Metacognitive awareness and reading strategies: Average and reading disabled students

Susana Padeliadu, George Botsas and George Sideridis

Abstract

The goal of this study was to investigate the reading strategies of students with and without reading disabilities, and document the major metacognitive deficiencies of reading disabled students. Two hundred and fifty students attending grades 3 through 6 in elementary school participated in the study. Metacognitive awareness and reading strategies were assessed through the protocol developed by Miholic (1994). The data analysis revealed that reading disabled students have a significantly lower level of metacognitive reading awareness than the average readers, and that they use mostly non-effective reading strategies. There were no significant differences in regard to gender and few differences in relationship to the grade the students attended.

Key words: metacognition, metacognitive awareness, reading comprehension, good readers, poor readers, regulation, conditional knowledge, planning, evaluation

1. Introduction

Children with reading problems are often characterized as disorganized, passive or careless readers. These characterizations stem mainly from their reading difficulties. In recent years, in order to explain children’s difficulties in reading and, in particular, reading comprehension, psychologists and teachers have turned to the study of children’s metacognitive skills (Garner 1980, 1981, 1988, Garner and Kraus 1982, Garner and Taylor 1982, Wong and Jones 1982). These difficulties have been described as metacognitive deficiencies or failure of the children with reading difficulties to think about the way they think (Meltzer
According to Flavell (1976, 1979), the term metacognition describes the awareness of a person about cognitive phenomena, cognitive functions and their products. Concerning specifically metacognitive skills in reading, these refer to a) self-assessment of the reader in relation to their reading, i.e. awareness of the task at hand and their own capability, b) planning of actions that will lead to deduction of meaning from the text at hand, c) coordination of actions - strategies selected for use to solve the existing reading comprehension problem (Brown, 1980, Paris and Lindauer 1982).

Ann L. Brown quite early on, focused her interest on children with reading difficulties and presented their main features in relation to reading comprehension, which concern:
1. Recognition of the problem situation posed by the text and the need for using a strategic intervention (Brown 1975)
2. Use of inferential reasoning to assess the probability (the hypothesis) that the meaning of the text might be true (Brown 1978);
3. Predicting the result of using a strategy before and after reading (Brown and Lawton 1977)
4. Predicting the difficulty of the task to be completed (Brown 1978, Tenney 1975)
5. Planning the allocation of effort vis-à-vis the use of strategies (Brown and Campione 1977, Brown and Smiley 1978)
6. Monitoring success in the comprehension efforts in terms of specific strategies, so that they are used no more if successful, but applied again after modification, if unsuccessful.

Other researchers have used the term metacognitive awareness instead of metacognition, to express the same concept. Metacognitive awareness is the awareness of the child about him/herself as a reader, the perception of the reading task s/he is faced with as well as of the strategies s/he is using (Paris and Jacobs 1984, Miholic 1994, Hall, Bowman and Myers 1999).

Researchers' views on the metacognitive skills of children with reading disabilities have developed through three stages. Initially it was thought that children with learning disabilities have no metacognitive skills in relation to reading (Hallahan and Dailey Kneedler 1979, Wiens 1983). The difficulties they encounter in comprehension and reading in general were explained as a result of their lack of metacognitive skills. Research, however, soon proved this view to be fallacious.

The next interpretation was that children with learning difficulties may have
some metacognitive skills, but they are so cognitively passive that they cannot activate these skills and, therefore, be successful (Bouchard-Ryan, Weed and Short 1986, Torgesen 1977, 1979).

Currently, the view that seems to be gaining ground is that children with learning disabilities have metacognitive skills, which, however, are less sophisticated than those of their peers without learning problems (Wong and Wong 1986). More specifically, these children use fewer metacognitive comprehension strategies (Garner and Kraus 1982), which are usually of a lower complexity level than those used by good readers (Kobasigawa, Ransom and Holland 1980, Myers and Paris 1978, Paris and Myers 1981). In relation to their peers, they have knowledge of fewer reading strategies—which they also find difficult to describe (Forrest and Waller 1980)—, recognize their mistakes with more difficulty, and display a poorer recollection of the text content (Paris and Myers 1981). Furthermore, even when they are aware of certain successful techniques, they do not actually use them when it comes to solving reading comprehension problems, or cannot adapt them to the task at hand (Paris and Myers 1981).

Quite often children with reading disabilities use strategies that are common among younger or less experienced readers. Children with learning disabilities, such as beginner readers, do not seem to know certain important factors and strategies related to reading, such as the goal of reading or the use of strategies for text comprehension (Myers and Paris 1978). They, therefore, believe that the only goal in reading is decoding rather than comprehension (Johns, 1980, Myers and Paris 1978, Reid 1966).

Despite international recognition of the significance of metacognitive skills, there are no research data concerning Greek children with or without reading disabilities. Additionally, no reference is made to metacognitive skills when reviewing language teaching. Our aim in this paper has been to look into children’s reading strategies by examining children with and without reading disabilities, and to document the most important metacognitive deficiencies of learners with reading problems. Gathering this information will allow us to further understand the problems of children with learning disabilities and to develop appropriate ways to remedy these problems through language instruction.

Our research questions were:

1. What is the profile of children with reading disabilities concerning their metacognitive skills in comparison to good readers?
2. What is the relationship between metacognitive skills in reading with sex and grade for good readers and for children with reading disabilities?
2. Methodology

2.1 Sample

Two hundred and fifty (250) children of the upper four Elementary School grades (3rd-6th) from Macedonia, Thrace and the islands of Northern and Eastern Aegean were included in the study. One hundred and twenty five (125) of them were good readers and the rest one hundred and twenty five (125) had reading disabilities and were attending special classes at their schools (Table 1).

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<th>Table 1. Sample distribution per reading group</th>
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<tr>
<td>N</td>
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<tr>
<td>Children with reading disabilities</td>
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<td>Good readers</td>
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<td>Total</td>
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Of these, 143 were boys (57.2%) and 107 were girls (42.8%). Thirty-six (36) attended the 3rd grade (14.40%), 81 attended the 4th grade (32.40%), 83 were in the 5th grade (33.20%) and 50 in the 6th grade (20%).

2.2 Data Collecting Instrument

Metacognitive awareness in reading as well as the reading strategies selected by children were assessed with the help of the protocol developed by V. Miholic (1994), which was adapted for the Greek language. This includes 10 questions concerning common reading behavior patterns of the child-conditions prevailing during reading: inability to understand a word, inability to understand a sentence, use of recall strategies, planning before reading, repetition of reading when something is not understood, assessment of comprehension difficulties, pace of reading, central and main ideas, texts with complicated concepts, and important sentences within the text. For every one of these behavior patterns/conditions there are four possible answers corresponding to effective or non-effective strategies, i.e. strategies used by good or poor readers.

Exercises 1, 2, 5, 7, and 9 concern the regulation of cognitive functions used for comprehension. This regulation refers to monitoring and redefining one's efforts during reading so that the final objective, i.e. comprehension, is achieved (Paris and Jacobs 1984). By using this group of strategies, a reader controls his/her learning (Schraw 1998), in this case, his/her reading comprehension. Exercise 3 concerns conditional knowledge, which means that a child knows
when and why s/he should use declarative and procedural knowledge (Jacobs and Paris 1987, Schraw 1998). Declarative includes a child’s knowledge about him/herself as a reader and the factors influencing his/her reading performance; procedural refers specifically to which strategies the child should use and when. Exercise 4 concerns the planning of the cognitive event — reading in this case — and the corresponding cognitive faculty or strategy for a specific cognitive objective (Jacobs and Paris 1987). Finally, exercises 6 and 10 concern the evaluation of an objective or the cognitive potential of the reader (Paris and Jacobs 1984).

The protocol was given to each child individually. To start with, there was an announcement of the process. The researcher read the question and asked the child if s/he used the strategies that followed. Children could choose more than one strategy per question. Data were collected by the special class teacher, at every reference school, following specific instructions.

3. Results

3.1 Metacognitive skills profile

The profile of children in relation to their metacognitive skills is described along three axes in Figures 1 and 2, and Table 2. The first axis concerns the strategies used by poor and good readers; the second axis concerns overall performance in metacognitive awareness; the third axis concerns specifically the strategies as they were grouped by Miholic (1994).

3.1.1 Strategies of poor and good readers

![Figure 1. Means of selection of strategies of poor and good readers per group of reading ability](image-url)
As shown in Figure 1, children with reading disabilities (RD) are significantly lagging in the selection of good readers' strategies (Mean\textsubscript{RD}=26 and SD\textsubscript{RD}=16.56) in relation to good readers (GR) (Mean\textsubscript{GR}=51 and SD\textsubscript{GR}=21.53).

As far as the strategies of poor readers are concerned, children with reading disabilities select, on average, 45 strategies of poor reading (SD\textsubscript{RD}=22.38), while good readers have a mean of 14 (SD\textsubscript{GR}=11.23). Differences observed between children of the two groups are statistically significant concerning the strategies of good readers (F(1,249)=105.76, p<0.000) as well as those of poor readers (F(1,249)=231.01, p<0.000).

3.1.2 Overall performance in metacognitive awareness

In regard to the overall performance in metacognitive awareness, this was defined as the numerical difference between the strategies of good and poor readers selected (Figure 2).

![Figure 2. Overall performance (Difference of means) of selection of strategies of good and poor readers per level of reading ability](image)

Children with reading disabilities show a negative difference concerning overall performance Mean\textsubscript{RD}=-19 (SD\textsubscript{RD}=28.23), which means that they use overwhelmingly more strategies of a poor rather than a good reader. On the contrary, the difference in the performance of good readers is positive, Mean\textsubscript{GR}=37 (SD\textsubscript{GR}=23.00). The difference in the overall performance of good readers and students with reading disabilities is statistically significant (F(1,249)=234.88, p<0.000).
3.1.3 Regulation strategies, conditional knowledge, planning and evaluation

Mean selection values of poor and good reader strategies vis-à-vis the grouping proposed by the protocol inventor (Miholic 1994) are presented in Table 2.

Table 2. Mean selection values of poor and good readers vis-à-vis exercise grouping

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<th>Good reader strategies</th>
<th>Poor reader strategies</th>
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<tr>
<td></td>
<td>Students with</td>
<td>Good</td>
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<td></td>
<td>Reading Difficulties</td>
<td>Readers</td>
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<tr>
<td>Regulation</td>
<td>28</td>
<td>52</td>
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<tr>
<td>Conditional Knowledge</td>
<td>23</td>
<td>50</td>
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<tr>
<td>Planning</td>
<td>20</td>
<td>50</td>
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<tr>
<td>Evaluation</td>
<td>22</td>
<td>47</td>
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</table>

The analysis of variance showed that the differences of selections of good reading strategies in the regulation exercises between good readers and students with reading disabilities is statistically significant (F(1,249)=93.19, p<0.000). The same is true about the conditional knowledge exercise (F(1,249)=83.44, p<0.000), the planning exercise (F(1,249)=53.79, p<0.000) and the evaluation exercises (F(1,249)=75.71, p<0.000).

Concerning the strategies of poor readers, the analysis of variance showed that the difference of selections of poor reading strategies in the regulation exercises between good readers and students with reading disabilities is statistically significant (F(1,249)=211.22, p<0.000), in the exercise of conditional knowledge (F(1,249)=115.53, p<0.000), the planning exercise (F(1,249)=46.28, p<0.000) and the evaluation exercises (F(1,249)=70.89, p<0.000).

The differences in the overall performance in all groups of exercises between good readers and students with reading disabilities were also statistically significant. Specifically, in regulation exercises it was found that F(1,249)=255.85, p<0.000, in the conditional knowledge exercise F(1,249)=148.98, p<0.000, in the planning exercise F(1,249)=68.02, p<0.000 and in the evaluation exercises F(1,249)=117.14, p<0.000.

3.2 Metacognitive skills and sex and grade

An analysis of variance was performed to determine the relationship between the selection of good or poor reading strategies and children's sex and grade. This analysis showed no statistically significant differences concerning sex or grade for either group of readers.
As for the overall performance of metacognitive awareness, the analysis of variance also showed no statistically significant differences concerning sex between good readers and children with reading disabilities. On the contrary, the relationship between grade and overall performance in metacognitive awareness was statistically significant, but only for the group of good readers ($F(3,114)=4.61, p<0.1$), with students in the 3rd grade being statistically at the lower level than students in grades 4 and 5.

4. Discussion

According to contemporary views in the field of learning disabilities, the low performance of children with learning disabilities in various subjects and, especially, in reading and comprehension should not be attributed to deep cognitive but to metacognitive deficiencies (Wong 1996). According to our findings, the initial hypothesis that children with learning disabilities have no metacognitive skills and strategies (Wong 1996) does not seem valid. Children with reading disabilities do have metacognitive strategies, although these are fewer and less sophisticated than the strategies used by their peers who have no reading disabilities (Wong and Wong 1986).

The picture emerging is quite clear. Children with reading disabilities are aware of fewer good reader strategies and of more poor reader/beginner strategies. This makes them behave as younger children in the reading field, as children at the initial reading stages, with a strong focus on decoding. It is, therefore, possible, that, after all the cognitive effort they make to decode, they do not have much cognitive power left to attempt comprehension and develop metacognitive awareness vis-à-vis reading (Wong 1996). However, it should also be mentioned that even in children without reading disabilities, there is some use of poor reading strategies and this may be due to the language instruction in Greece.

As far as metacognitive awareness and sex is concerned, there seems to be no difference between boys and girls, neither in the good readers’ group nor in the group of children with reading disabilities.

On the contrary, our findings confirm the research findings that have shown that there are developmental differences between age groups concerning metacognitive awareness (Cross and Paris 1988, Jacobs and Paris 1987, Kurtz and Borkowski 1984, Myers and Paris 1978, Paris and Jacobs 1984, Pressley, Harris and Marks 1992, Schneider and Pressley 1997, van Kraayenoord and Schneider 1999, Weinert 1986). Additionally, our findings show that good readers develop their metacognitive skills significantly after the 3rd grade, whereas children with reading disabilities develop their skills extremely slowly, up to the
6th grade of elementary school.

Regarding the specific nature of metacognitive skills, we have shown that children with reading disabilities do use planning strategies, but these are far fewer than those used by good readers. Therefore, children with reading disabilities cannot select the appropriate strategies, so as to allocate their cognitive powers accordingly. More specifically, they may have problems anticipating reading, organizing their strategies in sequence or allocating time and attention before attempting the materialization of an objective (Schraw 1998). However, as our results show, even with good readers, planning is developed towards the end of childhood, around puberty (Bereiter and Scardamalia 1987).

Conditional knowledge presents a similar picture. Children with reading disabilities select fewer strategies as to when and why certain other strategies should be used (Garner 1990, Jacobs and Paris 1987, Paris and Jacobs 1984). This means that children with reading disabilities, even if they possess certain strategies, they do not know when and why to use them to achieve the desired objective. Crucially, the use of acquired strategies cannot be effective unless the reader can allocate his/her resources appropriately (Reynolds 1992).

Furthermore, children with reading disabilities often have difficulty in examining and assessing the goal of a reading task or its results. Consequently, when they reach the end of their cognitive effort, they do not know if the results actually fulfill the necessary conditions. Therefore, they cannot go back to the text and use different strategies or adapt existing strategies to reach the desired goal.

Finally, children with reading disabilities use fewer regulation strategies as compared to good readers. Especially monitoring ability of their cognitive effort is acquired slowly and is particularly poor in all children, even in some adults (Pressley and Ghatala 1990). For children with reading disabilities, who do not monitor their comprehension while it is taking place, this means that they cannot redirect their efforts towards comprehension, with a negative effect on the final result.

In conclusion, contrary to initial hypotheses of researchers, it seems that children with reading disabilities do possess certain metacognitive strategies. These are generally fewer and less sophisticated than those used by their peers without reading disabilities. They use fewer good reading strategies, while they carry on using many strategies used by poor or beginning readers, i.e. strategies generally used by younger children. Their difficulty in planning does not allow them to build a cognitive effort that follows an organized scheme for the use of strategies in order to achieve their desired objective, i.e. comprehension. A fur-
ther difficulty stems from the children's lagging behind in strategies of depend-
ent knowledge, while during their cognitive effort they are in no position to
monitor or redirect it, if necessary. Finally, deficiencies of the children with
reading disabilities in strategies to assess the result of their cognitive effort,
paint the picture of the passive reader who can not interact with his/her effort
so as to change an inappropriate approach.

The emergence of specific metacognitive skills, necessary to pupils with
reading disabilities as well as to good readers show specific needs and directions
for instruction. Integration of metacognitive strategies in all stages of educa-
tional practice will support cognitive efforts and performance of all pupils to the
extent we know that metacognitive awareness can be taught (Schneider and
Pressley 1997, van Kraayenoord and Schneider 1999, Weinert 1986). Such teac-
ching of metacognitive skills should be comprehensive and gradual.

So, as far as language instruction is concerned, it is necessary to focus on all
parameters of metacognitive awareness (conditional knowledge, planning, use
of strategies, regulation, evaluation of use of strategies, and the final result) ac-
cording to the needs recorded for each group of children. Finally, it is necessary
to apply a gradual approach to metacognitive awareness. This will initially in-
clude making the child aware of metacognitive knowledge; it will then go on to
consolidate comprehension as a reading objective and eventually aid the acquisi-
tion of new strategies and their association with specific cognitive tasks.

References


Bouchard-Ryan, Ellen, Keri Weed, and Elizabeth Short (1986). “Cognitive behavior modifi-
cation: Promoting active, self-regulatory learning styles”. In Joseph K. Torgesen and
Bernice Y. L. Wong (eds), *Psychological and Educational Perspectives on Learning Disa-

Brown, Ann L. (1975). “The development of memory: Knowing, knowing about knowing,
and knowing how to know”. In Howard W. Reese (ed.), *Advances in Child Development

— (1978). “Knowing when, where and how to remember: A problem of metacognition”. In

— (1980). “Metacognitive development and reading”. In Rand J. Spiro, Bertram Bruce and
Hillsdale, NJ: Lawrence Erlbaum.


