

# Comparison of cognitive-behavioral therapy and acceptance and commitment therapy on cognitive flexibility in mothers with autistic children

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## Abstract

**Background:** Mothers with autistic children encounter with many challenges due to their child's developmental problems. This study aims to compare the effect trainings of cognitive-behavioral therapy (CBT) and acceptance and commitment therapy (ACT) on cognitive flexibility of the mothers with autistic children.

**Methods:** The present research is a quasi-experimental study as pretest and posttest with a control group, which was performed on mothers with autistic children in three autism rehabilitation centers of Mashhad in 2020-2021. 45 people designated by purposive sampling method and randomly settled in three groups of 15 people (2 groups as experimental and 1 group as control). The experimental groups underwent interventions of CBT and ACT in 8 sessions of ninety minutes; whereas, control group didn't undergo any training. All three groups completed the cognitive flexibility inventory (CFI) in the pretest and posttest. Statistical analyses were performed using SPSS 23 software and method of covariance analysis (ANCOVA).

**Results:** The results indicated that both training methods of CBT and ACT significantly increased the cognitive flexibility of the mothers with autistic children ( $P < 0.05$ ). Based on the results of Tukey's test, CBT training was more effective on cognitive flexibility of the mothers with autistic children compared to ACT training.

**Conclusion:** With regards to the more effectiveness of the CBT, this therapeutic intervention approach can be used to improve emotion regulation strategies and increase the cognitive flexibility the mothers with autistic children.

**Keywords:** Autistic Disorder; Acceptance and Commitment Therapy; Cognitive Behavioral Therapy.

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## Introduction

Autism is a neurodevelopmental disorder in which the growth process of the brain and central nervous system (CNS) does not go well, and with the disorder in this part person's functions are affected (1), which makes it very difficult for families to cope with and

leads to family tensions and turmoil (2). In addition, it has a devastating effect on emotion, learning ability, memory and growth. These disorders are divided into six main categories, including inability of learning, attention deficit and hyperactivity disturbance, communication disorders,

autism spectrum disorder (ASD), mental disabilities, and movement disorders (3).

Autism is the most common of these disorders, which is usually diagnosed between the ages of 1 to 5 years and is based on behaviors such as lack of eye contact, specific physical and behavioral characteristics, communication and language disorders, and severe or mild reactions to sensory stimuli (1, 4). Based on previous research, ASD has dramatically augmented worldwide over the past decades (4, 5). In Iran, the prevalence rate of ASD has been also reported as 95.2 per 10,000 people (5). Hence, increasing the prevalence of ASD requires special attention and national efforts to eliminate its consequences are essential.

Children with autism encounter with significant challenges in life and need strong support from family, school, community and government. Also, parents with autistic children face to numerous challenges because of their child's growing difficulties (6). The needs and special behaviors of these children and the unfavorable prognosis of these disorders cause a lot of tension for the parents, and this may affect their relationship with the child and the performance of the child and the whole family (7), in addition, it affects the mental health of family members (6).

The reaction of the mothers with autistic children depends on how theirs flexible in dealing with the problem (8). People with flexible thinking ability have more cognitive flexibility than others who are not pliable. Because they use alternative explanations, they can positively reconstruct their frame of mind and adapt to stressful events or challenging circumstances (9). Therefore, cognitive flexibility can synchronize a person's behavior to the environmental situations ahead (10). When a person does not have cognitive flexibility, he or she is passively exposed to environmental conditions, illness, and mental health, and often makes mistakes, so with cognitive flexibility;

fundamental changes can be made in intellectual re-presentation (11).

Basic principles in cognitive-behavioral therapy (CBT) point out those irrational thoughts are the main cause of many problems in our daily lives. Thus, the treatment process can help patients to identify these thoughts and confront them decisively, and in general, form a new philosophy as a result of life (12). CBT, as a method of psychotherapy, helps individuals learn to identify destructive thought schemas that can negatively affect their emotions and behaviors (13). In fact, CBT enables clients to create a new network of thoughts and adaptive behaviors that compete with and eliminate maladaptive networks and memories. To achieve this goal, CBT includes the following components: education about the nature of fear and anxiety, reviewing of signs and symptoms, relaxation training and proper breathing, and cognitive reconstruction, etc. (14).

Another treatment that has been considered by therapists in recent years to help the psychological difficulties of parents with autistic children is acceptance and commitment therapy (ACT). ACT is an interventional method and includes communication framework theory, which uses the processes of awareness, acceptance, and also behavior change to create psychological flexibility (15). This Psychological approach helps clients to gain a meaningful and purposeful life by integrating acceptance and mindfulness interventions into commitment and change strategies. In fact, the purpose of the ACT is not to change the shape or incidence of bothersome thoughts and sentiments; while its main goal is to enhance psychological flexibility. In fact, psychological resilience means the ability to deal with the moments of life and stabilize behavior, which according to the situation, is consistent with the individual's values (15-16). The basic processes of this therapy are: acceptance, connection with the present, mindfulness,

cognitive failure, worthiness and committed measure, all of which cause the psychological flexibility that can be required by mothers of autistic children (16).

Considering the prominent role of the process of accepting autism disorders by the mothers with autistic children, matching the admission structures, commitment with the problems and issues facing these mothers, and other side the need to reduce the negative consequences of this disorder in families, it is necessary to fulfill more studies. In addition, Surveys have shown that psychological resilience is a protective factor against various stressors of daily life. In this regard, many research have been carried out on the effectiveness of the two methods of CBT and ACT on cognitive flexibility in the mothers of children with autism, but no study has been done on which of the two methods has a greater impact on improving cognitive flexibility of this mothers. Therefore, this study aims to compare the effect trainings of CBT and ACT on cognitive flexibility of mothers with autistic children.

## Methods

The present study is a quasi-experimental research as pretest and posttest with a control group, which was performed on mothers with autistic children in three autism rehabilitation centers of Mashhad in 2020-2021. In this study sampling method was purposive and 45 people who met the inclusion criteria were selected. Then people in terms of demographic characteristics such as; age and level of education, which could possibly influence the results of the study, were matched and randomly assigned to three groups of 15 people (2 groups as experimental and 1 group as control). Inclusion criteria to the study were: the mothers with autistic children and mean age between 25-55 years, and having diploma degree. Also, exclusion criteria were: non-cooperation of the mother and absence of more than two sessions. Ethical considerations of the study were included obtaining written consent from the mothers with autistic children, providing written information about the research to parents, confidentiality of information and subjects identity.

Table 1. Stages of cognitive-behavioral therapy group

Session	Content
First	Define autism, resilience, cognitive flexibility and perceived stress, and write down the most important and distressing emotional and behavioral consequences in group life
Second	Teaching about healthy and unhealthy negative emotions, and discussing spontaneous negative thoughts
Third	ABC model training; A for the activating event, B for the beliefs, C for the emotional and behavioral consequences
Fourth	Teaching strategies to combat cognitive distortions (profit and loss techniques). Replacing negative thoughts with positive thoughts practicing it in a Session, Summarizing and concluding a session, modeling training
Fifth	Teaching and explaining irrational beliefs about variables of resilience, cognitive flexibility and perceived stress and how to challenge these beliefs, teaching the use of reward methods and punishing emotional and behavioral consequences
Sixth	Educating and explaining the irrational belief of low tolerance for failure and resilience and perceived negative stress that affects our lives, education about meeting the challenges of the people of children with autism
Seventh	Teaching and explaining irrational beliefs about self-blame and the world and others, the challenge of questioning that belief, teaching emotional rational imagery, and advocating technique
Eighth	Training to play a wise role, training to prepare a happy task list, training to be ashamed and summarizing the contents of previous post-test sessions

In this study, first the needed authorization was obtained from the university to collecting data and then after determining the steps and structure of educational sessions, the framework of them was reviewed and ratified by the specialists. The experimental groups of CBT and ACT received the required training as 8 sessions of ninety minutes, while 15 individuals as control group did not receive any training and waited for the end of the training sessions. At the beginning of each meeting, the previous home exercises were reviewed and then trainings were given. Then at the end of the sessions, questions were answered. Finally, at the end of, all mothers in 3 groups fulfilled the posttest.

The content of the educational program of CBT was planned based on the book of the CBT group (17). The stages of CBT group for each session are separately listed in Table 1. The content of the training program of ACT sessions was also adjusted and done based on the practical guide of

ACT (18), which the sessions are summarized in Table 2.

The research instrument included the cognitive flexibility inventory (CFI), which was first designed by Dennis and Vander wal, 2010 (8). This CFI consists of 20 questions and is used to assess and treat depression and other psychological illnesses. The CFI had concurrency and convergence validity of -0.39 and 0.75 with the Beck depression inventory and the Martin and Robin cognitive flexibility scale, respectively. Also, the reliability of this questionnaire for the whole scale was 0.91 using Cronbach's alpha method (8). Its Persian version was assessed by Soltani et al., and its reliability and cronbach's alpha coefficients reported 0.71 and 0.90, respectively (19).

Data analyses were done using SPSS 23 software. To examine the homogeneity of the variance-covariance matrix, the Box's M test was applied and Levene's test was

Table 2. Content of acceptance and commitment therapy sessions

Session	Content
First	Introduce and express members' expectations of the meetings, explanations about the ACT. Introduce of the intervention and its basic hypothesis that suffering is institutionalized in human life and is part of a normal life, was conducted. The goals and expectations of the mothers were asked to participate in these meetings, then the objectives were divided into two categories, which were included; 1. Achieving better feelings and thoughts 2. Living based on what is valuable to them.
Second	Fault, use of allegory and metaphor, extraction of avoidance experience, blending, values to the individual, mindfulness practice, and home practice
Third	Reviewing the previous session home exercise, teaching the naturalness of emotions and not fighting them, specifying the inadequacy of monitoring negative actions, teaching the propensity towards feelings and negative practices, and home exercise
Fourth	Reviewing the previous session home practice, the difference between acceptance and submission, identifying values, measuring values, actions, goals and obstacles
Fifth	Reviewing the previous session's homework, learning to separate assessments from personal experiences, separating thoughts from reality, using metaphor (bad cup metaphor), observing thoughts without judgment, adopting the explanations of efficiency and right and wrong traps, and practice mindfulness
Sixth	Reviewing the previous session home practice, considering yourself as a context (chessboard metaphor), expressing the self-difference as content, behavior, and explanation of self as process, and home practice
Seventh	Reviewing the previous session home practice, committed action in the form of efficiency, communication with the present and teaching mindfulness techniques, presenting practical solutions in removing hindrances and homework
Eighth	Reviewing the before sessions and assessing effectiveness in people's life, getting feedback from members, practicing regular homework, and take post-test

Table 3: Demographic characteristics of the mothers with autistic children

Variables	First experimental group	Second experimental group	Control group	
Age	25- 34 years	5 (33.34%)	8 (53.33%)	7 (46.66%)
	35-44 years	7 (46.66%)	5 (33.34%)	4 (26.67%)
	45< years	3 (20%)	2 (13.33%)	4 (26.67%)
Level of Education	Diploma	5 (33.34%)	4 (26.67%)	5 (33.34%)
	Bachelor's degree	8 (53.33%)	9 (60%)	7 (46.66%)
	Master's degree and higher	2 (13.33%)	2 (13.33%)	3 (20%)
Number of children	1	7 (46.66%)	6 (40%)	7 (46.66%)
	2 and more	8 (53.34%)	9 (60%)	8 (53.34%)
Employment situation	housewife	12 (80%)	13 (86.67%)	14 (93.33%)
	Employee	3 (20%)	2 (13.33%)	1 (6.67%)
Husband's job	self-employment	8 (53.34%)	6 (40%)	7 (46.66%)
	Employee	7 (46.66%)	9 (60%)	8 (53.34%)
The severity of autism	Level 1	2 (13.33%)	3 (20%)	2 (13.33%)
	Level 2	4 (26.67%)	4 (26.67%)	3 (20%)
	Level 3	9 (60%)	8 (53.33%)	10 (66.67%)

used to the existence of variances homogeneity. To evaluate the effect of groups training of CBT and ACT on cognitive flexibility, the covariance analysis (ANCOVA) was applied.

## Results

Table 3 shows the demographic characteristics of the mothers with autistic children. The mean scores of cognitive flexibilities in the three groups are presented in Table 4. Based on the results, the mean of cognitive flexibility of CBT group was increased in comparison with the pretest. Similarly, the mean scores of posttest in the ACT group has increased in compared to the pretest scores ( $P < 0.05$ ), while no significant difference was observed between the mean of cognitive flexibility of control group in before and after ( $P < 0.05$ ). The Kolmogorov-Smirnov statistic was applied to assess the normality of cognitive flexibility variable. The finding indicated that the significance level is more than 0.05, so the data had a normal distribution.

The research variables were examined by Levene's test. According to the results, the variances groups of CBT and ACT for cognitive flexibility were the same ( $P > 0.05$ ). Also based on the results, the significance level of the Box's M test was more than 0.05, so there was a presumption of homogeneity of the variance-covariance matrix.

In the present study, according to the results of ANOVA after the pretest effect was controlled as shown in Table 5, a significant difference was observed between scores of cognitive flexibility in the three groups of CBT, ACT, and control group ( $F(41.2) = 5.07, P < 0.01$ ).

Then, the cognitive flexibility variable in the three groups was analyzed using the Tukey post hoc test, the results of which are presented in Table 5. With respect to results, the level of significance in the two intervention groups with the control group was less than 0.05, which shows the significance difference between the mean of cognitive flexibility in the studied groups

Table 4: Mean scores of cognitive flexibilities in the studied people

Variable	Group	Pretest (Mean $\pm$ SD)	Posttest (Mean $\pm$ SD)	P-value
Cognitive flexibility	CBT	50.07 $\pm$ 6.18	63.47 $\pm$ 11.55	0.025
	ACT	52.00 $\pm$ 8.57	62.93 $\pm$ 12.10	0.04
	Control	50.33 $\pm$ 8.36	52.50 $\pm$ 8.22	0.12

Table 5: The covariance analysis results in related to cognitive flexibility score of the studied groups

Variable	Total squares	df	Mean square	F	P-value	Effect Size	Test power
Pre-test	36.72	1	36.72	0.31	0.58	0.01	0.08
Group membership	1194.30	2	597.15	5.07	0.01	0.20	0.79
Error	4826.35	41	117.72				
Total	6075.20	44					

( $P < 0.05$ ). This difference was more in the training group of CBT (-11.27), therefore the effect of CBT group is greater than the ACT on cognitive flexibility.

### Discussion

The present study aims to compare the effect of CBT and ACT on cognitive flexibility in the mothers with autistic children in Mashhad. The findings of the study indicated that the effect of CBT on cognitive flexibility of these mothers is more in comparison with ACT. The results confirmed the findings of Forman et al., (20), Niles et al., (21), and Moghtadai and Khosh Akhlagh (22). In the research of Ejei et al., the intervention effect based on the ACT on reducing anxiety and improving treatment acceptance in the mothers with autistic children was higher compared to CBT after 3 months of follow-up, which didn't agree with the findings of the our study (23). In the study of Valizadeh and Ahmadi, two therapies approach of CBT and ACT had the same effect on the life quality of the mothers with autistic children (24). In the Yabandeh et al., although the effect of the ACT approach was more than CBT, however it was not statistically significant (25). Given that different results were obtained from previous studies that have been done by comparing these two approaches. It can be explained that: Clients, who receive a diagnosis of psychological disorders, always expect the

therapist to do something to eliminate or at least reduce their symptoms. This goal is reflected in CBT that focuses on challenging cognitions by controlling and reducing physiological arousal (26). But the situation is a little different in the view of ACT, in that the goal of acceptance is to make one accept whatever inner experiences, thoughts, feelings, memories, and bodily sensations offer, without the need to defend oneself against them. In fact, ACT seeks to shift the focus client from changing and reducing signs to having a worthwhile life (27). Therefore, in explaining these results, it can be supposed that the mothers with autistic children should not consider the crisis experience of having such children as an abnormality or disease; rather, they should consider it as one of the factors that has affected health. Moving from a crisis stage to a new stage of recovery is the mainstay of treatment, which requires structural changes in personality, beliefs, attitudes, ideals, desires, and orientations to a new path to understanding more precious pleasures and comforts; It also organizes fundamental changes in the internal structure and in the external quality of life and creates an opportunity to plan movement in a new style and in a different direction (28).

The results of present study revealed that the mean scores of cognitive flexibilities in the CBT group meaningfully augmented in

Table 6: The results of Tukey's test for cognitive flexibility variable in the studied groups

Groups	Mean differences	P-value
CBT	ACT	0.53
	Control	11.27
ACT	CBT	-0.53
	Control	10.73
Control group	CBT	-11.27
	ACT	-10.73

comparison with the control group; in other words, CBT was effective on cognitive flexibility of the mothers with autistic children. This result confirmed the finding of Soltani et al., (19) and Gunduz (29). Dehghani also found that CBT can effect on improving the emotional health and irrational beliefs of these mothers (30). Mami and Amirian concluded that CBT is effective and can improve the emotional health of the mothers (31). In addition, Lee et al., (32), Zong et al., showed that CBT effects on the cognitive flexibility of the mothers with autistic children (33). In explaining this finding, it can be said that cognitive flexibility is the capability to change mental motives, which is also referred to as the individual's assessment of environmental situations. In other words, it can enable proper replies to an altering environment and be associated with optimistic living consequences (45). Mothers with ASD children often view their environment as immutable, and the world is fixed, meaningless, and useless to them (35). Cognitive and behavioral flexibility allows for the appropriate regulation of thoughts and behaviors in response to changing environmental demands (36). Mothers with more cognitive flexibility justify their life quality in the encounter of adversity and achieve personal growth by controlling events. In other words, the more flexible a person is and the ability to understand of difficult situations, and also in the encounter of difficult living events, the ability to offer alternative solutions; consequently, individual's capacity for coping and adaptation and as well psychological well-being increases (37).

Also in this study, the mean cognitive flexibility scores of the group of ACT were meaningfully increased to the control group. Therefore, ACT was effective on cognitive flexibility of the mothers with autistic children, which was accordance with the results of Fashler et al., (38) and Batink et al, (39). In explanation, it can be said that ACT has probably improved

mothers' health via factors including acceptance without adjudication, coping with inner involvements without avoidance, repression and trying to modify them. In order to enhance the adaptability and resilience of the mothers with autistic children, ACT helps them to not think themselves as failed, hurt or hopeless, and life becomes valuable for them. This will improve the psychological health and overall quality of life of the mothers (40). Psychological resilience is the change process in ACT that has the avoidance dimensions and cognitive integration. Therefore, this approach tries to increase the quality of life by creating psychological flexibility and encouraging the individual to take action in the field of individual values (41). With respect to the results, we can point to the processes that are common in the two therapeutic methods, such as the fact that both methods believe that inflexible and automatic reactions to experiences are inefficient responses and exacerbate problems (42). Based on the existing findings and with emphasis on cognitive functions, and the use of cognitive techniques, the present study was able to free the participants from adopting an inefficient method and style of thinking and provide them with the skill of selecting various thought modes. As well it abetted people to create intellectual rotation and relieve themselves of the stress imposed on them. In addition, their self-awareness about behavioral motivations and failure to achieve the desired result, despite constant effort particularly in interpersonal relationships, helped them to benefit from their cognitive flexibility.

One of the limitations of this study is the impossibility of following the programs implemented during the corona pandemic. Also, the impossibility of random sampling of the study may affect the results of statistical analysis and thus have adverse effects on the internal validity of the research. Furthermore, the statistical people of the present study were consisted of the mothers with autistic children in Mashhad.

Therefore, the use of the results and its generalization in future research can be accompanied with the required caution.

### Conclusion

The results of present study confirmed that the methods of ACT and CBT had significant effects on cognitive flexibility of the mothers with autistic children. According to the results, it can be stated that the present study was able to free the participants from adopting an inefficient method and style of thinking and provide the person with the skill of choosing different thought styles. The findings of this study can be inferred that promoting the mental well-being of the mothers with autistic children can play a significant figure in improving the capability to cope with negative events and also lead to cognitive flexibility as one of the basic characteristics of these mothers. Accordingly, it is recommended to use these methods in counseling centers to progress the cognitive flexibility of mothers with autistic children.

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