A New Cognitive Restructuring and Critical Thinking Intervention on Test Anxiety

Saeid Motevalli, Mohd Sahandri Ghani Hamzah, and Maryam Gholampour Garmjani

***Abstract*- This article was written as a conceptual paper to present a new combinational therapeutic approach on the base of cognitive restructuring and critical thinking intervention due to assisting students to combat proficiently with test anxiety. Regarding to cognitive approach, anxious students suffer from test anxiety because they engage with some irrational thoughts and difficulties in concentration on task-relevant thought. Thus, if students are trained to manage their irrational thoughts and substitute with rational thoughts, they will experience a low level of test anxiety during their study journey. Although there are various treatments and interventions in the cognitive approach, cognitive restructuring and critical thinking skills were considered in this article for some reasons. Cognitive restructuring is one of the techniques in cognitive approach therapy as a learning process to convert cognitive misrepresentations, or fundamental of faulty thinking with the goal of replacing irrational thoughts and beliefs with beneficial rational thoughts. Moreover, critical thinking can classify as a reasonable and reflective thinking process which is directed to make a decision about our beliefs or actions, and also about a certain situation or problem. The present intervention involves the combination of two related cognitive restructuring sub-models (rational emotive behavior therapy and systematic rational restructuring) and critical thinking skills. Through this intervention as a cognitive process, students could evaluate their cognitions, emotions and behaviors are true.**

***Keywords*- test anxiety, cognitive restructuring, rational emotive behavior therapy, systematic rational restructuring, critical thinking**

I. INTRODUCTION

Anxiety is a familiar emotion to all of us which caused by a perceived danger, harm, lose, or threat (Hockenbury, 2010; Arroll & Kendrick, 2018). As a psychological and physiological condition, anxiety can find its roots in physical, mental, behavioral, and cognitive causes (Seligman, 2001). It is regarded as a natural response to a stressful agent, assisting one in handling an unwieldy condition by means of encouraging the individual to get adapted to the problem. One of the remarkable criteria to determine anxiety as normal or abnormal can be mentioned by the severity , the reasoning behind it, and its consequences (Barker & Buchanan-Barker, 2010).

Saeid Motevalli*, Universiti Pendidican Sultan Idris, Malaysia (*Email address: saeid@fpm.upsi.edu.my).
Mohd Sahandri Ghani Hamzah, Universiti Pendidican Sultan Idris, Malaysia (sahandri@fppm.upsi.edu.my)
Maryam Gholampour Garmjani (maria.aramesh@yahoo.com)

As a suitable and consistent reaction, anxiety seems to be an indispensable part of normal life in all human societies. Life without anxiety or with excessive anxiety is largely threatened. On the contrary, mild anxiety can moderate life appropriately and make it more efficient and bearable (Abolghasemi, Mehrabizadeh-Honarmand, Najarian, & Shokrkon, 2004).

Test Anxiety

Test Anxiety is a subjective feeling of nervousness, worry, apprehension, and tension has a significant effect on academic performances and students feel this anxiety in an assessment context which considered threatening (McCarthy, 2007; Vitasari, Nubli, Othman, Herrawan, & Sinnadurai, 2010; Mascret, Danthony & Cury, 2019). Numerous studies have attempted to confirm the negative impacts of test anxiety on educational performance (Abolghasemi, 2002; Abolghasemi et al., 2004; Luigi et al., 2007; Reeve & Bonaccio, 2008; Chin, Williams, Taylor & Harvey, 2017; Thomas, Cassady & Heller, 2017; von der Embse, Jester, Roy & Post, 2018). The critical reason for students' poor academic performance lies on the lack of concentration on some parts of the homework because impertinent ideas interfere with his mental or cognitive process and interrupts the appropriate concentrations on the task (Abolghasemi et al., 2004). Regarding to Beck and Emery's, through the assessment or evaluation time, the anxious students waste their time on irrelevant thoughts which already preoccupied with irrelevant issues. Thus, anxious students are mainly concerned about their own performance and their poor competence, incapability and worthlessness which create some involuntary physical responses (Beck & Emery, 1985). The students' performance can be terribly affected by the stressful situations, which exposed to a high degree of stress that come from outside of school, and students' attention is mostly distracted from giving priority to their academic goals.

Test anxiety is associated with serious fear, worry, high heartbeat, butterfly in the chest and other physiological symptoms (Abolghasemi et al., 2004; Vitasari et al., 2010; Alibak, Talebi & Neshat-Doost, 2019). Numerous studies suggested that there are at least two components of test anxiety, which called worry and emotionality (Putwain, 2007; Spielberger & Vagg, 1995; Steinmayr, Crede, McElvany & Wirthwein, 2016; Raufelder, Regner & Wood, 2018). Worry component is refered to the cognitive anxiety and pessimism about the student's competence, and performance, but the emotionality component refers to the physiological arousal in the exams (Putwain, 2007; Raufelder, Regner & Wood, 2018). Anxious students interpret the exam as a

threatening situation or stimulus, so in such situations, they behave anxiously as though they were in danger and threatened. With regards to studies on test anxiety, it can be conclude that anxious students (especially suffer from test anxiety) have poor academic performance or achievement (Luigi et al., 2007; Reeve & Bonaccio, 2008). Likewise, Aronen indicated that a high level of anxiety can decrease the quality of students' memory, and so do their reasoning and concentrating (Aronen, 2004). Test anxiety suggests growing concern about situations in which there is a formal performance evaluation specifically in the academic areas. Majority of students suffer from test anxiety, but the degree of destructive effects on college students is estimated to range from 20% to 35% (Naveh-Benjamin, 1991; Zeidner, 1998). If test anxiety is of a severe degree, it can critically interfere with the quality of performance (Rothman, 2004). It is accepted that test anxiety can be dealt with in terms of two aspects. The first aspect revolves cause the thought and concern about the future and the second one are feeling that reflects one's awareness about increased physiological reactions (Cassady & Johnson, 2002).

In test anxiety, worry component defined as cognitive uneasy feeling about the probability of occurrence of disappointment, embarrassment, or failure. It may also involve cognitive disorders such as memory problems, oversensitivity, and concentration difficulty (Huberty & Dick, 2006; Rothman, 2004; Zeidner, 1998). According to Huberty and Dick (2006) emotionality component consists of two types of disturbances: Physiological disturbances and behavioral disturbances. Physical symptoms of physiological hyperarousal include rapid rate of respiration, sweaty palms, feelings of nausea, and increased rate of heartbeat (McDonald, 2001). Moreover, McDonald states that worry component refers to uncontrollable, unwanted, repelling cognitive activity linked to negative thoughts and emotional uneasiness (McDonald, 2001). Furthermore, another component of the test anxiety construct is called cognitive interference (Swanson & Howell, 1996). This component deals with interfering, intrusive thoughts that nullify the attempt to retrieve the previously learned information (Wine, 1982). The studies conducted by Lowe suggested that social humiliation and derogation are associated with fear or worry that will cause lower the quality of one's performance on tests (Lowe et al., 2008).

Cognitive Restructuring and Test Anxiety

In educational psychology, there are a vast number of interventions to reduce anxiety level among students and at the same time to improve their academic performance. One of the interventions is the cognitive restructuring (CR) which is a learning process to controvert cognitive distortions, or essential faulty thinking with the goal of replacing irrational thoughts and beliefs with beneficial rational thoughts. Cognitive restructuring assumes that individuals are directly responsible for creating dysfunctional emotions and their consequential behaviors, like stress, anger, depression, and anxiety. Correspondingly, cognitive restructuring advises to change irrational beliefs or thoughts and substitute more rational ones (Ellis, 1999; Ellis & Harper, 1975). Cormier labelled that cognitive restructuring as a rapidly growing systematic strategy that attempted to teach clients to replace their negative cognitions with positive and fruitful thoughts and actions (Cormier & Cormier, 1991). Cognitive restructuring is a valuable method for controlling symptoms of depression and anxiety. On the basis of cognitive restructuring, anxiety and depression disorders belonged to the interpretation of the situation and stimuli, not on the base of the situation and stimuli. The idea is that behaviors and feelings are the result of automatic thoughts, which related to the core (deeply held) beliefs. Thus, feelings and behaviors of anxiety and depression are the result of automatic negative thoughts or irrational beliefs that could be modified. A simple process of recognition of these thoughts and irrational beliefs could be conducted with clients using the A – E model. On the basis of A-E or ABCDE model, an initial event or the antecedent could be due to automatic thoughts or irrational beliefs about the event.

These automatic thoughts could create some behaviors and feelings as consequences. It is remarkable that these thoughts are automatic and often negative; they are not an adequate representative of real world evidence. Hence, it is necessary to attempt to seek evidence which could support or disprove the evidence or disputing automatic thoughts. Lastly, improving rational alternative explanations of automatic thoughts could result in a new interpretation of the antecedent or alternative explanation. This process could permit the client to control and evaluate the thought process and realize how to feel better in another way. Cognitive restructuring is a relatively vague term, which means different things to different individuals and has been used synonymously with cognitive therapy. The two most famous cognitive therapeutic methods in test anxiety intervention are Rational Emotive Behavior Therapy (Ellis, 1962, 1977; Hickey & Doyle, 2018) and Systematic Rational Restructuring (Goldfried, Decenteceo, & Weinberg, 1974; Krispenz & Dickhäuser, 2018). Both forms of treatment based on the premise that anxiety or emotional disturbance is a result of illogical or irrational beliefs. While rational emotive behavior therapy gives the rationale for cognitive restructuring, systematic rational restructuring classifies this rationale into a series of systematic steps and procedures (Zeidner, 1998). Therefore, the combination of these methods could complete each other and create a fast treatment for anxious students.

Rational Emotive Behavior Therapy (REBT)

Rational emotive behavior therapy (REBT) aims at educating test-anxious students to recognize and change their irrational beliefs and thoughts systems, presumed to be mainly responsible for their anxiety reactions in evaluative situations. According to Fletcher and Spielberg (1995), the main therapeutic approach should attempt to train students how to challenge and dispute their own irrational beliefs and faulty

assumptions and then train how to replace theses irrational thoughts with more realistic and rational ones (Fletcher & Spielberger, 1995). Ziedner in 1998 claimed that anxious high school students should encourage to identify their irrational content from their disruptive thoughts, evaluative situations in which these thoughts tend to occur, and then recognize the negative behavioral consequences of these thoughts (Zeidner, 1998). This encouragement to identify irrational content may assist them to acknowledge the negative behavioral consequences due to their irrational beliefs about test anxiety. Two essential irrational beliefs on test anxiety are successful thought and self-worth. Anxious students attempt to be a success on main exams at all cost, and this success on these exams is equal to self-worth (Zeidner, 1998). Test anxious individuals can be characterized by perfectionist beliefs which assumes as an irrational belief, maintaining that anything less than perfect is failure. Anxious students feel that they do not meet their high standards of performance (all or nothing irrational thought, musts/shoulds, and exaggerated belief). Likewise, they will continue to fail these predictions become self-fulfilling assumptions. There are numerous case accounts that point the negative impact of perfectionism. Perfectionism cause that students struggle to cope with the pressures of achieving exceptionally high standards (Kearney, 2002; Vecchio & Kearney, 2007).

According to the ABC model (Ellis, 1977), a test situation does not create the feeling of anxiety but it is what the person says to oneself that makes one anxious. However, the test situation refers to an activating event (A = "I have a Mathematics exam next week and I start to panic when my teacher informs us in the class"). This antecedent associated with certain irrational beliefs (B = "I will be a failure and a terrible student if I flunk this exam"). Finally, the beliefs can create emotional consequences (C = "I feel extremely anxious, nervous, and upset about this upcoming exam"). Rational emotive behavior therapy also indirectly influences emotionality by modifying irrational appraisals, Whereas primarily linked to perceptual, appraisal, and reappraisal processes, (Spielberger & Vagg, 1987). Fletcher and Spielberger (1995) suggest that test-anxious students' irrational beliefs can be replaced or substituted with a REBT intervention which might contribute to improve attitudes toward academic work and the strengthening of a person's self-concept (Fletcher & Spielberger, 1995). REBT intervention demonstrates test-anxious individuals how strongly challenge, question, and dispute their irrational beliefs (Zeidner, 1998). The common methods in order to eliminate anxious students' irrational beliefs involves a direct and active verbal disputing the maladaptive thinking patterns and distorted cognition. One example of REBT intervention is with Socratic question. For instance, test-anxious students are trained to ask themselves of some of the following questions: "What would happen if I failed this example? What would be a terrible thing happen?", "Who determines my success?" "What kind of evidences can support this idea that I am a worthless individual if I fail upcoming Science exam?"

This approach maintains that if test-anxious students learn how to dispute persistently and forcefully their irrational ideas, they will acquire a new cognitive set of rational thoughts (Zeidner, 1998). This new cognitive set or construct is composed of beliefs such as "It is not that awful thing happens to me, but only pure unpleasant feeling if I fail. I know if I study harder, I can pass this Maths exam. Although there are numerous good reasons why I would like, I have not been a successful person. I will not be a worthless person if I fail this exam in this time because I am solely a person who has done poorly at the present, nonetheless who probably could do better later" (Ellis, 1962). There are numerous evidences of effectiveness of rational emotive behavior therapy on test anxiety, which confirmed that rational emotive behavior therapy is appropriate and effective treatment in reducing anxiety among high school students (Barabasz, 1981; Fletcher & Spielberger, 1995; Wessel & Mersch, 1994).

Systematic Rational Restructuring (SRR)

Similar to REBT techniques, the aim of systematic rational restructuring (SRR) is to discover the worrisome task-irrelevant thoughts of students who suffer from test anxiety. The systematic rational restructuring therapy able to reduce anxiety level during tests by distracting the irrational thoughts and substituting positive self-statements that redirect their attention to the task at hand (Denney, 1980). The rationale behind of this therapy is that test-anxious individuals may control their anxiety by learning to control task-irrelevant cognitions. To do this, these individuals generate their anxiety and direct attention from their task-directed performance. On the base of cognitive restructuring techniques, systematic rational restructuring therapy concentrates on the rational self-control. At first, students introduced to their own core belief which substantially determines their emotions while they experience in evaluative settings. At that time, they learnt to respond to their negative emotions from the test situations, which cause the anxiety-engendering thoughts during test-taking situations (i.e. "I will not pass the exam, and I'm no good"). They use their self-talk to think about the necessity in order to substitute positive thoughts to counter negative ones (i.e. "It is not terrible to fail, only inconvenient"). The main purpose of systematic rational restructuring intervention is to present and improve a new insight for anxious students. A treatment so called an imaginable rehearsal may help anxious students to change their irrational thought to avoid of text anxiety. For instance, students are inquired to describe how anxious they feel when imagining a crucial test situation. Group discussion with the members and facilitators (i.e. Counsellor or educational psychologist) is carried out to identify their description or explanation of their upset feeling towards test anxiety. Students are advised to think aloud during this process same as meta-cognitive strategies. The therapist may prompt them in their attempts to explore or reevaluate their perception of the event. Following the revaluation process, they then note the extent to which

their anxiety has decreased. To conclude, Fletcher and Spielberger stated that students are directed to engage in task-relevant behaviors (e.g., Working actively on the test itself) (Fletcher & Spielberger, 1995). These behaviors are incompatible with the generation of negative self-statements.

Critical Thinking (CT)

There are some cognitive skills such as perception, recognition, attention, memory, language, creativity, problem solving, judgment, decision making and reasoning (Goldstein, 2015). Moreover, there are some skills higher than cognitive skills that called metacognitive (higher level of cognition or thinking about thinking) skills such as critical thinking, a process which utilize some cognitive skills such as self-regulation, judgment, analysis, evaluation and inference. This skill also involves some thinking methods in order to extent how people inclined or willing to perform a given thinking skill and increases the chances of producing a logical conclusion to an argument or solution to a problem (Dwyer & Walsh, 2020; Dwyer, Hogan, & Stewart, 2012, 2014; 2015; Halpern, 2014). The term of critical thinking refers to a purposeful process and self-regulatory judgment and contains of some cognitive process. Critical thinking as a meta-cognitive skill is nonlinear and recursive process which can inspire an individual to obtain and assesses variety of evidences correlated to his believe or in a certain situation how to behave. Accordingly, critical thinking can assistance people to apply several cognitive skills in order to make a proper judgment about a certain situation by using of decision making, monitoring, and developing a high quality judgment (Facione, 2011). Consequently, it can be said that critical thinking can be consider as a reflective and reasonable thinking process directed to make a appropriate decision about our actions and beliefs in a certain problem or situation. People can be able to evaluate their actions by this decision making process as always true, sometimes true, partly true, or false (Bullock, Nunner-Winkler, Stern, López, & Ziegler, 2003; Raiskums, 2008). Some researchers highlighted that critical thinking must involve thinking attitudes and skills or dispositions and cognitive skills alone is not a sufficient measure of critical thinking (Ennis, 2003; Halpern, 2014; Sosu, 2013). The term of critical thinking disposition mentions about individual's internal motivation to think critically once confronted with challenges or problems in which need to problem solving, evaluating ideas, or making decisions and can be used as a measure of competent clinical judgment (Chen, Chen, & Pai, 2019; Facione, 2011).

Therefore, it is safe to say that critical thinking could be consider as a cognitive or meta-cognitive process which refers to the best way of thinking by utilizing various mental processes such as recognition, consideration, selection, evaluation, problem solving, and judgment. Precisely, it can assist individuals' thinking styles in relevant and irrelevant issues in order to make a proper decision making about if something is right and accurate or not (Coulter & Collins, 2011). Similarly, critical thinkers may apply some critical competencies such as purposes, goals, objectives, questions, information, data, evidence, experience, assumptions, presuppositions, concepts, theories, values, implementations, assessing thinking, and specially students who think critically routinely analyze reasoning (Paul & Elder, 2019).

Facione (2011) mentioned some core critical thinking skills such as interpretation, inference, analysis, evaluation, explanation, and self-regulation (see in Figure 1).

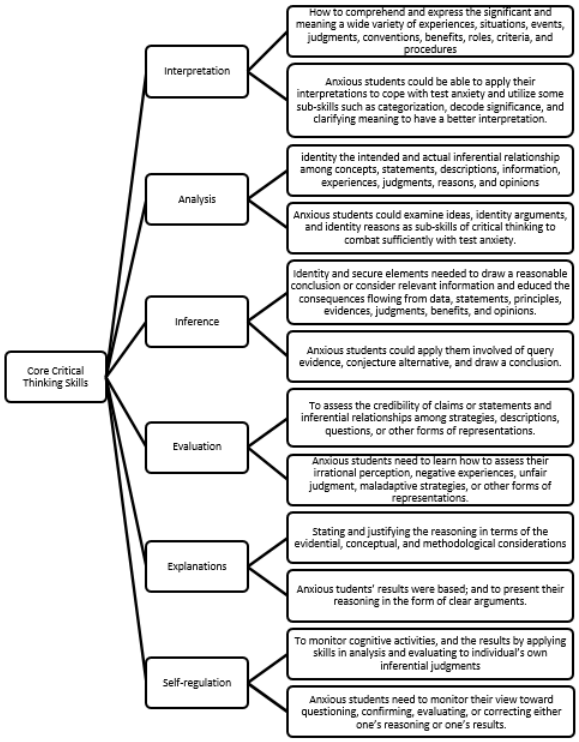


Figure 1. Core Critical Thinking Skills And Anxious Students Adapted From Facione (2011)

Furthermore, to have strong critical-thinking skills, anxious students ought to be motivated to engage tests anxiety solutions and make decisions properly to applying those skills to combat with test anxiety through different examinations' circumstances such as before, during, and after the exam. In sum up, critical thinking rely not only on logical processes but also it highlights wide-ranging of intellectual criteria such as trustworthiness, accurateness, clearness, justice, significance, and exactness.

II. INSTRUMENTS: COGNITIVE RESTRUCTURING AND CRITICAL THINKING INTERVENTION

More adequate rational thoughts and interpreting rationally directly enables students to substitute the task-irrelevant thoughts with task-relevant thoughts and at the same time decrease the test anxiety. Completing the cognitive restructuring intervention can

help anxious students to understand, how their cognitive process can affect their behavior and emotions especially test anxiety. Similarly, students will educate to distinguish their cognitive distortions, irrational beliefs, and negative automatic thoughts with the goal of disputing them as the second step and then substituting the irrational beliefs with rational ones. Two cognitive therapeutic methods, Rational Emotive Behavior Therapy (Ellis, 1962, 1977) and Systematic Rational Restructuring (Goldfried et al., 1974), based on the premise that anxiety or emotional disturbances are results of irrational thinking were used. Rational emotive behavior therapy prepares some fundamental and rationale for cognitive restructuring and systematic rational restructuring can organize this rationale into more systematic steps and procedures (Zeidner, 1998).

New cognitive restructuring and critical thinking intervention consisted of nine psycho educational counselling sessions in 90 minutes, that focused on the combination of cognitive restructuring therapies and critical thinking skills (see Table I). This intervention was developed by the researchers and content validity of this intervention approved by four Iranian experts who were associate professors in Imam Khomeini International University and the reliability of this intervention approved by Aghmashe High School in Qazvin, Iran.

TABLE I: COGNITIVE RESTRUCTURING AND CRITICAL THINKING INTERVENTION

Teaching Sessions	Topic of Sessions	Allocation of Time	Procedure of the session
First session	Anxiety and Test Anxiety		Socialization on anxiety (state and trait components) and test anxiety
Second session	Cognitive Restructuring I		Socialization on cognitive restructuring
Third session	Cognitive Restructuring II	90 minutes	Cognitive restructuring worksheet
Forth session	Cognitive Restructuring III		ABCDE model and Test Anxiety
Fifth session	REBT model I		Clarify Therapeutic steps of REBT
Sixth session	REBT model II		REBT and perfectionism
Seventh session	SRR model		Systematic Rational Restructuring (SRR) and Task-relevant and Task-irrelevant thoughts
Eighth session	Critical Thinking Skills		concentrate on Critical Thinking Skills
Ninth session	Conclusion		question and answer about all sessions

III. CONCLUSION

This article set out to present a combination of cognitive restructuring and critical thinking intervention, which was attempted to assist anxious students to combat efficiently with test anxiety. Through this intervention, anxious students will educate to understand about the test anxiety and its negative effects on the academic performance. They also will able to identify two components of test anxiety such as state and trait anxiety to achieve the clear insight about the problem. Besides, they will able to determine the excessive irrational beliefs about taking tests and identify the ABCDE model on test anxiety with regards to cognitive restructuring in order to improve their knowledge about the effects of beliefs on behaviors. Furthermore, students will be able to list four techniques to catch the rational thoughts such as recognizing, challenging, questioning, and disputing the irrational thoughts on the base of rational emotive behavior therapy. Anxious students will clarify the negative effects of perfectionism on test anxiety through the rational emotive behavior therapy model. Correspondingly, on the base of systematic rational restructuring therapy, anxious students will describe the irritating task-irrelevant and task-relevant thoughts, and identify how to control their anxiety by controlling task-irrelevant cognitions. Besides, they will learn critical thinking skills such as interpretation, analysis, inference, evaluation, explanations, and self-regulation. All in all, through this intervention, anxious students will be familiar with different kinds of cognitive restructuring methods to cope with test anxiety due to improve academic achievement. Moreover, critical thinking assist students to apply some critical skills on the base of cognitive processes in order to cope better and more effective with test anxiety.

The evidence from this intervention suggests that the combination of cognitive restructuring and critical thinking could be consider as a valid and reliable intervention to assist students to cope properly with test anxiety. Cognitive restructuring and critical thinking intervention used for test anxiety may be applied to other emotional disorders such as depression, phobia, and so on. On the other side of view, a number of significant limitations need to be considered in this intervention such as making sessions interesting for students, presenting the contents in the simple forms and comprehend able, and applying a combination intervention which involves of rational emotive behavior therapy, systematic restructuring therapy, and critical thinking skills. In conclusion, this intervention has thrown up many questions in need of further investigation. Further experimental investigations are needed to estimate the effects of this intervention on anxious students in different contexts and situations.

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