



# Effectiveness of Group Schema Therapy on Eating Attitude and Self-Regulation in Overweight Adolescent Females with Binge Eating Disorder

Samaneh Rasouli Saravi<sup>1</sup>, Fariba Hassani<sup>2\*</sup>, Farnaz Keshavarzi Arshadi<sup>2</sup>, Valiollah Farzad<sup>2</sup>, Mozghan Sepahmansour<sup>2</sup>

<sup>1</sup> Ph.D. Candidate in General Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran

<sup>2</sup> Department of Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran

## \*Corresponding author:

Fariba Hassani, Department of Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran  
Tel: 011-33034153  
Email: Far.hassani@iauctb.ac.ir

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## Abstract

**Background and Objective:** Obesity and overweight are among the most common health problems in adolescence, which is rapidly increasing as a serious threat to health. Eating attitude is one of the most crucial issues in eating disorders that include beliefs, thoughts, feelings, behaviors, and relationships with food. This study aimed to investigate the effectiveness of group schema-therapy on eating attitude and self-regulation of overweight adolescent females with binge eating disorder.

**Materials and Methods:** This quasi-experimental study was conducted using a pretest-posttest design with a three-month follow-up. In total, 30 female students were selected purposefully within the age range of 15-17 years and body mass index of 25-29.9 from high schools in Sari, Iran during 2018. Subsequently, according to the obtained score of 17 and higher in the binge eating scale, they were assigned into two experimental (n=15) and control groups (n=15) using a randomized complete block design. The experimental group participated in 13 group schema therapy sessions of 1.5 h weekly. Both groups were assessed again one week after the intervention and three months after the last session of the treatment. The data were collected using the Binge Eating Scale, Young Schemas Questionnaire with 90-question Short Form, Eating Attitude Test-26, and self-regulation questionnaire. Moreover, the data were analyzed in SPSS software (version 22) through repeated measures of ANOVA and covariance analysis.

**Results:** The results indicated significant differences between pretest and posttest regarding the eating attitude and self-regulation scores in the experimental group, which were consistent until the follow-up stage ( $P<0.05$ ).

**Conclusions:** According to the results of this study, it is recommended that clinical specialists use the group schema therapy approach in the treatment of people with binge eating disorder.

**Keywords:** Binge eating disorder, Eating attitude, Group schema therapy, Overweight

## Background

Obesity and overweight are one of the most common health challenges in adolescence, which is rapidly increasing and being doubled in the last two decades. Overweight is one of the risk factors for mortality in developing countries resulting in rising health costs and a negative impact on their economies [1]. Women are more prone to overweight and obesity, compared to men. Studies of weight-related behaviors among adolescent females have shown that body mass index (BMI) affects weight-control behaviors and overweight girls engage in weight-loss behaviors, which in turn, can lead to eating disorders among this population [2].

Mozaffari Khosravi et al. conducted a study on high school students and showed that 16.7% of the participants were overweight or obese. Moreover,

they revealed that 12% of the students were at the risk of eating disorders, and there was a significant relationship between BMI and risk of eating disorders [3].

Similarly, Isomaa investigated the prevalence of eating disorders in adolescent females and reported the prevalence of binge eating disorder, anorexia nervosa, and bulimia nervosa in 9%, 2.6%, and 0.4% of the population under study, respectively [4]. One of the crucial issues of eating disorders is eating attitudes, which include beliefs, thoughts, feelings, behaviors, and relationships with food. Eating-related behaviors occur as a result of one's tendencies.

Adolescence is the period of rapid change in the body, an increased interest in body shape, and ideas about being lean, which can exacerbate this

tendency. Physical imagery is crucial during this period; therefore, abnormal attitudes and behaviors in eating may provide grounds for eating disorders [5]. Food intake, on the other hand, is the goal of the basic regulatory mechanism for hunger and saturation that is essential for survival, in which self-regulation plays a central role. The disruption of this hemostatic adjustment through psychological or biological vulnerability factors not only has a lasting effect on food intake but also on eating behavior, body weight, and subsequent psychological transformation [6].

According to a study conducted by Heaterthon and Wagner, the intake of overweight and obese children, as well as adolescents, has a higher booster function than normal people [7], which limits self-regulation capacity [8]. Ozyildirim et al. define self-regulation as a process whereby individuals set goals, control their emotions and thoughts, and improve their strategies [9]. In the theoretical conceptualization of Telch et al., overeating is observed as a "maladaptive emotion regulation strategy that continues through the temporary reduction of distressing emotional states" [10]. Stress, emotions, and negative thoughts can all contribute to unbearable emotional states that individuals can use to overeat, distract, or temporarily limit their awareness. In addition to negative emotions, it is assumed that negative fundamental beliefs about oneself, such as "I am obese" or "I am a bad and worthless person" contribute to these emotions [11].

Rezaee et al. showed a significant difference between obese and normal women regarding eating attitudes, self-regulation, and lifestyle [12]. In the same vein, Vitousek and Holon believed that future studies on the etiology of eating disorders should focus on experiences and deeper levels of cognition rather than negative self-thoughts about food, weight, and body shape [13]. Subsequently, numerous studies have been conducted on the role of early maladaptive schemas in eating disorders. The results of a study conducted by Moloodi et al. indicated that obese people with binge eating disorders had significantly higher scores, compared to obese people without this disorder in the schemas of abandonment/instability, emotional deprivation, and inadequate self-control/self-discipline [14].

Furthermore, Zho et al. showed that adolescents with high stress had more early maladaptive schemas, higher levels of impulsivity, and more severe overeating [15]. Interventions based on adolescent lifestyle modification, increasing physical activity, drug therapy, and surgery-based therapies have, to some extent, reduced BMI; however, they

have no long-term effects. Lifestyle reform needs to be comprehensive and consistent to be effective. On the other hand, medications have side effects, and surgical-based therapies can lead to problems after surgery and even subsequent surgeries [16].

Although existing therapeutic interventions, including cognitive-behavioral therapy and interpersonal therapy, have empirical support for the treatment of binge eating disorder, these interventions are not successful for all affected patients since they do not include all of the underlying mechanisms involved [17].

Moreover, cognitive-behavioral therapy has shown to be effective in eating disorders; however, studies have revealed that about 50% of the people with anorexia nervosa remain symptomatic at the end of treatment [18,19]. Follow-up data also showed that approximately one-third of individuals with bulimia nervosa continue to meet diagnostic criteria after cognitive-behavioral therapy. The therapeutic outcome in anorexia nervosa is even more frustrating [20]. Among the new treatments in psychology that are nowadays used in various cases, including eating disorders [21, 22], schema therapy seems to be a good option for the treatment of this disorder.

Childhood experiences and schemas play a significant role in the formation of this disorder. Moreover, schema therapy is an integrated approach that originates from many therapeutic models and emphasizes the therapeutic relationship, emotional experience, and early childhood experiences [23]. With this background in mind, it is assumed that group schema therapy allows group members to be linked with their early experiences in the supportive context of the group.

The members of the therapist team come together and create opportunities for learning and possibly new behaviors and experiences, as well as emotion regulation [24]. Therefore, any studies that address the effectiveness of this approach is necessary and important. Since a limited number of studies have been carried out in Iran on the effectiveness of this approach in the treatment of eating disorders, including binge eating disorder.

### Objectives

The present study aimed to answer the question of whether group schema therapy affects the eating attitude and self-regulation of overweight adolescent females with binge eating disorder.

### Materials and Methods

The present study was conducted based on a quasi-experimental method using a pretest-posttest design, as well as follow up with a control group.

The study population consisted of all overweight females aged 15-17 years who were studying in public high schools in Sari, Iran. The participants were selected using a purposive sampling method by referring to high schools in Sari, Iran. Subsequently, the height and weight of the students were measured with the help of the physical education teachers, and those with BMI of 25-29.9 were included in this study. They were then asked to respond to the overeating scale questions.

In total, 30 female students were selected randomly from the overweight girls, and they obtained a score of 17 and higher on the overeating scale. Furthermore, based on the self-esteem scores, they were assigned into experimental and control groups using a randomized complete block design. The Binge Eating Scale, Young Schemas Questionnaire with 90-question Short Form, Eating Attitude Test-26, and Self-Regulation questionnaire were used to collect the data. Following that, the experimental group (n=15) participated in 13 group schema therapy sessions of 1.5 h weekly. On the other hand, the control group received no intervention. After the last session and three months later, both groups were re-assessed by the same instruments.

The inclusion criteria were: 1) willingness to participate in the study, 2) female gender, 3) minimum level of primary school education, 4) BMI of 25-29.9, 5) obtained score of 17 or higher on the overeating scale, 6) age range from 15 to 17 years, 7) lack of no dietary plans, and 8) consumption of no medication at the time of the study and six months before it.

On the other hand, the students who were overweight due to physical illnesses (i.e., hypothyroidism or other hormonal disorders) and immobile due to injuries and fractures with compensatory behaviors after overeating (cleansing or restriction) or psychiatric disorders (i.e., depression and obsessive-compulsive disorder), and those who participated in individual counseling sessions and were absent in more than 3 sessions were excluded from the study.

It is noteworthy to mention that the research objectives and procedures were explained to the students, and informed consent was obtained from them after they express their willingness to participate in the study. Moreover, it should be noted that the control group received group schema therapy at the end of the study. Data were analyzed in SPSS software (version 22) through repeated measures ANOVA and analysis of covariance.

#### Young Schema Questionnaire (90-question short form)

Young developed this 90-item questionnaire to

measure 18 early maladaptive schemas (EMSs). The items are grouped into five domains bringing together the EMSs that tend to develop together: Disconnection/Rejection (Abandonment, Mistrust/Abuse, Emotional Deprivation, Defectiveness/Shame, Social Isolation/Alienation); Impaired Autonomy/Performance (Dependence/Incompetence, Vulnerability to Harm or Illness, Enmeshment/Undeveloped Self, Failure); Impaired Limits (Entitlement/Grandiosity, Insufficient Self-Control/Self-Discipline); Other-Directedness (Subjugation, Self-Sacrifice, Approval-Seeking/Recognition-Seeking); and Over vigilance/Inhibition (Negativity/Pessimism, Emotional Inhibition, Unrelenting Standards/Hyper criticalness, Punitiveness) [25].

The items are scored based on a 6-point Likert scale from "definitely false to me=1" to "definitely true to me=6". Each person's score on each schema is obtained by summing up the five questions on that schema. The score of each schema ranges between 5 and 30, and the high score indicates an inefficient schema. In Iran, Sadooghi et al. (2008) reported the internal consistency of the subscales of the questionnaire by Cronbach's alpha method between 0.90 and 0.96. Moreover, Cronbach's alpha of the whole scale was obtained at 0.94 in this study [26].

#### Overeating Scale

This 16-item overeating scale was designed by Gormally et al. to measure overeating severity [24, 27]. The items consist of three or four sentences. This questionnaire is based on behavioral characteristics (e.g., amount of food consumed) and cognitive, emotional, guilt, or shame responses. The students were asked to select a sentence that describes them in the best way. The items were graded from zero to three, and the overall score ranged from 0 to 46. Moloodi et al. estimated the reliability of this scale at 0.72, 0.67, and 0.85 using retest and split-half methods, as well as Cronbach's alpha, respectively [14].

Moreover, the sensitivity coefficient and specificity of the Persian version of this scale using a cut-off point of 17 were 84.6 and 80.8, respectively [14]. The Cronbach's alpha coefficient of this scale was determined at 0.70 in this study.

#### Eating Attitude Questionnaire

This scale was developed by Garner and Garfinkel (1982) and included 26 questions measuring three dimensions of diet, overeating and food preoccupation, as well as control over oral behaviors [28]. This questionnaire is scored based on a Likert scale from "always=3", to "more often=2", and "often=1". The three options of sometimes, rarely, and never are scored zero, and

question 26 is scored negatively. The score range on this questionnaire is within 0-78, and the scores above 20 indicate the likelihood of an eating disorder. The validity and reliability of this questionnaire were reported desirable in a study conducted by Shafiei et al., [29]. Cronbach's alpha coefficient for this questionnaire was obtained at 0.72 in this study.

### Self-regulation scale

This 63-item self-regulation scale was developed by Miller and Brown (1991) to measure the self-regulation component [30]. They developed a 7-step self-regulation model that included receiving relevant information, evaluating the information and comparing it to norms, triggering change, searching for options, formulating a plan, implementing the plan, and assessing the plan's effectiveness. The items were scored based on a 5-point Likert scale from "strongly agree=1" to "strongly disagree=5".

Regarding the interpretation of the scores of this

scale, subscale scores were not individually recommended, and the overall score was used for interpretation. An overall self-regulation score of 213 and lower, 214 to 238, and an overall score above 238 indicated poor, moderate, and high self-regulation capacities, respectively. Miller and Brown considered this scale a suitable index to evaluate the overall self-regulation components and reported a test coefficient of 0.94 [30]. Cronbach's alpha coefficient of the self-regulation scale was obtained at 0.93 in this study. Moreover, the corresponding values of its components were determined at 0.72, 0.80, 0.72, 0.72, 0.70, 0.71, and 0.76, respectively.

### Group Schema Therapy Protocol

A combination of schema-based cognitive therapy protocol proposed by Broersen and Van Vreeswijk [31] and group schema therapy protocol was adapted for eating disorder proposed by Simpson [24]. This protocol was presented during 13 treatment sessions each of which lasted 1.5 h (Table 1).

**Table 1.** Summary of group schema therapy sessions

Sessions	Content
1	<ul style="list-style-type: none"> <li>• A short explanation of what group therapy entails</li> <li>• Discussions on safety issues and setting group boundaries</li> <li>• Discussions on the expectations of the group: participants spend 5 min discussing a little bit about themselves and what they hope to get from the group</li> <li>• Introducing the partners to the larger group, the person will have a chance to add to the introduction</li> <li>• Teaching schema model: childhood needs+early maladaptive schema</li> <li>• Defining schemas: what are the gaps in childhood?</li> <li>• Explaining how schemas drive behaviors/problems and hand back scored YSQ questionnaires</li> <li>• Identifying links between schemas and eating/other life patterns</li> <li>• Introducing three phases of treatment: (1) identifying and dealing with schemas (2) using mindfulness to manage schemas, and (3) actively challenging schemas</li> <li>• Homework for next session</li> </ul>
2	<ul style="list-style-type: none"> <li>• Explanation of rating system to participants, validation of feelings, schema summary (homework sheets), schema "triggering", predicting behavior (within and out with sessions) based on schemas</li> <li>• Schema process strategies: check workbook for an information sheet on maladaptive coping styles, explore the links between restriction, bingeing, overeating, and schema coping styles</li> <li>• Homework for next session</li> </ul>
3	<ul style="list-style-type: none"> <li>• Discussion on schema identification in small groups</li> <li>• Following feedback regarding the schema diaries in the big group</li> <li>• Explaining how thoughts/schemas have influenced behavior and feelings</li> <li>• Identifying how the eating behaviors help ones to avoid difficult feelings associated with schema triggering</li> <li>• Identifying "Core Hurt" (i.e. defectiveness, abandonment, and emotional deprivation)</li> <li>• Group discussion on what is self-worth? where does it come from? what messages does society convey about self-worth/lovability/acceptability/success? how does our definition of self-worth affect the way we treat ourselves</li> <li>• Identifying how eating behaviors manifest as coping strategies (i.e. as ways of avoiding difficult feelings, avoiding schemas being triggered, and overcompensating for feeling defective by trying to be thinner than others)</li> <li>• Homework for next session</li> </ul>
4	<ul style="list-style-type: none"> <li>• Discussion on schema identification and schema triggering in small groups</li> <li>• Following feedback in big groups</li> <li>• A group discussion of about 30 min</li> <li>• Focusing on schemas triggered in the past week, and following the feedback from how participants found the schema diaries and formulation sheets</li> <li>• Explaining the cognitive technique: "cost-and benefit analysis"</li> <li>• Group exercise: self-prejudice, how do they react to info which is inconsistent with belief ?</li> <li>• Generating schema-maintenance and schema-change strategies</li> <li>• Homework for next session</li> </ul>



**Table 1.** Continued

5	<ul style="list-style-type: none"> <li>• Group discussion of 30-40 min</li> <li>• Asking the participants whether they have completed the schema diaries and if they need any help in this regard, how did members find the positive data log exercise for homework? Have group members been able to find evidence against the schema?</li> <li>• Discussion on the homework "cost and benefit analysis"</li> <li>• Finding more disadvantages associated with holding on to schemas by the therapist and group members</li> <li>• An introduction to role play "THE COURT"</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Distribution of the rating sheets</li> <li>• Group discussion</li> <li>• Introduction on "Continuum" (Schema evaluation) exercise and the rest of the group is divided into two groups of negative and positive.</li> </ul>
6	<ul style="list-style-type: none"> <li>• The negative group play the part of the schema and try to think of reasons why the new belief cannot be true</li> <li>• The positive group then argue with evidence to fight against the schema (why it is not true) by showing how the person can't be 0% worthwhile/ lovable/ normal because of the things they do (despite the schema trying to sabotage them)</li> <li>• discussion on the role-play</li> <li>• Paying attention to the homework exercise/flashcards</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Distribution of flashcards for feedback</li> <li>• Asking questions: are the ratings showing up any changes?</li> <li>• Group discussion on the homework exercise/ flashcards</li> </ul>
7	<ul style="list-style-type: none"> <li>• Explanation of the concept of modes, paying attention to the three most important schema modes of the group members</li> <li>• Introducing the role play "the schema and the healthy adult"</li> <li>• One-half of the group plays the healthy adult, the other half plays the role of the schema (if required use the flashcards).</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Distribution of the rating forms</li> <li>• Asking questions: are there changes in schema severity?</li> <li>• Group discussion</li> </ul>
8	<ul style="list-style-type: none"> <li>• Changing schema behavior will lead to the next role play. One of the members is asked to discuss a situation that evoked a particular schema behavior. He/she is asked to play out this situation, (in which they play themselves); however, this time by trying to be in "healthy adult" side (with 'helpers' standing behind)</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Focusing on healthy adult and happy child modes</li> <li>• Doing "mindfulness of healthy adult and happy child" exercise and exercise review</li> </ul>
9	<ul style="list-style-type: none"> <li>• Asking questions after mindfulness exercise, "what did you feel? how do your eating patterns fit in with this? Do you use restriction (and/or other compulsive behaviors) to block your vulnerable child (as schema compensation)? Or do you use bingeing (and/or other impulsive behaviors) to block your vulnerable child after schemas have been triggered?</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Reviewing homework: drawings of a healthy adult and a happy child</li> </ul>
10	<ul style="list-style-type: none"> <li>• Sitting meditation in 30 min (As part of this exercise, Juggling Exercise)</li> <li>• Ending the session with throwing balls to each other in order to connect and communicate with each other mindfully</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Distribution of schema severity ratings</li> </ul>
11	<ul style="list-style-type: none"> <li>• Exploring the past week by the group members in 20-30 min.</li> <li>• Mode work: fighting the schema side, explaining how modes affect individuals, and doing exercise</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Exploring the past week by the group members in 20-30 min.</li> </ul>
12	<ul style="list-style-type: none"> <li>• Asking questions: is schema severity rating improved?</li> <li>• Mode work: emphasizing the importance of working on schemas/modes because of the end of therapy sessions, practice mindfulness, reminders of relapse prevention</li> <li>• Reminding members that the follow-up session will take place within the next 3 months</li> <li>• Homework for next session</li> </ul>
	<ul style="list-style-type: none"> <li>• Distribution of schema severity ratings</li> </ul>
13	<ul style="list-style-type: none"> <li>• Exploring the past week by the group members in 20-30 min.</li> <li>• Asking questions: is schema severity rating improved? If not, what hinders the changes? Do members need help with making specific goals, or working out how to take the first steps towards change? What fears/ anxieties might hinder changes? How might change affect the current relationships?</li> <li>• Talking about ending the sessions. Is schema triggered? Retreating into familiar coping modes? What is happening to eating patterns and how are these related to coping? How can healthy adult be brought in?</li> <li>• Repeating healthy adult mindfulness exercise from MBCT sessions.</li> <li>• Discussion on the Reminders of relapse prevention materials in mindfulness-based cognitive therapy sessions.</li> <li>• Arranging the questionnaires to be handed out and letting everyone know that a follow-up session will be offered in 3 months' time.</li> </ul>

## Results

The mean ages of the control and experimental groups were 15.53 and 15.47 years, respectively. As

shown in Table 2, there is an improvement in the mean scores of the experimental group in the posttest stage, compared to the pretest stage, and

this increase continued until the follow-up phase. On the other hand, there is no significant difference between intervention and follow-up in terms of the scores in the control group scores. Covariance analysis was utilized to evaluate the effectiveness of group schema therapy on eating and self-regulation among overweight girls with an eating disorder. The preconditions were initially examined to use this test.

Initially, the normality assumption was performed, and the results of the Kolmogorov-Smirnov test showed no significant difference between groups in this regard; therefore, the data were normally distributed in this study ( $P < 0.05$ ). Moreover, the assumption of covariance matrix homogeneity, homogeneity of variances, and the linear relationship between pretest and posttest values were examined with those in the follow-up. Finally, the assumption of slope homogeneity of the regression lines was tested and confirmed ( $P < 0.05$ ). Furthermore, according to the result of Levin's test, no significant difference was observed between the two groups in terms of variances ( $P < 0.05$ ).

Table 3 tabulates the results of repeated measures analysis of variance. It can be observed that the F value was significant for self-regulation and eating attitude over time ( $P < 0.05$ ). Moreover, there is a

significant difference between the two groups in this regard ( $P < 0.01$ ). In addition, the experimental group obtained a better mean score of self-regulation and eating attitude, compared to the control group at the posttest and follow-up sessions.

As shown in Table 4, group schema therapy has a significant effect on self-regulation and eating attitude in overweight adolescent females with binge eating disorder ( $F = 79.730$ ,  $P < 0.001$ ). The initial level of self-regulation in the pretest phase also affected the self-regulation and eating attitude of this group in the posttest phase ( $F = 42.297$ ,  $P < 0.001$ ). Moreover, the initial level of eating attitude in the pretest also affected the self-regulation and eating attitude of the adolescent girls in the posttest ( $F = 90.689$ ,  $P < 0.001$ ).

Covariance analysis was employed to evaluate the stability of the treatment effectiveness at the follow-up stage.

The results obtained from Table 5 show that changes in the follow-up stage were not significant, compared to those in the posttest ( $P = 0.989$ ,  $F = 0.011$ ). However, given the amount of self-regulation score and eating attitude, changes were observed during the study. Although there were no significant changes during the posttest until the

**Table 2.** Mean $\pm$ SD of self-regulation and eating attitude per group

Variable	Group	Pretest		Posttest		Follow up	
		Mean	SD	Mean	SD	Mean	SD
Self-Regulation	Experimental	208.73	28.779	269.20	27.857	268.07	28.106
	Control	200.40	29.722	199.80	29.979	199.80	29.881
Eating Attitude	Experimental	20.60	6.895	13.93	6.681	14.20	8.906
	Control	23.67	9.832	23.80	9.937	23.60	9.311

**Table 3.** Results of repeated-measures analysis of variance

Source	Variable	Sum of squares	df	Mean of squares	F	P	Effect size
Time	Self-regulation	373.09	1,13	328.99	114.65	<0.05	0.804
	Eating attitude	211.26	2	105.63	15.80	<0.05	0.361
Error	Self-regulation	91.11	31.75	2.86			
	Eating attitude	374.31	56	6.68			
Time* Group	Self-regulation	378.47	1,13	333.74	116.30	<0.05	0.806
	Eating attitude	216.42	2	108.21	16.18	<0.05	0.366
Group	Self-regulation	672.40	1	672.40	26.78	<0.05	0.489
	Eating attitude	1246.94	1	1246.94	5.84	<0.02	0.173
Error	Self-regulation	702.89	28	25.10			
	Eating attitude	5975.956	28	213.42			

**Table 4.** Multivariate analysis of covariance analysis of the main study assumption in the posttest phase

Source	Test	Values	F	df	P	Effect Value	Statistical power	Box's Test
Self-regulation (Pre-test)	Pillai's Trace	.772	42.297	2. 25	<0.001	.772	1	2.203 P=0.566
Eating attitude (Pre-test)	Pillai's Trace	.879	90.689	2. 25	<0.001	.879	1	
Error	Pillai's Trace	.864	79.730	2. 25	<0.001	.864	1	

**Table 5.** Covariance analysis of research hypothesis at the follow-up stage

Source	Test	Values	F	df	P	Effect Value	Statistical power	Box's Test
Self-regulation (Posttest)	Pillai's Trace	.990	1285.244	2. 25	<0.001	.990	1	0.437 P=0.940
Eating attitude (Pre-test)	Pillai's Trace	.810	53.208	2. 25	<0.001	.810	1	
Error	Pillai's Trace	.001	.011	2. 25	0.989	.001	.051	

follow-up stage, there was a change in the scores, compared to the pretest. This implies that treatment was effective in improving the status of students. In the follow-up stage, self-regulation scores and eating attitudes in the posttest also affected the follow-up stage ( $P < 0.05$ ).

## Discussion

This study aimed to investigate the effectiveness of group schema therapy on eating attitude and self-regulation in overweight adolescent females with an eating disorder. The results revealed that the mean scores of eating attitudes were decreased significantly after group schema therapy (i.e., in the posttest phase) in the experimental group, and these changes were stable until the follow-up phase. In other words, group schema therapy leads to the improvement of the eating attitude. People with eating disorders in addition to the specific symptoms of this syndrome have serious inappropriate and ineffective eating attitudes with a complex relationship with food that is characterized by anxiety, anger, fear, and guilt [32].

Numerous studies, such as the studies conducted by Pugh [20] and Turner et al. [33], have confirmed the interaction of early maladaptive schemas with eating attitudes. According to the results of the mentioned studies, people who scored higher on eating attitudes had more maladaptive schemas. The findings of this study are consistent with the results of a study performed by Sharifi and Etemadi on adolescent females with anorexia. They studied 40 adolescent girls with anorexia nervosa who referred to counseling centers with beliefs about eating disorder and shame. The results of the study indicated the effectiveness of group schema therapy on reducing beliefs about eating disorder and shame in this population [34].

Eating attitudes include food-related beliefs, thoughts, feelings, and behaviors. On the other hand, high BMI is associated with inadequate nutritional beliefs, such as all-or-nothing thinking, repeated guilt feelings, eating-related failure, and subsequent overeating periods [35, 36]. Individuals in this study found that (through cognitive techniques of schema therapy, such as finding confirmatory or rejecting evidence of schema and profit, as well as loss analysis) self-judgment and evaluation based on weight and physique in the past, as well as their relationships with parents and important people in life simply resulted in overeating to escape the painful feelings that arose from it.

They also found that overeating flashcards helped them to escape these painful emotions for only a very short time. Due to the experience of

overeating, they recalled that they experienced other unpleasant emotions shortly after overeating, including guilt and shame. Therefore, they learned to substitute overeating for more efficient behaviors, such as showering, reading books, eating healthy food, and calling a friend.

On the other hand, the results of the present study have shown that group schema therapy has been effective in self-regulation among overweight girls with an eating disorder and has increased self-regulation ability in these individuals. Accordingly, this effectiveness has been consistent throughout the follow-up phase.

Harrison et al. [37], as well as Haynos, and Fruzzetti [38] have highlighted the role of lack of self-regulation skills, particularly emotional regulation in the formation and persistence of binge eating disorder. The findings of this study were consistent with the results of a study carried out by Simpson et al. (2010) to investigate the effect of group schema therapy on eating disorders. They evaluated the effectiveness of the group schema therapy on six people with binge eating disorder and re-evaluated the severity of the eating disorder, overall severity of schema, as well as shame and anxiety levels at the end of treatment and follow-up stage.

The results revealed a decrease in eating intensity, overall schema intensity, as well as shame and anxiety levels [24]. Moreover, Ghaderi et al. (2015) investigated the effectiveness of group schema therapy on cognitive emotion regulation strategies in students with symptoms of social anxiety disorder. The results showed a significant improvement in emotion regulation strategies [39]. In this case, it can be concluded that when the intensity of negative emotions is high due to the activation of the schemas, the imbalance in the regulatory skills resulting from these emotions makes self-regulation more difficult.

As a result, it leads to increased food intake as a way to avoid negative emotions by activating schemas (e.g., abandonment schema). Specific strategies of schema therapy focus on the perceived physical sense, body image, and self-regulation skills, especially emotional regulation.

Schema therapy emphasizes changing maladaptive coping styles and maladaptive schemas formed in childhood. It explains how they influence the processing and handling of life events in the treatment and the presentation of cognitive and behavioral techniques. It has also provided an opportunity to improve self-regulation strategies, especially emotion regulation, by emphasizing the replacement of more adaptive and newer cognitive and behavioral patterns rather than ineffective coping styles and strategies.

## Conclusions

According to the results, it is recommended that clinical specialists use this therapy in the treatment of people with binge eating disorder. It is also recommended that nutritionists, who use specific dietary interventions to help overweight people lose weight, refer them to clinicians for necessary evaluations before proposing diet plans.

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## Conflicts of Interest

The authors declared no conflict of interest regarding the publication of the study.

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