

## Evaluating the effectiveness of metacognitive strategies training on reducing the symptoms of attention deficit and impulsivity in adolescents

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### Abstract

**Introduction:** Attention Deficit / Hyperactivity Disorder (ADHD) is a persistent mental disorder. Its prevalence is reported to be 2 to 29% internationally. The aim of this study was to evaluate the effectiveness of metacognitive strategies training on reducing the symptoms of attention deficit and impulsivity in adolescents in Nowshahr.

**Methods:** The present study is a quasi-experimental study and the statistical population of this study includes adolescents under the auspices of Nowshahr Welfare Organization. Impulsivity questionnaire was administered as a screening to all adolescents covered by the Welfare Department. Based on the highest impulsivity score (total), 40 people were selected. They were then replaced by simple randomization in experimental and control groups.

**Results:** The results of multivariate analysis of covariance showed that the experimental group had a significant reduction in the symptoms of attention deficit and impulsivity in adolescents compared to the control group. Also, teaching metacognitive strategies among the components of attention deficit is effective on attention deficit / memory problem and restlessness / hyperactivity and among the components of impulsivity is effective on reducing cognitive impulsivity, motor impulsivity and unplanned ( $P < 0.05$ ).

**Conclusion:** The results showed that teaching metacognitive strategies can reduce the symptoms of hyperactivity and attention deficit.

**Keywords:** attention deficit, impulsivity, metacognitive strategies,

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**Introduction:**

Adolescence is a period of gaining knowledge and experience. During this period, adolescents use cultural and spiritual values in their decisions and test the concepts of commitment, decision-making, and evaluation. The impact of this age period on the lives of individuals and society is very significant; Because adult behavior is established in adolescence. However, most mental health problems develop during adolescence and early adulthood. The results of epidemiological studies conducted in the last two decades show that in 2-8% of patients with depression, the age of onset of symptoms was 16 years. There is other evidence that these individuals are more likely to develop major depression, anxiety, social dysfunction, Attention-Deficit / Hyperactivity Disorder, and even suicidal ideation in the coming years (1).

Meanwhile, homeless and neglected adolescents who do not have a proper social support network in the family and environment, suffer from disturbances and emotional disorders. and acquire appropriate coping and problem-solving skills to reduce stress and manage life's problems. In this regard, welfare organizations play a major role in improving and reducing these pressures (2).

According to the revised text of the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (3), Hyperactivity Disorder is a stable pattern of hyperactivity, which is more severe and more common than is usually seen in adolescents with similar developmental levels. The prevalence of this disorder is 3 to 7% and the ratio of boys to girls is 4 to 1 (3). Attention Deficit / Hyperactivity Disorder is one of the most common mental disorders in adolescents and 3 to 7% of adolescents of school age are affected (4). Although the cause of ADHD is not known (5), several factors are involved in the etiology of this disorder. Numerous correlation studies have led to speculation about the role of oral additives, blood lead levels, allergies, smoking and alcohol consumption during pregnancy as factors in the etiology of Attention Deficit / Hyperactivity / ADD. (6). At the same time, documentary research suggests the neurological (neurological) underpinnings of attention deficit disorder. The data from these studies have specific implications for the role of the lobe. The functions of the frontal lobe are executive in nature and are involved in planning and organizing resources and play a vital role in mediating inhibitory behaviors such as: controlling motor behavior and inhibiting attention to irrelevant or distracting stimuli (7).

One of the most obvious behavioral disorders is impulsivity in these children. Impulsivity is at the core of many social ills such as substance abuse, morbid gambling, personality disorders, and engaging in aggressive behavior. The process of deciding or choosing from options, after analyzing them, is one of the most excellent cognitive processes. A type of process called risky decision-making is processed when a person is faced with options and their selection entails present or future gains or losses. At the same time, the amount of this gain or loss is associated with some degree of probability or uncertainty (8).

Metacognitive education is an active approach to education in which the importance and position of the application of cognitive strategies and processes are addressed. The learner knows that he

must underline the important points and how will this benefit him? This will increase his learning efficiency. In this type of training, guidance and supervision of cognitive activities and processes are taught. Today, the importance of metacognition for high-level learning and problem solving is accepted (9). Learners can have the most successful learning when they have a good insight and knowledge about their personal ability. Researchers have found that if the level of metacognition improves, their learning outcomes will also improve (9; 10). The more a learner learns about effective learning strategies and the limitations of his or her learning and memory abilities, the more likely he or she is to progress (11:12).

The issue of metacognition has been the subject of much research for more than three decades and variables such as goal orientation, self-regulatory learning, problem solving, etc. have been studied in relation to it; But areas that remain unknown include the relationship between metacognition and the symptoms of ADHD, which have not yet been seriously explored. Learning learning skills is related to metacognitive theory. Metacognition involves self-awareness, control, and guidance. Learning metacognitive skills leads to self-knowledge, self-leadership, self-initiation, self-regulation, self-motivation, self-thinking, self-belief, learning, self-esteem, self-evaluation, and creative thinking (13). Attention Deficit / Hyperactivity Disorder is the most common behavioral disorder in childhood and adolescence. About 3 to 5% of teens get it before the age of one week. This complication is more common in the early years of school for adolescents and during adolescence and many patients get better with age. For some teens, indifference is the most obvious sign and for the other group, it shows all the behaviors that are a sign of hyperactivity and inattention. It is sometimes very difficult to distinguish between behaviors associated with attention deficit hyperactivity disorder and normal childhood behaviors. For a clinical diagnosis of this disorder, the symptoms should last for at least 5 months and occur before the age of 5 and have caused significant problems for the child in the field of education, social or at home. Attention Deficit / Hyperactivity Disorder (ADHD) affects about 5% of school-age adolescents and 6% of adolescents and adults (14).

So far, various treatments have been offered to reduce the symptoms of attention deficit / hyperactivity disorder. These therapies fall into two main categories: psychosocial therapies and pharmacological therapies (15). One of these treatments is teaching cognitive and metacognitive strategies. The observed relationship between central requests and motor behaviors of children and adolescents with attention / hyperactivity has provided great support for recent efforts to focus specifically on cognitive interventions for this segment of society (16).

So far, various treatments have been proposed to reduce the symptoms of attention deficit/ hyperactivity disorder. These therapies fall into two main categories: psychosocial therapies and drug therapies (17). One of these therapies is the teaching of cognitive and metacognitive strategies. The observed association between central requests and motor behaviors of attention-deficit / hyperactivity disorder in children and adolescents has provided much support (For recent

efforts to focus specifically on cognitive interventions for this segment of society due to the special importance and existing psychological and physiological crises at this particular age) (18).

Attention Deficit / Hyperactivity Disorder is important as a chronic disorder that can lead to individual and social disabilities and the researchers decided to conduct the present study with the aim of investigating the effect of teaching metacognitive strategies on reducing the symptoms of attention deficit and impulsivity in adolescents under the auspices of Nowshahr Welfare Organization.

### **Methods:**

Given the nature of experimental and quasi-experimental research in which experimental intervention takes place and the need for quarantine and careful control of test conditions, the sample size must inevitably be limited outside the standards based on the calculation of the sample size, such as the Cochran's formula and the Krejcie and Morgan table, in order to provide the conditions for accurate control, quarantine, and execution. For experimental and quasi-experimental studies, a sample size of at least 20 people in each group is required (19); Therefore, in this study, 40 adolescents covered by the office were identified as sampling units. This research was conducted under the supervision of Islamic Azad University of Chalous.

The independent variable was the training of metacognitive strategies that were presented to reduce the symptoms of attention deficit and impulsivity in adolescents under the auspices of Nowshahr Welfare Organization. Then its effects on the post-test scores of the experimental group were investigated and compared with the control group.

After completing the administrative steps and identifying the sampling units and replacing the units in the two experimental and control groups and justifying the problem, objectives and research methods for the participants, the pre-test was conducted. After performing the intervention (performing metacognitive strategies training for 10 sessions of 50 minutes), the post-test was performed. The questionnaires were administered in groups. Ethical considerations were observed in the present study, Thus, participation and withdrawal from the study was completely voluntary for the participants. In addition, the interventions were performed for the participants free of charge. The objectives of the study were also fully explained to the participants. Inclusion criteria in this study were:

- 1- To be selected through screening through screening and obtaining the highest impulsivity score.
- 2- To be covered by Nowshahr city welfare office.
- 3- Adolescents do not have mental disorders.

Table 1: Metacognitive Strategies Training Sessions

Row	Therapeutic sessions	levels
1	The first and second sessions	<p>planning: Working instructions and tree visualization:</p> <p>First, a reference is made to the order of work and the visualization of the tree and the tools needed for the students. Students are encouraged to learn better. This method is in the framework of self-regulation, which the instructor uses self-training. It includes self-declaration, self-evaluation and self-encouragement. Also, the use of positive self-expression means attributing the situation in writing and examining the issue to the effort in using the strategy; Introduce planning and explain its steps by the instructor with different examples; Teacher and student questions and answers, repetition and practice; Giving homework to students and reviewing it; Evaluate and encourage students and troubleshoot.</p>
2	Third and fourth sessions	<p>Organizing:</p> <p>Introducing the organization and explaining its steps by the teacher and questions and answers between the teacher and the student; practicing and solving problems and giving homework to the student; reviewing and evaluating it and encouraging the student.</p>
3	Fifth and sixth sessions	<p>Problem Solving:</p> <p>Using methods and ideas planned and organized in previous meetings; Introduce and teach possible problem</p>

		solving methods; Questions and answers and bug fixes; Assigning students and reviewing, evaluating and encouraging students.
4	Seventh and eighth sessions	Edit:  Introduce and teach editing and correcting ideas and problem solving methods; Q&A between instructor and students and bug fixes; Assigning students and reviewing, evaluating and encouraging students.
5	Ninth and tenth sessions	to correct  Learning to modify methods and ways passed or written; Questions and answers between teacher and student and debugging; Giving homework to the student.

Software will be used to analyze the data and research data are collected and analyzed at two levels:

- A) At the descriptive level, frequency distribution tables, percentages related to demographic characteristics and descriptive statistics are used to examine the research variables in the sample.
- B) At the inferential level, in proportion to the level of data measurement and statistical assumptions, the analysis of covariance is used to test the hypotheses.

A) **The eleventh edition of the Barratt Impact Scale** was developed by Professor Ernst Barratt (20) and is well correlated with the Eysenck Impulsivity Questionnaire. The structure of the questions collected from both questionnaires indicates some dimensions of hasty decision making and lack of foresight. This questionnaire has 30 items and the person must answer each of the items in this questionnaire, which is on a four-point scale. 11 out of 30 items on this scale are scored in reverse. In the options (1,7,8,9,10,12,13,15,29,30), the minimum and maximum scores on the mentioned scale are 30 and 12, respectively and the non-psychiatric control group usually score between 50 and 60 (21). This scale assesses three factors: cognitive / attention impulsivity (making quick cognitive decisions), motor impulsivity (acting without thinking), and nonplanning(lack of foresight or instantaneous orientation) (20).

In Iran, for the first time, (22) translated the original version of Barratt and used it in healthy people and opioid users, to standardize this questionnaire. Validity and reliability in the study were 0.75 and 0.83, respectively, which shows that the Persian translation of the "Barratt" impulsivity questionnaire is desirable in terms of validity and reliability. In the eleventh edition of the BIS-11 questionnaire, Barratt describes impulsivity based on the following three axes: 1- Ideomotor in the sense of acting without thinking, 2- Careful planning or attention to detail and 3- Coping stability means the ability of a person to foresee. This scale evaluates three factors: Cognitive impulsivity, Motor impulsivity and Nonplanning. This scale has 30 questions. Each of these phrases is answered on a four-point scale of "never" (score 1), "sometimes" (score 2), "often" (score 3) and "always" (score 4). This scale has ten negative questions that are scored inversely. The reliability of the scale was 0.83 using Cronbach's alpha for the whole test and 0.74, 0.74 and 0.73 for the motion, attention and unplanned subscales, respectively. In Iran, (22) reported an alpha coefficient of 0.78 for attention impulsivity, 0.63 for motor impulsivity, 0.47 for unplanned impulsivity and 0.83 for the whole test. The results showed that this scale correlated well with impulsivity self-assessment questionnaires such as the Zuckerman Emotion Scale, the Eysenck Impulsivity Scale, and the Behavioral Inhibition and Activation Scale (23). In this study, the reliability of the whole questionnaire was 0.80. B) Conners adult ADHD rating scale-self report form & subscales: This diagnostic questionnaire is a tool with appropriate validity and reliability. Contains 26 items that are scored zero to 3. It has five subscales (24) (25). The subscales include Attention / Memory Hyperactivity / Restlessness, Impulsivity, Problem with self-concept, and ADHD index. Each of the first four scales consists of five items. Attention Deficit-Hyperactivity Index is related to all items. So that the first scale includes items (3,5,17,18,21), the second scale includes items (4,6,6,10,11,23), the third scale includes (1,7,8,13,20) and the fourth scale includes items (9,15,16,25,26). In the study of Charles, Stephen, Jeffrey, Andrew & Nicole, each of the subscales has a good internal consistency coefficient. Thus, the alpha coefficient for each of the scales is 87 / ..., 74 /., 89 /., 85 /., 81 /., respectively. Obtained, which indicates an acceptable coefficient of validity (26).

### Results:

Before using the multivariate analysis of variance test, Box and Levin tests were used to observe its assumptions. Based on these results, the hypothesis of homogeneity of variances in the studied variables was confirmed. Levin test was not significant for any of the variables. As a result, the use of parametric tests is unrestricted. The box test was also used to test the hypothesis of homogeneity of variance-covariance matrices and the results showed that the box value was not significant ( $P = 0.04$ ,  $F = 2.68$  and  $BOX = 8.56$ ) and as a result, the assumptions of the difference between the covariances are established. Kolmogorov-Smirnov test was used to test the hypothesis of normal data distribution. According to the values of significance limit ( $P = 0.05$ ) for different groups and this value is greater than 0.05 and with a confidence interval of 0.95, it can be said that

the distribution follows the curve. Multivariate analysis of covariance with significance level ( $P < 0.05$ ) was used to investigate the research hypotheses.

Table 2: Mean standard deviation of scores of variables of attention deficit symptoms and subscales in the experimental and control groups in the pre-test and post-test stages

		<b>Groups</b>		<b>Statistics</b>	<b>standard error</b>
<b>Attention deficit memory problem</b>	pre- test	examination	Average	9.95	.487
			Standard deviation	2.121	
		control	Average	9.90	.464
			Standard deviation	2.075	
	Post-test	examination	Average	7.63	.447
			Standard deviation	1.950	
		control	Average	9.70	.448
			Standard deviation	2.003	
<b>Restlessness / hyperactivity</b>	pre- test	examination	Average	10.21	.469
			Standard deviation	2.043	
		control	Average	10.25	.416
			Standard deviation	1.860	
	Post-test	examination	Average	7.79	.463
			Standard deviation	2.016	
		control	Average	9.80	.352
			Standard deviation	1.576	
<b>Impulsivity</b>	pre- test	examination	Average	9.95	.487
			Standard deviation	2.121	
		control	Average	9.90	.464
			Standard deviation	2.075	
	Post-test	examination	Average	7.89	.404



			Standard deviation	1.761		
		control	Average	8.60	.609	
			Standard deviation	2.722		
<b>Difficulty imagining yourself</b>	pre- test	examination	Average	9.95	.487	
			Standard deviation	2.121		
		control	Average	9.90	.464	
				Standard deviation	2.075	
	Post-test	examination	Average	9.89	.507	
			Standard deviation	2.208		
control		Average	9.85	.466		
			Standard deviation	2.084		
<b>Symptoms of attention deficit</b>	pre- test	examination	Average	40.05	1.893	
			Standard deviation	8.249		
		control	Average	39.95	1.773	
				Standard deviation	7.930	
	Post-test	examination	Average	33.21	1.697	
			Standard deviation	7.398		
control		Average	37.95	1.368		
			Standard deviation	6.117		

Findings from Table (2) indicate that metacognitive strategies training has been able to reduce the rate of attention deficit in adolescents in the dimensions of attention deficit and memory problems, restlessness / hyperactivity, impulsivity and general perception problem ( $P < 0.05$ ).

Table 3: Multivariate analysis of covariance (MANCOVA), related to variables of attention deficit symptoms in two groups of control and experiment

Sources	The dependent variable	SS	df	MS	F	Sig.	Squared ita
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<b>group</b>	Attention deficit / memory problem	59.739	1	59.739	94.893	.000	.736
	Restlessness / hyperactivity Impulsive Problem with self-concept	45.436	1	45.436	52.104	.000	.605
		42.553	1	42.553	77.046	.000	.694

The results of analysis of covariance, the effect of training metacognitive strategies on reducing the components of impulsivity (cognitive attention, motor impulsivity and unplanned) in the experimental and control groups are shown in Table 5. As can be seen, the difference between the means of cognitive impulsivity scores was significant after the intervention in the control and experimental groups ( $F = 94.893$  and sig.  $<0.01$ ). The effect of education was 0.73. This means that the mean of cognitive impulsivity after intervention in the experimental group is lower than the control group. The group variable (control and experiment) explains 73% of the changes in cognitive impulsivity.

According to the table, there is a significant difference between the mean of motor impulsivity after the intervention in the control and experimental groups ( $F = 52.104$  and sig  $<0.01$ ). The mean of motor impulsivity after the intervention in the experimental group is lower than the control group. The group variable (control and experiment) explains 60% of the impulsivity changes in motion.

Also, there was no significant difference in the mean of nonplanning after the intervention between the control and experimental groups ( $F = .991$  and sig  $<0.05$ ). The mean of nonplanning after the intervention in the experimental group is not less than the control group and the group variable (control and experiment) explain 69% of the nonplanning changes.

Findings from the above tables in response to the research question about the effect of teaching metacognitive strategies reduces the symptoms of attention deficit and impulsivity of adolescents under the auspices of Nowshahr Welfare Organization ( $P <0.05$ ).

### **Discussion and conclusion:**

The aim of this study was to investigate the fact that teaching metacognitive strategies on adolescents' attention deficit and impulsivity has been able to reduce its symptoms. Symptoms included: attention deficit and memory problem, restlessness / hyperactivity, impulsivity and problem with self-concept, cognitive impulsivity, motor impulsivity and nonplanning.

The results of multivariate analysis of covariance test on the main hypothesis indicate that teaching metacognitive strategies is effective in reducing attention deficit symptoms with an ETA

coefficient of 0.46 and reducing impulsivity with an ETA coefficient of 0.86 in adolescents under the auspices of Nowshahr Welfare Organization.

A brief comparison of these findings indicates that the results of the studies of Wamqi et al. (27), Swan et al. (28), Ekhtiari et al. (29), Simon et al. (30) Karami; Entesar Foumani and Eskandari (31) implicitly support the findings of this study. Also, the studies of Soleimani et al. (32), Choobforoushzadeh et al. (15), Mohammad Khani (33), Rezvan (34) independently support the findings of this study.

Regarding the explanation of these findings in which the process of teaching metacognitive strategies affects the symptoms of attention deficit and impulsivity in adolescents, it is necessary to state the fact that in the training sessions of metacognitive strategies, techniques and techniques are presented, which motivate the subjects to take steps beyond their knowledge and look at what they are learning from a higher position. For example, the method of working and visualizing the tree and tools needed for students in the form of self-encouragement, self-assessment and self-expression and "activating the student's awareness, identifying tools. The purpose of the statement is to: Generating ideas and categories related to the topic "; Observing the order and rules of problem solving and respecting the ideas and thoughts of friends and classmates during the discussion "; Arranging to find solutions and fix problems and practice rain "Intellectual" and other pure techniques that are presented in the form of metacognitive strategies training protocol. During these metacognitive strategies training sessions, adolescents learn to solve any problem that is important to them and needs to be solved with the help of metacognitive methods and brainstorming and brainstorming using the Sexton TREE model (For example: difficulty in exams, anxiety, making a new and innovative handicraft, eliminating annoying thoughts or writing a creative story and the like). These educational activities have the power to modify and reduce the symptoms of attention deficit and impulsivity in adolescents.

The results of multivariate analysis of covariance regarding this hypothesis indicate that:

Teaching metacognitive strategies is effective on reducing attention deficit / memory problem with an ETA coefficient of 0.67 and reducing restlessness / hyperactivity with an ETA coefficient of 0.63 in adolescents covered by the Nowshahr Welfare Organization.

The results of existing studies, including the results of the study of Chatripour and Kikhani (35), Ejei et al. (36), Shaykh al-Islami (37), Barari and Hassani (38), indicate the effectiveness of teaching metacognitive strategies on several variables, which are either very close to the components of the symptoms of attention deficit or are in the same direction. Therefore, the evidence suggests that teaching metacognitive strategies has been effective on all of these variables. Including: Perceived efficiency and improving the quality of learning, reading, comprehension and learning speed, students' creativity, academic procrastination, field of scientific engagement, emotional freshness, Creativity, maturity and social self-

responsibility, self-efficacy, test anxiety, creativity, students' motivation for progress and self-concept.

Regarding the explanation of this finding, it is necessary to state that the symptoms of attention deficit are neuro-biochemical and organ disorders, which is in line with drug treatments both cognitively and therapeutically. But medication alone often fails to meet the comprehensive treatment needs of people with the disorder and it's just one aspect of the multifaceted treatment plan. Social skills groups, educating parents of children with attention deficit / hyperactivity disorder, and behavioral interventions at school and at home are often effective in the overall treatment of children with attention deficit / hyperactivity disorder. Evaluating the treatment of concurrent learning disorders and other psychiatric disorders is important. Also, group therapy with the aim of improving social skills and increasing self-esteem and sense of accomplishment in children with disabilities who have many functional problems in group settings, especially in school, can be very useful. The results of this study also confirm the fact that psychological therapy interventions, and in particular the teaching of metacognitive strategies as a complement to drug therapies, can be used as common therapies.

The results of multivariate analysis of covariance regarding this hypothesis indicate that: Teaching metacognitive strategies is effective on reducing cognitive impulsivity with an ETA coefficient of 0.73 and reducing motor impulsivity with an ETA coefficient of 0.60 and reducing unplannedness with an ETA coefficient of 0.69 in adolescents under the auspices of Nowshahr Welfare Organization.

Barari and Hassani (38), Karami; Entesar Foumani and Eskandari (2016) implicitly support the findings of this study.

To explain these findings, it must first be noted that impulsivity and impulsive behavior have three basic characteristics that distinguish it from similar terms such as hyperactivity. These behaviors are hasty, unplanned, thoughtless, and prone to error and unlike forced behaviors, one is aware of the existence of the behavior, and the purpose of the behavior is not to gain pleasure, but generally to avoid anxiety and is a special type of decision-making process known as risky decision-making. The point to consider about this hypothesis is that teaching metacognitive strategies has affected cognitive impulsivity more than motor impulsivity and unplanned, which indicates the effectiveness of this component of non-pharmacological and non-medical interventions. However, due to the nature of teaching metacognitive strategies, it was expected to have the greatest impact on cognitive impulsivity and the other two components have been affected but with less impact coefficients. Of course, it should be noted that several dimensions have been considered for structural impulsivity. Dimensions such as present orientation, gradual reduction of delayed reward, restraint of behavioral disruption, risk-taking, excitement, sensitivity to reward, prone to boredom, hedonism, poor planning, which can be classified into the same three main components.

#### **Research limitations:**

There are different techniques and techniques in this intervention, which seem to have influenced the components of impulsivity. These techniques include: "Tree Visualization", using exercises such as self-expression, self-assessment and self-encouragement and "social discourse" and the

participants' discussion and study in order to increase the production of ideas and "organize ideas, organize ideas", "reconstruct and find important points and clarify it", "Subjects are supervised in finishing ideas and making the problem-solving methods more interesting and useful and the development of creative thinking."

One of the limitations of the present study is the difficulty of applying metacognitive strategies and various techniques and conceptually and that it may not be sufficient in a short period of time such as the time of this study. This is also the first treatment protocol used for adolescents covered by the Welfare Organization. This study and its findings may not be sufficient to include this intervention in the list of selected interventions for the treatment of individuals with ADHD symptoms.

Based on the findings of this study, researchers are advised to conduct the following research topics for future research on the implementation of the same study at higher and lower levels of age and education. Other studies with the same title, while considering demographic variables, and the implementation of this study in a wider statistical population can be done despite the follow-up study in different time periods. Similar research can be done with the effect of mediating variables such as gender, intelligence, emotional intelligence and multiple intelligences. This study is a kind of prelude in this field and has the ability to be the source of selection and implementation of supplementary studies.

#### **Application of research:**

The applied results of this research can be used in some cases such as: in counseling and psychology clinics; Also in schools and the inclusion of topics in educational courses related to students' leisure time in order to reduce the level of impulsivity and its related components; Also, holding practical workshops on teaching metacognitive strategies for adolescents under the auspices of the Welfare Organization in order to use them to communicate with adolescents in order to differentiate normal adolescents from adolescents with attention deficits.

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