

A Randomized Clinical Trial in Comparing the Effectiveness of Acceptance and Commitment Therapy and Metacognitive Therapy on Mind-Wandering Index in Adolescents

Mitra Tavighi¹, Javad Khalatbari^{2*}, Shore Ghorban Shiroudi³, Mohamad Ali Rahmani⁴

1. Ph.D. Student in Psychology, Department of Psychology, Faculty of Psychology, Tonekabon Branch, Islamic Azad University, Mazandaran, Iran.
 2. Associate Professor of Psychology, Department of Psychology, Faculty of Psychology, Tonekabon Branch, Islamic Azad University, Mazandaran, Iran.
 3. Associate Professor of Psychology, Department of Psychology, Faculty of Psychology, Tonekabon Branch, Islamic Azad University, Mazandaran, Iran.
 4. Assistant Professor of Psychology, Department of Psychology, Faculty of Psychology, Tonekabon Branch, Islamic Azad University, Mazandaran, Iran.
- (*Corresponding Author: Javad Khalatbari, Email: javadkhalatbaripsy2@gmail.com)

(Received:20 April 2019; Revised: 1 May 2019; Accepted:21 May 2019)

Abstract

Introduction: Acceptance and commitment and metacognitive therapies are considered as third wave therapies. This study aimed to compare the effectiveness of acceptance and commitment therapy (ACT) and Metacognitive therapy (MCT) on the mind-wandering index in adolescents.

Methods: In a randomized clinical trial, 45 female adolescents in Karaj were estimated using a Cloninger sample volume estimation method and were selected through purposive screening sampling. They were randomly assigned into three groups. Two ACT and MCT were presented to the experimental groups in the form of ten sessions of 1 hour. The data were collected at three time intervals through a demographic checklist, a structured clinical interview and a mind-wandering questionnaire. Analysis of covariance and Bonferroni analysis tests were used.

Results: The primary outcomes showed that both ACT and MCT had a significant effect on the mind-wandering index ($p < 0.01$), although this effectiveness was more favorable in the MCT group ($P < 0.05$). The secondary outcomes also showed the stability of the results in the follow-up stage ($p < 0.05$).

Conclusion: The results of this study suggest the effectiveness of third wave therapies on psychological indices. These findings can be combined with clinical applications in planning new therapeutic and educational perspectives.

Declaration of Interest: None

Key words: Metacognitive therapy, Acceptance and commitment therapy, Mind-wandering.

Introduction

An adolescent's period is a critical period between childhood and young adulthood. Continuous growth of the brain tissue decreases the ability of the adolescent to successfully manage its emotions and put the teenager at risk for anxiety and stress disorders (1).

The physical, psychological and social changes of the teenagers are often accompanied by intense emotions that require different strategies for emotional regulation. Dysregulation of emotions is an important basis for the emergence of emotional and behavioral disorders during adolescence (2).

On the other hand, the mind-wandering, also referred to in some sources as irrelevant thoughts or thought independent of the stimulus, refers to the experience of the remaining thoughts on a single subject for a long period of time. This index is especially important when people are busy with a task that requires more attention. One of the key features of the mind-wandering index is the separation from the current environment and the tendency toward private thoughts, which is not related to the activity (3). Mind-wandering as a shift in attention from what is being done well refers to the ideas that come from within, which can lead to deviations and psychiatric disorders during adolescence (4, 5). Mind-wandering in tasks that require continuous attention and cognitive control reduce function (6, 7). The mind-wandering is in a state of stagnation due to the lack of cognitive control on this state. Therefore, it is common in people with lower mind control (8). Therefore, the invention of methods for fixing the attention and understanding of the nature of mind-wandering has clinical applications.

Metacognition is a multifaceted concept, referring to knowledge and beliefs related to thinking and strategies that individuals use to control and regulate their thinking processes (9). This concept involves knowledge, processes, and strategies that evaluate, or control cognition. Instead of paying pure attention to the schema, the Welsh executive function model considers other fundamental sciences that these fundamental sciences are meta-cognitive beliefs of individuals about the cognitive system and how it is controlled. This metacognitive knowledge includes positive and negative beliefs about thinking (9). In this way, the individual can test his/her assessments and beliefs by distancing from their thoughts and treating them as events that must be evaluated rather than being taken as an image of reality. People with high metacognitive abilities are expected

to have an acceptable cognitive control over the mind-wandering (10).

The mechanism of the effect of metacognitive therapy (MCT) that includes teaching skills to people to communicate is different from their thoughts (8). The goal of this therapy is to activate meta-cognitive mechanisms, increase control over the attention process and reduce emotional distress, so that the ability to separate itself from the process of rumination (active concern) increases (11). According to the metacognitive model, the activation of ineffective meta-cognitive beliefs leads to a reassessment of disturbing thought as a sign of threat. In response, individuals use a wide range of strategies to control their unwanted thoughts. The pursuit of the goal brings about some of the inevitable processes in the mind. So that, from the beginning of a goal to the end, different thoughts comes to mind (12). Research findings show that the promotion of meta-cognitive potentials can help control the mind-wandering (10).

On the other hand, Acceptance and Commitment Therapy (ACT) is a cognitive-behavioral therapy that is a combination of the acceptance and the mindfulness process (13). One of the main goals of ACT is to increase the psychosocial flexibility that can be appropriate for promoting health (14). ACT is based on the principle that the recognition of emotions should be considered in the conceptual context of phenomena. For this reason, instead of cognitive behavioral approaches that correct cognitive and inertial beliefs to correct emotions and behaviors, this therapeutic approach educates the authorities to take on their emotions in the first step and become more flexible in the current situation (15). For this reason, these therapies combine traditional cognitive behavioral techniques with mindfulness (16). Studies have shown that ACT can be effective in improving the quality of life (17) and reducing stress and depression (18). The findings of

systematic review of González-Fernández (19) suggest that ACT improves the emotional state, quality of life, and psychosocial flexibility.

Considering the importance of adolescence in the mindset and the importance of this index in the emergence of psychiatric syndrome and the need for planning evidence-based interventions in managing mind-wandering and considering the existence of a research gap in comparison of the effectiveness of two ACT and MCT, this study was conducted aimed to compare the effectiveness of ACT and meta-cognitive therapy on the mind-wandering index in adolescents.

Methods

The present study was a randomized clinical trial with a three month follow-up, conducted during December 2017 to June 2018. To do this, 75 female adolescence were selected using Cloninger sample volume estimation method and were selected through purposive screening sampling and were randomly assigned into three groups using Excel Office software. The inclusion criteria for this study were: 1) age range of 15-18 years; 2) obtaining a score higher than 24 at the screening stage through mind-wandering questionnaire; 3)

residence in the city of Karaj and the suburbs with a deviation of 30 square kilometers from the center; and 4) obtaining informed consent from the participants. Exclusion criteria were as follows: 1) diagnosis of acute psychiatric disorder; 2) receiving any therapeutic drug or psychological treatment within the three months leading up to the therapy; 3) more than two absentee sessions at the treatment sessions.

ACT (Table 1) based on the manual of Bond & Hayes, and MCT (Table 2) were presented to the experimental groups in the form of 10 sessions each 1 hour. The control group was put on the waiting list. The data were collected at three time intervals through a demographic checklist, a structured clinical interview, and mind-wandering Questionnaire. To analyze the data, analysis of covariance and Bonferroni analysis tests were used in the software environment of SPSS version 20. In order to observe ethical principles, after the end of the study, five sessions of psychotherapy were presented to the waiting list group. The research process was based on the latest version of the Helsinki Declaration. The provisions of the treatment sessions are presented in Tables 1 and 2.

Table 1. Summary of the content of the sessions of acceptance and commitment therapy (ACT)

Sessions	Executive plan
Session 1	Meeting members of the group, introducing therapeutic concepts of ACT, assignment.
Session 2	Examining the inside and outside world in ACT approach. Homework: The short-term and long-term consequences of a mind-wandering on performance.
Session 3	The expression of the mind-wandering as a matter, the acceptance of events without conflict and control of them, assignment.
Session 4	Explaining avoidance and its consequences, mindfulness practice, assignment.
Session 5	Introducing values and identifying the values of individuals, introducing mixing and faulting, assignment.
Session 6	Introducing you as a field, learning the inner experience as a process, assignment.
Session 7	Explaining the difference between value and goals, introducing types of mixings, emphasis on being in present, assignment.
Session 8	Learning commitment to action, the need to commit to values, identify behavioral schemes in accordance with values.
Session 9	Emphasizing the main processes of acceptance, faulting, self-actualization, being in the present, values and committed action.
Session 10	Overall feedback from sessions and post-test implementation.

Table 2. Summary of the content of the sessions of meta-cognitive therapy (MCT)

Sessions	Executive plan
Session 1	Introducing, introduction of meta-cognitive model, implementation of subsidence suppression, mindfulness practice, assignment
Session 2	Teaching and practicing of attention techniques and re-focusing attention on the situation, assignment.
Session 3	The challenge with the belief in the uncontrollability of thought (providing opposite evidence), assignment.
Session 4	Starting a challenge with mind-wandering, expressing metaphors from the mindfulness, assignment.
Session 5	Behavioral experiments for challenge with beliefs about danger and threat of mind-wandering, assignment.
Session 6	Reverse any non-adaptive strategies, assignment.
Session 7 and 8	Challenge with positive beliefs, assignment.
Session 9	Detecting emerging factors of mind-wandering, working on a new application, assignment.
Session 10	Reinforcement of alternative plans, post-test implementation.

1. Demographics Checklist: This checklist was prepared and used by the researcher to collect personal information such as the age and the history of psychological problems (20).

2. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I): It is a clinical interview questioner that is used to diagnose dysfunctions of axis 1 based on DSM-IV. The reliability coefficient between evaluators for SCID is reported to be 0.60 (21). The diagnostic agreement of this tool was favorable for Farsi language for most of the specific and general diagnosis with reliability greater than 0.60. The kappa coefficient for all of the current diagnoses and life expectancy diagnosis was 0.52 and 0.55, respectively (22).

3. Mind-Wandering Questionnaire (MWQ): This questionnaire was developed by Mrazik et al. (23) with the aim of evaluating the mind-wandering index. This tool contains a five-point scale that is scored in a six-point Likert scale. The minimum score of this instrument is 5 and the maximum score is 30, and scores above 24 as the cut-off point represent the mind-wandering. Mrazik et al. (23)

reported the reliability of this tool based on Cronbach's alpha equal to 0.85. Also, the investigation of intra-item correlations indicates internal reliability without additional items (average: 0.54, minimum: 0.439, maximum: 0.684). In this study, Cronbach's alpha was calculated as 0.85.

Results

Prior to using the parametric test of analysis of covariance, the assumptions of this test were examined. Regarding the homogeneity of the groups in the pre-test scores ($P > 0.05$, $F = 0.906$), and the normalization of the distribution by Kalomogrov-Smirnov test ($P > 0.05$), the equality of variance ($F = 2.490$, $P > 0.05$), and the linear assumption of the relationship between pre-test and post-test ($F = 27.744$, $P < 0.01$), and ultimately, the assumption of the same slope of regressions ($F = 1.332$, $P > 0.05$), the use of parametric test of analysis of covariance was possible.

Mean and standard deviation of the scores of Mind-wandering in three groups are presented in **Table 3**.

Table 3. Mean and standard deviation of the scores of Mind-wandering in three groups

Variables	ACT			MCT			Control		
	Mean ± SD			Mean ± SD			Mean ± SD		
	Pre-test	Post-test	follow-up	Pre-test	Post-test	follow-up	Pre-test	Post-test	follow-up
Mind-wandering	26.14 ± 1.23	20.43 ± 1.45	20.36 ± 1.55	26.40 ± 1.45	14.60 ± 3.46	14.47 ± 3.34	27.00 ± 1.07	26.80 ± 1.82	26.47 ± 1.41

As the results of table 3 show, the scores of Mind-wandering in the study decreased in ACT and MCT groups.

Table 4. Results of analysis of covariance test

Source of changes	Sum of squares	Degree of freedom	Mean squares	F	Eta
Auxiliary variable (pre-test)	127.306	1	127.306	59.378	
Independent variable (two therapies)	1034.289	4	258.572	0.008	0.780
Error	292.213	67	4.361		
Corrected total	1576.877	72			

** : P<0.01

Considering the significance of the result of analysis of covariance, Bonferron's post-test was used. The results showed that ACT and MCT were effective on the amount of mind-wandering of teenage girls. However, the

efficacy of MCT was higher than ACT (p<0.05). The results of the mean test of the two groups are presented in Table 5 to compare the post-test and follow-up scores.

Table 5. Results of the mean test of two dependent groups to compare the post-test and follow-up scores

Therapy	Implementation turn	M	SD	MD	Test of mean of two dependent groups				
					Standard deviation of differences	Standard error	DF	t	p.value
metacognitive	Post-test	14.60	3.46	0.13	1.12	0.29	14	3.459	0.027
	Follow-up	14.47	3.34						
Acceptance and commitment	Post-test	20.43	1.45	0.07	0.62	0.16	13	4.434	0.019
	Follow-up	20.36	1.55						

As shown in **Table 5**, the efficacy of both ACT and MCT remained stable until follow-up.

Discussion

This study was conducted aimed to compare the effectiveness of ACT and MCT on the mind-wandering index in adolescents. The primary outcomes showed that both ACT and MCT had a

significant effect on the mind-wandering index, however, the efficacy of the MCT group was more favorable. Secondary outcomes also showed the sustainability of the results at the follow-up stage. Although a similar study to date has not been found in the research history, previous studies have shown the effectiveness of each intervention.

In line with our findings on the efficacy of third-wave therapies on the mind-wandering as a factor in reducing the mindfulness process, the results of study by Meyer et al. (24) showed that ACT by influencing biases in mental interpretations leads to a reduction in the pathology of internalized disorders. More interestingly, it was found that interpretation bias served as a mediator in the relations between respectively dispositional mindfulness and acceptance, and symptoms of depression and anxiety. In this regard, and in line with our findings, the results of Pirnia and Golshani's study (25) showed that ACT has a significant effect on the resilience index. Also, the results of Malmir et al. (15) showed that the use of ACT is associated with increased mental control and reduction of anxious thoughts. In this study, inefficient beliefs (illogical), intellectual faults and cognitive distortions have reduced, and these in turn cause a reduction in anxiety. In this way bereaved patients' life expectancy has increased.

A part of our findings showed that MCT was associated with a significant decrease in the mind-wandering index. In this regard, and in line with our findings, the results of McPhillips et al. (11) suggest that MCT is an optimal option for controlling disturbing thoughts and reducing emotional distress in patients. MCT proved more parsimonious and, because it did not distinguish between realistic and unrealistic thoughts, might prove a better fit to emotional distress in cardiac patients.

In this regard, the findings of the study by Chery et al. (26) suggest the effectiveness of MCT on the reduction of depression symptoms and auto-negative thoughts in patients with cancer. Also, feeling challenged to understand the processes maintaining their distress was central to their enthusiasm for it, irrespective of their presenting difficulties. Also, Johnson & Hoffart (9) showed that MCT compared with cognitive-behavioral therapy is more challenging with negative metacognitive

beliefs, which can affect symptoms of depression and anxiety. Central nodes in treatment are worry and attention, the node of negative metacognitive beliefs about uncontrollability was more central in the MCT treatment.

In explaining this finding it can be admitted that since abstract thinking and metacognition are developed and formed at adolescence, it seems that ACT and meta-cognitive therapy can have a significant effect on the mind-wandering of the teenagers. ACT emphasizes helping people to have a satisfactory life, even though they have undesirable thoughts, feelings and emotions (16). MCT helps educate the attention and concentration of focus on the position to stop the process of inefficient and unrelated thinking and challenge negative beliefs in mind wandering (27). This intervention aims to interfere with the process of mind-wandering instead of thinking resulted from the wandering of the mind. The success of MCT, in contrast to other therapies, in reducing the mind-wandering depends on targeting thoughts unrelated to work (28). Although many people believe that rumination helps to solve their problem, but the response to the problems in this way brings with it more stress. The study by Wels et al. (28) showed that MCT led to changes in processes and activities such as rumination, monitoring of the threat, focusing on risk, thinking about the future, suppressing thoughts and behaviors such as behavioral, cognitive and emotional avoidance.

On the other hand, Mrazik et al. (23) showed that individuals with a mind-wandering are engaged in similar activities to deal with perceived inconsistencies and to regulate their negative emotions and stressors and mind-wandering is a pervasive-and problematic-influence on the performance and well-being of adolescents. But, in the long run, it comes with inverted results. The present study suggests that MCT provides better insights in the subjects in order to obtain better

treatment outcomes. Taken together, in light of the evolution of adolescence, it can be concluded that the facilitation of the underlying thinking styles has led to the reduction of irrelevant thoughts and jump in student's thoughts and, consequently, decreases the emotional and cognitive symptoms of the mind-wandering. Strategies that people with mind-wandering use in almost all their lives in order to free themselves from unrelated and self-serving tasks are not only effective and relieving, but also their physical, social, occupational, educational and psychological functions are heavily affected. In fact, metacognitive therapists, by interrupting the mechanisms of continuing inefficient strategies, rid the attention of the public from frequent engagement with the unpleasant events occurring in mind-wandering, giving the individual the ability to save their focus and concentrate from the trap of faulty cognitive / emotional / behavioral rings so that they can focus on other aspects of their lives. In order to provide more time for thinking about issues beyond the time and place in which they are located, adolescents reduce their activities because they incorrectly believe that thinking is a valuable opportunity to improve their lives (6, 27). Therefore, when these students undergo MCT, they will not have much time to drown in thought and rumination as a result of the techniques and assignments of this therapy; in such a situation, they will be able to carry out activities that have already been ignored or they were unable to do so.

According to the results of the studies conducted by Randall, Oswald, Beier (7) and Smallwood and Sclar (26), the mind-wandering in a wide range causes disruptions in performance. However, various strategies may minimize the downsides of mind wandering while maintaining its productive aspects. There is some evidence that people with poor metacognitive skills are more vulnerable to

mind-wandering. Reducing the mind-wandering requires metacognitive skills.

The objective of ACT is not elimination of difficult feelings; rather, it is to be present with what life brings us and to "move toward valued behavior". ACT invites people to open up to unpleasant feelings, and learn not to overreact to them, and not avoid situations where they are invoked. Its therapeutic effect is a positive spiral where feeling better leads to a better understanding of the truth. In ACT, 'truth' is measured through the concept of 'workability', or what works to take another step toward what matters (e.g. values, meaning).

The goals of MCT are first to discover what patients believe about their own thoughts and about how their mind works (called metacognitive beliefs), then to show the patient how these beliefs lead to unhelpful responses to thoughts that serve to unintentionally prolong or worsen symptoms, and finally to provide alternative ways of responding to thoughts in order to allow a reduction of symptoms. This study was accompanied by some limitations in the implementation process. Due to the limitations of the sample size, generalization of the results is difficult. It is suggested that in future studies, along with the paper and pen tool, biological indicators (29, 30) in the study of psychological indicators could be used. Performing a clinical trial on male students and comparing the results with the findings of this study can be a good route for future studies.

The findings of this study show the effectiveness of both ACT and metacognitive therapies on the reduction of adolescent mind-wandering. However, MCT was associated with a more significant effect. These findings can be combined with clinical applications in planning new therapeutic and educational perspectives. Conducting clinical trials can be a good route for future studies.

Conflict of interest

The authors did not declare any conflicts of interest.

Acknowledgement

The authors are grateful to all the people who participated in this study and helped to facilitate the research process, especially the education authorities of the 1st and 3rd district of Karaj.

References

- 1- Powers A & Casey B. J. The adolescent brain and the emergence and peak of psychopathology. *Journal of Infant, Child, and Adolescent Psychotherapy*. 2015; 14(1), 3-15.
- 2- Holmes C, Briant A, King-Casas B, Kim-Spoon J. How Is Religiousness Associated With Adolescent Risk-Taking? The Roles of Emotion Regulation and Executive Function. *J Res Adolesc*. Wiley; 2019 Jun; 29(2):334–44.
- 3- Chaieb L, Antal A, Derner M, Leszczyński M, Fell J. New perspectives for the modulation of mind-wandering using transcranial electric brain stimulation. *Neuroscience*. Elsevier BV; 2019 Jun; 409:69–80.
- 4- Mowlem FD, Agnew-Blais J, Pingault J-B, Asherson P. Evaluating a scale of excessive mind wandering among males and females with and without attention-deficit/hyperactivity disorder from a population sample. *Sci Rep*. Springer Nature; 2019 Feb 28;9(1): 1-9.
- 5- Mrazek MD, Phillips DT, Franklin MS, Broadway JM, Schooler JW. Young and restless: validation of the Mind-Wandering Questionnaire (MWQ) reveals disruptive impact of mind-wandering for youth. *Front Psychol*. Frontiers Media SA; 2013;4:1-7.
- 6- Kieran C.R. Fox a,□, R. Nathan Spreng b,c, Melissa Ellamil a, Jessica R. Andrews-Hanna d, Kalina Christoff a,eThe wandering brain: Meta-analysis of functional neuroimaging studies of mind-wandering and related spontaneous thought processes. *NeuroImage*.2015; 11:611-62.
- 7- Randall JG, Oswald FL, Beier ME. Mind-wandering, cognition, and performance: A theory-driven meta-analysis of attention regulation. *Psychol Bull*. American Psychological Association (APA); 2014 Nov; 140(6):1411–31.
- 8- McVay JC, Kane MJ. Why does working memory capacity predict variation in reading comprehension? On the influence of mind wandering and executive attention. *J Exp Psychol: General* [Internet]. American Psychological Association (APA); 2012 May; 141(2):302–20.
- 9- Johnson SU, Hoffart A. Metacognitive Therapy Versus Cognitive Behavioral Therapy:A Network Approach. *Front Psychol*. Frontiers Media SA; 2018 Nov 30;9, 1-10.
- 10- Drescher LH, Van den Bussche E, Desender K. Absence without leave or leave without absence: Examining the interrelations among mind wandering, metacognition and cognitive control. Chao L, editor. *PLoS One*. Public Library of Science (PLoS); 2018 Feb 9; 13(2):e0191639:1-18.
- 11- McPhillips R, Salmon P, Wells A, Fisher P. Qualitative Analysis of Emotional Distress in Cardiac Patients From the Perspectives of Cognitive Behavioral and Metacognitive Theories: Why Might Cognitive Behavioral Therapy Have Limited Benefit, and Might Metacognitive Therapy Be More Effective? *Front Psychol*. Frontiers Media SA; 2019 Jan 4; 9:1-18.
- 12- Vogel PA, Hagen R, Hjemdal O, Solem S, Smeby MCB, Strand ER, et al. Metacognitive Therapy Applications in Social Anxiety Disorder: An Exploratory Study of the Individual and Combined Effects of the Attention Training Technique and Situational Attentional Refocusing. *J Exp Psychol*. SAGE Publications; 2016 May 16; 7(4):608–18.
- 13- Østergaard T, Lundgren T, Zettle R, Jonassen R, Harmer CJ, Stiles TC, et al. Acceptance and Commitment Therapy preceded by an experimental Attention Bias Modification procedure in recurrent depression: study protocol for a randomized controlled trial. *Trials*. Springer Nature; 2018 Mar 27; 19(1): 203, 1-12.
- 14- Wersebe H, Lieb R, Meyer AH, Hofer P, Gloster AT. The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *Int J Clin Health Psychol*. Elsevier BV; 2018 Jan;18 (1):60–8.
- 15- Malmir T, Jafari H, Ramezanzadeh Z, Heydari J. Determining the Effectiveness of Acceptance and Commitment Therapy (ACT) on Life Expectancy and Anxiety Among Bereaved Patients. *Mater Sociomed*. 2017;29(4):242-246.
- 16- Gray R, Hillel S, Brown E, Al Ghareeb A. Safety and Efficacy of Acceptance and Commitment Therapy (ACT) in Schizophrenia Spectrum and Other Psychotic Disorders: Protocol for a Systematic Review and Meta-Analysis. *Methods Protoc*. MDPI AG; 2018 Oct 24; 1(4),38, 1-8.
- 17- Rose MR, Norton S, Vari C, Edwards V, McCracken L, Graham CD, et al. Acceptance and Commitment Therapy for Muscle Disease

- (ACTMus): protocol for a two-arm randomised controlled trial of a brief guided self-help ACT programme for improving quality of life in people with muscle diseases. *BMJ Open*. BMJ; 2018 Oct;8(10):e022083: 1-10.
- 18- Wynne B, McHugh L, Gao W, Keegan D, Byrne K, Rowan C, et al. Acceptance and Commitment Therapy Reduces Psychological Stress in Patients With Inflammatory Bowel Diseases. *Gastroenterology*. Elsevier BV; 2019 Mar;156(4):935–945.e1.
 - 19- González-Fernández S, Fernández-Rodríguez C. Acceptance and Commitment Therapy in Cancer: Review of Applications and Findings. *Behav Med*. Informa UK Limited; 2018 Mar 20;1–15.
 - 20- Pirnia B, Akhondi M, Pirnia K, Malekanmehr P, Farzaneh S, Deilam K, ... & Zahiroddin AR. A Single-Case Experimental Design to Study the Combination of Cognitive-Behavioral Therapy and Pharmacotherapy for Smoking Cessation. *CJMB*. January 2019; 6.1. 136–139.
 - 21- Pirnia B, Pirnia K, Aghajanpoor M, Mardan F, Zahiroddin A. Relationship between function of hypothalamic-pituitary-adrenal axis and executive functions in chronic methamphetamine users: A cross-sectional study. *Asian J Psychiatr*. Elsevier BV; 2018 Jun; 35:113–4.
 - 22- Pirnia B, Pirnia K. Effectiveness of Oxytocin on Reducing Alcohol Consumption and Depression Syndrome in a Patient with Oropharyngeal Carcinoma. *IJCM*. Kowsar Medical Institute; 2018 Oct 16;In Press(In Press).
 - 23- Mrazek MD, Phillips DT, Franklin MS, Broadway JM, Schooler JW. Young and restless: validation of the Mind-Wandering Questionnaire (MWQ) reveals disruptive impact of mind-wandering for youth. *Front Psychol*. Frontiers Media SA; 2013;4 (560):1-7.
 - 24- Mayer B, Polak MG, Remmerswaal D. Mindfulness, Interpretation Bias, and Levels of Anxiety and Depression: Two Mediation Studies. *Mindfulness*. Springer Nature; 2018 Apr 12;10(1):55–65.
 - 25- Golshani G., Pirnia B. Comparison of Mindfulness-Based Cognitive Therapy (MBCT) with Acceptance and Commitment Therapy (ACT) On the Severity of Fatigue, Improvement of Sleep Quality and Resilience in a Patient with Prostate Cancer: A Single-Case Experimental Study. *IJCM*. Kowsar Medical Institute; Int J Cancer Manag. 2019; 12(2):e88416: 1-4.
 - 26- Cherry MG, Salmon P, Byrne A, Ullmer H, Abbey G, Fisher PL. Qualitative Evaluation of Cancer Survivors' Experiences of Metacognitive Therapy: A New Perspective on Psychotherapy in Cancer Care. *Front Psychol*. Frontiers Media SA; 2019 May 1;10 (949): 1-13.
 - 27- Smallwood J, Schooler JW. The Science of Mind Wandering: Empirically Navigating the Stream of Consciousness. *Annu Rev Psychol*. Annual Reviews; 2015 Jan 3;66(1):487–518.
 - 28- Wells A, Walton D, Lovell K, Proctor D. Metacognitive therapy versus prolonged exposure in adults with chronic post-traumatic stress disorder: A parallel randomised controlled trial. *Cognit Ther Res*. 2015;39:70–80.
 - 29- Pirnia B, Pirnia K & Zahiroddin A. Auricular Acupuncture for Craving in a Single-subject Case Study of Woman with Fibromyalgia and Chronic Ecstasy Use. *Iran J Public Health*. 2018 Jul 47(7), 1055-1057.
 - 30- Pirnia B, Mohamadi A.R, Zahiroddin A, Bazargan NM, Malekanmehr P & Pirnia K. Evaluation of the Effectiveness of Auricular Acupuncture in Suicidal Ideation and Cortisol Level in Dysthymic Patients with Comorbid Opiate Use Disorders Enrolled in Methadone Maintenance Treatment: A Randomized, Double-Blind, Sham-Controlled Trial. *Iran J Psychiatry Behav Sci*. 2019; 13(2):e12498: 1-5.