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The Mediating Role of Body Checking Behavior and Body Image in the Relationship Between Emotional Regulation and Coping Styles with Binge Eating Disorder in Women

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A B S T R A C T

Objective: The aim of this study was to investigate the mediating role of body checking behavior and body image in the relationship between emotional regulation and coping styles with binge eating disorder.

Methods: The research design was a cross-sectional descriptive study of a correlational nature. The target population consisted of all women visiting clinics in Shiraz, and a sample of 200 women was selected using the convenience sampling method. The measurement tools used in this study included the Body Checking and Body Image Questionnaire, the Emotion Regulation Questionnaire, the Coping Styles Questionnaire, and the Binge Eating Disorder Scale. The obtained data were analyzed at both descriptive and inferential levels. In the descriptive section, indices such as mean, standard deviation, minimum, and maximum scores were calculated. At the inferential level, Pearson correlation coefficient and path analysis with structural equation modeling were conducted.

Findings: The results indicated that body checking behavior and body image, as mediating variables, create a significant relationship between emotional regulation and coping styles with binge eating disorder. Both emotional regulation and body checking behavior directly and indirectly predicted binge eating disorder. Additionally, coping styles, particularly problem-focused coping, helped reduce binge eating behaviors, whereas emotion-focused and avoidant coping styles had more negative effects on this disorder.

Conclusion: These results emphasize that body image and checking behaviors can increase body dissatisfaction and contribute to the persistence of binge eating disorder.

Keywords: *Body checking behavior, body image, emotional regulation, coping styles, binge eating disorder.*

1. Introduction

Eating disorders are recognized as common psychological disorders that encompass physical and psychological symptoms, including dysfunctional thoughts about eating, weight, and body shape, behaviors such as dieting, binge eating, fasting, exercising, and compensatory activities, which lead to significant disturbances and harm to the individual (Maher et al., 2022). Eating disorders are characterized by disrupted nutritional behaviors and a marked disturbance in an individual's thoughts about food and self, with clinical forms including overeating, rumination disorder, binge-eating disorder, anorexia nervosa, and bulimia nervosa (Binte Zaman, 2024). In the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), eating disorders are defined as a group of psychological disorders characterized by abnormal eating patterns, intense concern about weight or body image, and behaviors that significantly impair the individual's daily functioning. This classification includes disorders such as anorexia nervosa, bulimia nervosa, binge-eating disorder, other specified feeding or eating disorders (OSFED), and unspecified feeding or eating disorders (UFED). Among these, binge-eating disorder, which was first introduced as an independent disorder in DSM-5, is defined by recurrent episodes of binge eating in which the individual consumes a large amount of food in a short period and experiences a lack of control over this behavior. These episodes are often associated with feelings of distress, shame, or guilt; however, unlike bulimia nervosa, compensatory behaviors like self-induced vomiting or the use of laxatives are absent. To diagnose this disorder, the behavior must occur at least once a week for a period of three months. The inclusion of this disorder in the DSM-5 has greatly facilitated the diagnostic and treatment process, highlighting the importance of targeted therapeutic interventions (Maher et al., 2022; Mond & Gill, 2024; Rizzo et al., 2024).

One of the most common eating-related disorders and the most prevalent psychiatric issue among young women is binge-eating disorder (Asmaribardezard et al., 2018). Binge eating involves consuming a large amount of food unusually quickly, accompanied by a loss of control during the eating period, occurring at least twice a week for a period of six months (Telch et al., 2001). Binge-eating disorder is the most common eating disorder, and although it is not limited to obese individuals, it is the most prevalent diagnostic disorder in this group (Tasca et al., 2007). In 2005, approximately 500 million people worldwide were identified as obese, and it is estimated that by 2030, this number will reach one billion. The prevalence of obesity has become so widespread that the World Health Organization has declared it an epidemic and a global health threat. In research literature, binge-eating disorder is defined as recurrent episodes of excessive eating and consumption of large quantities of food within a short period, along with a loss of control over the behavior, followed by the use of compensatory behaviors (such as vomiting or using laxatives and diuretics) to prevent weight gain (Asmari Bardezard et al., 2021; Ghadimi Nouran et al., 2020; Telch et al., 2001).

This disorder, through altering eating patterns and inadequate nutrient intake, can lead to numerous physical and psychological health issues, disrupting the quality of life of the affected individual and leading to psychological damages such as depression, increased suicidal ideation, disrupted interpersonal relationships, reduced quality of life, as well as physical and biological damage, including malnutrition, osteoporosis, amenorrhea, cardiovascular diseases, diabetes, increased cholesterol, increased blood pressure, electrolyte imbalances, stomach irritation, bleeding, gastrointestinal disorders, decreased heart rate, hypotension, slowed metabolism, and even death (Abraham & Kellow, 2011; Griffiths et al., 2016; Joshua et al., 2023; Machado & Ferreira, 2014; Mond et al., 2004; Rahmani & Omidi, 2019; Rahmani et al., 2018; Sadeghzadeh et al., 2023; Safarzade & Mahmoody Khorandi, 2015). The ratio of the prevalence of binge-eating in women to men is 3:1 (Asmaribardezard et al., 2018). The primary symptoms of this disorder in individuals include eating faster than normal, eating until feeling full, eating without hunger, eating in private due to feelings of shame, guilt, or disgust. Binge-eating disorder is a multifactorial disorder, and both individual and environmental factors can contribute to its development. One of the individual factors influencing binge-eating disorder is the concept of body-checking behaviors. Body-checking behaviors include frequent weight measurement, regular checking of body changes in the mirror, using special clothing to measure body size, pressing different parts of the body to check for fat, and comparing one's weight and body shape with others (Kiani, 2023; Stefano et al., 2016).

Body-checking behaviors resemble obsessive acts in which the individual avoids addressing the root cause of their distress through mental preoccupation with body shape and size. Farbern (1997) found in a study that in patients with eating disorders, body-checking behaviors, excessive focus on the body, and concern related to a negative body image

contribute to body dissatisfaction. Body-checking behaviors are used to monitor changes in body weight and shape, but they subsequently increase the perception of body defects, leading to heightened weight control and, ultimately, the formation of negative beliefs about body image and the creation of an unnatural body image. Individuals with body-checking behaviors tend to focus on their negative body image and self-perception. Although body-checking behaviors appear harmless in the short term and reduce anxiety temporarily, they become reinforced over time, leading individuals to rely on these behaviors for reassurance about their weight and body shape (Stefano et al., 2016). Body-checking behaviors are essentially the beginning of cognitive distortions that maintain and perpetuate eating disorders in patients. Just as preoccupation with eating and food increases concerns about body size and shape in individuals with eating disorders, body-checking behaviors can also intensify these concerns and lead to the creation of a negative body image, reinforcing behavioral patterns such as eating disorders (Kiani, 2023).

Experimental studies examining the underlying factors of binge-eating indicate that one of the factors contributing to binge-eating disorder is body image and the perception individuals have of their own body (Fogelkvist et al., 2020; Marshall et al., 2020; McLean & Paxton, 2019; Mento et al., 2021; Merwin et al., 2023). The prevalence of body dissatisfaction is a significant concern because it is linked to psychological disorders and deficiencies, such as low self-esteem, cosmetic surgery, depression, social anxiety, eating disorders, and substance abuse. Body image disorder impacts individuals' overall functioning, well-being, self-esteem, and physical and psychological health (Marco et al., 2018; Rizzo et al., 2024).

Characteristics of individuals with binge eating disorder include an inability to follow a diet, lack of restraint, and negative body image. Disturbances in body size and weight perception, obsessive thoughts about food, exercise, and distorted body image are symptoms that individuals with this disorder experience. The concept of body image refers to the internal representation of an individual's body size, shape, and form, which includes perceptual, emotional, cognitive, and behavioral aspects of the bodily experience. The conceptual framework of body image consists of two components: the perceptual dimension (the individual's evaluation of their body size) and the cognitive-affective dimension (the individual's attitude toward their body shape) (Layam et al., 2019). In other words, body image refers to how an individual thinks and feels about their body. It also involves the mental image of the body, which may not align with its actual shape and size (Arora & Brotto, 2017; Fogelkvist et al., 2020; Grabe et al., 2008). Body image can change over the course of life, and having a healthy body image is important because when individuals feel good about their bodies, they are likely to have good self-esteem and mental health, along with a balanced attitude toward eating and physical activity. However, a negative or unhealthy body image often leads to dissatisfaction, and such individuals frequently wish to change the size or shape of their bodies (Guest et al., 2019; MacNeill et al., 2017; Sheykhan et al., 2019; Stefano et al., 2016). A positive body image may be of greater importance in the lives of girls than boys. According to studies, most girls with a negative or unhealthy body image experience low self-confidence, lose their appetite, avoid seeing friends and family, engage less in extracurricular activities, or avoid visiting their doctors (Grabe et al., 2008).

Explanatory models of binge eating in eating disorders suggest that painful emotions are the most significant accelerators and maintainers of the disorder, playing a key role in emotional regulation for the affected individuals. Therefore, another factor associated with binge eating is emotion regulation (Hajiyousef et al., 2022). Studies indicate that one variable that is deficient in individuals with binge eating disorder is the weakness in cognitive and emotional regulation strategies for negative emotions (Hajiyousef et al., 2022; Kord & Karimi, 2017). When a person turns to eating as a compensatory behavior under pressure, effective emotion regulation helps them use appropriate coping strategies in situations where binge eating is likely. Individuals with binge eating disorder struggle with managing emotions such as tension, anger, and depression, and this lack of control leads to increased eating behaviors. Emotional eating is defined as a response to negative emotional states such as anxiety, anger, and fear, and is an abnormal reaction to distress (Hughes & Gullone, 2011). Emotion regulation in individuals with binge eating is impaired, and these individuals respond to emotional disturbances by overeating, particularly foods that are sweet and high in fat, which increases their risk of obesity (Arend et al., 2020; Bilici et al., 2020). Therefore, emotion regulation refers to actions taken to change or adjust emotional experience, expression, and intensity in response to specific goals or values. The cognitive emotion regulation model is one of the most important emotion models that is aided by cognitive strategies and processes. Cognitive processes help individuals regulate their emotions (Meule et

al., 2021). Cognitive emotion regulation refers to all cognitive strategies that represent ways in which an individual copes with stressful situations or adverse events (Vatanpanah et al., 2023, 2024). Additionally, cognitive emotion regulation strategies refer to how individuals think after a negative experience or traumatic event, and these strategies are typically divided into positive and negative emotion regulation strategies (Braet et al., 2018; Frayn et al., 2018). Positive strategies are adaptive in coping with stressful events and lead to improved self-esteem, social competence, and so on. These strategies include acceptance, reappraisal, positive refocusing, positive re-evaluation, and adopting a perspective. In contrast, negative strategies are maladaptive and lead to stress, depression, and other mental health issues, such as self-blame, blaming others, rumination, and catastrophizing (Babakhanlou, 2023).

Given the above, binge eating is an unhealthy coping strategy that originates from poor emotional regulation when individuals cope with stressful conditions as a maladaptive defense mechanism. It appears to be possible to examine it within the framework of a causal model (Abbasi et al., 2013; Herren et al., 2021). Individuals with binge eating disorder struggle with expressing and regulating their emotions, which is a common and significant factor in the formation and persistence of binge eating disorder. They often use overeating as a coping and soothing strategy (Zucchelli et al., 2020). Many positive and negative psychological variables are associated with eating disorders, with one of the key factors being coping styles. How individuals respond to stressful events essentially depends on their interpretation and evaluation of those events. People of all ages face stress and, due to its negative nature, they attempt activities aimed at reducing stress, which is referred to as coping methods and activities (Bailey et al., 2016). Coping styles are defined as cognitive and behavioral efforts to increase control and manage stressful situations, adjust to the environment, or attempt to prevent the negative outcomes of stressful conditions (Bailey et al., 2016). Generally, there are three main coping styles: problem-focused, emotion-focused, and avoidance-focused. Problem-focused coping styles involve strategies in which individuals seek more information about the issue, cognitively restructure the problem, and prioritize problem-solving. Emotion-focused coping styles include strategies where individuals, instead of solving the problem, try to reduce unpleasant emotions through anger, distress, crying, blame, rumination, etc. Avoidance-focused coping styles involve strategies where individuals attempt to escape or avoid the stressful situation. Research findings on the relationship between coping styles and eating disorders are contradictory (Herren et al., 2021).

Given the role of binge eating in the physical, psychological, and social health of individuals, it is essential for professionals and researchers to pay more attention to binge eating behaviors and their reduction. Understanding patients' concerns about their body image and body-checking behaviors can directly influence how these behaviors relate to binge eating. On the other hand, considering that cognitive emotion regulation strategies and understanding individuals' coping styles in the face of stressful events can play an important and valuable role in identifying binge eating behaviors, this study aims to predict binge eating based on body image, body-checking behaviors, cognitive emotion regulation, and coping styles.

2. Methods

2.1. Study Design and Participants

The present study is a descriptive correlational research design aimed at predicting binge eating based on body-checking behaviors, body image, cognitive emotion regulation, and coping styles. The statistical population includes all individuals visiting nutrition clinics in Shiraz between 2018 and 2019. Based on the descriptive cross-sectional design of the study, 200 participants were selected from the target population using convenient sampling, following the Morgan table, and tested. Due to the use of convenient sampling and the researchers' discretion in selecting the sample size, no dropouts were observed in the number of participants. The inclusion criteria for the study were: having a body mass index between 25 and 40, being aged 20 to 50 years, no physical diseases affecting obesity, having a medical record with a treating physician, the ability to comprehend the content of the questionnaire, and the exclusion criteria included morbid obesity due to physiological reasons (hormonal and metabolic), ongoing psychiatric treatment, and the absence of written and verbal consent to participate in the study.

The study was conducted individually. After obtaining consent from the participants, the necessary information was collected via questionnaires, and instructions on completing the questionnaires were provided. The completed questionnaires were collected after the participants had spent the time they felt comfortable with. During the course of the study, the researchers adhered to all ethical considerations, including participants' freedom to choose whether or not to participate. Confidentiality of personal information was

guaranteed. The study ensured that no actions or activities put the health of participants or others at risk.

2.2. Measures

2.2.1. Binge Eating

This 16-item scale was designed by Gormally et al. (1982) to measure the severity of binge eating in individuals with obesity. Each item consists of 3 or 4 statements, from which individuals select the best description. This scale measures both cognitive-affective (e.g., feelings of guilt, preoccupation, restrictive eating) and behavioral (e.g., eating quickly, eating alone, rapid consumption) dimensions of binge eating. The validity and reliability of the original scale in English have been reported as satisfactory. In the Iranian version of this scale, internal consistency was found to be 0.67, test-retest reliability was 0.72, and Cronbach's alpha was 0.85. Additionally, the sensitivity coefficient was reported as 88% (Asmari Bardezard et al., 2021; Asmaribardezard et al., 2018).

2.2.2. Body Checking

This questionnaire is a self-report tool with appropriate validity and reliability for measuring body checking behaviors. It contains 23 items and uses a Likert scale ranging from 1 (never) to 5 (often). The initial factor structure suggests that this scale is a robust tool for assessing body checking behaviors, including overall appearance checking, specific body part checking, and checking specific to individual patterns. High scores on this scale are strongly correlated with greater body dissatisfaction, fear of obesity, body image avoidance behaviors, and general eating disorders. The scale evaluates the frequency of body checking behaviors. It includes three subscales: overall appearance checking (10 items), specific body part checking (8 items), and individual-pattern checking (5 items), with the total score calculated as the sum of all item responses, with a maximum score of 115 and a minimum of 23. In the original version, Cronbach's alpha for internal consistency was reported as 0.94 for the total score and 0.88, 0.92, and 0.83 for the subscales of overall appearance, specific body parts, and individual-pattern checking, respectively. Test-retest reliability for these subscales was 0.94, 0.91, and 0.90, respectively, with an overall reliability of 0.94, indicating acceptable reliability. In Iran, Azimzadeh (2009) reported Cronbach's alpha of 0.94 for the body checking questionnaire and test-retest reliability of 0.96 (Kiani, 2023).

2.2.3. Cognitive Emotion Regulation

This scale, developed by Garnefski et al. (2002), is designed to assess the ways individuals think after experiencing life-threatening or stressful events. It consists of 36 items rated on a five-point Likert scale, from 1 (never) to 5 (always). The range of scores on this questionnaire is from 36 to 180 and includes nine subscales: self-blame, other-blame, rumination, catastrophizing, acceptance, positive refocusing, planning refocusing, positive reappraisal, and perspective-taking. In an external sample validation study, Garnefski and Kraaij (2007) calculated the test-retest reliability using Cronbach's alpha for its subscales, which ranged from 0.75 to 0.85. Additionally, exploratory factor analysis indicated that the questionnaire's construct validity extracted nine factors with shared values ranging from 0.55 to 0.78, explaining 68% of the total variance. In a study conducted in Iran, Hasani (2010) reported Cronbach's alpha coefficients for the subscales ranging from 0.77 to 0.87, with construct validity supported by factor analysis, which identified nine factors explaining 74% of the variance (Babakhanlou, 2023; Kord & Karimi, 2017).

2.2.4. Body Image

The Body Image Test was created by Fisher in 1970 and contains 46 items, with each item rated on a scale from 1 (very dissatisfied) to 5 (very satisfied). A score of 46 on this test indicates a disorder, while a score above 46 suggests no disorder. The validity of this test was examined by Yazdanjou (2018) in Iran. The Pearson correlation coefficient between the first and second administration of the test for first-year students was 0.81, for second-year students was 0.84, for third-year students was 0.87, and for all students combined was 0.84. Given the significance of this coefficient, a meaningful correlation was found between the scores from the first and second administrations of the body image test (Kord & Karimi, 2017; Sheykhan et al., 2019).

2.2.5. Coping Styles

This questionnaire, developed by Lazarus and Folkman (1985), consists of 66 items based on a four-point Likert scale. It measures eight coping strategies, which are ultimately divided into two general styles: problem-focused and emotion-focused. Lazarus (1993) estimated the internal consistency of this scale to range from 0.66 to 0.79 for its subscales. In studies by Zeyn al-Abedini (2004) and

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Hashemzadeh (2005), the validity of the test was reported as 0.79 and 0.89, respectively. In a study by Zarei and Asadi (2011), Cronbach's alpha coefficient was 0.82 (Abbasi et al., 2013).

2.3. Data Analysis

Descriptive data were analyzed using descriptive statistics (mean and standard deviation), while Pearson correlation was used at the inferential level. Structural equation modeling (SEM) and Amos software were used to analyze the data and examine the relationships between variables.

3. Findings and Results

To better understand the studied variables, indices such as the mean, standard deviation, skewness, and kurtosis were used, with their values presented in Table 1.

Table 1

Descriptive indices of the studied variables

Variable	N	Mean	Standard Deviation	Skewness	Kurtosis
Emotion Regulation	200	47.47	6.93	-0.62	1.57
Coping Strategies	200	37.64	7.01	-0.87	1.73
Body Checking	200	60.13	16.86	-0.64	0.15
Body Image	200	60.59	20.57	0.26	-0.15
Binge Eating	200	40.70	5.42	0.61	0.40

Table 2 shows the Pearson correlation coefficients between emotion regulation, coping strategies, body checking, body image, and binge eating.

Table 2

Pearson correlation coefficients between the studied variables

Variable	Emotion Regulation	Coping Strategies	Body Checking	Body Image	Binge Eating
Emotion Regulation	1				
Coping Strategies	0.715**	1			
Body Checking	0.473**	0.524**	1		
Body Image	0.137*	0.047	0.298**	1	
Binge Eating	0.152*	0.021	0.135*	0.013	1

**p<0.01, *p<0.05

Table 3 presents the structural equation modeling results to investigate the mediating role of body checking in the relationship between emotion regulation, coping strategies, and binge eating. According to the results in Table 3, the estimated path coefficients for all paths, except for the coping strategies–binge eating path, are significant. The results suggest that only emotion regulation and body checking can significantly predict the variance in binge eating. Additionally, emotion regulation can predict binge eating significantly through the mediation of body checking.

Table 3

Results of structural equation modeling for examining the mediating role of body checking

Path	Estimated Value	SE	CR	P
Coping Strategies → Body Checking	2.56	0.49	5.23	0.001
Emotion Regulation → Body Checking	0.614	0.219	2.80	0.005
Coping Strategies → Binge Eating	0.212	0.153	1.38	0.165
Emotion Regulation → Binge Eating	0.468	0.169	2.72	0.006
Body Checking → Binge Eating	0.065	0.027	2.37	0.018

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As shown in Table 4, the CFI, NFI, and IFI values are 0.646, 0.630, and 0.651, respectively, all of which are at acceptable levels. Additionally, the RMSEA index value is 0.173, and the FMIN index value is 2.03, both of which indicate good model fit.

Table 4

Fit indices of the structural equation model for examining the mediating role of body checking

Path	CHI-Square	P	DF	CMIN/DF	CFI	NFI	IFI	RMSEA	FMIN
Emotion Regulation → Body Checking → Binge Eating	26.236	0.001	6	3.32	0.646	0.630	0.651	0.173	2.03

Table 5 shows the direct, indirect, and total effects of the variables on each other. Based on the results from the structural equation modeling, the following conclusions were drawn: The direct effect and total effect of coping strategies on body checking were both 0.470. The direct effect and total effect of emotion regulation on body checking were 0.180. The direct effect and total effect of body checking on binge eating were 0.292. The direct, indirect, and total effects of coping strategies on binge eating were 0.152, 0.084, and 0.068, respectively. Finally, the direct, indirect, and total effects of emotion regulation on binge eating were 0.060, 0.053, and 0.112, respectively.

Table 5

Direct, indirect, and total effects of the variables on each other

Path	Direct Effect	Indirect Effect	Total Effect
Coping Strategies → Body Checking	0.550	---	0.550
Emotion Regulation → Body Checking	0.176	---	0.176
Body Checking → Binge Eating	0.191	---	0.191
Coping Strategies → Binge Eating	0.134	0.105	0.029
Emotion Regulation → Binge Eating	0.033	0.034	0.067

Table 6 presents the results of structural equation modeling to investigate the mediating role of body image in the relationship between emotion regulation, coping strategies, and binge eating. According to the results shown in Table 6, the estimated path coefficients for the coping strategies → body image, emotion regulation → body image, and emotion regulation → binge eating paths are significant. However, the paths coping strategies → binge eating and body image → binge eating are not significant. Given that body image does not have a significant relationship with binge eating and that body image is introduced as a mediating variable in the model, it can be concluded that body image does not play a significant mediating role in the relationship between emotion regulation, coping strategies, and binge eating.

Table 6

Results of Structural Equation Modeling for Examining the Mediating Role of Body Image

Path	Estimated Value	SE	CR	P
Coping Strategies → Body Image	3.10	0.74	4.21	0.001
Emotion Regulation → Body Image	1.62	0.31	5.20	0.001
Coping Strategies → Binge Eating	0.086	0.18	0.46	0.469
Emotion Regulation → Binge Eating	0.093	0.08	1.12	0.259
Body Image → Binge Eating	0.002	0.01	0.31	0.912

Table 7 shows the fit indices for the structural equation model to examine the mediating role of body image. As seen in Table 7, the CFI, NFI, and IFI values are 0.628, 0.612, and 0.454, respectively. Additionally, the RMSEA index value is 0.172, and the FMIN index value is 0.12.

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Table 7

Fit Indices of the Structural Equation Model for Examining the Mediating Role of Body Image

Path	CHI-Square	P	DF	CMIN/DF	CFI	NFI	IFI	RMSEA	FMIN
Emotion Regulation → Body Image → Binge Eating	236.23	0.001	6	27.59	0.588	0.593	0.599	0.333	2.01

Table 8 presents the direct, indirect, and total effects of the variables on each other. Based on the results obtained from structural equation modeling, the following conclusions were drawn: The direct effect and total effect of coping strategies on body image were 0.372. The direct effect and total effect of emotion regulation on body image were 0.354. The direct effect and total effect of body image on binge eating were 0.023. The direct, indirect, and total effects of coping strategies on binge eating were 0.070, 0.009, and 0.062, respectively. The direct, indirect, and total effects of emotion regulation on binge eating were 0.111, 0.008, and 0.103, respectively.

Table 8

Direct, Indirect, and Total Effects of Variables on Each Other

Effect	Direct Effect	Indirect Effect	Total Effect
Coping Strategies → Body Image	0.355	---	0.355
Emotion Regulation → Body Image	0.332	---	0.332
Body Image → Binge Eating	0.008	---	0.008
Coping Strategies → Binge Eating	0.040	0.003	0.037
Emotion Regulation → Binge Eating	0.077	0.003	0.074

4. Discussion and Conclusion

The results showed that both the direct and indirect effects of coping strategies on binge eating disorder were significant. The results of this test are consistent with the prior findings (Abbasi et al., 2013; Bailey et al., 2016; Herren et al., 2021).

To explain the above findings, it can be stated that Hamburg and Adams (1967) defined coping as "seeking and using information." Coping refers to efforts made to control and manage situations that are perceived as dangerous and stressful, one of which is binge eating disorder. Coping requires effort and planning, and the final outcome of coping responses is not always positive. Coping is considered a process that occurs over time, and it involves the individual using flexible responses that are most appropriate for the situation. For example, when someone is anxious, they might engage in overeating, but using problem-focused coping strategies can prevent binge eating (Bailey et al., 2016). Problem-focused coping includes strategies where individuals seek more information about the issue, cognitively restructure the problem, calculate and prioritize problem-solving. These factors initially enable individuals to deal effectively with stressful events, and ultimately lead to a reduction in eating disorders. On the other hand, emotion-focused coping involves strategies where an individual attempts to reduce unpleasant emotions through anger, sadness, crying, blaming, rumination, and so on. Emotion-focused coping is usually effective in the short term but ineffective in the long term. Therefore, these factors suggest that increasing emotion-focused coping does not lead to a meaningful change in the level of eating disorders. Moreover, avoidance coping strategies involve individuals seeking to escape or avoid stressful situations and resorting to maladaptive behaviors such as eating. These factors suggest that increasing avoidance-focused coping leads to a higher level of eating disorder (Bailey et al., 2016).

The results also showed that the direct and indirect effects of cognitive emotion regulation on binge eating disorder were significant. These results are consistent with the prior findings (Asmari Bardezard et al., 2021; Babakhanlou, 2023; Rahmani & Omidi, 2019; Telch et al., 2001).

In explaining this finding, it can be stated that the ability to recognize emotions can help individuals become more aware of the factors that contribute to negative and positive emotional experiences. Awareness of factors that affect emotions and understanding their impact enables individuals to take appropriate actions in response to life's stressors, which in turn influences their binge eating behaviors. For instance, individuals with positive cognitive emotion regulation can adapt better to life's pressures. This awareness allows them to manage their emotional responses

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in the face of stressors and use appropriate coping strategies. The nature of social life and the need for interaction with others has overshadowed the use of many emotions, which once were the most accessible tools in human life. In today's civilized society, the nature of problems that humans face is different from those faced by early humans. Today's problems mostly occur in the form of human relationships, where using fight-or-flight responses, that is, emotional and extreme reactive confrontations, is ineffective. High emotional attention is associated with lower cortisol levels and blood pressure, which is important for physical health and may lead to binge eating disorder.

The results also showed that the direct effects of body image on binge eating disorder were significant. These results are consistent with the prior findings (Fogelkvist et al., 2020; Griffiths et al., 2016; Hughes & Gullone, 2011; Layam et al., 2019; MacNeill et al., 2017; Marshall et al., 2020; McLean & Paxton, 2019; Mento et al., 2021; Merwin et al., 2023; Stefano et al., 2016).

Studies found that body shape and size were associated with body image and eating disorders. It was concluded that body mass index is generally positively correlated with eating disorders and body dissatisfaction, and BMI can be a predictive factor for eating disorders (McLean & Paxton, 2019). Researchers argued that BMI is considered a predictive factor for eating disorders in longitudinal studies and that BMI can trigger the pathophysiology of anorexia nervosa in early adolescence. Given that weight or BMI decreases definitively in one type of eating disorder (anorexia nervosa), while in the other two types, weight can either increase, decrease, or remain normal, the variation in BMI as a predictor factor for eating disorders is not unexpected (Layam et al., 2019; MacNeill et al., 2017).

The results showed that the direct effects of body checking on binge eating disorder were significant. These results are consistent with the prior findings (Kiani, 2023; Stefano et al., 2016). The results also indicated that body checking plays a significant mediating role between coping strategies and binge eating. The findings of this test are consistent with the prior results (Kiani, 2023; Stefano et al., 2016). The results also showed that body checking mediates the relationship between emotional regulation and binge eating. The findings of this test are consistent with the prior results (Babakhanlou, 2023; Hajiyousef et al., 2022; Hughes & Gullone, 2011; Kord & Karimi, 2017).

In explaining these findings, it can be said that body checking behaviors resemble obsessive actions in which individuals avoid addressing the root causes of their distress by becoming preoccupied with the shape and size of their body. Farbern (1997) found that in patients with eating disorders, body checking behaviors, excessive attention to the body, and negative body image concerns reinforce body dissatisfaction. Body checking behaviors are used to monitor changes in body weight and shape but lead to an increase in the perception of body defects, resulting in greater weight control efforts, ultimately leading to the formation of negative beliefs about body image and the creation of an unnatural body image. Evidence indicates that body image is one of the key elements in the pathology of eating disorders. A key factor in maintaining a negative body image is body checking behaviors, which cause individuals to focus on negative body image and negative self-perception, leading to negative behaviors such as binge eating. Body checking behaviors, although seemingly harmless in the short term and reducing anxiety, become reinforced over time, and individuals become dependent on these behaviors for reassurance about body weight and shape (Kiani, 2023; Stefano et al., 2016).

On the other hand, individuals with binge eating, due to limited access to emotional regulation strategies, use eating as a way to manage negative emotions and experience much more negative emotions. Therefore, emotional turmoil, due to blaming others, with reduced self-control and disruption of self-regulation processes, can create the groundwork for excessive eating behaviors such as binge eating. Additionally, rumination, which is a form of negative emotion regulation, consists of passive, repetitive thoughts focused on negative events and outcomes, preventing adaptive problem-solving and leading to an increase in negative thoughts (Babakhanlou, 2023; Hajiyousef et al., 2022). In other words, rumination enters awareness involuntarily, diverting attention from current topics and goals (Hughes & Gullone, 2011). In fact, it can be said that rumination is one of the individual's maladaptive strategies that functions similarly to ineffective coping styles. Individuals with a rumination or self-focused response style tend to focus their attention on negative emotions and thoughts, which exacerbates negative thoughts and distorted cognitions that can influence the increase in binge eating behaviors. Acceptance, on the other hand, is one of the adaptive strategies in emotional regulation that helps individuals cope with stressful conditions. Acceptance includes a practical and useful coping response that involves accepting reality while making a determined effort to solve the situation (Kord & Karimi, 2017). In other words, it involves accepting what one has experienced and letting go

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of what has happened. Individuals who use the acceptance strategy benefit from improved attention processes, increased control over limited cognitive resources, enhanced cognitive control, emotional experience without reducing memory capacity, and greater ability to inhibit inappropriate responses.

The results showed that body image mediates the relationship between coping styles and binge eating. The findings of this test are consistent with the prior results (Babakhanlou, 2023; Hajiyousef et al., 2022; Hughes & Gullone, 2011; Kord & Karimi, 2017).

In this regard, it should be noted that high body mass index (BMI) is associated with an increased experience of negative body image and a reduced ability to experience positive body image. It appears that these individuals, by comparing their bodies with ideal beauty standards, engage in negative self-evaluations and judgments of their bodies, leading to negative emotions such as shame, embarrassment, and so on (Hajiyousef et al., 2022). In other words, individuals' subjective valuation of their appearance, as well as their evaluation of both positive and negative beliefs and perceptions about their bodies, can be related to binge eating. When an individual's actual physical appearance deviates significantly from their ideals and values, a negative body image evaluation occurs. Additionally, attitudes toward shape, appearance, and weight affect the process of acquiring body image information. On the other hand, binge eating, as one of the eating disorders, refers to psychological conditions characterized by body-related cognitive disturbances, poor self-regulation, and dysfunctional eating behaviors. Negative body image is related to overestimation of weight and shape, which is considered the core pathology in eating disorders, and individuals with eating disorders show high levels of body dissatisfaction due to internalizing the ideal of thinness (Kord & Karimi, 2017). Additionally, another feature found in individuals with high BMI is traits such as perfectionism, which is linked to disturbed eating behaviors.

The results showed that the mediating role of body image between emotion regulation and binge eating was significant. The findings of this study align with the prior results (Babakhanlou, 2023; Hughes & Gullone, 2011; Rahmani et al., 2018; Sadeghzadeh et al., 2023; Telch et al., 2001).

The role of body image in binge eating can be explained as follows: disordered eating, such as binge eating, was significantly higher among individuals (especially women) with greater body dissatisfaction compared to those with a more favorable body image. These individuals increasingly experience dissatisfaction with their body shape and appearance, making them more prone to unhealthy and unconscious eating behaviors (Rahmani et al., 2018; Sadeghzadeh et al., 2023). Additionally, individuals with high levels of perfectionism have high personal standards, engage in excessive self-criticism, worry about their failures and mistakes, are dissatisfied with their performance, and have a general sense of inadequacy. This sense of inadequacy is linked to negative psychological outcomes, including symptoms of eating disorders such as binge eating (Sadeghzadeh et al., 2023; Telch et al., 2001).

On the other hand, such individuals actively attempt to change their conditions with a positive mindset. Individuals who adopt acceptance strategies tend to deal with situational signs more actively and flexibly, reducing rigid stereotypical responses and preventing the experience of binge eating (Sadeghzadeh et al., 2023; Telch et al., 2001). Those who use positive reappraisal strategies try to focus on thoughts about happy and pleasant matters rather than thinking about the actual event. In other words, the person recalls positive experiences when faced with unfavorable situations. On the other hand, individuals with eating disorders tend to use avoidant coping styles to deal with stress, which seeks to avoid negative events and situations. This avoidance can manifest cognitively (denial and suppression of thoughts) or behaviorally (escaping responsibility, seeking external support, excessive self-care in the form of physical complaints, binge eating, anorexia, or substance use) (Babakhanlou, 2023; Hughes & Gullone, 2011; Rahmani et al., 2018). However, individuals with positive reappraisal strategies have high organizing and adaptive abilities in stimulating situations. By recalling their positive experiences, they can regulate and manage their emotions, experiencing them freely or preventing their occurrence without external or internal pressures. Thus, the positive reappraisal strategy can play a significant role in reducing binge eating behaviors. Positive reappraisal is considered an adaptive coping strategy that involves changing the way of thinking about a situation and interpreting it as an opportunity for personal growth, in order to reduce emotional stress in potentially emotion-eliciting situations, which leads to both a reduction in expressive behaviors and negative emotional experiences (Babakhanlou, 2023; Sadeghzadeh et al., 2023).

Therefore, it can be concluded that individuals who adopt the best coping strategies when facing unpleasant events, focus on evaluating the situation, planning, and taking action

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to solve the problem, will experience more positive emotional outcomes, better mental health, greater cognitive control, greater inhibitory ability, and lower levels of emotions and negative behaviors, such as binge eating.

5. Suggestions and Limitations

The sample of this study consisted of women visiting nutrition clinics in Shiraz, and the findings of this study cannot be generalized to men. A limitation of the study was the difficulty in selecting and coordinating with the participants to take part in the test and the large number of questions. Another limitation of this study was that it was conducted among visitors to nutrition clinics in Shiraz. Therefore, caution should be exercised when generalizing the results of this research to individuals in other cities. One other limitation was the assessment of participants' honesty in answering questions, which was beyond the researcher's control. Given that the study was limited to visitors to a few nutrition clinics in Shiraz, the generalization of the findings to other samples should be done with caution. This study was cross-sectional and was not longitudinal. Naturally, cross-sectional studies are subject to fundamental and cultural changes because the researchers had no control over the recent life events of the participants. Another limitation of the present study is that, given that the sampling method used was convenience sampling, the generalizability of the results should be made with caution. This study was descriptive and non-experimental, so causal inferences about the results are not permissible. Since the study was cross-sectional and the researchers had no control over the recent life events of the participants, it is recommended that future studies be conducted longitudinally and with larger sample sizes. It is also recommended that future research use simple random sampling methods to reduce sampling error. The data in this study were collected using questionnaires; it is recommended that future studies employ other measurement methods, such as semi-structured interviews, continuous observations, and other qualitative methods. Based on the findings of this study, binge eating can seriously be influenced by body checking behaviors, body image, cognitive emotion regulation, and coping styles in patients. Therefore, it is recommended that future studies examine the role of cognitive emotion regulation and coping strategies in experimental designs regarding binge eating. This study was conducted in nutrition clinics in Shiraz, but since Iran has a different cultural, ethnic, and religious background, similar studies should be conducted in different communities and cultures across the country.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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