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## Metacognition and reading: Investigating intervention and comprehension of EFL freshmen in Turkey

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### Abstract

This study investigated the impact of a metacognitive reading strategy training programme (METARESTRAP) on metacognitive reading strategies and reading comprehension. The quasi-experimental study was conducted with 93 freshmen in the English Language Teaching Department of Çanakkale Onsekiz Mart University. After pre and post reading tests and a metacognitive reading strategy questionnaire were administered, the six-week METARESTRAP was implemented. The results demonstrated that METARESTRAP significantly fostered reading comprehension skills by providing awareness of metacognition along with declarative, procedural, and conditional knowledge about metacognitive reading strategies. It can be concluded that METARESTRAP worked well specifically for matching- type cohesion, coherence, text structure, and global meaning questions along with multiple- choice-type main idea, opinion, detail, and reference questions.

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### 1. Introduction

Becoming a more efficient reader requires integration of complicated skills as reading entails a very complex process. The integration of sociolinguistic factors into psycholinguistic reading models (see, Goodman, 1967; Lunzer & Gardner, 1979; Smith, 1971) resulted in the recognition of reading as a unitary process. Thus, reading researchers started to use the term *reading strategies* (Wallace, 1992), defined as “mental operations or comprehension processes that readers select and apply in order to make sense of what they read” (Abbott, 2006, p.

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637). Readers employ such strategies in order to simplify the reading process and comprehend better, thereby becoming more effective strategy users. In this respect, the present study primarily aims at investigating the impact of metacognitive reading strategy instruction on reading comprehension.

### 1.1. *Metacognition and metacognitive reading strategies*

Metacognition involves conscious awareness and control of one's learning. Metacognitive skills allow learners to monitor their progress when they understand and learn something. Metacognition provides learners with ways to estimate the results of their efforts by allowing them to predict the likelihood of being able to remember the material (Flavell, 1985). Thus, metacognitive knowledge sends a message to learners that there are ways to organize material to make it easier to learn and remember, that some rehearsal and review strategies are more effective for one kind of material than another, and that some forms of learning require deliberate application of specific strategies whereas others do not. It thereby becomes possible for less competent FL (foreign language) learners to improve their skills in the target language (TL) with the help of strategy training (Carrell, Pharis & Liberto, 1989).

Metacognition has a significant impact on improving reading comprehension both in L1 and FL (Baker & Brown, 1984; Flavell, 1979; Flavell, Miller, & Miller, 2002; Mokhtari & Reichard, 2002; Sheorey & Mokhtari, 2001). Studies have posited the superiority of skilled and cognitively-mature readers on the effective employment of metacognitive reading strategies (see MacLean & d'Anglejan, 1986; Mokhtari & Sheorey, 2002).

The reading strategy literature includes a considerable number of studies conducted to examine the efficacy of strategy instruction in the hope of stimulating comprehension (e.g., Carrell, 1985; Carrell et al., 1989). Bråten and Samuelstuen (2004), Mokhtari and Reichard (2004), and Sheorey and Mokhtari (2001) report a positive relationship between strategy awareness, strategy use and reading performance. The literature identifies a long list of metacognitive reading strategies. For example, Hansen and Pearson (1983) emphasised *asking questions*, Fehrenbach (1991) *activating schema*, Lundeberg (1987) *searching for specific information*, Olshavsky (1976-1977) *predicting*, and Pritchard (1990) *summarizing*. Although *rereading* is considered important (Mokhtari & Reichard, 2002; Pressley, 1986, Pressley & Woloshyn, 1995), Andre and Anderson (1978-1979) indicated the superiority of *self-questioning* over *rereading* due to the active participation of readers.

Cromley and Azevedo (2006) stress that, while reading, skilled readers orchestrate a large number of cognitive and metacognitive mental activities (i.e. comprehension strategies) such as summarizing, paraphrasing, generating questions and answering them, activating relevant background knowledge, and monitoring. On the other hand, ineffectual readers are unable to solve their reading problems as they lack the declarative, procedural, and conditional knowledge (Baker & Brown, 1984; Mokhtari & Reichard, 2002). They are also "less aware of effective strategies and of the counterproductive effects of poor strategies, and are less effective in their monitoring activities during reading" (Çubukçu, 2009, p. 3). Relevant to this, the present study aimed to implement the *Metacognitive Reading Strategy Training Programme*, hereafter called *METARESTRAP* and provided a basis for Razi (in press).

## 2. Methodology

### 2.1. *Research questions (RQs)*

RQ1 Is there a difference between post reading test scores of the experimental group and the control group?

RQ2 Is there a difference between post self-reported metacognitive reading strategy use of the experimental group and the control group?

RQ3 What is the impact of METARESTRAP on different types of questions?

### 2.2. *Setting*

The study was implemented in the Advanced Reading and Writing Skills Course Çanakkale Onsekiz Mart University (COMU), English Language Teaching (ELT) Department in the fall semester of the 2008-2009

academic year. It should be noted that the participants were delimited to advanced-level young adult undergraduate EFL learners attending COMU, in western Turkey. METARESTRAP, the reading test, and the Metacognitive Reading Strategy Questionnaire (MRSQ) were administered in English, which was not the L1 of the participants.

### 2.3. Participants

The participants were native Turkish speakers who did not use English as a communicative tool and who were pursuing BA degrees. All the participants were considered advanced Turkish learners of English. Table 1 illustrates the distribution of participants.

Table 1. Distribution of participants.

Groups	Intact Classes	Female	Male	Class Total	Group Total
<i>Experimental</i>	<i>1A Day</i>	16	7	23	46
	<i>1B Evening</i>	21	2	23	
<i>Control</i>	<i>1B Day</i>	19	3	22	47
	<i>1A Evening</i>	18	7	25	
Total		74	19	93	93

Most of the participants were females; however, male participants' indiscrete distribution between the experimental group and the control group provided gender homogeneity. Absentees, repeating students and Erasmus exchange students were excluded. A result, the study was carried out with 93 students. The average age in both groups was 19. The average time period for exposure to English was 9 years in both groups. YDS and reading exemption examination scores were used to evaluate proficiency in English. Independent samples t-test results for YDS did not indicate significant differences between the mean scores of the experimental group ( $M = 346.78$ ,  $SD = 5.13$ ) and the control group ( $M = 346.19$ ,  $SD = 5.89$ ). In addition, independent samples t-test results relating to the reading test scores did not indicate significant differences between the mean scores of the experimental group ( $M = 55.30$ ,  $SD = 11.03$ ) and the control group ( $M = 55.28$ ,  $SD = 10.65$ ). Thus, it can be concluded that the experimental group and control group were similar to each other in terms of proficiency in English.

### 2.4. Materials and instrumentation

In addition to their regular course materials, the experimental group followed METARESTRAP, which was developed by the researchers. The first week introduced the concept of metacognition and participants were instructed as to why they needed to employ metacognitive reading strategies. The principles of METARESTRAP were adopted and strategies were introduced regarding time usage, setting reading goals, motivation to read, and searching out relevant information. In the second week, students were provided with background knowledge strategies. The aim of the third week was practising question generation and inference strategies to monitor comprehension. In the fourth week, students were instructed on annotating strategies. During the fifth week, students were instructed on how to employ visualizing strategies referring to their senses to aid anticipation. Context-based evaluative strategies were taught in the sixth week with an aim of enabling students to understand the relationship between parts of a text and to monitor their comprehension more effectively by using context.

A four-section, 30-item reading test was developed by the researchers and used to assess reading comprehension. There were four-option multiple-choice and paragraph matching questions. To develop reliability for the reading test, it was piloted with 100 students in the ELT department of COMU over the fall semester of the 2008-2009 academic year (see Razi, 2012).

MRSQ (Taraban, Kerr & Rynearson, 2004) was used to reveal the strategies employed by the students. It consisted of 22 *analytic* and *pragmatic* statements. To pilot the MRSQ, it was administered to 205 students in the Foreign Language Teaching Department of COMU during the fall semester of the 2007-2008 academic year. Reliability analysis revealed a Cronbach's alpha score of  $\alpha = .83$  over 22 items in the MRSQ (see Razi, 2008).

### 2.5. Procedures for Data Collection

MRSQ and reading comprehension test was administered before and after the implementation to both groups. During the implementation, METARESTRAP was followed by the experimental group (1A Day and 1B Evening). The control group (1B Day and 1A Evening) pursued their course conventionally. The strategies were practised by the help of the book 'Reading Practice Tests' (Razi & Razi, 2008) in the experimental group. The same book was also followed by control group participants. Pretest and posttest scores were analysed by one-way repeated measures of ANOVA, MANOVA, and descriptive and frequency statistics through SPSS (20.0).

### 3. Findings

Considering RQ1, ANOVA did not indicate significant differences between the experimental group ( $M = 56.94$ ,  $SD = 6.83$ ) and control group ( $M = 66.94$ ,  $SD = 6.83$ ) pre reading test scores. To examine the impact of the intervention, post reading test scores of the experimental group and control group were taken into consideration and Mauchly's test of sphericity did not result in significant values; therefore, while reporting the results of the tests of within-subjects effects, sphericity was assumed. In addition, Benferroni was used for confidence interval adjustment in the analysis process. A one-way repeated measures of ANOVA test indicated significant differences between the experimental group ( $M = 66.94$ ,  $SD = 6.83$ ) and control group ( $M = 60.08$ ,  $SD = 5.76$ ) post reading test score [ $F(1, 91) = 8620.27$ ,  $p < .0001$ ,  $\eta^2 = .990$ ].

Considering RQ12, ANOVA did not reveal significant differences between the experimental group ( $M = 3.58$ ,  $SD = .36$ ) and control group ( $M = 3.59$ ,  $SD = .29$ ) self-reported pre metacognitive reading strategy use. A one-way repeated measures of ANOVA test indicated significant differences between the experimental group ( $M = 4.11$ ,  $SD = .31$ ) and control group ( $M = 3.58$ ,  $SD = .36$ ) self-reported pre metacognitive reading strategy use [ $F(1, 91) = 64.539$ ,  $p < .0001$ ,  $\eta^2 = .415$ ]. The results also revealed a significant interaction effect between pre and post self-reported strategy uses. Such an interaction might be due to the impact of METARESTRAP since the experimental group participants enhanced their self-reported metacognitive reading strategy use with METARESTRAP, whereas the control group participants' self-reported metacognitive reading strategy employment indicated ("almost identical" or) similar mean values for both self-reported pre ( $M = 3.59$ ,  $SD = .29$ ) and post metacognitive reading strategy use ( $M = 3.58$ ,  $SD = .36$ ). The control group's stable scores on metacognitive reading strategy use highlight the fact that conventional following of the Advanced Reading and Writing Skills Course does not foster self-reported metacognitive reading strategy use.

Participants' responses were also analysed to compare self-reported use of analytic and pragmatic components of the MRSQ. A MANOVA test indicated significant differences between the experimental group ( $M = 4.15$ ,  $SD = .31$ ) and control group ( $M = 3.52$ ,  $SD = .38$ ) participants' self-reported post use of analytic metacognitive reading strategies [ $F(1, 91) = 78.224$ ,  $p < .0001$ ]. As suggested by Coe (2002), the mean difference between the two groups was divided by the standard deviation of the control group, resulting in a large effect size ( $d = 1.69$ ). MANOVA also indicated significant differences between the experimental group ( $M = 3.98$ ,  $SD = .59$ ) and control group ( $M = 3.75$ ,  $SD = .51$ ) participants' self-reported post use of pragmatic metacognitive reading strategies [ $F(1, 91) = 4.048$ ,  $p < .05$ ], with a medium-effect size ( $d = 0.45$ ).

Considering RQ3, MANOVA was used to compare the experimental group and control group participants' scores in the four sections of the post reading test. The results indicated significant differences in Part 2 (paragraph matching) of the post reading test [ $F(1, 91) = 31.873$ ,  $p < .0001$ ] with a large effect size ( $d = 1.25$ ). However, post reading test results did not indicate significant differences in Part 1 [ $F(1, 91) = .025$ ,  $p = .875$ ], Part 3 [ $F(1, 91) = 2.360$ ,  $p = .128$ ], or Part 4 [ $F(1, 91) = .001$ ,  $p = .969$ ].

Investigating the participants' number of correct answers in pre and post reading tests revealed that the experimental group made some progress in 24 questions, remained stable in 3, and deteriorated very slightly in 3 questions in the post reading test after the implementation of METARESTRAP. However, the control group increased in 18 questions, stayed stable in 4, and decreased in 8 questions in the post reading test. The overall progress for the correct answers was 138 for the experimental group, and 55 for the control group. The experimental group answered matching type cohesion, coherence, text structure, and global meaning questions in

Part 2 better where the differences were significant. The experimental group also answered multiple-choice (MC) type main idea, opinion, detail, and reference questions in the other three parts of the text better after the implementation; however, these differences were not significant. Finally, MC type attitude, implication, and comparison questions received little or no benefit from METARESTRAP. In conclusion, the experimental groups' gain scores were greater than the control groups'. Table 2 reports the results of the experimental and control group participants in all four sections of the pre and post reading tests.

Table 2. Comparison of pre and post reading test results by group and section.

Group			Section of Test			
			1	2	3	4
Experimental	Pre	<i>M</i>	17.87	10.17	13.74	14.67
		<i>SD</i>	3.46	5.25	4.01	3.10
	Post	<i>M</i>	19.30	16.26	14.96	16.41
		<i>SD</i>	2.25	4.80	4.17	2.82
	<i>M</i> Difference		1.44	6.087	1.22	1.74
Control	Pre	<i>M</i>	17.81	10.81	13.53	14.73
		<i>SD</i>	3.45	5.71	4.13	2.82
	Post	<i>M</i>	19.21	10.98	13.45	16.44
		<i>SD</i>	3.23	4.21	5.24	2.94
	<i>M</i> Difference		1.40	0.17	-0.09	1.70

The experimental group participants made the greatest improvement in the second part (matching questions) where the differences were significant, as shown in Table 2. On the other hand, the participants in the control group did not make any progress in this section. For the first and fourth parts of the test, it can be concluded that both the experimental and control groups made similar progress. However, none of these differences were significant. In addition, for the third part of the test, again, the experimental group outperformed the control group; however, the difference was not significant.

#### 4. Discussion

Inefficient readers are unaware of various beneficial strategies; therefore, they employ the same useless strategies repeatedly (Anderson, 2005). Therefore, success by the experimental group may be expected in relation to the application of METARESTRAP. However, the control group's advancement can be explained by the *learning effect* as their Advanced Reading and Writing Skills Course contributed to their comprehension. Nevertheless, the experimental group's superiority over the control group indicates the impact of METARESTRAP on reading comprehension. This finding runs parallel with the literature as metacognition has been shown to have a significant impact on improving reading comprehension (Baker & Brown, 1984; Flavell, 1979; Flavell et al., 2002; Mokhtari & Reichard, 2002; Sheorey & Mokhtari, 2001) and reading strategy instruction studies indicate the efficacy of such implementations on reading comprehension (Andre & Anderson, 1978-1979; Baumann, Jones, & Seifert-Kessell, 1993; Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007; Carrell, 1985; Carrell et al., 1989; Çubukçu, 2008; Fan, 2009; Hamp-Lyons, 1985; Handyside, 2007; Kern, 1989; Muñiz-Swicegood, 1994; Raymond, 1993). Thus, METARESTRAP appears to assist in developing metacognitive reading strategies, which in turn results in better comprehension. Learners should also be encouraged to be aware of their own learning process, allowing them to make more use of transfer skills (NRC, 2000).

Apart from transferring strategies across situations, transfer across languages is another controversial issue. Hence, before the implementation of METARESTRAP, participants indicated their self-reported metacognitive reading strategy use to a medium extent although they had not received any strategy training previously. Therefore, they employed self-reported metacognitive reading strategies which were byproducts of their L1 reading skills and



their challenging experiences in FL. As FL knowledge is more important than L1 reading abilities (Alderson, 2000), transferring reading skills to FL is prevented by the linguistic threshold if it is not surpassed.

When readers become competent at employing strategies, the strategies move beyond their conscious control and become "skills" (Paris, Wasik, & Turner, 1991). Therefore, reading strategy researchers should provide challenging texts to prevent readers from administering automated skills (Cromley & Azevedo, 2006). Consequently, this study delivered a C2 level challenging reading test which urged participants to refer to their strategy repertoires to overcome reading problems. As expected, being instructed on metacognitive reading strategy use provided an advantage to the experimental group. Although intense exposure to TL might also increase metacognitive reading strategy use (Carson & Longhini, 2002), learners produce strategies only if they are instructed to do it (Pressley & Woloshyn, 1995). Therefore, expecting the development of the same strategies from all readers may be considered naïve (Aebersold & Field, 1997) and assuming their automated acquisition may leave readers adrift in a sea of miscomprehension.

Reading requires achieving either literal or implied meaning. Brown (2001) maintains that it is not possible to interpret all language properly with reference to its literal and surface structure and indicates that implied meaning is derived from processing pragmatic information. In relation to comprehending pragmatic meaning, Taraban et al. (2004) investigated university students' self-reports on metacognitive reading strategy use. Their results indicated the superiority of analytic strategies over pragmatic ones. Therefore, a relationship between greater use of analytic strategies and higher expected grades is expected; however, they do not expect such a relation between greater use of pragmatic strategies and higher grades. Although analytic strategies cannot be employed by all students, Taraban et al. insist that as memorising information is appreciated by university students, pragmatic strategies may be employed by any student. Nevertheless, all students cannot employ pragmatic strategies in conjunction with analytic strategies, although there is supposed to be an increase in academic performance by effectively orchestrating these strategies. METARESTRAP can be regarded as having a significant impact on encouraging the self-reported use of both analytic and pragmatic metacognitive reading strategies as the experimental group participants self-reported their promotion from medium to high users of both analytic and pragmatic metacognitive reading strategies after its implementation. Hence, METARESTRAP can be viewed as an instructional programme which encourages the self-reported use of both analytic and pragmatic metacognitive reading strategies compatibly.

## 5. Conclusion and implications

The results reveal that METARESTRAP accelerates Turkish young adult university EFL learners' reading comprehension by providing awareness of metacognition along with declarative, procedural, and conditional knowledge about metacognitive reading strategies. METARESTRAP promoted learners' self-reported metacognitive reading strategy use while conventional reading instruction did not affect it. This may imply that after implementation, readers are able to better control their reading process. First of all, they are aware of the available metacognitive reading strategies and have a good repertoire of efficient reading strategies from which they can select appropriate ones in relation to their current reading task. Thus, they can better control the process, which in turn results in better reading comprehension due to more effective use of metacognitive reading strategies.

In addition to improved control of the reading process, METARESTRAP is also beneficial for achieving better performance in matching type cohesion, coherence, text structure, and global meaning questions. As METARESTRAP encourages readers to pay attention to thematic relationships between paragraphs, readers are better able to realize the flow of ideas in relation to the genre of the text. Thus, they can be regarded as interactive readers who start reading a text having gained a general understanding. The success of the participants in this study in Part 2 of the reading test is therefore not surprising.

METARESTRAP also increases scores in MC type main idea, opinion, detail, and reference questions to a limited extent. Nevertheless, learners benefit little from METARESTRAP in regard to MC type attitude, implication, and comparison questions. In this respect, results indicate that skills appearing at the top in Bloom's taxonomy receive little benefit from METARESTRAP. This might imply that developing proficiency in answering MC type attitude, implication, and comparison questions requires more time. Therefore, learners should be

expected to transfer their strategies to non-academic situations in extensive reading situations which will enable them to develop efficient reading skills using more efficient strategies.

Readers' aims may differ from each other causing the employment of various strategies in classroom reading and outside (Chastain, 1988). For example, Pressley and Woloshyn (1995) refer to Pressley's (1986) *good information processor model* to imply strategy transfer between situations. When faced with a challenge, learners consider similarities with previous challenges, plan their task, use the strategy, and monitor themselves. Unsurprisingly, this requires using some invaluable STM (short-term memory) capacity; however, practising these strategies will remove the restriction on the STM (Pressley & Woloshyn, 1995). Therefore, reading teachers should model strategies by providing declarative, procedural, and conditional knowledge before practising them. Encouraging their practice in non-academic settings is also essential in enabling transfer of these strategies across situations.

The impact of FL METARESTRAP on L1 should be investigated along with the impact of L1 METARESTRAP on FL reading comprehension. Investigating the long-term impacts of METARESTRAP by delivering multiple posttests would also be beneficial. Secondly, this study investigated participants' own reports on their metacognitive reading strategy employment by means of a questionnaire. To assess actual strategy use, researchers might benefit from a combination of on-line and off-line methods (Veenman, 2011).

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