

## The Effectiveness of Clinical Model of Therapeutic Creativity on Cognitive Flexibility in Children with Autism

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### ABSTRACT

**Background and Objectives:** Children with autism have many problems, and then it is necessary to identify and strengthen those factors that reduce the vulnerability of autistic children against problems. Therefore this study was conducted aimed to investigating the effectiveness of clinical model of therapeutic creativity on cognitive flexibility in children with autism. **Methods:** The research design of this study was semi-experimental type as pretest-posttest with control group. The studied sample was including 16 children with autism who were selected through convenience sampling method and were categorized randomly into two groups of experiment and control. Cognitive Flexibility Inventory (CFI) was used for data collection and data analyzing was conducted with univariate analysis of covariance and using SPSS-21 software. **Results:** The results showed that clinical model of therapeutic creativity have significant effect on improving cognitive flexibility ( $F= 5.11, p < 0.05$ ) in children with autism. **Conclusion:** According to the results of this study, clinical model of therapeutic creativity can be suggested as an effective method in improving cognitive flexibility of autistic children.

**Keywords:** *Therapeutic Creativity, Cognitive Flexibility, Autism, Children.*

Pervasive developmental disorders are a group of growth disorders that, in contrast to other socio-emotional disorders, have a more confirmed and more neurobiological basis and show themselves with deficiencies in social-communication interactions and repetitive and stereotypic patterns in their interests and behaviors (Paul, 2006). Among these disorders, autism has attracted more attention to itself. Autism is in fact a disorder with qualitative damage in social and communication interactions that correlates with repeated and limited behaviors and interests before the age of three, and its symptoms and attributes cannot be cited for other disorders such as Rett syndrome and childhood disruption disorder (Kogan et al, 2009). When this disorder was first introduced in 1940, there was a prevalence of about 1

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to 4 births per 10,000 live births. In 2004, Center for Disease Control (CDC), with the participation of the American Academy of Pediatric Medicine, estimated the prevalence of autism in the two diagnostic systems of ICD-10 and DSM-IV in a population of 2 to 6 per 1,000 people, and in the United States this number increases to one birth are born in 166 births (Shore et al, 2008).

Children with autism and their families have a lot of problems. One of the problems of the parents who have autistic child is the inability to communicate with them and understand their needs and desires. For the parents it seems very painful that their sick child is unable verbally or non-verbally to express their wishes, while they see their restlessness and chaos, but they cannot find its cause and they themselves would be disappointed. Lack of emotional reactions or inappropriate emotional reactions in dealing with parents from an autistic child with problem and the lack of expressing feelings in the usual manner are one of the other abusive issues of parents. That is, they do not react to the affirmation of their affections. They even sometimes are waiting for a glimpse of a look, a smile and a loving statement from their child. The brain is composed of various neural networks. Some of these networks are responsible for coordinating and integrating other networks. Typically, executive actions refer to the function of these coordinated and integrated networks (Brown, 2006). Executive actions are a general concept that refers to the process of mind and ability to control the body, cognition, and excitement to guide the behavior toward the goal (Corbett et al., 2009). These actions are generally referred to as functions such as scheduling, work memory, impulse control, inhibition, flexibility, as well as initiating and directing activities (Stuss et al., 2002). One of the components of executive action is cognitive flexibility. Cognitive flexibility refers to the individual's ability to perform a different act or to change mind in responding to changing situations (South and et al, 2007). The weak cognitive flexibility is characterized by clamping, stereotypic behaviors, and difficulties in regulating and modifying motion activity (Ozonoff and McEvoy, 1994). Lopez et al (2005) investigated the relationship between cognitive processes with limited and repeated symptoms in autistic disorder. The results of this study showed that several executive functions (eg, workload, cognitive flexibility and response control) with limited and repeated symptoms are related with autism disorder. It means that the more defective the cognitive flexibility is, the more restrictive and repetitive patterns of behavior are more evident, while other executive processes (for example, planning and fluidity) have no significant relation with repeated and limited symptoms. Another study by LeMonda et al (2012) investigated the relationship between stereotypic movements and executive function in children with autism disorder. The results of this study showed that executive function has the ability to predict stereotypic behaviors. Particularly low scores of executive function predicted a high frequency and longer duration of stereotypic movements in autistic children.

Several treatments have been designed for this disease, including dietary treatments, taking medications (such as Loperidol and Imipramine, taking vitamin B, etc.) and cartoon therapy and planned training experiences (including socializing, intercourse, guided action about 20-

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25 hours per week, etc.). One of the newest methods for treating this disease is creativity therapy that has recently been investigated and researched. The effect of therapeutic creativity on cognitive-behavioral flexibility allows for the interaction of the child with his/her contemporaries and calls for active participation in his/her treatment and, as a result, the benefits of this approach greatly overcome the defects of other approaches. In addition, one of the benefits of therapeutic creativity is that it has well-dedicated goals and treatment methods. In the area of therapeutic creativity success, most creativity therapists believe that in 80% of cases, their treatment has been successful. The mechanisms of the impact of this approach are through correction of incompatible concepts and changing the views and attitudes associated with the symptoms of the disease, and focuses on the bilateral and complex interaction between cognition, excitement, behavior and environment (Gerald, 1999).

Children with autism disorder are sometimes referred to as those who have severe intellectual and emotional limitations and cannot benefit from therapeutic creativity, but children with autistic disorder with higher levels of function can use from therapeutic creativity practices. Although these individuals are suffering from autism disorder, their intelligence performance is higher than those who have autistic anxiety disorder (Samadi, 2010).

Therapeutic creativity utilizes the dimensions of creativity helps these children in identifying areas of particular motivation and skill, and helps these children strengthen their perceptual abilities. According to the literature, children with autism have a lot of problems and finding ways to reduce their problems is very important. Also, in none of the previous studies, the effectiveness of the clinical model of therapeutic creativity on the improvement of the cognitive flexibility of children with autism has not been studied. Therefore, the research seeks to investigate whether clinical model of therapeutic creativity are effective in promoting the cognitive flexibility of children with autism.

### **METHODS**

In this research, a semi-experimental design, from pretest-posttest type with control group were used. The statistical population of the study consisted of all autistic children in Tehran in 2016. Among them, 16 people were selected from autistic children of Shahidan Farazdaq School based on entry criteria for the study and through convenience sampling and were randomly categorized into two experimental (8 people) and control (8 people). Entry criteria were developing autism disorder based on the diagnosis of pediatric psychologist, being able to read and write, satisfaction of the parents for participating their children in psychotherapy sessions, not using other psychotherapy services and counseling, and also having good physical condition to attend training sessions.

At the beginning, the examiner participated in the course of the clinical model of therapeutic creativity under the supervision of the corresponding teacher and learned all the necessary techniques and methods and, by combining and using existing resources, organized a course

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for autistic children. After the random allocation of the subjects to the experimental and control group and performing pre-tests for the experimental and control group, the cognitive flexibility (CFI) test was taken from the patients and a new educational program for creativity was performed for the experimental group.

The training period was presented as weekly sessions on Tuesday and Thursday with total 10 sessions. Creativity training was held in workshop meetings. The role played by the subjects was in the form of activities, assignments and exercises performed at the workshop or at home. Post-tests at the end of training were carried out for both groups. In the educational program, the metacognitive components of creativity were limited to 23 hours of workplace training due to the educational ability, but other components of creativity included motivational components and body language for maximizing the efficiency and flexibility in subjects was developed to more than 23 hours of workshop activity, including conducting and practicing workshop activities in the home for autistic children. At the end, post-tests were performed for the experimental group, and statistically analyzed. To analyze the data, the descriptive indices of mean and standard deviation and at the inferential level, univariate covariance analysis (ANCOVA) were used. Data were analyzed by SPSS-21 software.

### ***Cognitive Flexibility Inventory (CFI)***

Cognitive Flexibility Inventory (CFI) was developed by Dennis and Vander Wal (2010). This questionnaire is a short-term self-report questionnaire including 20 questions that is used to assess the type of cognitive flexibility that is needed in a person's position to challenge and replace inefficient thoughts with more efficient thoughts. The method of scoring is based on a 7-point Likert scale and seeks to measure three aspects of cognitive flexibility: a) the desire to understand difficult situations as controllable situations; b) the ability to understand several alternative justifications for human life events and behaviors, and (c) the ability to create multiple alternative solutions for difficult situations. This questionnaire is used in clinical and non-clinical work to assess the person's progress in creating flexible thinking in cognitive-behavioral therapy of depression and other mental illnesses. Dennis and Vander Wal (2010) showed that this questionnaire has a good factor structure, convergent validity, and concurrent validity. The concurrent validity of this questionnaire with Beck Depression Inventory (BDI-II) was equal to -0.39 and its concurrent validity with Martin and Rayne's Cognitive Flexibility Scale was 0.75. The Cronbach's alpha reliability for the whole scale, perceived control, and perception of different options were 0.91, 0.91, and 0.84, respectively, and by re-test, they were equal to 0.81, 0.75 and 0.77, respectively. In Iran, Shareh et al (2014) reported that the coefficient of re-test of total scale was 0.71 and the subscales of perceived control, perception of different options and perception of behavior justification were 0.55, 0.72, and 0.57, respectively. These researchers calculated the Cronbach's alpha coefficients for the whole scale equal to 0.91 and for the subscales, 0.87, 0.89 and 0.55, respectively. CFI also has a good factor, convergent and concurrent validity in Iran. In Iran, unlike the main scale of which only two factors were obtained, the cognitive flexibility

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questionnaire has three factors of perceived control, perception of different options, and perception of behavior justification.

**Table 1: The summary of the sessions of clinical model of therapeutic creativity**

Sessions	Session's topic	Session's purpose	Session's method
First session	Introduction	Communication, taking pre-test	introducing, meeting with the therapist, a general overview of the clinical pattern of therapeutic creativity, the categorization and goals of the course, reviewing the structure of the sessions, rules and regulations, familiarity of the members with each other, the goals and methods of treatment, the rules and problems of the group, hours and how to work at home, a description of social flexibility
Second session	Teaching metacognitive components of creativity	taking pre-test	Taking the test of cognitive flexibility questionnaire, teaching of metacognition component in the first step, fluidity and flexibility, showing the effect of beliefs on feelings and behaviors, and providing homework
Third session	Teaching metacognitive components of creativity	Creating flexibility	Teaching the second step (mental design and thinking and perception improvement), reviewing the previous assignment and teaching the process of thinking, perception, and

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Sessions	Session's topic	Session's purpose	Session's method
			mental design improvement and doing homework
Fourth session	Teaching metacognitive components of creativity	Variable change	From the metacognitive component to teaching the third step of finding solution, reviewing tasks of the previous session, training of other cognitive and social components, doing homework
Fifth session	Teaching metacognitive components of creativity	Variable change	Practical exercises for teaching and better understanding of the metacognitive component, reviewing the tasks of the previous session, teaching other cognitive components, teaching and better understanding the metacognitive components, cognitive errors and false beliefs and doing homework
Sixth session	Teaching the components of the body language	Cognitive Flexibility	Teaching components of the body language of the therapeutic creativity, including motion behaviors and body language (people who had difficulty communicating and presenting information to others in motion behaviors were asked to play a more active role in the meetings) and doing homework

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Sessions	Session's topic	Session's purpose	Session's method
Seventh session	Motivational components of creativity	Creating flexibility	Teaching motivational components and providing homework
Eighth session	Motivational components of creativity	Creating flexibility	more emphasis on motivational factors and reviewing the exercises of the previous session
Ninth session	Motivational components of creativity	Create a sense of social support	a general review of creativity methods
Tenth session	The final meeting	Taking the test	taking social flexibilities tests and saying goodbye

### RESULTS

In the descriptive information section, in each group, there were 2 girls and 6 boys randomly and their average age was 12 years. The obtained results of the research variables are as follows:

*Table 2: Descriptive indices of cognitive flexibility in two control and experimental groups*

Variable	Stage	Experiment		Control	
		Mean	Std. Deviation	Mean	Std. Deviation
Cognitive flexibility	Pre-test	3.55	0.52	3.70	0.33
	Post-test	3.91	0.66	3.70	0.38

The above table shows the mean and standard deviation of cognitive flexibility in the control and experimental group. Based on the results, the mean and standard deviation of the experimental group in the cognitive flexibility pre-test was  $3.55 \pm 0.52$  and in the post-test, it was  $3.91 \pm 0.66$ , indicating that the post-test scores of the experimental group had significant changes compared to their pre-test scores, while by comparing the means of control group it could be seen that no change have been occurred in the control group.

The use of ANCOVA test requires reviewing the pre-assumptions that can be used in case of confirmation of pre-assumptions; therefore, we first consider these pre-assumptions.

*Table 3: Shapiro Wilk test to check the normality of scores distribution*

Variable	Group	Value	Significance (P)
Pre-test	Experiment	0.972	0.356
	Control	0.943	0.263
Post-test	Experiment	0.880	0.065
	Control	0.891	0.143

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One of the pre-assumptions for performing univariate covariance analysis is the normal distribution of scores. To evaluate the normal distribution of scores in post-test in experimental and control groups, Shapiro Wilk test was used. Based on the results, the significance level of all variables in both groups is higher than 0.5 ( $p > 0.05$ ), which shows that the distribution of social flexibility scores in the post-test stage in both control and control groups is normal.

**Table 4: Leven test results to examine the consistency of variances**

Variable	Degree of freedom equal to 1	Degree of freedom equal to 2	F	Significance (P)
social flexibility	1	14	0.137	0.150

Another pre-assumption is performing homogeneous covariance analysis of the variance between experimental and control groups in research variables. Table 4 shows the results of the Leven test for the homogeneity of the variance among the groups. The F-value for cognitive flexibility is not significant ( $p > 0.05$ ), hence the pre-assumption of equality of variances is confirmed.

**Table 5: The results of multivariate analysis of variance to examine the effect of the test on the cognitive flexibility component**

Variable	Source of change	Degree of freedom	Mean squares	F coefficient	Significance	Eta square
cognitive flexibility	Groups	1	1.78	5.11	0.021	0.211

The above table shows the results of univariate covariance analysis to examine the effect of the test on cognitive flexibility. Based on the results, there was a significant difference between the experimental and control groups in cognitive flexibility ( $F = 5.11$  and  $p < 0.028$ ). According to the results of Table 2 and the comparison of the mean of the experimental and control group in the cognitive flexibility variable, it is observed that in the post-test and in comparison with the pre-test, the mean of the experimental group was increased in cognitive flexibility, while no significant changes were observed in the control group. Therefore, the research hypothesis is confirmed and it is concluded that therapeutic creativity increases the cognitive flexibility of children with autism.

## DISCUSSION

The purpose of this study was to investigate the effectiveness of therapeutic creativity on promoting the social flexibility of children with autism. The results of data analysis showed that there is a significant difference between the control and experimental groups in the post-test, which suggests that the clinical model of therapeutic creativity has been effective and has been able to increase social flexibility in children with autism. The result of this research



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is in line with the results of the researches by Saeidi et al. (2012), Yaghoublou and Janipour (2015), Zarabi Moghadam and Amin Yazdi (2015), Soltani (2015), Nishabouri Mohammadi and Soltani Koochanbani (2015).

Pirkhaefi and Borjali (2012), in the study of the clinical applications of the therapeutic creativity model among the students, concluded that stimulating the components of creativity facilitates mental health, self-efficacy and adaptive methods of individuals. In a research conducted by Pirkhaefi et al (2017), they concluded that the clinical model of therapeutic creativity can reduce physical complaints, anxiety and social function disorders in individuals under treatment, and the use of this therapeutic approach for patients with these syndromes in students is suggested. Cognitive flexibility refers to the ability of children to adapt cognitive process solutions in confronting with new and unexpected situations in the environment. Therapeutic creativity model teaches children to retrieve information easier in response to a diverse situation and organize and apply cognitive processes. Therapeutic creativity helps these individuals to better understand the complexity of issues and examine the space of issues to see how changing variables and goals can change the space.

Cognitive flexibility is one of the key skills in creativity that fosters imaginative creativity; in cognitive flexibility, the child must adapt his decisions to other children for imaginative creativity. Therefore, children with autism who are in lack of pretending plays have a disorder in this function; however, the pretending creativity in children with autism syndrome is less common than normal children, and this is not specific to autism (Mirzadeh and Pirkhaefi, 2017). The creation of cognitive flexibility in the creativity model is also followed by the specific concepts and methods of this model, which are interpreted as the creation of creative mind and personality. Creativity in individuals or therapists is educated and trained at five levels of structural components including metacognitive creativity, linguistic, motivational, personality and motivation. The purpose of this training and exercises is to reshape the mind and personality and to create better conditions for the "process of change" (Pirkhaefi, 2014). Therefore, children who are under the clinical model of therapeutic creativity can develop their cognitive flexibility.

Generally, it can be concluded that therapeutic creativity by providing strategies and strengthening the mental and cognitive bases of children with autism causes cognitive flexibility, or, in other words, increases the ability of these children to perform different practices or change their mind in responding to changing situations. In general, the data and results of this research should be followed with caution. Due to some limitations, including time limits, there was no possibility to follow-up. Due to the frequency and severity of the problems of autistic children, the attention of authorities is important. Therefore, the intervention based on the clinical model of therapeutic creativity can be an important step in providing cognitive flexibility and social support for this group. Therefore, it is suggested that policymakers and planners, as well as physicians, counselors, psychologists and other health professionals, are advised to apply this therapeutic approach with knowledge of the

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research results in order to see the happiness and improve the quality of life of autistic children as well as their families.

**Conflict of Interest:** None declared.

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