The Effectiveness of Meta-Cognitive Skills Training on Improving Critical Thinking Skills in Students with Neuroticism Disorder

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ABSTRACT─ *Introduction*: This study aims at investigating the effectiveness of teaching of meta-cognitive skills in improving critical thinking female students suffering from neurotic disorder.
Method: The current research is of semi-experimental kind and contained a pre-test, post-test and control group. Statistical population studied in this research includes female students of the third grade of a high school located in Rasht throughout educational year of 93-94. The samples studied here were 40 students who were firstly chosen in terms of their scores in the Eysenck juvenile personality test and then randomly divided in two groups: the experimental and control ones. Meta-cognitive skills were taught to the members of experimental group for 10 sessions weekly while the members of the other group were not involved in any teaching programs. In order to record any variation in critical thinking the California questionnaire (form B) at pre-test and post stages were completed.
Results: Results received from analyzing covariance showed that differences in critical thinking variable and its components which include analysis, interpretation, inference, inductive reasoning and deductive reasoning were significant. The results are indicative of positive impact of teaching meta-cognitive on significant improvement of critical thinking.
Conclusion : It is a matter of fact that students have neurotic disorder, mainly they face restrictions in the areas of critical thinking, hence teaching critical thinking skills can, to some extent, contribute to the betterment of their critical thinking skills.
KEYWORDS: Health, Mental health, Personal health, Psychosis

Introduction

Living in the age of communication, has made people face in every moment of life with a lot of new information and decision-making positions. That may in the past have not seen, special training about. in this situation, the successes and failures which they choose in the correct-option, more than anything will depend on, the development of intellectual abilities and, in particular, way of their critical thinking. Critical thinking is a process of mind that as a cognitive activity, a process by which ideas, information and resources and its suppliers be evaluated and find logical order and regularity and finally connected whit ideas and other information (Shabani, 1386). Considering that one of the challenges of education, is preparing students for living in a world of change and transformation, therefore, teaching critical thinking skills enable them to understand the broader reached information and increase the ability to derive quickly and solve real-world problems, and would updated and fluid their thinking process (Dwyer, 2014). In addition, critical thinking can lead to the development of thought processes through beyond self-centered attitudes and perceptions and the extension of the experience of students and providing them with modern values and ideas (Meyers, 1997). Many studies, confirmed the positive impact of critical thinking on students' education. Like Smrsy, 2011; Talebpour, Noori, and Molavi, 1381; Asjadi, Ghale noie, and Omidvar; in 1391 and Manadaran Arani in 1370. That knows critical and analytical thinking as one of the six factors that influence motivation and academic achievement of learners. Critical thinking, like other cognitive processes, is under the influence and control of metacognitive processes that regulate it. Information that are obtained from Metacognitive monitoring often experienced as subjective feelings and are able to influence the thinking and behavior. Study of Hazerevazifeh (1391) showed a significant positive relationship between certain components of student's metacognitive knowledge and skills with their critical thinking. Interacting with metacognitive factors, emotions which are representing native data of person can influence on a wide range of cognitive processes such as biasing in attention and memory judgment and decision-making as a source of information (Clore &Parrott, 1994). According to some theories, like Wells & Matthews emotional disorders model (1994), between metacognitive processes and excitement, there is a reciprocal relationship that linked Meta-cognitive and thinking shape directly to emotional vulnerabilities and persistence of emotional disorders. And believe that emotional disorders, are a result of a metacognitive processes which are leading to the formation of certain thinking

styles and trap the person in the negative processing of information about themselves. any distortion in metacognitive monitoring and control can have a role in biases and emotional disorders on this regard due to modifying distorted beliefs and metacognitive knowledge of people and is particularly important in improving their emotional disorders, and consequently to improve cognitive thinking, (Biabangard, 1381). Among emotional disorders, neuroticism is a disorder that people generally have shaky feelings and that prevents proper adjustment and makes a framework that prone people to irrational beliefs and therefore are less able to control their impulses and therefore react dramatically (Schultz & Schultz, 2013). These people pay less effective experiences and feelings separation than others (Skalina, Gunthert, Ahrens & Wenze, 2015). based on this, it seems that these people according in terms of biases in thinking and inability to control their thoughts in the field of critical thinking skills that need to understanding the available evidence and receiving hidden meanings in opinions and ideas do not have a desirable capacity and the negative consequences of this issue is reflected in the activities of daily life and their education (Hatami, Muhammadi, Ibrahimi, and Hatami, 1389). The research results of Ghaffari (1390) has shown that Five aspects of personality such as neuroticism been able to explain0.51 variance of the dependent variable of critical thinking. The results of Soleimani Far (1390) shows a significantly positive relation. between neuroticism and critical thinking on the one hand and meta-cognition and critical thinking on the other hand, in expressing the necessity of critical thinking for those suffering mental illnesses-neurosis it can make desirable effect on reducing the negative bias of mind, freedom from restraint, tend to be sensitive to the feelings of others, gaining understanding others, and understanding others disagreements and conflict thoughts (Marzano, 2001). There is possibility of helping them to correct their distorted beliefs by helping them to learn new ways to control attention, establishing relationships with thoughts and negative beliefs and change metacognition causing maladaptive thinking patterns (Biabangard, 1381). Meta-cognitive therapy are based on changing Mindsets of patients with psychological disorders (cognitive syndrome and attention). And try to help patients learn new ways to control attention, establishing relationships with negative thoughts and beliefs and change metacognitive beliefs that create maladaptive thinking patterns. compared to metacognitive therapy, metacognitive training mechanisms, has increased by promoting scientific involvement, positive attributions, locus of control, motivation further progress, creativity, productivity and self-responsibility, self-confidence in person and enable the ability to identify problems and decide freely and adopt the best solutions (Mahboobi and Mostafaei, 1385). Given above and the high percent of prevalence of psychological disorders among students (Kaveh, Shojaeizadeh, and EftekhareArdabili, 1382), the aim of this study was to determine the effectiveness of metacognitive skills training on improving neurosis girl's students' critical thinking. Reviewing the listed research literature distorted metacognitive beliefs are effective on creating emotional disorders such as neurosis . And due to the negative effects of neuroticism on the process of critical thinking and modifying distorted metacognitive beliefs regarding to the results of researches (Hashemi, 1389), The hypothesis of this study is : metacognitive skills training is effective on improving neurosis girl students' critical thinking .

Method
The methods used in this study was quasi-experimental with pretest-posttest and control group. The sample of the study included female students studying in Grade 12 in 1393-1394 school year in Rasht. And the sample were selected by multistage random sampling method. Such that first of among school districts in Rasht one districts was randomly selected and five schools were randomly selected from among the region and study questionnaires were used by students. Then, according to the study criteria, including score more than 50 in Eysenck junior Eysenck personality questionnaire (JEPQ) (Eysenck and Eysenck 4) , lower score of 15.89 in critical thinking questionnaires based on The California critical thinking skills test(Fashion and Fashion, 1990) . lack of experience of mourning, and lack of experience of certain psychological impact (such as divorce of parents) in the past year, a total of 40 students were selected and randomly divided into two experimental and control groups (each group of 20 students) . those in the experimental group received the intervention and those in the control group were not received any intervention during this period Course held in 10 - 30minute sessions (in one of the schools in the district and by the investigator) and during them students become familiar whit metacognitive thinking skills and and did it so for practical assignments. After the end of the training period again and in the same conditions   posttest of critical thinking from both groups were taken.

Research Tools
Eysenck junior Eysenck personality questionnaire) JEPQ) was used to assess neuroticism personality dimension. It measures three fundamental character of psychosis, neurosis and neuroticism and extraversion.   Neuroticism scale that contains 20 questions was used in this study. The questionnaire has been standardized for boys and girls by Rahimi Nejad in Iran (1382) and reliability for neuroticism scale reported 72/0. Also Rahimi Nejad and Asgari (1382) have calculated reliability for female students aged to 16 years 74/ 0. The California critical thinking skills test :this questionnaire is designed by Fashion and Fashion (1990), is containing 34 questions (four or five options) by one correct answer. And involve five fields of analysis, evaluation, inference, inductive reasoning and deductive reasoning to measure critical thinking skills. the validity of this test investigated by Khalili and Soleimani (1382) by principle component analysis and varimax rotation and all tests were seen highly correlated with total scores as well as factors were contented by favorable validity to each other . Khodamoradi, Saeid Alzakryn, Alavi Majd, Yaghmaee, and Shahabi (1385) were calculated reliability of the questionnaire79/0. In this study, the reliability of the

questionnaire through Cronbach's alpha was calculated 78/0. In the following schedule based on the training of sessions to experimental group defined. The content is adapted of the sessions of "metacognitive skills training program, the first part documents (causal) and the second section early conclusion" (Moritz, Woodward, 1390) and researcher has added to the program some section.

Table 1: timeline the material presented in training course

Session	Purpose	Content	Tasks
First	Familiarity with students. Understanding the human thinking process	Provide a description of the work in this course and how people think	explain examples of thinking and how it shape by students
Second	Introduction to types of thinking (cognitive and metacognitive) and their role	The introduction of cognitive and metacognitive processes and the role and mechanisms of metacognition in controlling cognitive activities	According to a particular behavior, such as reading, identify its cognitive and metacognitive processes.
Third	familiarity whit metacognitive skills and responsibility	Showing slides prepared on the responsibility with provide additional details	Accurately respond to related questions about slide.
Fourth	Introduction to definition and types of Attribution concerning the events and its effects	Explain with examples of the types of documents and its complications (Explain the causal about what happened) contains blame or earn credits	Pay attention to the example given in the slides carefully and respond to them step by step.
Fifth	continuation discussion about Attribution to themselves to others and conditions	Slideshow about the possible positive and negative effects of attribution (selfishness, increase self-confidence or moderation)	With reference to their surroundings, tell others some of the positive and negative effects of attribution to others.
Sixth	To create realism in life	Talk about taking a set of causes in the event of failure of not only themselves but others	Comment in the case of the contributory factors in teacher's example.
Seventh	Promote timely conclusion	View a slideshow about hasty the decision and against late decision and complications of each	Discuss the consequences of hasty or delayed decisions in the slide show.
Eighth	Introduction to planning Skills	Introducing the planning stages for activities include: goal setting, time predictions, how to deal with the issue and strategy selection	Planning for educational activities for a week and project it for classmates.
Ninth	The introduction of self-regulation metacognitive skill	Necessity for flexibility in procedures and modify them if necessary	Participation in class discussion about the results of the program without flexibility
Tenth	Conclusion The overall of the material presented in the course	An overview of the skills taught and remove ambiguities in this regard	Participation in the summary of presented lessens and try to use them in practice

Results:

Meta-cognitive skills training on improving students' critical thinking of neurotic female is effective the study hypothesis stating that were analyzed by using ANCOVA and its results went on visible.

Table 2: adjusted mean and standard error of components of critical thinking in the experimental and control groups

Variable	Trial		control	
	Mean	Standard Error	Mean	Standard Error
Analysis	3/16	0/13	2/29	0/13
Evaluation	5/66	0/15	4/70	0/15
Deduction	4/55	0/15	2/50	0/15
Inductive Reasoning	5/59	0/29	4/46	0/29
Deductive reasoning	3/35	0/16	4/10	0/16

According to the study, the pretest-posttest design with a control group so the best way to Analysis data is using multivariate analysis of covariance so before doing the analysis, at first test assumptions, including homogeneity of variance-covariance matrices, the same variance is examined. Box test results showed that due to the significant value (Sig=0.01, F (99 / 5813, 15) =1.29, 72/22 = Box s M=22.72. The condition of homogeneity of variance-covariance matrices are not established.

Table 3: Levine test for equality variances of Critical Thinking

Components	F	df1	df2	sig
Analysis	3/83	1	38	0/06
Evaluation	23/05	1	38	0/01
Deduction	3/24	1	38	0/08
Inductive Reasoning	2/08	1	38	0/16

Deductive reasoning	10/41	1	38	0/01

Levine test is done to check the assumption of equal variances. So except components of the evaluation and deductive reasoning calculated F is more than $P \le 05$. So difference is not statistically significant and assumption of equal variances is on. Results of the analysis are reported in Table 3.

Table 4: Test the combined effect sizes of meta-cognitive skills training on improving critical thinking based on Wilks Lambda

Wilks Lambda	Value	F	df1	df2	sig	ή
	0.241	32.18	5	29	0.01	0.58

According to the above table, the effect of metacognitive skills training on improving students' critical thinking in combination with variable Partial =0/58 ή ,Wilks Lambda =0.249, F (29, 5) =18.32 Has a significant effect (p<0.01). This means that meta-cognitive skills training is effective on improving students' critical thinking Eta squared values (0/58) can be seen on above table shows very high intensity.

Table 5: Results of the effect of metacognitive skills training on improving students' critical thinking components

Changes Resources	MS	Do	MS	F	Sig	effect size
Analysis	5/73	1	5/73	19/92	0/01	0/38
Error	9/5	33	0/29			
Evaluation	7/01	1	7/01	18/82	0/01	0/36
Error	12/29	33	0/37			
Deduction	31/68	1	31/68	78/85	0/01	0/71
Error	13/26	33	0/40			
Inductive Reasoning	9/79	1	9/79	6/89	0/01	0/17
Error	46/9	33	1/42			
Deductive reasoning	11/99	1	11/99	28/01	0/01	0/46
Error	14/12	33	0/43			

According to the results of table 4 the effect of meta-cognitive skills training on the analysis of the F (33, 1)= 19.92 intensity of the effect (0.38) , on the evaluation with F (33, 1)= 18.82 and the intensity effects (0.36), on the inference whit F (33, 1) = 78.85 and intensity effects (0.71), on the Inductive Reasoning whit F (33, 1) = 0.69 and intensity effects (0.17),and on the Deductive reasoning whit F (33, 1) = 28.01 and intensity effects (0.46).

Conclusion

The aim of this study was to determine the effectiveness of meta-cognitive skills training on improving neurosis students' critical thinking was the results showed that that teaching these skills Couse improving critical thinking of students' whit disorders is neuroticism. these results are consistent with results of Soleymanifar (1390) that Indicates significant relationship between the dimensions of metacognition (knowledge of cognition and cognitive regulating) with critical thinking, Hazer Wazifeh (in 1391) referred that there is a significant relationship between some components of metacognitive knowledge and critical thinking skills and Bransford (1968, cited in Alipur, 1392) which showed facilitating access to memory and metacognition, focus on background knowledge and help students to take advantage of their ability to solve problems, improve the skills of reasoning and critical thinking in them. In explain how meta-cognitive skills training can be effective on critical thinking of neurotics, review of the Theory of Wells & Matthews (1994) can be useful. According to this theory it is one of the characteristics of people with psychological disorders their thinking are biased and controlling it becomes difficult for them (Wells, 1994). A way that meta-cognitive skills helping those includes modifying beliefs, Attribution and thinking of this people to ward their self-efficacy and empowerment. At all metacognitive skills training through impact on neurosis students' thinking, can improve cognitive processes and empowerment in the face of negative thoughts and judgments realistic and timely conclusion in the events of life, and improve them in the field of Conclusion and evaluation and more detailed analysis and reasoning and critical thinking.

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