears that nearly all the more proficient are more sensitive to grammatical structure in their quoting of text. Perhaps there is an indication of an important difference in these readers, if their sensitivity to grammatically well-formed structures may be taken as indicative of their awareness of the way the grammar of a language works to mediate meaning. We might say that these readers' language behaviour shows that sensitivity is linked in some way to reading competence and may be taken as a contributor to reading proficiency. However the difference may be interpreted, it is fairly consistent among these readers and seems to be significant as an indicator of language awareness.

c. The text quotation results: conclusion

This second type of response, it has been argued, is not one which is as indicative of language awareness as the first grouping, linguistic description. What we have seen is that the data trends are not as clear as those for the first category, while there is still general support for them. Clearly there is a general trend for older readers to use the larger scale units more, while there is a possibility that the less proficient lack grammatical awareness and sensitivity to grammatical form.

Metalinguistic data: conclusion

There is a parallel between the two broad categories- Types I and II - in their use of 'word', where there is a tendency for younger readers to be rather more preoccupied with it, and for older readers to work across the whole range of the larger scale units of language rather than the micro units. This convergence of the two data sources is a moderately strong and strengthens the claim that there is a developmental tendency for readers to increase their use of larger scale units of language. Younger readers are more concerned with smaller scale units here and it appears to take some time before a reader can come to terms with the broader aspects of language and to appreciate their significance. The adult readers have been seen as constituting a separate group to some extent, particularly in the first category, in that there is a greater richness and competence amongst the adult readers which is not at all apparent in the younger group. However we also noted the ability of the upper second grade group to use language across all categories (in sharp distinction to their lower groups peers); this suggests that it is possible for the younger readers to have a fuller awareness of language and has important paedagogical implications.

There is a marked trend in this data for the more proficient to be more aware of language in all its aspects, as defined here. This is particularly the case in the first broad category, Type I, where the more proficient are quite consistently more likely to use the full range of categories, while this conclusion is supported in its broad thrust by the second category. The second category has also raised the interesting question of

grammatical awareness on the part of the lower proficiency group through their pattern of quotations. The interaction between age and proficiency is another feature of this data. The older, more proficient readers seem to demonstrate an awareness of language that marks them off from the other groups, in both their range of categories and tendency towards an emphasis on the use of broader categories. The relationship between language awareness and proficiency is therefore firmly established and emerges as an important conclusion from this study.

The pattern of development from micro to macro aspects of language with increasing age has held up within both of the aspects of language examined here. This convergence provides us with greater support for the main proposition: these readers largely see language as consisting of small units, while the older and the more proficient are able to move out of this conception and appreciate that there are larger scale groupings of linguistic complexes. However the basic framework is a simplistic one - a view that the smallest parts, perhaps, provide a foundation on which larger scale units build themselves up in a hierarchical framework to the point where semantic and stylistic aspects become apparent. The fundamental notion remains as a hypothesis, however, and the claims made here are made only as propositions that are fully consistent with the data, and that have the support of the reliability checking that has been reported. What is more apparent in the data is the strength of the developmental findings. The patterns of development are much more apparent than in the earlier strategic data. We cannot avoid the conclusion that, under the school and more general social conditions experienced by these readers, it takes a good deal of time before anything but the most rudimentary conceptions of language emerge. And it is not as though readers' awareness of language is not functional. There is equally strong evidence here that such awareness and reading proficiency are closely and substantially associated. This does not mean, of course, that such late emergence of language awareness is inevitable. The capabilities of the youngest but more proficient group must be taken into account here, as we have indicated; there is always the possibility of some readers becoming aware of language much earlier. We can only

speculate what difference this early emergence of language awareness may mean for these young readers.

When we direct our attention once again to the issues about the type of reader processing that has been involved we can now propose a basic framework that seems to have applied in these cases. The nature of written language as an object, a feature of language that becomes much more apparent during emerging literacy, seems to be the fundamental issue here. These readers have demonstrated that they are becoming more and more aware of language in its own right, as a thing rather than a process, and show that they are able, in varying degrees, to reflect on its properties at a functional level. This process of reflection can be best characterised as a distancing activity where the reader can stand off from the hitherto invisible phenomenon and begin to construct it as an object that now has to be set up as such, as a necessary part of the process of reading. This notion of distancing can be seen in two ways, in terms of a part/whole or as a concrete/abstract framework. The latter is easily described: it is the ability to abstract away from the concrete, written text toward the abstract language system that underlies it, and has been apparent in all the language awareness data but particularly in the linguistic description material. At its most abstract is the activity that involves the reader in moving beyond language itself to the semantic and stylistic properties that determine its form in a functional model of language. The former, the part/whole relationship pattern in the model of language, refers to the model of language that these readers seem to possess, rather than the process by which they construct such a model. It would be tempting to characterise it as a constituent structure model based on the notion of rank, but such an interpretation could only be justified where we had some more substantial data, probably derived from follow up probes. It seems much more likely that their model is one of small scale units aggregating into a larger scale framework. Perhaps there is a connection between these two aspects, with the smaller scale units being more apparent to all readers, particularly the less proficient and the younger, and thus more concrete and dominant in their perception of language. The larger scale units and aspects beyond language would

then be less apparent and therefore seen as more abstract; the older and more proficient are then found to be those more at home with these aspects of language.

What these readers have provided us with is an insight into their perceptions about language in a situation where their attention was on a reading task. We have seen that for them language is a necessary aspect of their understanding of text interpretation, that their attempts to model language are part and parcel of the process of monitoring their own reading and also that the richer grasp of language is strongly associated with reading proficiency. But we also note the poverty of their grasp of what language is and of how it works. This is particularly the case amongst the younger and the less proficient readers, where far fewer responses are given and where the range of these is quite seriously limited. Finally we note that this poverty need not necessarily be so: the youngest, more proficient readers seem to possess an awareness of language that is more developed than that of their less proficient peers, suggesting that younger readers who are not progressing may be assisted by their attention being drawn to aspects of written language as part of the process of learning to read.

Finally, are we to say that this activity is a metalinguistic one? The description we have provided of reflective readers able to distance themselves from the more concrete aspects of the written text and able to abstract away to the idea of language as system suggests that there is an ability apparent amongst these readers to see language as operating and existing at one remove from direct experience. In this sense their processing can be seen as metalinguistic. Their metalanguage might be highly conventional and limited to a conception that is strongly influenced by the written mode, but it is nonetheless an attempt at linguistic description which suggests a processing of and knowledge about language that results from the task of becoming more literate.

It seems to be reasonable to infer that readers responding in this way can distance themselves from language in the task of reconstructing meaning insofar as they can appreciate the actual language forms or structures. Here is evidence that the reader is engaged in a reciprocal distancing act that mirrors the activity of the writer. Such a capacity to distance we might argue is a sign of the mastery of one of the essentials of

reading and also shows that the reader has been able to move away from the limitations of oral language in this regard. It is an important sign of development out of the oral culture and into the culture of the written language.

When readers refer to language and text in these ways we can demonstrate that the reader is showing an awareness of language as an object; we are able to fill out the picture we have developed so far, of strategic behaviour that focusses entirely on the reader's processing, by showing the reader's understanding of the actual focus of that processing, the text itself. This means that the portrait we are drawing of the readers will include not only a description of their processes of reading but also will provide an indication of their understanding of the text that they are processing. Thus we are able to provide information that will counterbalance any suggestion that this study merely attends to the strategic side of these readers' processing, and only deals with neutral strategies without taking into account text as the object of the readers' attention.

The narratives used in this study are fictional and so require the author to set up the context carefully, since even the action is imaginary. To read this genre of the written register it is necessary to appreciate that the author has had to use a variety of techniques to construct the context, and these techniques have arisen from the demands of writing and not from speech. Since written language must to some extent create its own context the reader is faced with a task that is quite novel for one used to the oral mode, where context is usually immediate and therefore the distance between speakers is minimal.

Because these readers indicate something about how they perceive text itself it seems appropriate to categorise these responses as indicative of knowledge about language as an object, presumably as a result of their reflection on language and text. The ability to reflect on an aspect of one's experience that is concerned with language may be called metalinguistic, but the level of consciousness involved is not easy to characterise. Such reflection is an activity in which the focus is on the reader's knowledge of language, so that the outcome of it would be some addition to their store of knowledge about language. What seems to be happening here is that the interviews have stimulated the reader to attend to their understanding of language itself through their reflection on text,

the particular instantiation of language that is the object of their attention in this case. This concept may be seen as an aspect of metacognition, here characterised as the ability to reflect on and regulate one's experience of thought, or one's cognitive processing. That is, it is argued that metacognition is the superordinate or most general concept in that it is concerned with the knowledge and control of cognitive functioning itself; more specific features of behavioural functioning such as language functioning are therefore to be seen as operating within this overall framework. Thus the ability to think about thinking is the umbrella function of which thinking about language is an aspect. Alternatively, metalinguistic behaviour may be set up as a separate and presumably independent category from metacognition and the question would then arise as to its relationship to metacognition. Either way the relation between the two would need to be clarified. But for the purposes of this study the further question is not necessarily crucial; we shall reserve a discussion of this for the conclusion of this section.

The language oriented responses seem to be more concerned with metalinguistic knowledge, that is, with the reflective aspect of metacognition associated with knowledge rather than regulation. We are concerned here with the other major aspect of metacognition itself, knowledge about an aspect of one's own cognitive functioning, in this case, text processing. In particular we are here focussing on text, as the object of the functioning. These responses are very distinctive within this corpus of data: they have an 'objective' cast in that they involve descriptions of text itself, in some cases quite independent of the reader's processing. Inevitably however we find that the references to text are found within contexts where the reader also refers to their own processing activity.

SECTION IV - SUMMARY OF RESULTS AND DISCUSSION

It must be noted at this point that the issue of awareness, an expression we have used to summarise the notion of metacognition in information processing, has been described here with reference to different data sources. Awareness, in the Miscoe

Taxonomy, is defined according to the readers' tendency to correct a miscue, in various ways. In the Think Aloud protocols it is defined in terms of the readers' reports about their own processing while reading (orally or silently) and has been analysed in terms of direct and indirect awareness of such processing, and in terms of language awareness. It is therefore not the case that we can immediately conclude that such awareness refers to the same construct in each case. Nevertheless an argument can be made that what is being tapped throughout this study is a second order construct involving readers' distancing of themselves from the task of reading. This distancing activity is common to both data sources insofar as correcting a miscue and reporting on a correction strategy or on a comprehension problem involve the reader in a second order processing activity. This activity seems to include the notion of removing oneself from the actual stream of processing in some way, a 'disembedding' action needed to make a shift from the smooth flow of automatised reading processing so as to make a correction or apply a remedial strategy, and in the process using one's knowledge of the language system to facilitate the whole procedure. In this sense we argue that awareness is a common feature in all of the data we have discussed and now review. We will reserve a final discussion of the notion of awareness in this study to the last chapter, however.

The results derived from the Miscue Taxonomy do not clearly support a view that metacognition in reading develops slowly over time. The youngest readers were as aware as other readers in the sample studied, although it was mainly the older readers who were concerned to fine tune the semantic structure of their texts. The less proficient were also shown to be aware but they were quite clearly less able to use a strategy to remedy their comprehension problems. In this section of the data the notion of metacognition seems best understood as a monitoring activity arising from an awareness of a problem that can result in a break in the first order processing so as to repair the comprehension loss. Thus while the young, less proficient readers seemed to be able to check their own comprehension, they lacked sufficient knowledge of repair strategies to deal with the problem. There is little in this data which enables us to decide whether the awareness

shown here is conscious or not and no means of determining whether there is a pattern of development towards more conscious awareness.

The TA results tend to present a stronger picture of the development of metacognition in reading. Here we see a gradual change in readers' ability to monitor their processing of text, and particularly to use a range of strategies to develop meaning. The youngest, less proficient readers were certainly less aware than their peers, but the oldest less proficient were highly aware - but equally unable to use appropriate strategies. However what does emerge clearly from the TA results are marked trends towards the more proficient being more aware and more varied and flexible in their use of strategies to get to meaning, a pattern supporting the view that metacognitive development is a shift to more and more flexible use of strategies relevant to the task. We have not argued that this is a cause-effect relationship, with metacognitive awareness causing readers to use strategies better; nevertheless the relationship is strongly present and it is quite apparent that good readers are much more aware of their own processing and able to use strategies to remedy any problems. We find that the idea of metacognition in this material is probably best understood in terms of a continuum of awareness, again incorporating the idea of readers distancing themselves from the task of reading so as to more effectively carry it out. More particularly there is evidence of a belief system about the atomistic nature of text; this may be part of a second order knowledge system that these readers have built up, perhaps now well below consciousness and learned (indirectly) from their experience with their teachers and schools.

Finally, we have seen the stronger evidence for the development of metacognition in the knowledge-oriented, metalinguistic data. Here the trends are more marked, with older readers gradually and consistently demonstrating their knowledge of the larger scale units, and of the range of units, in the language system underlying the texts. Such trends support the arguments in the literature stressing the sensitivity of knowledge states to development over time. This developmental pattern of an increase in knowledge interacted with the proficiency differences here, with a marked tendency for the more proficient to be more aware of language by using the larger scale categories more and by using a

greater range of language units than the less proficient. In the metalinguistic material we see that these readers are demonstrating a knowledge of the abstract language system, by distancing themselves from the concrete texts to the abstract system underlying them, and by being able progressively to refer to larger scale units of language as they develop. Thus in this last section we saw that the emphasis was on the knowledge aspects of metacognition, as applied to language, and not to the self-regulation aspects of the construct.

We turn to an examination of the commonality in these results in the last chapter, where the significance of the findings for the research questions and related issues will also be taken up.

CHAPTER FIVE

CONCLUSIONS

The convergence of the data.

The first research question in this study concerned the possibility that metacognition develops over time in the reader, such that older readers will demonstrate greater awareness and self-regulation or control than younger ones. The second revolved around the contribution metacognition makes to reading, examined here by an analysis of proficiency differences. Underlying both issues was the problem of the fuzzy-edged nature of the concept of metacognition itself and the question of whether the data obtained in this study can be used to clarify what is involved in metacognition. We now examine the data trends to see whether there is a convergence of results from the various data sources in the answers provided to these three questions.

a. Does metacognition develop?

It would be a mistake to attempt to answer the question about metacognitive development in reading without first specifying which aspect of metacognition is being focussed upon. If we are referring to the knowledge component of metacognition then we can say that there is indeed support for the view that it develops relatively slowly over time. The evidence comes from the TA 'direct' data and from the metalinguistic material, where the former demonstrated a trend towards an age-related increase in awareness of comprehension problems. The latter was even more strongly patterned according to an age-related pattern of change, indicated in the increase in frequency and range of use. The Miscue data does not support this trend, however, giving as it does only limited support for an age related increase in awareness. The strong patterns of awareness of comprehension and strategic awareness in the younger readers' Miscue data plainly preclude any conclusion that younger readers are lacking in awareness which would only gradually increase with age.

When we look at the connections between the Miscue data and the metalinguistic material some interesting links may be seen, insofar as knowledge factors are concerned. While the Miscue data shows that younger readers are aware of the whole text, the language data reveals that they also quote at a high level from their texts, thus revealing an

awareness of the text itself. It appears that they have a good idea of text, a concrete phenomenon which is immediately available for examination. However the language awareness data shows that this awareness is limited to the text itself, as their awareness of the more abstract language system underlying text is far more limited. In this sense there is definitely a developmental trend for these readers to become more gradually aware of the less tangible system of language that underlies the concrete text (as discussed in ch. 2, Metalinguistic development). Further, the Miscue data suggests that adults fine tune their interpretation of the text, a view supported by the language data which demonstrates strongly that the older readers are much more aware of the semantic system and other more abstract features of the language system. The convergence of these two data types provides further confirmation of the important concrete/abstract distinction that was apparent in the language data. We cannot, therefore, claim that there is a simple, non-developmental trend here; instead, while asserting that young readers (particularly the proficient young readers) are as aware as older readers, we must point out that there is a marked patterning of awareness in the sample that points towards a difference in metacognitive functioning at the knowledge level in the older readers, and particularly among the adults. In terms of the main models of development there has been evidence of novices becoming more expert, rather than a movement through invariant stages of growth. The evidence also supports the view that the knowledge aspect of metacognition is later in developing.

On the issue of control of the reading process we can say that the younger, less proficient readers monitor and control their reading less well than older readers, although some support exists for the position that both younger and poorer readers are less able to monitor and control their processing of text. It has been noted that the stronger evidence for any developmentally based pattern comes from the indirect measures of awareness, called here strategic awareness. The data gained through these measures seems to bear more saliently on the issue of self-regulation or metacognitive control. We can surmise that readers need time to develop the ability to select and deploy effectively appropriate reading strategies when they have realised that there is something amiss with the meaning

they have been building up as they read, and that their increasing awareness of language itself is a factor in this slow pattern of development. There is growing strength to the claim for a specific developmental aspect in the data overall, in the sense of movement from being a novice to that of being expert. This movement is not clearly age-related. We can therefore conclude that increasing power and flexibility in the older readers is not only based on their strategic awareness but also on their greater awareness of language itself.

The link between knowledge and control aspects of metacognition, and the question of their separateness (and separability) now emerges as an issue. These readers appear to provide evidence in support of the view already discussed, that knowledge states and control processes are closely entwined in metacognitive functioning during reading. We cannot say whether knowledge states in these readers develop because their ability to control increases (Lawson, 1984), or whether it is the increase in metacognitive knowledge that enables the readers more effectively to control the processing (Donaldson, 1978). It might be best to take the view that there are differences of emphasis in the discussion of the relation between these two aspects (Garner, 1987).

The picture of the more mature adults' language functioning that is involved in the task of text processing is one of a certain richness and complexity that marks them off from others in the group studied. We seem to have unearthed a trend of some significance, one which is almost dichotomous in form. That is, although the younger, more proficient readers are quite aware of their own comprehension, they are not as aware of the need for flexibility in using appropriate strategies, nor do they possess the range of strategies that the older readers display. Note that we have hypothesised that underlying this lack of competence is a lack of language awareness as defined in the language hierarchy.

b. Explaining the development of metacognition

It has been inferred, in the case of the indirect, TA categories, that the ability to report a strategy is itself an indication of awareness. This raises the possibility that being able to report in the way that these readers have is significant in itself as an estimator of

their awareness. Note, also, that we have not found any differences in age groups in ability to report, so that it seems that the phenomenon of awareness observed in the act of reporting is a universal one amongst this group. However it is still necessary to consider some possible ways in which readers' awareness has actually emerged. Clearly readers' reports may simply have been stimulated in part by the interview itself, taking place as it does in a one-to-one arrangement where each individual is being treated seriously as an informant. This becomes a more likely possibility in view of the fact that in most classrooms very few readers are asked to carry out such activity.

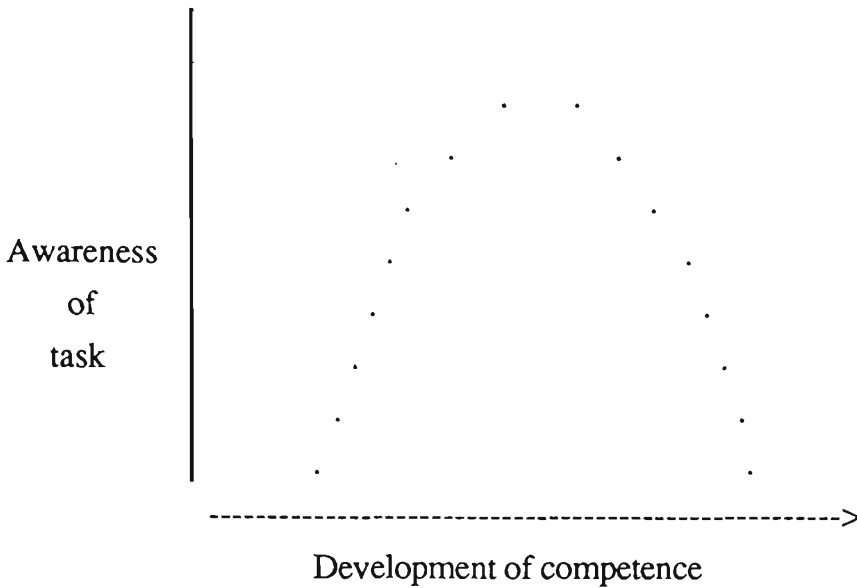
Another possibility is that the reference to a problem in the processing of the text by the reader is itself a means of raising consciousness. Thus the reader may have a stronger memory of that processing activity where more effort had to be expended on the task, or where the smooth flow of text interpretation had been broken by the emergence of some sort of difficulty.

It is also possible that there is something like a developmental framework for awareness at work here. Novice readers may be more aware of their own processing because they are still involved in the development of appropriate reading strategies, and must constantly deliberate on the usefulness and applicability of their particular strategy. They are consequently less likely to have automatised them such that they are driven down into the subconscious. Older readers, having spent more time in using their strategies no longer need to attend to them at a more conscious level. However we have seen that awareness levels are still high amongst adults, although this trend is inflated by the less proficient readers; thus to some extent the notion of a developmental framework is not so strongly supported here.

Another possibility is that the developmental profile's graphical representation is like an inverted U: the young novices are preoccupied with discovering and developing the appropriate strategies and while this is in progress has little processing space left for anything else, such as maintaining or gaining a sense of awareness of what they are doing. However as the capabilities develop, awareness increases because less effort has to be spent on processing, and the reader becomes more aware with increasing internal

and external feedback of success in the task of learning. Then, with longer term use of the capabilities, the reader becomes less aware of processing through the process of automatisisation.

This last explanation is diagrammed in the following figure:



Informal work by Halliday (personal communication, 1986) provides us with another insight into the emergence of awareness of language. When asked to report what was said in some newspaper headlines his respondents initially described the gist of the text, but when probed further reported lexical items, then described aspects of morphology when asked for further responses until finally they discussed aspects of grammatical metaphor and transitivity. He notes that movement is from surface features of text down into the grammar and cryptogrammar, or more generally, from lexis to grammar. This is explained with reference to the unique difficulties we have, in our culture, when we are asked to reflect on language. In one's earliest years considerable effort is put into the task of developing the mother tongue, while later one's ability to function effectively in one's social group depends on the ability to use the language fluently and with speed. Survival depends, at least in the early years, not so much on the capacity to reflect on language, but more on ability to deploy it skilfully. This all suggests that some readers would have difficulty with the task; and perhaps the less proficient

intuitively recall some of the difficulties experienced in the earlier oral language development phase, and find the demands of developing new strategies appropriate to the written mode to be difficult. Nevertheless we have found in this study that virtually all the readers were capable of reporting in strategic terms and therefore were able to surmount the pressures which may have applied to them, at least in the case of the younger readers.

c. The relation of metacognition to reading

There is an even more marked convergence of results when the proficiency differences between groups are examined. The more proficient readers in nearly all cases are both more aware and more likely to know what is the most effective means of solving their comprehension problem and are more capable of actually using appropriate strategies to this end. The language awareness data also provides very strong support for the trend. We found that there was a very marked tendency for the more proficient readers to show their awareness of the fuller resources of the language system. There is therefore to be found in our results a very clearly marked convergence indeed. We can conclude on the basis of this convergence of results that there is a strong connection between proficiency, awareness, language awareness and strategic competence, and a particularly close connection between the last three factors - although it is not possible within the scope of the present design to comment on causality. Awareness alone, it has been shown, is not sufficient for reading competence, as the data from the less proficient readers in both sources has demonstrated quite clearly. Proficiency in reading depends not only on one's being aware of a difficulty in comprehension but also on one's being able to act by selecting an appropriate strategy that will get to meaning. Underlying this capability seems to be a substrate of language awareness that in some ways may be taken to be the most fundamental factor of all.

This evidence is important for the question about the role of metacognition in reading. It clearly supports the position that competence in reading is related to metacognition as defined here. The controversial question about the link between

metacognition and performance in the case of the domain of reading, can be answered in the affirmative, contrary to the claims made more generally in the metacognition literature.

d. Clarifying the concept of metacognition.

i. What is revealed by the verbal reports?

In this study awareness has been indicated (and therefore defined) by the readers' ability to report on their own processing of the text in the context of the correction of or a reference to comprehension problems, or by the investigator's inference from the correction patterns in an oral reading.

The ability of the readers at all developmental levels to report as fully and comprehensively as they have, and in such similar terms, is significant in itself and deserves further comment. We know from the work of Vygotsky (1978) that it is likely that children use private speech as a self-instructional device as they perform cognitive tasks. Such self-instructional activity can provide us with a clue to metacognition by showing how children's use of self-directive language is related to self-regulation (Lloyd & Beveridge, 1981). Such language often contains words which refer to parts of the environment that observers can note. When children say to themselves: 'I must take my dog outside' they reveal how they are using language to control their behaviour. This verbal report reveals how they are managing the task as they play. In the same way the verbal reports obtained in this study also reveal how readers are managing the task of reading. Thus metacognition may take place in a social world which has been internalised and where children use language as if they were another person, with special access to their own thoughts. The reports are therefore to be understood in the light of the metaphor of reporting: reporters have gained access to information and as a result know that they possess the information. We have not argued that in our verbal reports the readers knew, and were able to describe, *how* they were able to access this information; this would be going beyond the limits set out in our procedures, those that have been adumbrated by Ericsson and Simon (1984). But we are arguing that these readers do know *that* they know, for the reasons we are now outlining. Thus when they report that they 'sounded it

out' they are saying that they know that they sounded it out. We are not claiming that they knew what were the processes for gaining access to their own processing.

We might ask how it is that they know this. One possibility has already been suggested- that at least the younger children have used language directly to solve the comprehension problem, so that the reports are actually reports of self-instructions. The reporters, at whatever age, may have developed an awareness of their own actions as part of the experience of learning, by using reflective processes as part of the learning process itself. If this is the case then these reflective processes will be part of the learner's representation of what is actually learned. The reports can then be seen as a recall of these representations from the learner's system.

There are other grounds to be found for this claim about verbal reporting. In the systemic-functional model of language (Halliday, 1978, 1985) the language system is set up on a tristratal basis: the semantic system is realised through the next level, the lexicogrammar, which in turn is realised through the phonological system. Halliday argues that a fundamental principle here is that language is based on the 'meaning potential' that is incorporated in the culture, and that we are in some sense constrained by our cultural semiotic, from which our individual meaning potential is derived.

The issue is centred on the concept of realisation, the essential encoding activity that takes place between the three systems. When the speaker generates an utterance we can say that the utterance is the product of the ripples of realisation running through the systems, with the end result being the text, which has emerged as the particular instance of meaning that was decided on by the speaker. The inference that can be drawn is that speakers do not know what they mean until they have said it, because until the text is produced there is only a meaning potential. Hearers can therefore legitimately conclude, on the basis of the actual utterance, that the speakers now know what it is that they mean. Without a saying there is no meaning - only a potential for meaning. The essential point is that it seems reasonable to conclude that listeners can infer that speakers know what it is that they mean once the utterances have been generated. Note, of course, that much of the

foregoing discussion is based on inference from some linguistic descriptions that have not been tested at the level of psychological functioning.

What seems to be apparent from the reports is that the readers have been able to free themselves from the context in which they are functioning and can report on themselves. Such a phenomenon implies that they do so as though they are other persons, who are not bound by the immediate context. In fact, they are treating themselves as objects. And it may be that this ability to disembody from the immediate context is related to early experiences of written text, as an object that stands apart as a concrete artifact in the child's environment, and not a fleeting series of sounds that are produced and then immediately fade from one's surroundings.

The effect of encountering written text seems to be an important aspect of this issue. The reports were made with a focus on the reading of a written text, an object, that stands available for inspection and reinspection. Thus the relatively unconscious act of producing the report is linked to the focus on the written text, where the language becomes more object like and therefore accessible to consciousness. It may therefore be that the shift from the oral to the written culture is a major aspect that accounts for the ability to report. But what we are arguing for essentially is that the fact of the reports is itself important evidence for self-awareness and metacognition.

How, then, has metacognition in these readers been apparent in their processing? It has been shown to operate at different levels, some more directly indicative of awareness than others. This definition goes beyond those conceptions of comprehension monitoring expressed in terms of knowledge about comprehension and knowledge about how to comprehend (Wagoner, 1983) where it is not easy to see where the metacognitive as against the cognitive processing is involved. We have argued that it is possible to say of individuals not only that 'They know about comprehension' but 'They know that they know about comprehension'. When we transpose this statement to the first person, and find a reader who can say, 'I am comprehending' we can more readily accept that such a claim by the individual presupposes that that person is, at least at the point of utterance, aware that they are comprehending.

ii. Insights into metacognition

There are some convergences between the data sources that are significant and bear on the question of the concept of metacognition itself. We have noted that the young child's level of consciousness may have been increased by the demands arising from the relatively new written mode. The TA data showed that younger, more proficient readers were strategically aware. In the language awareness material this notion also appeared very clearly in the younger, proficient group. We have argued that there is an important stimulus provided by the written mode and that this lies at the heart of their attempts to construct a model of language (not text) that is at one remove from their direct experience. At the least there are direct parallels between the two sources of data. Another convergence is to be found in the belief pattern demonstrated through the strategy use patterns, where the atomistic nature of beliefs about text was mentioned, together with the associated notion of the need to interpret a text piece by piece, on a localised basis. This belief pattern is confirmed and further explicated by the micro to macro pattern of language that emerged so clearly from the language awareness data. The less proficient quite clearly showed that they perceived language as a series of small scale units, predominantly letters and words, without much awareness of larger scale units. Thus the conclusion from one source is confirmed quite directly by another data source.

It has also proved to be important to distinguish between the essential concepts in metacognition and cognition, because of the fundamental issue concerning the importance of the notion of second order functioning, which is assumed to be critical to the model. It is, however, very easy to set up a model of inquiry which in fact simply looks at metacognition as a knowledge, of the same order as any other form of knowledge processing, and thereby to extinguish the distinction between first and second orders of functioning. This is not to say that metacognitive knowledge is necessarily of a sort different to any other forms of knowledge, but to insist that it operates in a second order fashion in relation to other forms of knowledge. The question about any difference in kind of functioning or processing is still an open one that remains part of the problem: the

point is that the problem would not even be available for examination if the distinction between the levels were not to be carefully maintained.

In the present study, however, it *has* proved to be possible to conceptualise metacognition as a second order form of processing - awareness or knowledge of cognitive functioning, and the ability to control certain strategies of cognitive processing, ie., those involved in comprehension in reading. These two aspects of metacognition - knowledge and self-regulation - are generally accepted as central to the concept itself; we have argued, however, that separating these two aspects of metacognition runs the risk of oversimplification although it has been done to assist in the task of clarifying the concept itself. During the study it became increasingly clear that the two strands are not separate at the level of reader processing.

In reading, therefore, we are concerned first with the readers' knowledge of their cognitive resources needed for the task of comprehension, and second, with their capacity to regulate this task by monitoring their success in reading and remedying any difficulties as they arise. We have seen how the first aspect, knowledge of one's cognitive resources has been regarded as an awareness of what is needed to read successfully (of purpose, task, text type etc.) an aspect that seems essential to any understanding of metacognition. In this study some of the focus has been on the monitoring component of the second concept, self-regulation, where the readers are required to keep track of their competence in getting meaning and to take steps to deal with comprehension failure by the use of appropriate strategies. We have found that the TA and Mischue taxonomies have partly provided an insight into monitoring through the category we have called awareness, that is, an awareness of the success or failure of the reader in getting to meaning. But these taxonomies have also raised the question of a more general awareness, as we shall shortly see. Nevertheless, it is clear that readers who can be shown to be aware of what is going on with their own state of understanding texts are plainly monitoring according to this conception. When considering the other aspect of monitoring, remedying the comprehension problem when necessary, the broader notion of strategic awareness has

been very useful: here the readers have been shown to put into play an appropriate activity that enables them to deal with the comprehension problem.

To be able to remedy a comprehension problem it seems obvious that a reader must first have some awareness of the problem, so that it would be expected that a reader who is strategically competent (able to use the sorts of strategies we have uncovered) would be aware. In fact we have found a close association between awareness and strategic competence. However the reverse does not apply; we have found readers who are aware of their problems with comprehension but are unable to deal with them effectively. The TAFE group are important here, since they have a very strong pattern of high awareness and low strategic competence. There is, therefore, the possibility of a disjunction within this formulation of monitoring; while the TAFE readers have been keeping track of their success or failure, ie., they are aware of their lack of understanding, they are not able to bring a strategy into play to remedy this failure. This group of readers highlights the disjunction quite dramatically, but other groups also exhibit it to a lesser extent. So we cannot say that these particular readers are possessed of knowledge about their own resources for processing in reading. What they know is precisely the opposite: that they do not know what to do when faced with problems in comprehension. It is the more proficient readers in our sample who have confirmed this first aspect of metacognition, namely the need to be aware and able to exercise one's strategies.

So when we look at the two major components of metacognition as proposed by Brown (1984) we find that we have some evidence for the first aspect, knowledge of one's own cognitive resources as related to reading. The proficient readers throughout the whole group have shown a high level of strategic awareness and competence in deploying appropriate strategies in the service of comprehension. Readers who are in this sense aware of what to do and can actually use an appropriate strategy as they read must in some sense possess knowledge of their own cognitive resources needed for reading - although we stress that such a conclusion is an inference drawn from our data, as we have no evidence that bears directly on this first aspect of metacognition. Finally, we have

also shown that better readers, and particularly the older readers, were much more aware of the language factor in reading, the clearest example of a knowledge state in the data here discussed. The link between metalinguistic awareness and reading proficiency is very strong and represents an important finding in this study.

The interconnection between the two major aspects of metacognition confirms the proposition put earlier, that knowledge and regulation can be separated for analysis, so as to clarify what is involved in metacognition. We have shown how readers plot the course of their movement through the text by focussing on their own level of understanding and then calling on a strategy to remedy any problem they might be having with meaning. But we have also shown that it is possible to conclude that the strategically competent (in our terms) are also showing signs of knowledge of their own cognition as it applies to reading, thus supporting the other claim that separation of these two major aspects can be an oversimplification. Essentially we argue that knowledge and control are closely interrelated and only separable for analysis in the way that has been done here. It is quite clear that both factors are present in the functioning of the readers in the sample and that we are justified in claiming that both aspects of metacognition itself are equally significant. These two aspects of the model of metacognition, while separable for analysis, have been construed in the research to date as operating together in a unitary fashion in the learners' functioning. By using verbal reports we have been able to show that the model squares with the readers' perceptions of the task. The model has therefore not been imposed on their experience, but is supported by it.

The data from the group of readers examined in this study is supportive of the idea that metacognition in reading is essentially a unitary notion, as seen from the readers' viewpoint. It has also been demonstrated that an analysis of its components is both feasible and illuminating when it comes to the question of clarifying the fuzzy-edged nature of the concept itself.

Summing up the findings

This study has resulted in the establishment of a model of metacognition as it applies to the domain of reading in which the twin notions of knowledge and self-regulation were operationalised within the framework of a specified model of reading. It has been shown that these interrelated concepts are readily apparent and salient in the reading process, the former being conceptualised as self-knowledge of one's own cognitive processing while reading and the latter as the capacity to take control of one's capabilities in the reading process so as to maximise comprehension. For the process of reading to operate smoothly a reader must be able to synchronise and utilise both of these aspects of metacognition.

But it has also been shown that these two features of the concept can be isolated and studied independently of each other, and it is this feature that has clarified the main concept of metacognition. It has been particularly useful to have been able to set up gradations in the notion of awareness itself, important because previous studies have tended to treat metacognitive phenomena as entities that are not gradable, but that are phenomena operating in an all or nothing fashion. In the latter case either one is aware or one is not. We have demonstrated that in reading this is not an adequate way of conceptualising metacognition. The question of levels of consciousness and of tacit or intuitive knowledge is relevant here: this work provides support for the possibility that one's knowledge can run up and down the scale of explicitness. It might be the case that at certain stages in the development of reading competence it is easier to be aware of one's own processing, but there has been no evidence from the study suggesting that novices generally are lacking in awareness, although the lack of awareness in young, less proficient readers is quite apparent. And the contrasting high level of awareness in the oldest less proficient group, as shown in the TA data, suggests that if one does not acquire proficiency quite early as a reader one will certainly build up some sense of awareness along the way, even if without a guarantee of proficiency.

There have been two ways of conceptualising the notion of a gradation of awareness. The TA data has produced the continuum notion of awareness, while there is

a parallel in the hierarchy of awareness in the Miscue material. The continuum was set up because there was a difference that was verging on the qualitative between the groupings of the various categories, whereas the hierarchy was so named because all its components were direct indicators of awareness, and potentially equal in this respect. While it must be acknowledged that these two clines of awareness have emerged for different reasons and that neither can be mapped onto the other there has nevertheless been an important convergence in the two data sources in respect of the gradations in awareness, thus providing another line of confirmation that awareness operates at different levels in the individual while reading.

There is, finally, one other factor that emerged from the language awareness data, enabling us to make a new analysis of the notion of metacognition. It is now apparent that the shift from oral to written language, paralleled by the movement in the reader's processing from an unconscious to a conscious level, provides us with an important new insight into metacognition. What the metalinguistic, language data has demonstrated is the sheer functional value of an increased level of awareness of language itself. This shift from the oral to the written culture is clearly a highly significant one for learners in our classrooms, and those who successfully make the transition show that they are becoming more and more conscious both of their own processing and the language which is the bedrock of the domain of reading that is the subject of this investigation.

The metalinguistic evidence has therefore provided us with a new insight into metacognition itself. We are now able to propose that the movement in these readers' (and particularly the more proficient readers') processing from the part to the whole and from the concrete to the abstract is itself a useful way of conceptualising metacognition in the language domain. The processing involved in these twin activities seems to involve the activity of removing oneself from one's direct experience of the behavioural phenomenon under consideration (in this case, the interpretation of text) so as to appreciate the abstractness of language as system, rather than the more concrete experience of text. This distancing process, as we have called it, seems to be a useful way of modelling the process of metacognition and has the great advantage that it is a model that has arisen

within the domain of language that is the focus of the metacognitive activity which is under investigation here. Thus we are able to say that the distancing process, characterised by the shift from concrete to abstract, is an appropriate model for metacognition, while the result or product of this processing is the part to whole movement that is equally important for language processing.

This formulation is one that has arisen from a specifically linguistic orientation to a psychological problem, and must be taken seriously in that it is grounded in the domain of language which is the focus of the psychological processing. We have therefore developed a reorientation and refinement of the existing model of metacognition as awareness and self-regulation by positing the distancing process or strategy on the part of the reader, a distancing not from their own processing but from the text, so as to be able to perceive the language system itself underlying both the text and their own processing. In this sense a fundamental factor in metacognition and reading is the awareness of the language system which constitutes the basis for any text processing.

Some cautions and continuing problems.

There are many questions raised by our explanation of strategic competence in readers that centres on the emergence of awareness. There seems to be no certain resolution of the various possibilities put forward here to account for the early appearance of awareness in young readers, although the U-curve theory discussed above appears to be a very fruitful one. However we still need to be able to account for the continuing higher level of awareness amongst the more proficient readers, including to some extent older readers, and also the interesting question of the very high awareness of the adult, less proficient readers in this study.

There is an overriding possibility in a study of this sort that, so far as the TA data is concerned, the measures of awareness have been generated, to some extent, by the procedures used in the study itself. By interviewing readers who are actually engaged in the task of reading and asking them about their reading it is possible that their consciousness about themselves is raised, and as a result they become more aware of

their own processing. This remains as a built-in problem for this type of research, although it has been counterbalanced to some extent by the design insofar as the miscue data is not subject to this problem.

The fact that a reader does not report awareness under the circumstances of this study cannot be taken absolutely to imply that that reader possesses no awareness. It may be that the reader chose not to report or felt constrained by the interview procedures used, including some unidentified factors relating to the reader-interviewer relationship. However the interpretation of the data made here seems to be justified in the light of such a strong trend toward proficiency differences in awareness. The fact that the more proficient are universally and consistently so much more aware leads to the conclusion that the lower level of reporting among the less aware is not an artifact of this study but a genuine indication of their approach to reading; the difference itself is the significant point here, since there is more likely to be a similarity between the groups if there was some extraneous influence from the design in these results. What is needed to sort out this question is some more fine grained analysis of the processing of the less proficient.

Generalising from this data.

This study was not designed to provide information about a random sample that would be generalisable to whole populations, so it is not appropriate to make wide ranging conclusions at this point. What has emerged are some clear patterns of metacognitive behaviour in relation to reading in a group of readers of not insignificant size spanning most of the age range of interest to educators. The strength of the patterns can be taken as suggestive of distinct possibilities for readers who are like these readers, and since they represent such a wide span of ages, both sexes and the proficiency differences we have specified here, the breadth of information inherent in this group can be taken as important for the transferability (to use Guba's term: Guba, 1981) of these findings.

We can therefore argue with some confidence that there would be many readers to whom the evidence and conclusions of this study would apply, in that early readers

(although not beginning readers in the sense of those just commencing school) from the junior part of the Primary school, older Primary readers, early Secondary and young adult readers have been incorporated into the groups under investigation. It is possible that beginning readers would display different patterns of metacognitive activity from the second graders who have had two or more years of reading instruction and therefore can be expected to have acquired some attitudes about reading from their teachers. Perhaps younger readers would display a greater level of awareness insofar as they are more deeply concerned with the task of gaining competence in reading; on the other hand they may be so preoccupied with this task that their awareness may actually be lower. Either of these possibilities are consonant with the explanations we have proposed here. There is a possibility that the older Secondary school reader group not covered in this study (grades nine to twelve) may also differ from the findings here, since they will have had the experience of a more intensive, examination oriented curriculum. Whether this approach may predispose them to a more or less self-conscious learning style and a greater awareness in reading is difficult to say, however. These two groups seem to be the only two that could stand outside the framework of findings here.

The other problem associated with the applicability of these findings is the size of the sample studied. Eight readers from each age cohort constitute a modest sample and there is no question that there is a possibility that they are not typical of their age-mates. In a sense this study could be taken to be one of a series of case studies, but the total of forty constitutes a much more significant sample than the intensive study of a handful of readers, from which a richly detailed body of data is to be expected. We are dealing with conclusions that lie midway in applicability between the narrow but detailed material of a small scale case study and the large scale survey studies where generalisability in the traditional sense is possible.

It must also be noted that the readers were a select group in that teachers were asked to nominate readers who would be capable of maintaining a conversation with an adult not well known to them; such individuals would therefore be likely to be more confident and possibly outgoing. Whether these essentially social and affective factors are

likely to impinge on the cognitive aspects under investigation is a matter for speculation, but there does not appear to be any known reason for this aspect of personality to intrude on the quality of the data gained from such a group.

The essential point therefore is that these conclusions are likely to be transferable to readers with similar characteristics, and that beyond this limitation the conclusions should not be too readily applied. However these qualifications are not so substantial as to render these conclusions so limited that their value is severely reduced; rather the sample ought to be seen as moderately typical of populations involved in formal schooling, and the applicability of the findings seen in this light.

Educational implications: awareness and school learning.

The process of all school learning involves (and possibly aims at and results in) an increase of consciousness about what is learned and how it is learned. The focus in this study has been on the how of learning, ie., the strategies themselves and how they are used (though not how they are acquired). When we are involved in an examination of the written mode of language this aspect of learning becomes increasingly salient, because it is claimed by linguists that the demands of both learning and processing the written mode are such as to bring up to consciousness the nature of the task in the experience of the reader (Halliday, 1985). Others point out that all growth in the use of language is to some extent dependent on awareness of it (Doughty & Doughty, 1974).

In the pre- school period the child has developed the oral mode of language very substantially, in a relatively unconscious and intuitive way. The task at school is to adapt to a more deliberate and planful approach to learning, in fact a more self-conscious one, since school learning operates on the basis of organised, sequenced and explicit activities that are designed to promote learning. The child must therefore become more aware of learning itself, a process we might characterise more generally as learning how to learn. Tapping in to this process of awareness would be an important development in our understanding of school learning generally.

Learning to read requires the novice reader to come to terms with a new mode in the language system, the written mode. While reading and listening are similar in that they are both receptive language operations, the significant differences between spoken and written language mean that the learner must develop new strategies to master this new mode. But even more important is the effect on the child of having to face up to this mode shift in the classroom environment where self-conscious learning is predominant. The child has already developed a perfectly useful set of strategies to learn to listen and speak. When faced with the task of reading the child may now bring up to consciousness those strategies that were used earlier to learn to listen.

However in the new school situation the child will find that there are significant differences in the way language is used in the written mode. It is likely that there will be a need to modify the learning strategies to take this into account; but since we can specify what the mode differences are in some detail (higher lexical density, changes in the reference system and a general tendency for the language to change as it is abstracted away from the activity that is the focus of the language) we can argue that the child's newer strategies will have to attend to these particular aspects. Now possibly the most obvious characteristic of the new mode is its synoptic aspect: written language can be scrutinised repeatedly, seen as a whole and worked over while all the time remaining available to view by the reader and writer. The novice reader can therefore adopt an entirely different attitude toward the reading task: it will now be possible to focus on these features of language quite deliberately and, since this is a general demand that the teacher will have already made, it is likely that the child will actually do so. This does not mean that the task is not effortful; in fact it will be, to the extent that the mode is different and to the extent that the child becomes aware of this. But what is important here is the likelihood that the novice reader will have to become much more aware and less intuitive about the task of learning to read. And of course, if this is the case it will have some bearing on the reader's progress in acquiring competence.

We can now see that the rather general notion of awareness described here is likely to be a key aspect of learning wherever text is part of the learning environment.

This means that awareness of one's processing of text is not only a necessary part of literacy learning but of learning throughout the curriculum since text whether oral or written is essential to learning in the formal educational system.

The curriculum question then becomes one of deciding how and at what point the teacher may become involved in the process of increasing awareness in the learner. We have shown that awareness and proficiency in reading, ie., in getting meaning from text, are closely associated, so that the less proficient learners will be at a disadvantage until they learn how to come to terms with their own processing as the more proficient have already done. The teacher, therefore, must consider ways in which awareness can be raised, at least in the case of these less proficient readers. If we knew more about how this had actually occurred (in the proficient readers) then we could utilise the knowledge directly in the service of those who are less aware. Certainly there are some clues as to what teachers could do in the present study. Learning to read could be seen as a problem-solving process where conscious attention by the readers to the way they are processing text needs to be highlighted. In this approach learners should be encouraged to attend to the type of strategy they are using and perhaps be led to the end-point where meaning in text is seen as something to be argued over because it is essentially problematic. Teachers could also focus quite specifically on the language features of the texts being read, by shared reading and modelling activities where the texts' linguistic characteristics are clarified.

Since we have only been able to speculate about how the process of development of awareness takes place, we can only conclude that teachers take note of these possibilities and test them in the classroom for themselves.

Suggestions for further study

This study needs to be followed up by work that is not restricted to the static, snapshot like approach that has been taken here. This material has been limited because it only represents the readers' strategies one at a time at various fixed intervals in the reading process. A useful follow up would be an approach where the reader's processing

is studied more continuously, over a longer period of time, while using a complete text, as was done here. A rereading of the same text could be made so as to allow for the reprocessing that inevitably takes place with more than one reading. No doubt this sort of procedure would yield a much fuller picture of the individual's patterns of awareness and strategy use. A particular matter of concern is to examine younger readers, including the beginner group who have just entered school, and an investigation of readers able to read at school entry would also be particularly important.

There are also advantages in following up the more socio-cultural aspects of this study by examining a number of variables in these readers such as gender, and language background, in the case of those with a family where English is not the dominant language. The texts used in this study were all narratives so the reading of other genres could well unearth different responses.

It would also be useful to study readers' processing of self-chosen texts, within the framework of the classroom itself. The extension of this type of study to the classroom, while posing new problems for the investigator, would be of great value since it would reveal information about metacognition that is more ecologically valid. Finally, an adaptation of these procedures to the task of writing should prove to be of great interest and significance.

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APPENDIX

Texts used for the silent reading.

Aaron, I. E., et al, *Reading Unlimited: The wild and free; The other inhabitant; I catch the bank robber*

Blaxell, G. A., & Winch, G., *Reading Rigby: Bushfire*

Bryning, F., *Mt Gravatt Reading Scheme (Level 4) : Journey into orbit*

Clymer, T., & Jones, V. W., *Reading 360 Australia : The little boy with the big name*

Ewers, J. K., *Modern Australian Short Stories : Young woman in a wimple; Trees can speak; The letter; High Maharajah*

Krok, L., *Mt Gravatt Reading Scheme (Level 3): At the creek*

Martin Jr., Bill & Brogan, P., *Sounds freedomring: The buck and the old man.*

Murdoch, W. & Drake-Brockman, H., *Australian Short Stories : John Price's bar of steel.*

Poe, Edgar Allan, *Tales of mystery and imagination :Ms found in a bottle*