



Research Paper: The Effectiveness of Training Metacognitive Strategies on Reducing Rumination and Worry



Somayeh Mirzaian¹

¹ M.A. in Clinical Psychology, Department of Psychology, Tehran University, Tehran, Iran

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Abstract

Rumination and worry are among the cognitive conflicts in many people. This research was conducted with the aim of the effectiveness of training metacognitive strategies on reducing rumination and worry. This research is a semi-experimental type with a pre-test-post-test design and a control group. 32 students of Shahid Beheshti University were selected based on the cut of point in the Ruminative Responses Scale (RRS) and the Penn State Worry Questionnaire (PSWQ) by purposive sampling method and were assigned in two experimental (n = 16) and control (n = 16) groups. Metacognitive strategies were taught to the experimental group for 8 sessions, but the control group did not receive any training during this period. Data analysis was done using covariance analysis and SPSS-26 software. The findings showed that metacognitive therapy was able to significantly reduce rumination and worry in the experimental group compared to the control group ($P < 0.001$). Based on this finding, it can be concluded that training metacognitive strategies can be used effectively to reduce rumination and worry.

Address: Department of Psychology, Tehran University, Tehran, Iran

Tel: +98 (913) 287 8086

E-mail: sha139495@yahoo.com



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1. Introduction

Today, all people are deeply involved in their thoughts and are anxious and worried about past experiences and future events (Tran, 2023). Worry is one of the universal phenomena that include all people and its definition can be a bit complicated. Worry occurs when your mind is occupied with negative and unreliable thoughts (Forster et al., 2015). Treatment of worry is necessary if it becomes severe and uncontrollable, otherwise it can be completely normal and an important phenomenon in life (Vişlă et al., 2022). Not all types of worries are bad, but some of them are useful and necessary. Worry has been one of the useful tools for human survival, because during human evolution, those who were worried and looked for food and shelter survived. Effective worry causes people to face life problems and look for a solution to solve problems. Another type of worry is troublesome worry, which does not produce a correct and precise solution like effective worry (Borkovec et al., 1991; Dippel et al., 2023). Treating troublesome worry is essential because it does not give you the opportunity to solve your problem with the right solution and causes severe stress and anxiety (Gori et al., 2023). This type of worry focuses on events that are very unlikely or impossible to happen (Borkovec et al., 1991; Dippel et al., 2023).

One of the concepts related to worry is rumination (Hoyer, 2009). Rumination is defined in psychology as a compulsive focus of a person's attention on the symptoms and causes of a distress and paying attention to its causes and results, instead of focusing on its

solutions (Watkins & Roberts, 2020). Rumination and worry are related to anxiety and other negative emotional states. Rumination has been widely researched as a factor of cognitive vulnerability and as a background for depression (Hoyer, 2009; Wong et al., 2023). The difference between rumination and worry is that worry is focused on the future and is usually activated as a coping strategy in response to disturbing thoughts. When negative beliefs are activated, a person experiences worry, but rumination focuses on bad feelings from past experiences.

Worry and rumination are common among the general population and among students. For example, Joubert et al. (2022) in a study on 207 adults showed that 38% of them are involved in worry and rumination on a daily basis. Bakshi and Ansari (2007) in their research on 400 students of Tehran University of Medical Sciences showed that 4.8% of them had severe worry and 34.3% had moderate worry.

Among the strategies that have grown in recent years in order to reduce cognitive conflicts in the field of psychotherapy is paying attention to metacognitive strategies. Metacognition refers to the factors that are responsible for monitoring and controlling cognition (Fiedler et al., 2019). Therefore, metacognitive strategies are measures to monitor cognitive strategies and control and guide them (Scorţan, 2023). In this mechanism, a person tries to control the situation by controlling his thoughts, and through this, he provides appropriate performance and solutions (Farazandeh et al., 2023). Several researches have shown the

effectiveness of metacognitive strategies in various areas, including rumination (Ansari et al., 2021; Normann & Morina, 2018; Solgi & Hosseini, 2021) and worry (Ansari et al., 2021; Normann & Morina, 2018; Hammersmark et al., 2023).

Considering that many of us worry many times during the day or ruminate on the events of our lives, and this behavior is widespread in all members of society, including students, the present study was conducted with the aim of investigating the effectiveness of metacognitive strategies training on reducing rumination and worry.

2. Methods

2.1. Statistical Population, Sample, and Sampling Method

This research is a semi-experimental type with a pre-test-post-test design and a control group. The research population was the students of Shahid Beheshti University in the academic year 2022-2023. 32 students of were selected based on the cut of point in the Ruminative Responses Scale (RRS) and the Penn State Worry Questionnaire (PSWQ) by purposive sampling and were assigned in two experimental (n = 16) and control (n = 16) groups.

Consent to participate in the research, not suffering from other mental disorders, not participating in other psychotherapies and not taking psychiatric drugs were among the criteria for entering the research. Also, the participants could withdraw from the study whenever they wanted.

2.2. Instrument

Ruminative Responses Scale (RRS): The Ruminative Response Scale (RRS)-short form was developed by Nolen-Hoeksema & Morrow (1991) and is one of the most widely used measures of rumination, comprising 22 items and two components: reflection (items 1-11) and brooding (items 12-22). It is scored on a 4-point Likert scale from never (1) to always (4). A higher score indicates more rumination. A cut of point above 51 on this scale is considered severe rumination (Rosenbaum et al., 2017). Some studies have supported the reflection–brooding two-factor model and confirmed the satisfactory psychometric properties of this scale (Burwell & Shirk, 2007; Schoofs et al., 2010). Luminet (2004) reported the internal consistency of the scale as 0.88 to 0.92 and its test-retest reliability as 0.68. In Iran, Bagherinejad et al. (2010) confirmed the factor structure of the scale and reported its internal consistency to be 0.88.

Penn State Worry Questionnaire (PSWQ): The PSWQ was developed by Meyer et al. (1990) and is a 16-item self-report scale designed to measure the trait of worry in adults. In scoring the PSWQ, a value of 1, 2, 3, 4, and 5 is assigned to a response depending upon whether the item is worded positively or negatively. Possible range of scores is 16-80 with the algorithm of total scores: 16-39 low worry, 40-59 moderate worry, and 60-80 high worry. In this research, people whose level of worry was severe (high) were selected. PSWQ validity have been confirmed in various studies (Startup & Erickson, 2006; Zlomke, 2009). In Pestle et al. (2008), Cronbach's alpha was

reported as 0.91. In Iran, the results of the study by Moghadasin et al. (2019) showed the best fit for the single-factor model among 8-12-year-old children and 13-18-year-old adolescents. These results indicate the appropriate construct validity of this questionnaire in the Iranian population. Cronbach's alpha was equal to 0.85 for children and 0.86 for teenagers.

Metacognitive Strategies Training: The training of metacognitive strategies was based on the protocol of Miegel et al., (2020) and Ghorbani et al., (2022) and was conducted in eight sessions once a week and for 90 minutes in each session. Table 1 shows the sessions and the content of each session.

Table 1
Metacognitive strategies training sessions

Sessions	Content of each session
First session	Teaching cognitive strategies, expressing the purpose, summarizing, taking notes and telling the learned material to others
Second session	Defining the metacognitive strategy, finding out about one's cognitive skills and acting correctly in situations
Third session	Teaching planning strategies, predicting the necessary time and speed, selective attention, overestimation of threat, choosing appropriate strategies
Fourth session	Repetition and review of the stated content and solving problems in a group
Fifth session	Monitoring strategy, controlling the effectiveness of activities, meditation to search for reasons, exaggerated sense of responsibility and self-questioning to monitor understanding
Sixth session	Self-regulation strategy training, change, modification or adjustment of self-regulation
Seventh session	Repetition and review of the stated content and solving problems in a group
Eighth session	Answering questions, thanking and post-test

Data analysis was done using covariance analysis and SPSS-26 software

3. Results

The mean and standard deviation of the age of the students in the experimental group

were 23.15 and 4.28 and in the control group were 23.78 and 2.72. The mean of the research variables are presented in Table 2 for the two experimental and control groups separately.

Table 2
The mean of the research variables separately for the two experimental and control groups

		Rumination	Worry
Experimental group	Pre-test	54.21	66.12
	Post-test	31.79	34.58
Control group	Pre-test	55.08	66.83
	Post-test	56.47	65.27

As can be seen in [Table 2](#), the mean of worry and rumination in the experimental group decreased in the post-test, but in the control group, rumination increased slightly and worry decreased slightly. The normality

of the data distribution was checked with the Kolmogorov-Smirnov test and the homogeneity of variances was checked with the Levene's test, which is presented in [Table 3](#).

Table 3
Checking the normality of data distribution and homogeneity of variances

		F	P		
Kolmogorov-Smirnov test	Pre-test (rumination)	0.45	0.37		
	Post-test (rumination)	0.67	0.23		
	Pre-test (worry)	0.81	0.18		
	Post-test (worry)	0.72	0.21		
Levene's test		F	df ₁ /df ₂	p	
	Rumination	1.09	1/30	0.44	
	Worry	2.17	1/30	0.36	

The non-significance of the Kolmogorov-Smirnov test and Levene's test shows that the data distribution is normal and the condition

of homogeneity of variances is established. The results of covariance analysis are presented in [Table 4](#).

Table 4
Results of covariance analysis of metacognitive strategies training on rumination and worry

variable	Source of changes	Sum of squares	Df	Mean squares	F	P
Rumination	Pre-test	28590.11	1	28590.11	58.46	0.001
	group	15496.74	1	15496.74	29.74	0.001
	error	7432.45	30	642.28		
	total	51519.3	32			
Worry	Pre-test	33460.75	1	33460.75	46.09	0.001
	group	18026.41	1	18026.41	23.10	0.001
	error	6012.33	30	471.36		
	total	57499.22	32			

According to [Table 4](#), the training of metacognitive strategies has been able to significantly reduce rumination and worry in

the experimental group compared to the control group.

4. Discussion

The purpose of this research was to investigate the effectiveness of metacognitive strategies training on reducing rumination and worry. The findings of the research showed that the training of metacognitive strategies was able to significantly reduce rumination and worry in the experimental group compared to the control group.

This findings are consistent with researches of [Ansari et al. \(2021\)](#), [Hammersmark et al. \(2023\)](#), [Normann & Morina \(2018\)](#) and [Solgi & Hosseini \(2021\)](#).

In explaining these findings, it should be said that metacognitive strategies help people gain a better understanding of their dominant ways of thinking by creating awareness of cognitive processes. In this regard, it has been shown that metacognitive strategies of monitoring thoughts can help people suffer less cognitive fusion ([Rabie et al., 2012](#)). Worry and rumination are both related to negative thoughts that are constantly going through our minds, and after them we experience negative emotions ([Lewis et al., 2019](#)) and suffer mental distress ([Xie et al., 2019](#)). But in metacognitive model, instead of cognitive models -that attention is paid to the content of thoughts- is considered to the process and process of thoughts that flow in our head. For example, why should we believe that "worrying is a good thing" or that "if I constantly think about past negative experiences, I can learn from them". In the metacognitive model, it is assumed that we should be aware of the flow of our thoughts and in fact gain knowledge about our

cognitions. Hence, by learning metacognitive strategies and some negative thoughts, the students participating in this research were able to engage less with their negative thoughts and monitor their thinking process from above.

Although this research was accompanied by new findings that can be used in society to reduce the level of worry and rumination in different groups of people, it was also accompanied by limitations. The findings are limited to the research community of students of Shahid Beheshti University and caution should be exercised in generalizing their findings to other groups. The data collection method was also based on self-report questionnaires and were not used some other tools such as examining daily experiences, physiological indicators or observing people in natural situations. It is suggested that in the future, more research should be done in this field and among different groups of society. Conducting such researches can be beneficial in designing and implementing preventive and therapeutic programs in order to reduce worry and rumination in the society.

5. Conclusion

The findings of this research showed that teaching metacognitive strategies can be effective in reducing worry and rumination. Therefore, according to the increasing trend of worry and rumination among different groups of people, teaching these strategies can help reduce worry and rumination in society.

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Conflicts of Interest

The Author declare that there is no conflict of interest with any organization. Also, this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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