Chapter 19

METACOGNITION AND LITERACY

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INTRODUCTION

> We often find pupils following instructions or performing tasks without wondering why they are doing what they are doing. They seldom question themselves about their own learning strategies or evaluate the efficiency of their performance. Some children virtually have no idea what they should do when they confront a problem and are unable to explain their strategies of decision making. There is much evidence, however, to demonstrate that those who perform well on complex cognitive tasks, who are flexible and perserverant in problem solving, who consciously apply their intellectual skills, are those who possess poorly developed metacognitive abilities. Costa (1985)

When we open a novel, unfold a letter from a friend or spread the pages of a newspaper, we usually experience the reading process as automatic and almost effortless. Most researchers into the reading process would agree that when skilled readers read familiar material written in ordinary language, for relaxation or simple information-gathering, we perform the process of deriving meaning from the text on the page at a level below the threshold of consciousness. We recognise words on the page almost instantly without consciously thinking about how to recognise them, we follow the train of meaning communicated by those words with little conscious attention to what is happening. Reading is automatic.

But what happens when we come across a word, or a phrase, or an idea, that for some reason disrupts this easy flow of reading? What about when the language of the text is no longer transparent? When something just doesn't seem to fit? If you have read the quotation which began this chapter, you should have experienced just such a moment when you reached the fourth to last word. "*Poorly* developed metacognitive abilities?" you might have queried: "Surely it should be 'well developed'."

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Being able to do something to get back into the flow of reading during such moments of uncertainty means having the capacity to self-monitor your own understanding of reading in order to spot and then respond to a difficulty. Reading theorists refer to this capacity as "metacognition". In the language I shall use in this chapter, you have just had a metacognitive experience, and your comprehension monitoring has kicked into action. These terms are probably unfamiliar to many people, yet the processes to which they refer have been increasingly demonstrated to be of special importance in intellectual development and in the operation of many intellectual activities, in particular those of literacy. This chapter will explore the areas of metacognition and literacy, focusing in particular upon the roles of comprehension monitoring in reading and of metacognition in writing. I will then briefly review some of the practical ways in which teachers might respond to these insights by exploring some possible teaching strategies to develop metacognitive approaches to literacy processes.

METACOGNITION AND COMPREHENSION MONITORING

Vygotsky suggested (1962) that there are two stages in the development of knowledge: firstly, its automatic unconscious acquisition (we learn things or how to do things, but do not know that we know these things), and secondly, a gradual increase in active conscious control over that knowledge (we begin to know what we know and that there is more that we do not know). This distinction is essentially the difference between the cognitive and metacognitive aspects of knowledge and thought. The term metacognition is used to refer to the deliberate, conscious control of one's own cognitive actions (Brown, 1980), that is, cognition about cognition: thinking about thinking.

There is a hierarchical relationship between the terms "metacognition" and "comprehension monitoring" (Baker & Brown, 1984). "Metacognition" can be seen as the wider concept, applying to knowledge about cognition in general. "Comprehension monitoring" is seen as applying mainly to the comprehension of connected discourse, which may, of course, involve either reading or listening. In thinking about this topic the following kinds of questions tend to get asked (Wagoner, 1983): What do readers know about their own comprehension, that is, what they comprehend and how they comprehend? Are they aware of when they comprehend adequately and when they do not? How do readers decide when their comprehension is adequate? What kinds of strategies do readers use when they realise they do not comprehend what they read in order to compensate for this? Some fairly clear answers to these questions have emerged from research, and they are answers with important implications for teachers of reading.

An analysis of the operation of comprehension monitoring during the reading process must begin with a description of what this process involves. Good reading has been described as follows: "A good reader proceeds smoothly and quickly as long as his understanding of the material is complete. But as soon as he senses that he has missed an idea, that the track has been lost, he brings smooth progress to a blinding halt. Advancing more slowly, he seeks clarification in the

subsequent material, examining it for the light it can throw on the earlier trouble spot. If still dissatisfied with his grasp, he returns to the point where the difficulty began and rereads the section more carefully. He probes and analyses phrases and sentences for their exact meaning; he tries to visualise abstruse descriptions; and through a series of approximations, deductions, and corrections he translates scientific and technical terms into concrete examples." (Whimbey, 1975, p. 91).

While it is, of course, true that all readers do not follow precisely this sequence of actions, most theories of reading have suggested similarly strategic models for the comprehension process. Reading for meaning therefore inevitably involves the metacognitive activity of comprehension monitoring, which entails keeping track of the success with which one's comprehension is proceeding, ensuring that the process continues smoothly and taking remedial action if necessary. It thus involves the use of what have been called "debugging" skills (Brown, 1980).

Although mature readers typically engage in comprehension monitoring as they read for meaning, it is usually not a conscious experience. Brown (1980) distinguishes between an automatic and debugging state. Skilled readers, she argues, tend to proceed on automatic pilot until a "triggering event" alerts them to a failure or problem in their comprehension. When alerted in this way they must slow down and devote extra effort in mental processing to the area that is causing the problem. They employ debugging devices and strategies, all of which demand extra time and mental effort. Anderson (1980) suggests that efficient readers need not devote constant attention to evaluating their own understanding and he suggests the existence of an "automated monitoring mechanism" which "renders the clicks of comprehension and clunks of comprehension failure".

The events which trigger such action may vary widely. One common triggering event is the realisation that an expectation held about a text has not been confirmed by actual experience of the text. For example, in reading a sentence such as: "The old man the boats", the fourth and fifth words will probably cause a revision of the reader's sense of understanding and therefore take longer to process. Another triggering event is the meeting of unfamiliar ideas at too rapid a frequency for the reader to maintain a tolerance for the subsequent lack of understanding. The usual reader reaction to this is to slow down the rate of processing, devoting time and effort to the task of sorting out the failure in comprehension. The reader enters a deliberate, "aware" state quite distinct from the automatic pilot state, and the smooth flow of reading abruptly changes. (Baker & Brown, 1984).

Realising that one has failed to understand is only part of comprehension monitoring; one must also know what to do when such failures occur. This involves the making of a number of strategic decisions. The first of these is simply to decide whether or not remedial action is required. This seems to depend largely upon the reader's purposes for reading (Alessi et al., 1979). For example, if a reader's purpose is to locate a specific piece of information, a lack of understanding of the surrounding text will not usually trigger any remedial action. On the other hand, if the purpose is to understand a detailed argument, then practically any uncertainty will spark off extra mental activity.

In the event of a decision to take action, there are a number of options available. The reader may simply store the confusion in memory as an unanswered question (Anderson, 1980) in the hope that the author will subsequently provide sufficient clarification to enable its resolution, or the reader may decide to take action immediately, which may involve rereading, jumping ahead in the text, consulting a dictionary or knowledgeable person, or a number of other strategies (Baker & Brown, 1984).

Several studies of comprehension monitoring in action have been conducted. These have found that, in general, skilled readers evaluate their own understanding during the actual process of reading. If they encounter a confusion they give extra time to studying it and they reread previous sentences in an effort to clarify their understanding. They also seem to be prepared to make allowances for the fact that the problem might lie in the text rather than in them. This comprehension monitoring behaviour implies an active approach to gaining understanding from texts.

Research studies have also examined comprehension monitoring in younger and less able readers, and there has been a remarkable consistency in their findings. Garner (1987, p. 59) sums these up well:

> The convergent findings from recent research can be summarised: Young children and poor readers are not nearly as adept as older children/adults and good readers, respectively, in engaging in planful activities either to make cognitive progress or to monitor it. Younger, less proficient learners are not nearly as 'resourceful' in completing a variety of reading and studying tasks important in academic settings.

It appears that "planful, strategic behaviour" (Brown, 1978, p. 457) in the face of the kind of reading tasks likely to be encountered in school learning does not develop until relatively late in children's school careers, and for some children, those who find reading difficult, this may be very late indeed. This is important because this kind of awareness is an essential ingredient in success in school. "Part of being a good pupil is learning to be aware of the state of one's mind and the degree of one's understanding. The good pupil may be one who often says that he does not understand, simply because he keeps a constant check on his understanding. The poor pupil, who does not, so to speak, watch himself trying to understand, does not know most of the time whether he understands or not. Thus the problem is not to get pupils to ask us what they don't know; the problem is to make them aware of the difference between what they know and what they don't." (Holt, 1969, p. 23).

METACOGNITION AND WRITING

It is probably true to say that, of all the processes of literacy and language, writing is the most self-evidently metacognitive. The essence of the act of writing is the opportunity it affords us to put distance between ourselves and our thoughts. By expressing these thoughts in a visible way which we can subsequently rethink, revise and redraft, we are allowed, indeed forced, to reflect upon our own thinking. Alongside this reflection comes an enhancement in the degree to which we can be

conscious of these thought processes and thus an enhancement in our potential control of them. As Smith (1982) has argued, "Writing separates our ideas from ourselves in a way that is easiest for us to examine, explore and develop" (p.15).

The model of the writing process that has emerged from an increasing volume of research suggests that it is made up of a number of simultaneously operating and recursive processes, e.g. planning, composition, transcription, revision, etc. If this is so, then the mechanisms whereby these processes are controlled and co-ordinated in the writer are of some importance. What have been termed "executive control processes" (Raphael et al., 1989) have become a focus of interest precisely because they are a means of linking together diverse and complex component processes.

One of the main problems in teasing out the operation of executive control processes in writing is that it all seems so obvious. It is difficult to imagine writers with any degree of skill who are not continuously applying what they know about the writing process, about the structures of various text types, about purposes for writing, and about audiences, as they meld together a complex range of writing strategies and regulate their use of these strategies. However, while this is true of skilled writers, it is not so obviously true of writers who are less skilled, that is, children learning to write, or children who struggle in writing. It may be that one of the chief aims of instruction in writing should be to develop these executive control processes.

What does this metacognitive knowledge consist of? In many ways this parallels the metacognitive knowledge utilised in the process of reading comprehension (cf. Garner, 1987), which can be classified according to the dimensions of personal, task and strategy knowledge. I shall describe these three focal points of knowledge with reference to myself as a writer, although it is obvious, of course, that all writers are different.

Knowledge of Person

As a relatively experienced writer I know a good deal about how I write and the conditions which help and hinder this. I know, for example, that I write best, in the sense of committing words to paper, when I have a deadline that is looming, but that if that deadline becomes too pressing my writing performance deteriorates. I also know that in the long stretch of time between firming up an idea for writing and actually beginning to type text into the word-processor, I am engaged in what I might term invisible writing behaviour. I am testing out ideas, sequences, starting and finishing points in my mind; I am reading others' writing and assimilating their ideas to my own map of the territory I want to cover, or radically changing that map to accommodate these ideas; I am talking, and arguing, about the ideas I will write about, with my wife, my colleagues, my pupils—in fact, anyone who might be remotely interested. I know that all these things are a normal part of writing for me and I get concerned if they do not seem to be happening for any reason. I know also that when I begin to use the word-processor, however carefully I think I have worked out my map for this piece of writing, the act of writing itself will carry me off into new lines of thought and usually produce a much better end-product.

Knowledge of Task

The majority of writing I do tends to be similar in genre, that is, mostly expository prose and, occasionally, argument. Because I do a lot of this I know a good deal about how this kind of prose "works": that is, I know about structuring it to make it as accessible as possible to the reader; I know about the importance of erecting "signposts" in writing so the reader will be offered assistance through the piece; I know roughly who the likely audience will be for each of the pieces I write. My knowledge about other writing tasks is not so extensive. My experience, for example, of writing fiction has been very limited and unsuccessful, probably precisely because I have no clear, explicit understanding of the way such text "works".

Knowledge of Process

Being a pupil of writing as well as a writer, I am in the very privileged position of knowing a fair amount about the process of writing. The major effect of this, I am sure, is to reassure me that the processes I go through as I write, described above, are entirely normal and will, in the end, produce the right results. Because of this, when I encounter a particularly trying time in my writing, I do not panic as I once might have done but recognise the signs of normality and relax. (N.B. This does not always work!)

These three areas of knowledge can enable me to operate some executive control over writing, control which allows me to check my own progress, choose from alternative strategies, change direction as I proceed and make an evaluation of the emerging and completed product (Englert & Raphael, 1988). This knowledge can, however, only operate in this way if it is activated during the writing process. It is quite possible, as Paris (1986) suggests, to imagine a situation in which writers might have ample knowledge about themselves, the writing task and process, yet still fail to implement executive control because they did not recognise the particular situations in which they were writing as appropriate for particular actions.

In order, therefore, to develop children's executive control over writing, teachers need to ensure that children are given adequate opportunities to acquire the requisite knowledge about themselves as writers, about the writing process and about the demands of particular writing tasks, including textual structures. They also need to ensure that this knowledge develops beyond simply knowing that certain things can be done in writing to knowing how they can be done, and, further, to knowing when and why they should be done.

Of course, the process of establishing instructional aims in terms of metacognitive knowledge about writing is not as simple as stating the knowledge which skilled writers need. It may be that there are limitations on the extent to which young children are capable of mastering and implementing this knowledge. Such limitations might be a function of age and maturation or they might be a product of variable skill. One account of the differences between novice and expert writers has been that provided by Bereiter and Scardamalia (1987). From their own research and that of others, they affirm that studies of expert writers thinking aloud

while writing provide plenty of evidence of reflective activity (Flower & Hayes, 1980, 1981). These writers continually elaborate and reformulate their writing purposes and their plans for achieving these purposes, critically examine and revise their writing decisions, anticipate potential difficulties, make judgements and reconciliations between competing ideas, and show an alertness to the needs of their potential and actual readership.

Such indications seem to be almost entirely absent from the think-alouds of writers of school age. The explanation suggested for this is that these writers are taking different approaches to the process of writing. Bereiter and Scardamalia claim that the procedure which novice writers follow (which they refer to as "knowledge telling") is, in fact, a linear, non-reflective process, which consists, basically, of deciding what the topic is and then writing everything they know about it.

Expert writers, on the other hand, are more likely to have in mind several alternative ways of handling their writing task and their writing consists not only of expressing what they wish to say, but also of actually working this out as they write. This "knowledge transforming" has been described by a variety of professional writers.

Other writers and researchers have pointed to some other differences between the operation of metacognition in the writing of different groups. Englert and Raphael (1988), for example, suggest that pupils with learning difficulties tend to lack the metacognitive control that would enable them to implement and regulate a range of learning strategies. They seem, for example, to be less successful in regulating their textual understanding and fail to monitor or correct potential confusions as they read others' texts and produce texts themselves for others to read. This lack of ability to detect problems and to imagine the confusion which readers of their compositions may experience prevents them from successfully rereading, monitoring and revising these texts.

Fitzgerald (1987) suggests that novice writers often lack the ability to read their own writing from the perspective of another reader. Research findings on this are, however, mixed. Bartlett (1982) found that elementary school children spotted more problems and revised to a much greater extent when they worked with texts which had been written by others than when working on their own texts, which suggests that egocentrism had contributed to the breakdown in their revision processes. Revision was considerably easier when the children had no personal ownership of the texts they revised.

On the whole, therefore, it does seen that younger and less experienced writers are less able to operate metacognitively in their writing than expert writers. Indeed, it even begins to appear that it may be the level of awareness of the writing process that is itself responsible for the difference between expertise and lack of expertise in writing.

DEVELOPING META-LITERACY

There are several teaching implications arising from research in this area. Chief among these is the proposition that teachers who wish to enable their children

to develop their levels of awareness of the reading or writing processes do not simply have to wait for these children to get older and mature into more self-aware strategies. There are positive approaches which can be adopted, and research results suggest strongly that when potential problems in the operation of executive processes are minimised through supportive teacher behaviour, children tend to perform metacognitive operations such as comprehension (Palincsar & Brown, 1984) and revision (Fitzgerald, 1987) at a much higher level.

One way of offering such support is to try to ensure that the literacy experience provided for children is always meaningful and purposeful from their points of view. A number of studies have demonstrated positive effects from this approach, including Robinson et al. (1990), who found that young children can develop an awareness of audience in writing when they are engaged in authentic written dialogues with other writers. Bereiter and Scardamalia (1987) provide a possible explanation for this with their concept of children's "conditional competence" (p. 90), which suggests that children are capable of performing high-level mental activities when the task is of intrinsic worth to them. They do, however, introduce a caveat with their argument that successful writers are in fact those who are able to make tasks meaningful for themselves—this is part of the reason why they are good writers. Therefore, they claim, the teacher's provision of the "meaningful task" is only part of the solution. Of wider importance is the general prevalence of a knowledge-telling strategy in education which they see as part of a general problem of the lack of promotion of "intentional cognition . . . the setting and deliberate pursuit of cognitive goals" (p. 361). Children's awareness of their own thought processes, in writing and in reading, would be central to such intentional cognition.

Teacher Modelling

Several teaching strategies have been suggested as beneficial in developing children's abilities to monitor their own reading and writing. One relatively simple strategy with some history of success is that of teacher modelling. Tonjes (1988) discusses metacognitive modelling as a way of teachers demonstrating to children the monitoring strategies they use in their own reading, and Duffy et al. (1988) similarly discuss the idea of the teacher modelling mental processes to children. They argue that teachers using this approach should concentrate upon transferring metacognitive control from themselves to their children and should model mental processes—what they think as they read or write—rather than simply procedures—what they do. Only in this way, they suggest, can children learn strategies which they can apply across a range of situations rather than which are limited to the context in which they were encountered. This strategy is now familiar to most teachers as shared reading, but it is important to note that the real benefits of the approach are derived not just from a teacher reading aloud to a group of learners, but from his/her thinking aloud at the same time.

Shared writing is also a powerful teaching strategy and involves much more than just writing down what children say, acting as competent secretary to their authors. Shared writing provides teachers opportunities to:

- work with the whole class, to model, explore and discuss the decisions that writers make when they are writing
- make links between reading and writing explicit
- demonstrate how writers use language to achieve particular effects
- remove temporarily some of problems of orchestrating writing skills by taking on the burden of some aspects, for example, spelling and handwriting, thereby enabling the children to focus exclusively on how composition works
- focus on particular aspects of the writing process, such as planning, composing, revising or editing
- scaffold children in the use of appropriate technical language to discuss what writers do and think.

Think Alouds

Another apparently beneficial strategy is that of children being taught to ask themselves questions as they read. Miller (1985) reports on a study in which 8- to 10-year-olds were explicitly taught a self-questioning procedure to accompany their reading. These learners were better able to identify inconsistencies and errors in texts (that is, monitor their comprehension) than other children who were directly told to look for these inconsistencies. The self-questioning procedure these children were trained to apply consisted of the following questions, which they had to ask themselves as they read:

1. First, I am going to decide if this story has any problems in it, like if one sentence says one thing and another sentence says something different or opposite.
2. Second, as I read I will ask myself, "Is there anything wrong with the story?"
3. Third, I will read two sentences and stop and ask if anything is wrong.
4. Fourth, so far, so good, I am doing a great job. Now I will read the whole story and decide if there are any problems in the whole story.
5. Did I find any problems in this story?

Such prompting procedures have also been found to work well in developing writing. Bereiter and Scardamalia (1987) provide evidence of the usefulness of what they call "procedural facilitation", in which they include the use of prompt cards to suggest questions to pupils engaged in writing. Prompt cards might contain questions such as:

- An idea I haven't considered yet is . . .
- My own feelings about this are . . .

Prompts like these are a feature of the approach to scaffolding writing through writing frames (Wray & Lewis, 1997) and seem to enable learners of all levels of ability to extend their writing coherently. Important for the purpose of this chapter is that they work through generating reflection in the pupil writers, that is, metacognition.

Linked to the use of prompting procedures is the encouragement of pupil think alouds. Instruction that entails pupils themselves thinking aloud about their

reading processes has been shown to be effective at improving comprehension. A study by Bereiter and Bird (1985) showed that pupils who were asked to think aloud while reading had better comprehension than pupils who were not taught to do this, according to a question and answer comprehension test. A compelling study by Silven and Vauras (1992) demonstrated that pupils who were prompted to think aloud as part of their comprehension training were better at summarising information in a text than pupils whose training did not include think aloud.

Several researchers have theorised about why pupil think aloud is effective at improving comprehension. One popular theory is that getting pupils to think aloud decreases their impulsivity (Meichebaum & Asnarow, 1979). Rather than jumping to conclusions about text meaning or moving ahead in the text without having sufficiently understood what had already been read, think aloud may lead to more thoughtful, strategic reading. A study conducted with 9-year-old pupils provides some empirical support for this. Baumann and his colleagues found that training in think aloud improved children's ability to monitor their comprehension while reading (Baumann, et al., 1993). Children trained to think aloud as they used several comprehension strategies were better than a comparison group at detecting errors in passages, responding to a questionnaire about comprehension monitoring, and completing cloze items. One pupil trained in think aloud explained, "When I read I think, is this making sense? I might . . . ask questions about the story and reread or retell the story . . . " This and other pupils' comments suggested a thoughtful, strategic approach to reading through think aloud.

Reciprocal Teaching

Reciprocal teaching was developed by Palincsar and Brown (1984) with the aim of helping pupils from 6 years onwards to improving their understanding when reading. Reciprocal teaching is best represented as a dialogue between teachers and pupils in which participants take turns assuming the role of teacher. It is interactive, supported instruction in which the teacher or peer leads a group of pupils as they talk their way through a text to understand it. As they work together, group members monitor their understanding by stopping at regular intervals to ask questions, summarise, predict and clarify what they have read.

Each of these activities has a cognitive and a metacognitive dimension, in that not only are the children working upon their comprehension of the texts (comprehension fostering) but they are also having to reflect upon the extent of their comprehension (comprehension monitoring).

The reciprocal teaching procedure involves an interactive "game" between the teacher and the learners in which each takes it in turns to lead a dialogue about a particular section of text. The "teacher" for each section first asks a question, then summarises, then clarifies and predicts as appropriate. The real teacher models each of these activities, and the role played by the children is gradually expanded as time goes on from mostly pupil to mostly teacher.

Palincsar and Brown (1984) tested this procedure on a group of 11-year-olds with reading difficulties. These children did initially experience some difficulties in

taking over the role of teacher and needed a lot of help in verbalising during summarising, questioning, clarifying and predicting. They did eventually, however, become much more accomplished leaders of the comprehension dialogues and showed a very significant improvement on tests of reading comprehension, an improvement which seemed to generalise to other classroom activities and did not fade away after the completion of the research project. Palincsar and Brown attributed the success of their training programme to the reciprocal teaching procedure, suggesting that it involved extensive modelling of comprehension fostering and monitoring strategies that are usually difficult to detect in expert readers, and that it forced children to take part in dialogues about their understanding, even if at a non-expert level.

Reciprocal teaching has been extensively researched since the mid-1980s and results have generally been very positive. For example, Rosenshine and Meister (1994) documented the positive gains made by reciprocally taught pupils on experimenter-designed tests of expository reading, and Alfassi (1998) also reported the effectiveness of reciprocal teaching with suburban high-school pupils who were at least two years below grade level in comprehension. After 22 days of reciprocal reading, these pupils scored significantly higher than did pupils receiving traditional reading skills instruction, whose scores remained virtually unchanged.

CONCLUSION

Although there are several caveats to be made about the quality of the research evidence, in particular about the methods typically used to ascertain children's use of metacognition in reading or writing performance, it does seem to be likely that developing pupils' metacognition may be one possible way forward in developing their literacy. This seems to be particularly true for pupils who are struggling with literacy. It may be that a key to enhancing children's abilities in literacy is to develop their abilities to be more "aware" of their literacy processes.

If this is the case, then teachers need to consider carefully how they will set about doing this. Although, again, the research evidence is as yet incomplete, there do seem to be several teaching strategies that might be beneficial in this area. Reciprocal teaching has certainly created a great deal of interest, especially among teachers of children with reading problems (for example, McGowan & Bell, 1993), and this procedure currently seems to offer the greatest hope in terms of a well-founded, systematic approach to teaching. Its components, however, such as teacher modelling, encouraging self-questioning and explicit discussion of literacy processes, are all beneficial teaching activities in their own rights. The teaching of literacy would undoubtedly benefit from wider use of such approaches.

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