Awareness of reading strategy use and reading comprehension among poor and good readers

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ABSTRACT. The present study was designed to explore the primary school students' awareness of reading strategies and to identify possible differences between poor and good readers, in terms of frequency and efficiency. Furthermore, it aimed at exploring the relation between reading strategy awareness and reading comprehension. Eighteen poor readers and eighteen good readers, aged between 11 and 12, which were selected from a total of 201 sixth grade students, participated in the study. The study was conducted by using retrospective interviews as the basic instrument, in combination with reading test scores. Both groups utilized a variety of cognitive strategies, though it was revealed that poor readers, on the one hand, were less aware of the more sophisticated cognitive strategies, and on the other hand they reported a limited number of metacognitive strategies in comparison with good readers. In addition, both cognitive and metacognitive strategy awareness made a unique contribution to reading comprehension, beyond and above the effects of reading accuracy and reading speed.

Key words: reading comprehension, awareness of cognitive strategies, awareness of metacognitive strategies, poor readers

Reading is a complex process including a combination of perceptual, psycholinguistic and cognitive abilities (Adams, 1990; National Institute of Child Health and Human Development [NICHHD], 2000). It is widely accepted that the three key components of reading are accuracy (involves phonological and orthographic processing), fluency (involves time), and comprehension (NICHHD, 2000). Perfetti & Hogaboam (1975) stressed the importance of "*the conceptualization of reading as composed of separable components*" (p. 461), since it allows the researchers to examine the relationship among the different reading components and the way that they are linked.

The main goal of reading is to extract and construct meaning from the text (Sweet, & Snow, 2002). Reading comprehension is a complex cognitive ability requiring the capacity to integrate text information with the prior knowledge of the reader and resulting in the elaboration of a mental representation (Anderson, & Pearson, 1984; Afflerbach, 1990; Meneghetti, Carretti, & De Beni, 2006). Thus, reading comprehension is an interactive process that takes place between a reader and a text (Rumelhart, 1994); during this interaction, the reader brings variable levels of experiences and skills which include language skills, cognitive resources and world knowledge.

Ample evidence attests to the important role of word-level processes such as reading decoding and reading fluency to accomplish the higher-order processing involved in reading comprehension (Gough, & Tunmer, 1986; Juel, Griffith, & Gough, 1986; Perfetti & Hogaboam, 1975; Sindelar, Monda, O'Shea, 1990; Tan, & Nicholson, 1998). However, the modest correlations among these skills varying between 0.3 and 0.6 (Juel, Griffith, & Gough, 1986) leave room to seek other factors above the word- level that contribute to the variability in reading comprehension.

The readers' involvement in the text is of crucial importance since they should develop, modify and even reflect on all or some of the ideas displayed in the text. Guthrie & Wigfield (1999) highlighted that "*a person is unlikely to comprehend a text by accident. If the person is not aware of the text, not attending to it, not choosing to make meaning from it, or not giving cognitive effort to knowledge construction, little comprehension occurs*" (p. 199).

In reading, especially in reading comprehension, readers have been found to employ a wide range of strategies, while they are engaged in comprehending text (Paris, Wasik, & Turner, 1991), since reading comprehension "involves conscious and unconscious use of various strategies, including problem solving strategies to build a model of meaning" (Johnston, 1983).

Strategy is conceived as a deliberate goal-directed action (Pereira-Laird, & Deane, 1997), which can be either conscious or unconscious or automatic. More precisely, *reading strategies* have been defined as specific, deliberate, goal–directed mental processes or behaviours, which control and

modify the reader's efforts to decode a text, understand words and construct the meaning of a text (Garner, 1987; Afflerbach, Pearson, & Paris, 2008). Reading strategies have been usually classified into three broad categories, depending on the level or type of thinking processing involved: *cognitive, metacognitive strategies,* and *social affective* strategies (Chamot, 1987; O'Malley & Chamot, 1990). In this article, we will focus on the cognitive and metacognitive strategies.

Cognitive strategies involve direct 'interaction' with the text and contribute to facilitating comprehension, operate directly on oncoming information, manipulating it in ways that enhance learning. Under the heading *cognitive strategies,* can be classified the following ones: 'underlining', 'using titles', 'using dictionary', 'writing down', 'guessing from the context', 'imagery' 'activating prior knowledge', 'summarizing', 'using linguistic clues', 'using text markers', 'skipping the difficult parts' and 'repeating words or phrases' (Table 2). Metacognitive strategies are higher order executive tactics that entail planning for learning, monitoring, identifying and remediating causes of comprehension failure or evaluating the success of a learning activity; that is, the strategies of 'self-planning', 'self-monitoring', 'self-regulating', 'self-questioning' and 'self-reflecting' (Table 4) (Pressley & Afflerbach, 1995; O'Malley & Chamot, 1990).

There is often no clear distinction between the two categories of reading strategies because of the interchangeability in function (Brown, 1987), since "*metacognition draw on cognition*" (Veenman, Van Hout-Wolters, & Afflerbach, 2006). Metacognitive strategies "*involve planning, monitoring, and evaluating that take place before, during, and after any thinking act such as reading... In contrast, cognitive strategies refer to integrating new material with prior knowledge. Cognitive strategies that students use to acquire, learn, remember, retrieve and understand the material while reading include rehearsal, elaboration, and organizational strategies*" (Pereira-Laird, & Deane, 1997, p. 190). In other words cognitive strategies/skills are necessary to perform a task, while metacognitive strategies are necessary to understand how the task has been performed (Garner, 1987; Schraw, 1998), as they involve both the awareness and the conscious control of one's leaning.

Reading strategies are of interest not only for what they reveal about the ways readers manage their interaction with the text, but also for how the use of strategies is related to effective reading comprehension. Recent trends in the area of reading comprehension have led to an increasing emphasis on the role of metacognitive awareness, which has been defined as the perceived use of reading strategies while reading (Jacobs, & Paris, 1987; Mokharti & Reichard, 2002; Pressley, 2000). Most researchers related to metacognition distinguished 'metacognitive knowledge' (knowledge of cognition) from 'metacognitive skills' (regulation of cognition) (Schraw, 1998). Metacognitive knowledge refers to a person's declarative knowledge about the interactions between personal characteristics, task and the available strategies (Flavell, 1979; Veenman, Kok, & Blöte, 2005; Veenman, Van Hout-Wolters, & Afflerbach, 2006). Moreover, many researchers regarded 'metacognitive knowledge' as a synonym for 'metacognitive awareness' (e.g., Juliebo, Malicky & Norman, 1998). Metacognitive skills, on the other hand, refer to a person's procedural knowledge for regulating one's problem solving and learning activities (Veenman, Van Hout-Wolters, & Afflerbach, 2006).

There is consensus that awareness and monitoring of one's comprehension process are critical aspects of skilled reading, because successful reading comprehension is "*not simply a matter of knowing what strategy to use, but the reader must also know how to use it successfully*" (Anderson, 1991, p. 19). Most researchers agree that cognition and metacognition differ in that cognitive skills are necessary to perform a task, while metacognition is necessary to understand how the task has been performed (Garner, 1987; Schraw, 1998). Skilled readers usually use a mixture of cognitive and mecognitive strategies. Pressley, & Afflerbach (1995) observed that skilled readers use many different strategies in coming in terms with the text. Furthermore, O'Malley & Chamot (1990) suggested that good readers are more able to monitor their comprehension than poor readers and they are more aware of the strategies they use than are poor readers, and they use them more flexibly. Good readers adjust their strategies to the type of text they are reading and to the purpose for which they are reading. They distinguish between important information and details as they read, they use context more efficiently and are able to relate new information with information already stated, as well as to notice inconsistencies in the text and employ strategies to make these inconsistencies understandable (O'Neil, 1992; Paris, Wasik, & Turner, 1991).

In order to help readers with or without reading difficulties, it is very important to understand what specific problems they encounter during their reading process (Lau, 2006). Moreover it is necessary to identify poor readers' awareness of the strategies they employ while comprehending a text and to explore if they use these strategies effectively. It is noteworthy that despite the ample evidence concerning the relationship between reading strategy awareness and reading comprehension, no research has provided evidence on the fact that awareness of cognitive and metacognitive strategies contribute to reading comprehension beyond and above reading accuracy and fluency. In addition an attempt was made to focus on quantifying the verbalised retrospection verbal data in order to achieve more valid insights into readers' strategy awareness and to define more obvious differentiation between poor and good readers.

Specifically, the present study was designed and conducted aiming to examine:
(a) The range of cognitive and metacognitive reading strategies employed by poor and good readers.
(b) The possible differences between poor and good reader's awareness, in terms of frequency and efficiency, of using cognitive reading strategies.
(c) The possible differences between poor and good reader's awareness, in terms of frequency and efficiency, of using metacognitive reading strategies.
(d) The contribution of reading strategy awareness (cognitive, metacognitive strategies) to reading comprehension, beyond the well-established effects of reading accuracy and reading speed.

METHOD

Participants

Eighteen poor readers (10 boys and 8 girls) and eighteen good readers (10 boys and 8 girls) participated in the study. Their ages ranged from 11-4 to 12-2 years ($M = 11.8$ years, $SD = 0.24$ years). All participants were Greek speaking sixth-grade students and selected from ten classrooms with a total number of 201 students from five state primary schools in Northern Greece. Thirty six (36) participants were selected according either to their higher or lower reading ability based on the scores of a group administered screening reading test and the verification of their reading ability by teachers' judgments.

The sample selection was performed in two steps. In the first step, a screening test was administered to 201 sixth grade students. 26 good readers that they had cut off scores above the 87th percentile and 26 poor readers that they had cut off scores below the 13th percentile on the screening test were selected. The lower or higher reading achievement of the students was verified by the teacher's judgments for 24 poor readers and 22 good readers. In the second step of sample selection, a total of 10 students, one student with intellectual disability, 5 poor readers and 4 good readers, who seemed to be introvert and shy or failed to collaborate with the research assistants in the retrospective procedure, were excluded from the study. Five of the selected poor readers attended a resource room program (3-4 hours per week).

Instruments

The study was conducted by using retrospective interviews, as the basic instrument, in combination with reading comprehension, reading accuracy and fluency test scores; moreover, a screening reading test was used for student selection.

Screening Reading test. A Greek standardized screening reading test (Triga, 2004) was used to measure the general reading ability and select the sample of the study. It consisted of 42 multiple choice sentence completion items. The test was designed to be used for students aged between 10 and 14.

Reading material. Each student was exposed to two texts (a narrative and an informational text), which were followed by four reading comprehension open-ended questions. The texts, of different genres -narrative and informational respectively- were selected with the assumption that the theme will be familiar to the participants, eliciting strong interest in the texts. The narrative text, entitled "The little tree", consisted of 236 words (see Appendix 1). It had to do with the warm reception of trees for reforestation from the students of a classroom. The informational text, entitled "The Euro", consisted of 228 words (see Appendix 2). Its theme was related to national currencies of EC countries by Euro. All students were tested individually in a quiet room at their school. Students' reading aloud was tape-recorded and subsequently timed using a hand-held stopwatch. Reading records were used to

assess reading accuracy (measured in reading errors, one error per word misread), reading speed (measured in terms of the correct number of words read aloud per minute) and reading comprehension (scores on the 4+4 open-ended questions). All the correct answers contained at maximum 14 and 11 units of information respectively. Possible reading comprehension score for the narrative text ranged from 0-8 and for the informational text from 0-11. In statistical analyses the combined reading comprehension score, by addition, was used.

Retrospective interviews. Retrospective interviews were conducted with each of the students, after terminating their reading and responding to the reading comprehension questions. The participants were asked to report on their thoughts while they were completing the reading task (Camps, 2003; Garner, 1987; Ericsson, & Simon, 1984).

Interviews, consisted of ten (10) open-ended questions, were conducted for assessing students' awareness of the reading tasks, the difficulties encountered in the reading process, their reading strategy use, and their perceptions on abilities and weaknesses (see Appendix 3). More specifically, the first interview questions were directly related to the text (e.g., how a participant came to the decision to choose the answer to a question) and the interviewing proceeded with more general questions (e.g., what problems were encountered in comprehending the text, what they do when they do not understand the meaning of the text during reading, what they think when they do not understand the meaning of the text etc.). What matters in the interview is how the participant came to a certain answer (*the process*), not her/his correct or incorrect answers (*the product*).

The participants were asked to comment on their strategic processes during text comprehension—successful and unsuccessful strategies employed, retrospectively (Haynes, 1993; Morrison, 1996). The immediate recall minimizes the possibility that participants may start relying on inferences rather than reporting what happened (Camps, 2003; Ericsson & Simon, 1980). Compared to the 'on line verbal reports' (think-aloud reports), retrospective interviews provide more generalizable information than does the concurrent think-aloud technique corresponding more to the awareness concept (Wesche, & Paribakht, 2000). Moreover, retrospective verbal reports, as off-line reports, exclude the possibility of reactivity; they do not interfere with the normal process of reading, as the online think-aloud reports do. However, the retrospective technique has some drawbacks, since participants can rationalize their behaviour after the event or they can fail to recall accurately what they were thinking during the reading (Nisbett, & Wilson, 1977; cf. Ericsson & Simon, 1980, 1984), since the reporting is not concurrent with the processes being described (Ericsson & Simon, 1984).

Procedure

During the main session, which followed the session of screening test administration, each participant was tested individually in the two reading texts. After completing the first reading, the participants were given a chance to look over the text material for 30 seconds, and were subsequently asked to answer four open-ended questions for comprehension assessing purposes.

Upon the completion of reading comprehension questions, individual semi-structured retrospective interviews were conducted with the 36 students. Interviews averaged 15 minutes. The whole session including the reading tasks, reading comprehension questions, and semi-structured interviews were tape-recorded and transcribed.

Verbal data analysis

The verbal data underwent the following procedures:

a) Data reduction, which involved first and second level coding, resulted in groups of sub-categories, 'labelled' by a specific name (Miles, & Humberman, 1994), that were classified into two major categories: cognitive and metacognitive strategies.

b) The classification of cognitive and metacognitive strategies was based on taxonomies provided by Jacobs, & Paris (1987), O'Malley, & Chamot (1990), and Pressley, & Afflerbach (1995).

c) Furthermore, statistical analyses of the verbal data were not restricted to report mere frequencies of cognitive and metacognitive strategies as those frequency scores did not reflect the efficiency of strategies (Veenman, & Beishuizen, 2004). For this reason, following Jacobs, & Paris (1987), Lau (2006), and Pereira-Laird, & Deane (1997), we used quantified coding criteria to assess readers' strategy efficiency. Each strategy code was rated on a scale ranging from 0 to 2 (see Table 1).

Table 1. Coding criteria for the efficiency of strategy awareness in retrospective interview

Point	Coding criteria
0	Inadequate answer
1	Partially adequate answer
2	Strategic response=Understanding how to apply a strategy in comprehending a text

d) In order to examine the relationship between strategy awareness and reading components, we created and tested two specific indices: i) The Cognitive Strategy Awareness Index (CSAI) was the composite score of students on *12 cognitive strategies*, ranged from 0 to 24; it did not include the score on the 'ambiguous' cognitive strategy of *skipping the difficult parts*. The CSAI quantifies the awareness of cognitive strategies to an index, ii) The Metacognitive Strategy Awareness Index (MSAI) was the composite score of students on *10 metacognitive strategies*, ranged from 0 to 20. The MSAI quantifies the awareness of metacognitive strategies to an index.

Scoring Reliability
The second researcher (judge) rated all the transcribed data from the think-aloud protocols. The data rated for cognitive strategies and metacognitive strategies. After three months, the second researcher (judge) rated again 50% of the data (9 think-aloud protocols of poor readers and 9 of good ones). Intra-judge reliability averaged 96.4% for cognitive strategies and 94.3% for metacognitive strategies. The first researcher (judge) independently scored the other 50% of the data. Inter-coder reliability averaged 88.8% for cognitive strategies and 88.7% for metacognitive strategies. The two judges were not aware of participants' reading scores when coding.

RESULTS
Awareness of cognitive strategies
Descriptive statistics (frequency and corresponding percentage) for each strategy are presented on Table 2; accordingly, the cognitive strategies were ranked from the highest percentage to the lowest. There were a total of 203 reports of cognitive strategy use.

As it is indicated on the table 2, good readers reported that they employ cognitive strategies much more frequently, almost twice, than poor readers. Furthermore, from a total of 13 cognitive strategies reported in the study, *organisation strategies* (underlining, using dictionary, using titles, and writing down) were the most favourite strategies among poor readers (an aggregate of 54.28%). Besides, there was no significant relationship between using dictionary strategy and reading group ($\chi^2 = .55$, $df = 1$, $p > .05$), while the chi-square statistic was not valid in the case of underlining strategy and writing down strategy since 50% of cells had expected frequencies less than 5. The only significant relationship was that good readers reported the strategy of using titles more frequent than poor readers ($\chi^2 = 8.00$, $df = 1$, $p < .05$) (see Table 3).

Strategies referred to *more elaborate cognitive processes* (guessing from the context, activating prior knowledge, imagery, keeping meaning in mind, summarising) were reported less frequently by poor readers (11.42% in the aggregate). As it is presented in the table 3, there were significant relationships between strategy of guessing from the context and reading group ($\chi^2 = 18.84$, $df = 1$, $p = .000$), between strategy of activating prior knowledge and reading group ($\chi^2 = 16.20$, $df = 1$, $p = .000$), between imagery strategy and reading group ($\chi^2 = 9.75$, $df = 1$, $p < .01$), and between strategy of keeping meaning in mind and reading group ($\chi^2 = 12.50$, $df = 1$, $p = .001$); while the chi-square statistic was not valid in the case of summarising strategy. Apart from 'summarizing', there were statistically significant relationships between awareness of 'elaborate' cognitive strategies and reading group, indicating that poor readers reported these strategies less frequently than poor readers did.

Similarly, poor readers seemed to be less aware of strategies related to *using linguistic features of the text* (using linguistic clues, using text markers) (an aggregate of 7.14%). As it is presented in the table 3, there were significant relationships between the strategy of using linguistic clues and reading group ($\chi^2 = 19.31$, $df = 1$, $p = .000$), and between the strategy of using text markers and reading group ($\chi^2 = 5.60$, $df = 1$, $p < .05$). These significant relationships indicated that poor readers reported strategies based on linguistic features less frequently than poor readers did.

Table 2. Ranking of Cognitive Strategy Awareness and percentages within reading groups

Rank	Cognitive Strategy	Poor		Good		Total	
		f	$\%$	f	$\%$	f	$\%$
	Organisation strategies*	*38*	*54.28*	*48*	*36.09*	*86*	*42.36*
1	Underlining	17	24.28	17	12.78	34	16.75
2	Dictionary use	12	17.14	14	10.53	26	12.81
3	Using titles	8	11.42	16	12.03	24	11.82
13	Writing down	1	1.43	1	0.75	2	0.99
	Elaborate cognitive strategies*	*8*	*11.42*	*54*	*40.60*	*62*	*30.54*
4	Guessing from the context	3	4.29	16	12.03	19	9.36
5	Activating prior knowledge	2	2.86	14	10.53	16	7.88
9	Imagery	2	2.86	11	8.27	13	6.40
10	Keep meaning in mind	1	1.43	11	8.27	12	5.91
12	Summarizing	0	0.00	2	1.50	2	0.99
	Using linguistic features of the text*	*5*	*7.14*	*25*	*18.80*	*30*	*14.78*
7	Using linguistic clues	1	1.43	14	10.53	15	7.39
8	Using text markers	4	5.71	11	8.27	15	7.39
	Others						
6	Skipping the difficult parts	13	18.57	3	2.26	16	7.88
11	Repeating words or phrases	6	8.57	3	2.26	9	4.43
	TOTAL**	70	99.99	133	100.01	203	100

Note: *Cumulative frequencies and percentages, **Total not exactly 100.00 due to rounding

It is worth noting that the less 'elaborate' strategy of *skipping the difficult parts* reported as the most popular strategy among poor readers (24.28%) compared to good readers who reported their preference to use it to a lesser degree (12.78%). In relation to this strategy, there was a significant relationship between strategy awareness and reading group ($\chi^2 = 16.20$, $df = 1$, $p < .001$), indicating that poor readers reported this 'ambiguous' strategy more frequently than poor readers did.

Referring to the readers' efficiency of cognitive strategy awareness, nonparametric Mann-Whitney (2-tailed) tests were carried out to examine possible differences between poor and good readers. These analyses yielded similar results to χ^2 statistic, showing that good readers had significant better efficiency of awareness in the more elaborate cognitive strategies [guessing from the context ($U = 25.50$, $p = .000$), activating prior knowledge ($U = 44.00$, $p = .000$), imagery ($U = 80.00$, $p = .002$), keeping meaning in mind ($U = 69.00$, $p = .000$)], apart for summarising ($U = 144.00$, $p > .05$). Also, good readers had significantly higher efficiency of awareness in the strategies based on linguistics features [linguistic clues ($U = 39.50$, $p = .000$), text markers ($U = 98.50$, $p = .044$)]. In relation to the efficiency of awareness in the organisation strategies, there were no statistically significant differences among poor and good readers [underlining ($U = 128.00$, $p > .05$), using dictionaries ($U = 134.00$, $p > .05$), writing down ($U = 162.00$, $p > .05$)], except for using titles strategy where good readers had significantly higher efficiency of awareness ($U = 54.00$, $p = .000$). In addition, there was no significant difference among poor and good readers in repeating words or phrases ($U = 138.00$, $p > .05$). In the 'ambiguous strategy of *skipping the difficult parts,* poor readers had significantly higher efficiency of awareness than good readers ($U = 57.00$, $p = .001$). To sum up,

analyses, using Mann-Whitney tests, concerning the efficiency of strategies awareness gave a similar picture to this 'depicted' from the analyses with χ^2 regarding the frequency of strategies.

Table 3. Frequency of cognitive strategy awareness among poor and good readers

		Reading Group			
Cognitive Strategy		Poor	Good	χ^2 (1)	p
Organization cognitive strategies					
Underlining	no	1	1		
	yes	17	17	.00	*nv*****
Using dictionaries	no	6	4		
	yes	12	14	.55	.457
Using titles	no	10	2		
	yes	8	16	8.00	.012*
Writing down	no	17	17		
	yes	1	1	.00	*nv*****
Elaborate cognitive strategies					
Guessing from the context	no	15	2		
	yes	3	16	18.84	.000***
Activating prior knowledge	no	16	4		
	yes	2	14	16.20	.000***
Keeping meaning in the mind	no	17	7		
	yes	1	11	12.50	.001***
Summarizing	no	18	16		
	yes	0	2	2.12	*nv*****
Imagery	no	16	7		
	yes	2	11	9.75	.005**
Strategies based on linguistics features					
Using linguistic clues	no	17	4		
	yes	1	14	19.31	.000***
Using text markers	no	14	7		
	yes	4	11	5.60	.018*
Others					
Skipping the difficult parts	no	5	15		
	yes	13	3	11.25	.002**
Repeating words or phrases	no	12	15		
	yes	6	3	1.33	*nv*****

*p <.05 *significance of Fisher's Exact Test at the 2-tailed level*, ****p ≤.01, ***p ≤.001, nv****= the χ^2 statistic was not valid.

Awareness of metacognitive strategies
Descriptive statistics (frequency and corresponding percentage) for each strategy are presented in Table 4; accordingly, the cognitive strategies were ranked from the highest percentage to the lowest. There were a total of 120 reports of metacognitive strategy use.

As it is indicated in Table 4, good readers reported that they employ metacognitive strategies more frequently than poor readers; as twice and a half more instances of metacognitive strategies were reported by good readers comparatively to poor readers. It was worth mentioning that no 6th grade poor readers reported the most "demanding" monitoring and planning strategies such as *comprehension control*, *overviewing the text and important parts*, and *directed attention,* as well as the most sophisticated evaluation strategy of *self correction with automatic explanation of the error*. From a total of 10 metacognitive strategies reported in the study, *rereading*, *performance or text evaluation* and *slowing down* reading were the three most favourite ones among poor readers, while *rereading*, *selective attention* and *performance or text evaluation* were the three most favourite ones among poor readers, (see Table 4).

Table 4. Ranking of Metacognitive Strategy Awareness

Rank	Metacognitive Strategy	Poor f	Poor $\%$	Good f	Good $\%$	Total f	Total $\%$
	*Monitoring & planning strategies**	*24*	*68.57*	*64*	*75.30*	*88*	*73.33*
1	Rereading	14	40.00	18	21.18	32	26.67
2	Selective attention (e.g. looking for the main idea, key meanings)	4	11.43	17	20.00	21	17.50
4	Slowing down reading	5	14.28	6	7.06	11	9.17
6	Self-questioning	1	2.86	9	10.59	10	8.33
7	Comprehension control	0	0.00	5	5.88	5	4.17
9	Directed attention (concentrating on the task, defying distraction, task persistence)	0	0.00	4	4.70	4	3.33
8	Over-viewing	0	0.00	5	5.88	5	4.17
	*Evaluating strategies**	*11*	*31.43*	*21*	*24.70*	*32*	*26.67*
3	Performance or text evaluation	7	20.00	14	16.47	21	17.50
5	Problem identification	4	11.43	6	7.06	10	8.33
10	Self-correction & errors' explanation	0	0.00	1	1.18	1	0.83
	TOTAL	35	100.00	85	100.00	120	100.00

Note: *Cumulative frequencies and percentages.

As it is presented in Table 5, there were significant relationships between *selective attention* strategy and reading group ($\chi^2 = 19.31$, $df = 1$, $p = .000$), and between *self-questioning* strategy and reading group ($\chi^2 = 8.86$, $df = 1$, $p < .01$); no significant relationship was found between *slowing down reading* strategy and reading group ($\chi^2 = .13$, $df = 1$, $p > .05$); while the chi-square statistic was not valid in the case of *rereading* strategy. In the case of *comprehension control*, *directed attention* and *over-viewing* strategies the chi-square statistic was not also valid, since no poor readers reported these strategies and in a statistical level there were cells that have expected count less than 5; it can easily be noticed that 4-5 good readers reported at least once each of these strategies (see Table 5). Thus, apart from rereading and slowing down reading strategies, poor readers reported the remaining six monitoring and planning strategies less frequently than poor readers.

As it is shown in Table 5, there were significant relationships between strategy of performance or text evaluation and reading group ($\chi^2 = 5.60$, $df = 1$, $p < .05$), but no significant relationship was found between problem identification strategy and reading group ($\chi^2 = .55$, $df = 1$, $p > .05$); while the chi-square statistic was not valid in the case of self-correction strategy, since just one good reader reported this strategy.

With reference to readers' efficiency of awareness of metacognitive strategies, nonparametric Mann-Whitney (2-tailed) tests were carried out to examine possible differences between poor and good readers, which led to similar results to χ^2 statistic [selective attention ($U = 14.00$, $p = .000$), self-questioning ($U = 87.00$, $p = .003$), comprehension control ($U = 117.00$, $p = .018$)], directed attention ($U = 126.00$, $p = .037$)], and over-viewing ($U = 117.00$, $p = .018$)]. The only difference was that good readers in rereading had significantly higher efficiency of awareness than poor readers ($U = 68.00$, $p = .001$), while no significant differences were found in the strategy of slowing down reading ($U = 150.00$, $p > .05$).

Table 5. Frequency of metacognitive strategy awareness among poor and good readers

Metacognitive Strategy		Reading Group		$\chi^2(1)$	p
		Poor	**Good**		
Planning and monitoring strategies					
Rereading	no	4	0	4.50	nv****
	yes	14	18		
Selective attention (focusing on the main idea, key words etc.)	no	14	1	19.31	.000***
	yes	4	17		
Slowing down reading	no	13	12	0.13	1.00
	yes	5	6		
Self-questioning	no	17	9	8.86	.003**
	yes	1	9		
Comprehension control	no	18	13	5.81	nv****
	yes	0	5		
Directed attention	no	18	15	3.27	nv****
	yes	0	3		
Over-viewing the text and important parts	no	18	13	5.81	nv****
	yes	0	5		
Evaluating strategies					
Performance or text evaluation	no	11	4	5.60	.018*
	yes	7	14		
Problem identification	no	6	4	.55	.457
	yes	12	14		
Self-correction and errors' explanation	no	18	17	1.03	nv****
	yes	0	1		

p <.05** *significance of Fisher's Exact Test at the 2-tailed level*, ****p <.01, ***p <.001, nv*= the χ^2** statistic was not valid

Similarly, good readers had significantly higher efficiency of awareness in the strategy of performance/text evaluation than poor readers ($U = 81.50$, $p = .007$), but no significant differences were found in the strategies of problem identification ($U = 140.00$, $p > .05$) and self-correction ($U = 153.00$, $p > .05$).

To summarize the findings presented above, it can be mentioned that good readers had higher efficiency of awareness in the most sophisticated strategies of monitoring, planning and evaluating in comparison with poor readers.

Comparison of awareness of cognitive and metacognitive strategies among poor and good readers

Two independent *t*-tests were performed on the Cognitive Strategy Index Awareness (CSAI - quantifies the awareness of cognitive strategies) and Metacognitive Strategy Awareness Index (MSAI - quantifies the awareness of cognitive strategies to an index) in order to test the differences between poor and good readers. The means and standard deviations for the Cognitive Strategy Awareness Index (CSAI), Metacognitive Strategy Awareness Index (MSAI) are shown in Table 6.

The mean CSAI score of good readers was significantly higher than that of poor readers ($t = -8.28$, $df = 27.12$, $p < .001$), indicating that good readers have better awareness of cognitive strategies than poor readers. Also, the mean MSAI score of good readers was significantly higher than that of poor readers ($t = -7.02$, $df = 34$, $p < .001$), indicating that good readers have better awareness of metacognitive strategies than poor readers.

Table 6. Means, standard deviations minimum and maximum values for the Cognitive Strategy Awareness Index and Metacognitive Strategy Awareness Index between two group

| Variable | Reading Group | | | | | | | |
| | Poor | | | | Good | | | |
	M	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*
Cognitive Strategy Awareness Index	3.56	1.89	1	9	10.94	3.28	4	16
Metacognitive Strategy Awareness Index	2.61	1.75	0	5	8.11	2.82	4	15

Relationships among awareness of cognitive and metacognitive strategies and reading comprehension

Prior to correlation and regression analyses, a moderate positive skewness in CSAI scores was confronted with a square root transformation and a substantially positive skewness in reading accuracy scores with a logarithmic transformation. The Pearson product-moment correlation coefficients (*rs*) for the measures of Cognitive Awareness Strategy Index and reading accuracy were calculated on the basis of transformed values, while for Metacognitive Strategy Awareness Index, reading speed and reading comprehension on the basis of untransformed values.

Table 7 displays that all the intercorrelations were statistically significant. It is note worthy that the reading comprehension correlated moderately with the Cognitive Strategy Awareness Index (*r* = .565), and Metacognitive Strategy Awareness Index (*r* = .550). Also, CSAI and MSAI were moderately correlated with reading speed (*rs* = .652, .662 respectively), but low correlated with reading accuracy (*rs* = .423, .360 respectively). Not surprisingly, MSAI was highly correlated with CSAI (*r* = .802). In general, the results revealed a close relationship among cognitive strategy awareness, metacognitive strategy awareness, and reading comprehension. In addition, the fundamental reading skills of reading accuracy and reading speed were also close related to reading comprehension (*rs* = .536, .559 respectively).

Table 7. Correlations among reading accuracy, speed, comprehension, and awareness of reading strategies (cognitive and metacognitive) for both groups combined (*n* = 36)

Variables	1	2	3	4
1. Reading comprehension	-			
2. Reading accuracy (errors)	-.536**	-		
3. Reading speed	.559**	-.700**	-	
4. Cognitive Strategy Awareness Index	.565**	-.423*	.652**	-
5. Metacognitive Strategy Awareness Index	.550**	-.360*	.662**	.802**

* *p* < .05 (2-tailed), **p < .01 (2-tailed).

To obtain some further insights into the relationship of reading comprehension with the awareness of reading strategies (cognitive and metacognitive), two hierarchical multiple regression analyses were performed with reading comprehension as the dependant variable. We conducted two separate regression analyses, and not just one, to avoid multicollinearity, because of the high correlation between cognitive and metacognitive awareness. In addition, we used this type of regression analysis (hierarchical) to determine the independent contribution of cognitive strategies awareness (CSAI) and metacognitive strategies awareness (MSAI) to the reading comprehension, beyond the well-established contribution of reading accuracy and reading speed. Table 8 displays the standardized regression coefficients (β), R and significance of *F*, for each of the regression analysis, and multiple R^2 after each step, R^2 change with CSAI or MSAI in the equation, and significance of *F* change.

Table 8. Hierarchical regression analyses summary for the variables predicting reading comprehension ($n = 36$)

Step and predictor variable	β	R	F	R^2	R^2 change	F change
1st analysis						
Step 1		.59	9.02**	.35		
Reading accuracy (errors)	-.28					
Reading speed	.36					
Step 2		.66	8.07**	.43	.077	4.34*
Cognitive Awareness Strategy Index	.37					
2nd analysis						
Step 2		.66	8.21**	.43	.081	4.60*
Metacognitive Awareness Strategy Index	.39					

* $p < .05$, ** $p \leq .001$

In step 1, reading accuracy and reading speed were included as predictors in the regression analyses in order to control their effects on further steps. In step 2 of the first regression analysis, the addition of Cognitive Awareness Strategy Index to the equation resulted in a significant increment in multiple R^2 (7.7%). In step 2 of the second regression analysis, the addition of Metacognitive Awareness Strategy Index to the equation resulted in a significant increment in multiple R^2 (8.1%). Thus, both cognitive and metacognitive awareness contributed significantly to predicting reading comprehension, explaining additionally about 8% of the variance in reading comprehension, over and above that afforded by differences in reading accuracy and reading speed. Not unexpectedly, reading accuracy and reading speed explained together 35% of the variance in reading comprehension.

DISCUSSION AND CONCLUSIONS

The main goal of the present study was to establish an understanding of perceived use of cognitive and metacognitive reading strategies of poor and good readers. The interest was primarily focused on investigating possible differences in strategy awareness between poor and good readers, in terms of frequency and efficiency. Moreover, an attempt was made to examine whether the cognitive strategy awareness and metacognitive strategy awareness are important predictors of reading comprehension.

From the retrospective interview data, that shed light on readers' strategy awareness, it can be concluded that the poor readers were able to describe the use of a number of cognitive strategies to the same extent with the good readers. However, according to verbal reports, poor readers employed cognitive strategies less frequently and less efficiently than good readers did. Good readers utilised more frequently meaning-oriented reading, while poor readers adopted a word-centred model of reading, tried to process word meaning rather than trying to comprehend and retain the meaning of the text. Thus, they reported less frequently certain 'demanding' cognitive strategies, such as guessing from the context, activating prior knowledge, using imagery, keeping meaning in mind, as well as strategies based on linguistic features of the text. Their reports, compared with those of good readers showed that they did not keep a proper balance between more and less sophisticated cognitive strategies. Our findings support previous studies which indicated that good readers are aware of their purposes for reading and employ repertoires of cognitive strategies for processing texts (Grabe & Stoller, 2002; Pressley, 2002), as well as they use context and prior knowledge more efficiently for comprehension purposes (Van Dijk & Kintsch, 1983; Kintsch, 1988).

Concerning metacognitive strategies, poor readers were aware of a smaller repertoire of metacognitive strategies, since they reported that they used metacognitive strategies less frequently than good readers did. Good readers were more aware that the reading tasks can require different approaches, they were selectively attentive as well as they were able to take a larger, more synthetic view; however, poor readers replied on a much slower analytical procedure. Clear and significant differences were found to exist between the two groups in relation to monitoring comprehension. Although, good readers were aware of employing text-processing strategies for monitoring comprehension, poor readers tended to employ word-level cues to focus on decoding the text and they

did not frequently activate content schemata when needed, and did not control reading comprehension to a sufficient degree.

Our results accord with previous studies revealing that there is a difference in metacognitive strategy use between readers of varying reading levels in terms of frequency of use and type (Paris, Lipson, & Wixson, 1983). Good readers are more able to monitor their comprehension than less efficient readers, and they are more aware of the strategies they use than are poor readers (O'Malley & Chamot, 1990). In addition, good readers continuously evaluate their prediction and revise them as needed (Paris, Wasik, & Turner, 1991).

It is worth mentioning that poor readers employed the most frequent metacognitive strategy of 'rereading' in a less efficient way than good readers did. It was noted that the instances of cognitive strategies reported by poor readers correspond to one third of the total number of instances. On the other hand, the instances of metacognitive strategies reported by poor readers correspond to one fourth of the total number of instances. Overall, it seems that poor readers keep an inappropriate balance level between cognitive and metacognitive strategy awareness.

The results of this study revealed moderate intercorrelations among cognitive strategy awareness, metacognitive strategy awareness, and reading comprehension. The regression analyses showed that cognitive strategy awareness, metacognitive strategy awareness each explained 7.7% and 8.1% of the variance in reading comprehension over and above reading accuracy and reading fluency that explained together 35% of the variance. Thus, both cognitive and metacognitive strategy awareness can be considered to play a unique role in reading comprehension of 6th grade primary students. Comprehension failures can occur beyond the word-level skills such as reading accuracy and fluency. Additional and more elaborated research is needed to examine the role of cognitive and metacognitive strategies in reading comprehension.

Understanding the relationships among cognitive, metacognitive strategies and reading may generate useful approaches to teaching reading comprehension in poor readers. In short, the findings of this study are in line with the metacognitive theorists' and researchers' suggestions for explicitly teaching children to become strategic readers, providing poor comprehenders a repertoire of most sophisticated cognitive and metacognitive strategies, such as comprehension monitoring, that can promote reading comprehension (Brown, Pressley, Van Meter & Schunder, 1996; Paris, Lipson, & Wixon, 1994; Paris, Wasik, & Turner, 1991; Sweet, & Snow, 2002). On the other hand, our findings underline the role of reading accuracy and fluency to reading comprehension. Even in the 6th grade, it seems that the teaching of lower-level skills should not be ignored in the case of some poor readers, since these skills explain part of the variability in reading comprehension. On balance, poor comprehenders are needed instruction on word-level reading skills as well as on vocabulary, cognitive and metacognitive strategies etc. (Sweet, & Snow, 2002). Reading strategy training could facilitate the 'transfer' of strategies to new tasks, could increase readers' awareness of the variety of reading strategies that can be used and also could lead to metacognitive awareness which "*has been identified as a key factor in efficient reading*" (Devine, 1993). Moreover, through strategy training poor readers could compensate by invoking top-down and interactive strategies, as well as combining strategies to facilitate comprehension and could be assisted towards autonomous use of strategy use.

The study needs to consider some limitations in order to lead a more refined and rigorous future research. Firstly, there is no data on students' background related to their oral skills; it is important to identify possible oral language difficulties of the students, since reading skills and ability are assumed to be closely linked to oral language (Beck, Perfetti, & McKeown, 1982; Zwaan & Brown, 1996). Moreover, there is the need to expand the particular methodology used here; the 'simultaneous, introspective method' of think-aloud may provide more information on planning or self-monitoring (Juliebö, Malicky, & Norman, 1998). Although some information on metacognitive knowledge was gathered through retrospection, it is clear that "what people say" do not necessarily reflect "what people actually do" (Lau, 2006). Only by using multiple measures of verbal reports, a more complete and accurate picture of poor reader's awareness of strategy use could be obtained. Furthermore, there is a need for a larger sample of participants to investigate the cognitive and metacognitive strategy awareness and the nature of the relationship between poor readers' reading strategy awareness and reading comprehension. This could be achieved, as above mentioned, through employing a variety of methodological tools such as think-aloud reports and questionnaires.

In considering the results of the present study, some issues raised related to the need of training students to use strategies effectively. In strategy instruction, poor readers could be taught how to use strategies with explicit modelling, thinking aloud instructional strategies and a high level of scaffolding, as well as when to use them in certain learning contexts. Teaching students to utilize strategies during reading has been the focus of many studies and it has been found to affect both reading performance and strategy use of poor readers in a positive way (Anderson, 1992; Collins, 1991; Palincsar & Brown, 1987).

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Appendix 1. The narrative text (translated in English) and the reading comprehension questions
Welcome Small Tree

The trees have arrived within a truck along with the teacher (The teacher arrived with them). The old classmate run, came through the difficulties and the bureaucracy, got over the "please come tomorrow to sign", the signature was appended the forth day after Christmas the small trees were loaded. The teacher sent a telegram to the mayor and a lot of people and all the children were waiting in the square. The teacher could not imagine such a welcome. There were written words on burlaps such as "Welcome small tree", "hurray green", "green is LIFE". And the burlaps, pinned on wood, were waving in the wind, which was down there to welcome the small trees in his turn. A music "band"- Thanasis with his flute, five children with triangles, the carnival drum played a piece that no one knew, even the players didn't know it.

In this indescribable atmosphere the trees were unloaded, and the teacher climbed down (the truck).

-Hurray our teacher! The kids screamed when they saw him.

The teacher was embarrassed, he stumbled. But he regained his composure at once. (But he recovered his cool/sangfroid in a tick/straight away/straight off.)

-Hurray the teacher who has such pupils! he replied back.

This conversation (speaking/talk) was followed by clapping, the teacher was clapping too, the "band" was playing (striking up) the unknown melody, and people were really having a great time. The trees were unloaded from the truck, the children run hand in hand, and unloaded the trees as if they were infants or crystals. Their roots were in plastic bags, and they were so small-twenty centimeters according to Thanasis-that they frightened you, as if you will make an awkward move and break them. (*285 words / 236 Greek words*)

Reading Comprehension Questions
1. How does the writer describe the welcome that the teacher received?
2. How did the teacher manage to overcome bureaucracy?
3. How did the teacher feel with the children's welcome?
4. How are the trees described?

Appendix 2. The informational text (translated in English) and the reading comprehension questions
Euro

In January 2001 a new currency was welcomed in Europe: euro. Euro replaced the national currency of the countries which belong to the EMU (Economic and Monetary Union). The twelve countries using euro are the following: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxemburg, Holland, Portugal, Spain and Greece.

Euro facilitates commercial transactions among the countries as well as tourism. If someone wishes to travel to these countries, it is not necessary to visit the bank for a foreign exchange transaction, as in the past. Moreover, it will be easier to compare the various goods being sold within the countries of euro area and buy from the most advantageous place.

The new currency is divided into eight coins and seven banknotes of different value. Each country has chosen different characteristic symbols for the one side of the coins, whereas the banknotes are the same for all countries and at the back side there are images of gates and arches, symbols of unity and cooperation between people. In the front side of each paper note there is the geographical contour of Europe and a bridge that symbolizes the relations between the countries and their people.

The different coins, however, could be used without limitations in all countries.

One euro is divided in 100 cents or eurocents. This means that we need to calculate with decimal numbers also. (*226 words / 228 Greek words*)

Reading Comprehension Questions
1. What currencies have been replaced by Euro?
2. How many coins and banknotes does the new currency comprise?
3. What are the advantages of the new currency in the commercial transactions and in tourism across European countries?
4. How are the symbols depicted on the coins and banknotes in all European countries?

Appendix 3. The main questions of retrospective interviews
1. Tell me what were you thinking about while you were reading? Why…
2. What were the major difficulties you faced while reading the text?
3. Did you meet any difficulties in comprehending the text?
4. Did you meet unknown words? What do you do when meeting unknown words?
5. How do you confront the difficulties you encounter in certain parts of the text?
6. How do you usually deal with a reading text?
7. Did you use the prior knowledge to understand the meaning of this reading text? For example, did you help from what you knew about Euro in order to understand the meaning of the text?
8. What do you do for a better comprehension of a reading text?
9. When you do not understand a part of a text while reading, what do you think?
10. Which aspects of reading would you like to improve?