

Effects of metacognitive reading strategy training on metacognitive strategies and comprehension

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Abstract

Reading comprehension strategies which readers refer to make the process of reading easier gained specific attention by the late 1970s with the conclusion that readers who use effective reading comprehension strategies comprehend better than the others who do not. In this respect, the present study will focus on metacognitive strategies which seem to be involved in a number of classroom cognitive activities such as planning, monitoring, and evaluating. Therefore, this study aims to investigate the impact of a metacognitive reading strategy training programme on the use of metacognitive reading strategies and reading comprehension. To enable this, a metacognitive reading strategy training programme was developed by the researcher and a quasi-experimental study was conducted with experimental and control groups in the ELT Department of ÇOMU with first year classes over the fall semester of the 2008-2009 academic year in Advanced Reading and Writing I Course. Before the programme, the participants were delivered the pre-tests of reading comprehension and metacognitive reading strategy. Experimental group of participants pursued a six-week programme whereas control group pursued their course conventionally. After the programme, the participants were delivered the post-tests of reading comprehension and metacognitive reading strategy. The T-test results indicate significant differences between experimental and control groups in terms of participants' reading comprehension test scores and their use of metacognitive reading strategies after the implementation of metacognitive reading strategy training programme. These findings confirm the two hypotheses of the study that 'experimental group participants will outperform control group participants in terms of reading comprehension and use of metacognitive reading strategies'. It can be concluded that the use metacognitive reading strategies can be fostered by training and this results in better comprehension. Therefore, reading teachers are recommended to encourage readers to use metacognitive reading strategies in the process of reading.

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Content

- Literature review
 - Metacognition
 - Metacognitive reading strategies
- The study
 - Research questions
 - Setting and participants
 - Materials and instrumentation
 - Procedures for data collection and analyses
 - Findings and discussions
 - Conclusions and implications

Metacognition and reading comprehension strategies

- Metacognition
 - awareness of own learning, memory, and also thought processes (Flavell, 1976 & 1979).
 - maximizes memory by knowing the limitations of it. (Ellis Ormrod, 2006)
- Reading comprehension strategies: "mental operations or comprehension processes that readers select and apply in order to make sense of what they read". (Abbott, 2006: p. 637)

Metacognitive strategies

- Assist learners to *regulate* (Oxford, 1990; Rubin, 1981), *arrange* (Oxford & Nyikos, 1989), *organize*, *plan*, *evaluate* (Richards & Lockhart, 1996), *monitor*, *control* (Busato, Prins, Elshout, Hamaker, 2000), and *co-ordinate* (Johnson, 2001) their own strategies and learning.
- Encourage learners to observe their environment rather than focusing their attention on learning. (Williams & Burden, 1999)
- *Metacognitive experiences*: most likely to occur when careful, conscious monitoring of one's cognitive efforts is required (Abbott, 2006).

Rationale for the Study

- Learners are unaware that there are strategies which make their learning process easier.
- It is possible for less competent FL learners to improve their skills in the TL with the help of strategy training (Carrell, Pharis & Liberto, 1989).
- Strategy training is an "intervention which focuses on the strategies to be regularly adopted and used by language learners to develop their proficiency, to improve particular task performance, or both" (Hassan et al. 2005: p. 1).
- Hence, this study will implement the Metacognitive Reading Strategy Training Programme (METARESTRAP).

The Study

- **Aim of the study:**
 - To reveal the impact of METARESTRAP on reading comprehension by illustrating the interaction between the use of MRSs and reading comprehension.
- **Research questions:**
 - **RQ1:** Is there a difference between experimental and control group participants' reading comprehension scores?
 - **RQ2:** Is there a difference between experimental and control group participants' use of metacognitive reading strategies?
 - **RQ3:** What is the impact of METARESTRAP on different types of reading comprehension questions?

Setting

- Conducted in the ELT Department at the Faculty of Education of ÇOMU with four freshmen classes.
- Carried out over the fall semester of the 2008-2009 academic year.
- All the intact classes were taught by the researcher in 'Advanced Reading and Writing I Course'.

Participants

- Advanced Turkish learners of English
 - Foreign Language Examination (YDS)
 - Exemption examination
 - The four intact classes consisted of students coming from preparation classes who had registered at the university in 2007-2008 academic year and the students who were assigned to be proficient in 2008-2009 academic year exemption examination.

Participant Elimination

Treatment Groups	Intact Classes	Absentees	Retake	Erasmus	Foreign National	Class Total	Group Total
<i>Experimental</i>	<i>1A Day</i>	9	5	2	1	17	27
	<i>1B Evening</i>	10	0	0	0	10	
<i>Control</i>	<i>1B Day</i>	12	0	0	0	12	24
	<i>1A Evening</i>	8	4	0	0	12	
Total		39	9	2	1	51	51

Gender Distribution of Participants

Treatment 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

Average Age of Participants

Treatment Groups	Intact Classes	Female Mean	Male Mean	Classes Mean	Groups Mean
<i>Experimental</i>	<i>1A Day</i>	18.5625	18.2857	18.3333	18.5000
	<i>1B Evening</i>	18.5238	18.5	18.5217	
<i>Control</i>	<i>1B Day</i>	18.2632	19.3333	18.4091	18.9574
	<i>1A Evening</i>	19.2778	19.8571	19.44	
Mean		18.6486	19.0526	18.7312	18.7312

Period of Participants' Study of English

Treatment Groups	Intact Classes	Period	SD	Mean	SD
<i>Experimental</i>	<i>1A Day</i>	8.9130	1.53484	8.6739	1.70038
	<i>1B Evening</i>	8.4348	1.85438		
<i>Control</i>	<i>1B Day</i>	8.1364	2.33596	8.8085	2.06037
	<i>1A Evening</i>	9.4000	1.60728		
Mean		8.7419	1.88185	8.7419	1.88185

Participants' Distribution of Handedness

Treatment Groups	Intact Classes	Left-Handed	Right-Handed	Classes Total	Groups Total
Experimental	1A Day	1	22	23	46
	1B Evening	2	21	23	
Control	1B Day	2	20	22	47
	1A Evening	1	24	25	
Total		6	87	93	93

Materials & Instrumentation

The Reading Test: Validity of the reading test

Reading Test	Native speaker			Readability				Frequency	
	1	2	Mean	Flesch reading ease	Flesch- Kincaid grade level	Fog scale level	SMOG readability formula		
Part 1	Text 1	8	8	8	49.0	12.0	14.10	14.49	3009.24
	Text 2	9	8	8.5	30.1	12.0	16.94	15.53	3438.70
	Text 3	7	5	6	38.7	12.0	12.63	14.75	2261.30
	Text 4	6	5	5.5	37.4	12.0	9.11	15.85	2517.53
	Mean	7.5	6.5	7	38.8	12.0	13.20	15.16	2806.70
Part 2		8	6	7	36.2	12.0	13.84	15.14	6740.02
Part 3		10	8	9	42.4	12.0	15.20	15.77	3399.97
Part 4		7	7	7	40.7	12.0	12.41	15.14	3987.75
Mean		8.13	6.88	7.5	39.53	12.0	13.66	15.30	4233.61

Reliability of the reading test

Item analysis:

- The 32-question test was administered to a group of 100 participants for item analysis of *item difficulty* and *item discrimination*.
- All the items, except from 25 and 29 were appropriate. These two were removed.
- $\alpha = .81$ over 30 items.

Reliability of the MRSQ

- MRSQ (Taraban et al., 2004) had been delivered to 205 students at the Department of FLT of ÇOMU, consisting of ELT, GLT, and JLT programmes, during the fall semester of 2007-2008 academic year.
- $\alpha = .83$ over 22 items.

Procedures for Treatment Groups

TREATMENT 1 Experimental Group 1A Day & 1B Evening Classes	TREATMENT 2 Control Group 1B Day & 1A Evening Classes
Before the implementation of METARESTRAP, the participants of the experimental group were delivered the reading test in a 90 minute session. Following this, they were also delivered the MRSQ which aimed to investigate their use of MRSQ in relevance with both their way of answering the questions in the reading test and their general reading habits. The six-week METARESTRAP was administered to the experimental group of participants in the two intact classes of 1A Day and 1B Evening in the 3-hour course of Advanced Reading and Writing I. After the implementation of METARESTRAP, the participants of the experimental group were delivered the reading test once more in a 90 minute session again along with the MRSQ in relevance with both their way of answering the questions in the reading test and their general reading habits.	The participants of the control group were delivered the reading test in a 90 minute session at the same time with the experimental group of participants. They were also delivered the MRSQ which aimed to investigate their use of MRSQ in relevance with both their way of answering the questions in the reading test and their general reading habits. Control group of participants which consists of two intact classes of 1B Day and 1A Evening did not follow any specific strategy training programme. They pursued the 3-hour course of Advanced Reading and Writing I conventionally. After the implementation of METARESTRAP to the experimental group of participants, control group of participants were delivered the reading test once more in a 90 minute session again along with the MRSQ in relevance with both their way of answering the questions in the reading test and their general reading habits.

Metacognitive Reading Strategy Training Programme (METARESTRAP)

WEEK 1: Introduction to metacognitive reading strategies

- Introduction to metacognition and metacognitive reading strategies.
- Why do we need to learn metacognitive reading strategies?
- Principles of METARESTRAP

Planning strategies

- Plan your time, identify your goals, and motivate yourself to read the text.
- Preview the text to find out information relevant to your reading goals (skimming, scanning, skipping)

WEEK 2: Background knowledge strategies

- Identify the genre of the text.
- Activate your relevant schema (e.g.: refer to the title or pictures)
- Distinguish between already known and the new information.
- Check the text against your schemata.

WEEK 3: Question generation and inference strategies

- Form questions from headings and sub-headings.
- Anticipate/ask question the forthcoming information in the text.
- When information critical to your understanding of the text is not directly stated, try to infer that information from the text.
- Infer pronoun referents.

WEEK 4: Annotating strategies

- Underline/highlight important information.
- Paraphrase the author's words in the margins of the text.
- Summarize.
- Write questions/notes in the margins to better understand the text.

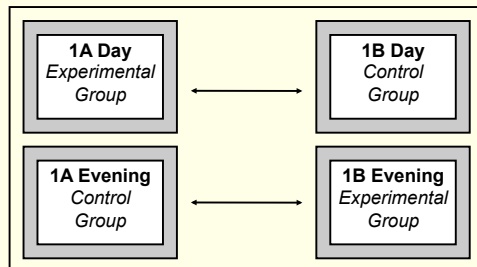
WEEK 5: Visualizing strategies

- Draw graphic logs.
- Refer to graphic organizers (semantic mapping / clustering).

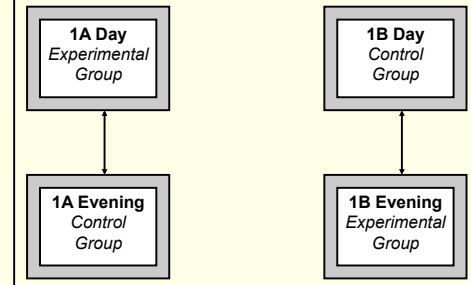
WEEK 6: Context-based evaluative strategies

- Answer your questions / clarify your predictions while reading the text.
- Re-read the text in case of difficulty.
- Read the text in short parts and check your understanding.
- Determine the meaning of critical unknown words.
- Distinguish main ideas from minor ones.

Controlling the Variable of Day / Evening Students



Controlling the Variable of Preparatory Class



YDS Scores

Independent Samples T-Test Statistics

YDS Scores

Treatment groups	N	\bar{X}	SD	df	t	p
Experimental	46	346.7826	5.12472	91	.516	.607
Control	47	346.1915	5.89266			

with a very small effect size ($d = .11$; $r = .05$)

Exemption Exam

Treatment groups	N	\bar{X}	SD	df	t	p
Experimental	46	55.3043	11.02698	91	.012	.990
Control	47	55.2766	10.64793			

with large magnitudes of effect ($d = 1.11$; $r = .49$)

Procedures for data analyses

- SPSS
- Descriptive and frequency statistics,
- ANOVA post-hoc Scheffe test procedure
- Independent and paired sample T-tests
- The reading test:
 - multiple-choice and multiple-matching questions
 - no need for interrater reliability analysis

RQ1: Is there a difference between experimental and control group participants' reading comprehension scores?

- **An ANOVA test:** no significant differences before METARESTRAP in pre reading test scores [$F(3, 89) = 1.55$, $p = .208$].
- **T-test:** very similar mean values for experimental and control groups pre test [$t = -.328$; $p = .744$] with small effect size ($d = -.07$; $r = -.03$).

RQ1: Is there a difference between experimental and control group participants' reading comprehension scores? (continued)

Intact Classes	Post Reading Test (Mean)	N	SD	Minimum	Maximum
1A Day (A)	69.7609	23	7.12210	56.00	82.50
1B Day (B)	61.1818	22	4.20755	52.00	70.50
1A Evening (C)	59.1000	25	6.78233	69.00	69.00
1B Evening (D)	64.1087	23	5.28926	52.00	72.00
Total	63.4677	93	7.16225	44.00	82.50

	Sum of Squares	df	Mean Square	F	Sig.	Direction of differences
Between Groups	1512.217	3	504.072	13.988	.000	B<A $p=.000$
Within Groups	3207.186	89	36.036			C<A $p=.000$
Total	4719.403	92				D<A $p=.021$
						C<D $p=.046$

Treatment groups	N	\bar{X}	SD	df	t	p
Experimental	46	66.9348	6.82936	91	5.241	.000
Control	47	60.0745	5.76060			

with large magnitudes of effect ($d = .41$; $r = .58$)

RQ1: Experimental & Control Groups Paired Sample T-Test Statistics of Pre & Post Reading Tests

Experimental Group Paired Sample T-Test Statistics of Pre and Post Reading Test

Tests	N	\bar{X}	SD	df	t	p
Pre-test	46	57.8043	10.42991	45	-7.206	.000
Post-test	46	69.5870	7.43737			

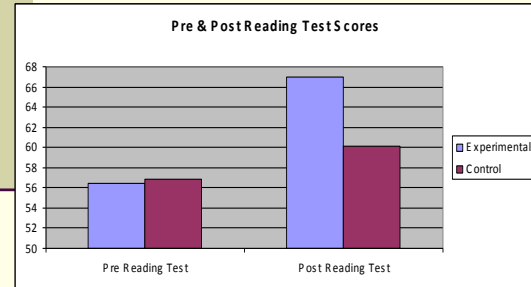
with large magnitudes of effect ($d = .96$; $r = .43$)

Control Group Paired Sample T-Test Statistics of Pre and Post Reading Test

Tests	N	\bar{X}	SD	df	t	p
Pre-test	47	58.1489	8.12398			
Post-test	47	61.3617	6.83159	46	-3.066	.004

with medium sized effects ($d = -.43$; $r = -.21$)

RQ1: Comparing Pre & Post Reading Test Scores



RQ2: Is there a difference between experimental and control group participants' use of metacognitive reading strategies?

- **ANOVA test:** no significant differences before METARESTRAP in MRSQ [$F(3, 89) = .52$, $p = .672$].
- **T-test:** very similar mean values for experimental and control groups pre test [$t = -.203$; $p = .839$] with small effect size ($d = .04$; $r = .02$).

RQ2: Is there a difference between experimental and control group participants' use of metacognitive reading strategies? (continued)

Intact Classes	Post Strategies (Mean)	N	SD	Minimum	Maximum
1A Day (A)	4.0316	23	.28035	3.59	4.73
1B Day (B)	3.6054	22	.33296	3.05	4.36
1A Evening (C)	3.5582	25	.39551	2.73	4.23
1B Evening (D)	4.1818	23	.32403	3.64	4.64
Total	3.8407	93	.42796	2.73	4.73

	Sum of Squares	df	Mean Square	F	Sig.	Direction of differences
Between Groups	6.728	3	2.243	19.722	.000	B<A $p=.001$
Within Groups	10.121	89	.114			C<A $p=.000$
Total	16.850	92				B<D $p=.000$
						C<D $p=.000$

Treatment groups	N	\bar{X}	SD	df	t	p
Experimental	46	4.1067	.30906			
Control	47	3.5803	.36440	91	7.506	.000

with large magnitudes of effect ($d = 1.49$; $r = .60$)

RQ2: Experimental & Control Groups Paired Sample T-Test Statistics of Pre and Post MRSQ

Experimental Group Paired Sample T-Test Statistics of Pre and Post Use of MRSs

Tests	N	\bar{X}	SD	df	t	p
Pre-test	46	3.5761	.36251	45	-9.168	.000
Post-test	46	4.1067	.30906			

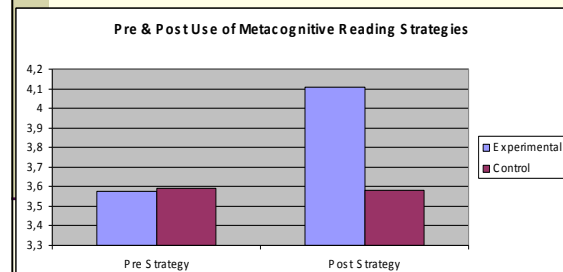
with large magnitudes of effect ($d = -1.58$; $r = -.62$).

Control Group Paired Sample T-Test Statistics of Pre and Post Use of MRSs

Tests	N	\bar{X}	SD	df	t	p
Pre-test	47	3.5899	.29097			
Post-test	47	3.5803	.36440	46	.170	.886

with small effect size ($d = .03$; $r = .01$)

Comparison of Pre and Post Use of MRSs

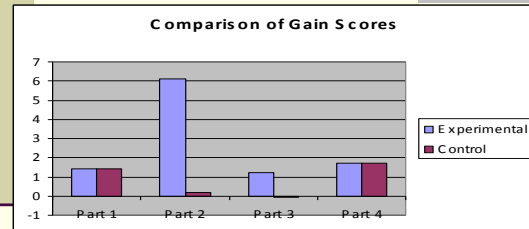


RQ3: What is the impact of METARESTRAP on different types of reading comprehension questions?

Experimental and Control Group Participants' Mean Values
on Four Parts of Pre and Post Reading Test

Treatment Groups			Parts of Reading Test			
			Part 1	Part 2	Part 3	Part 4
Experimental	Pre	Mean	17,8696	10,1739	13,7391	14,6739
		SD	3,46159	5,24639	4,01350	3,10057
	Post	Mean	19,3043	16,2609	14,9565	16,4130
		SD	2,24964	4,80016	4,16843	2,82116
		Mean Difference	1,43470	6,08700	1,21740	1,73910
Control	Pre	Mean	17,8085	10,8085	13,5319	14,7340
		SD	3,44925	5,71283	4,13285	2,81852
	Post	Mean	19,2128	10,9787	13,4468	16,4362
		SD	3,22986	4,20915	5,23703	2,93705
		Mean Difference	1,40430	0,17020	-0,08510	1,70220

Comparison of Gain Scores in Four Parts of the Reading Test



PART 1: Multiple choice type implication, opinion, detail, attitude, main idea
PART 2: Multiple matching type cohesion, coherence, text structure, global meaning
PART 3: Multiple choice type implication, attitude, opinion, detail, comparison, main idea
PART 4: Multiple choice type detail and reference

Discussions from RQ1

- The results confirm **H1a** that METARESTRAP can be regarded as having a significant impact on fostering reading comprehension.
- Experimental group's superiority was expected.
- Control group's better performance in the post test: learning effect of the course, contributed to their comprehension.
- In parallel with relevant literature as metacognition is supposed 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 (Allen, 2006; Andre & Anderson, 1978-1979; Baumann et al., 1993; Boulware-Gooden et al., 2007; Carrell, 1985; Carrell et al. (1989); Chang, 2006; Çubukçu, 2008a; Fan, 2009; Hamp-Lyons, 1986; Handyside, 2007; Kern, 1989; McMurray, 2006; Muñoz-Swicegood, 1994; Raymond, 1993; Sarig & Folman, 1987; Sheffield Nash, 2008; Talbot, 1995; Teplin, 2008).

Discussions from RQ2

- The results confirm **H2a** that METARESTRAP can be regarded as having a significant impact on teaching MRSs.
- Experimental group participants enhanced their use of MRSs.
- Control group participants' stable scores in pre and post tests on the use of MRSs highlight that following Advanced Reading and Writing I Course without a specific training on the use of MRSs does not result in more employment of such strategies.
- Transfer skills: aware of self learning process and learning strategies; then they can be transferred to new tasks after being learned (Chamot & O'Malley, 1987).
- Strategy use is a stable phenomenon and is not tied to any specific language (Block, 1986).

Discussions from RQ3

- **Control group:** responses in 16 questions increased, gained lower scores on 9 questions along with 5 stable scores.
- **Experimental Group:** responses in 20 questions increased, were stable in 9 questions, deteriorated very slightly in 1 question.
- Better at multiple matching type *cohesion, coherence, text structure, and global meaning* questions along with multiple choice type *implication, detail, and reference* questions.
- Little improvement in multiple choice type *attitude and opinion* questions.
- No changes in multiple matching type *main idea* or *comparison* questions.
- To interact with the text, readers need help.
- MRSs may help to orchestrate strategies.
- METARESTRAP assists to achieve their reading aims by harmonizing previously learned strategies along with newly learned ones.

Conclusions from RQ1

- It can be concluded that the implementation of METARESTRAP on Turkish young adults of university EFL learners provoke their reading comprehension.
- Gaining awareness on metacognition along with declarative, procedural, and conditional knowledge about MRSs with the implementation of METARESTRAP turned out to be more effective than the conventional reading instruction.

Conclusion from RQ2

- METARESTRAP promoted learners' MRS use; however conventional reading instruction do not have any impact on the use of MRSSs.

Conclusions from RQ3

- METARESTRAP works specifically well for multiple matching type *cohesion*, *coherence*, *text structure*, and *global meaning* questions.
- Works well for multiple matching type *cohesion*, *coherence*, *text structure*, and *global meaning* questions; and multiple choice type *implication*, *detail*, and *reference* questions.
- Does not work well for multiple choice type *attitude*, *opinion*, *main idea*, and *comparison* questions.

Implications

- Learn strategies to the point of automaticity and turn them into skills (Paris et al., 1983).
- Teach the strategy, also teach when, where, and how to use and evaluate their performance (Baker & Brown, 1984).
- Model them (Wu, 2005).
- Present them appropriate to different situations Singhal (2001).
- Teach them for quite a long time rather than a single lesson (Carrell, 1998; Garner, 1994).
- Do not present great amount of strategies at a time (Chamot, 1993; Pressley & Woloshyn et al., 1995).
- Relate individual strategies to each other as they are not utilized in isolation; instead in relation to each other (Anderson, 2005).
- Encourage learners to use newly learned strategies in their naturalistic environment (Donato & McCormick, 1994; Green & Oxford, 1995).

Suggestions for Further Research

- Implement METARESTRAP in FL and examine its impact in L1.
- Investigate relationship between different types of intelligences METARESTRAP.
- Implement METARESTRAP with multiple post tests; such as six-month of intervals to investigate its long-term impact.

Thanks for your participation...