Modeling Health Anxiety Based on Unhealthy Eating Behaviors, Health-Promoting Lifestyle, and Alexithymia with the Mediating Role of Body Image in Individuals with Binge Eating Disorder

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Purpose: The aim of this study was to model health anxiety based on unhealthy eating behaviors, health-promoting lifestyle, and alexithymia, with the mediating role of body image in individuals diagnosed with binge eating disorder.

Methods and Materials: This research employed a descriptive-correlational design using structural equation modeling (SEM). The statistical population included members of the Overeaters Anonymous community in Isfahan in 2024, from which a sample of 400 participants was selected through available random sampling. Data collection tools included the Health Anxiety Inventory, Eating Attitudes Test (EAT-20), Health-Promoting Lifestyle Profile, Toronto Alexithymia Scale (TAS-20), and Body Image Scale. Data were analyzed using SPSS-26 and AMOS-21 software. Assumptions for multivariate analysis were checked and confirmed, and model fit indices were used to evaluate the proposed structural model.

Findings: The results showed that unhealthy eating behaviors ($\beta = 0.23$, $p < 0.001$), health-promoting lifestyle ($\beta = -0.18$, $p = 0.002$), and alexithymia ($\beta = 0.29$, $p < 0.001$) had significant direct effects on health anxiety. Additionally, all three predictors showed significant indirect effects through body image (DEB: $\beta = 0.14$; HPL: $\beta = -0.12$; AI: $\beta = 0.17$; all $p < 0.01$). Body image was confirmed as a mediating variable, and the total effects of DEB, HPL, and AI on health anxiety were 0.37, -0.30, and 0.46 respectively. The model demonstrated a good fit based on RMSEA, CFI, and other indices.

Conclusion: The findings highlight the importance of emotional processing, behavioral regulation, and body image in predicting health anxiety among individuals with binge eating disorder. Clinical interventions should address alexithymia, promote healthy lifestyles, and improve body image to effectively reduce health-related anxiety symptoms in this population.

Keywords: *Health anxiety; binge eating disorder; alexithymia; body image; health-promoting lifestyle; eating behaviors.*

1.   Introduction

Health anxiety is a psychological construct characterized by excessive and persistent worry about one's health status and the misinterpretation of bodily sensations as indicators of serious illness. In recent years, this phenomenon has received increased attention due to its strong associations with emotional dysregulation, maladaptive health behaviors, and body image disturbances. Among individuals with binge eating disorder, health anxiety can act as both a cause and consequence of behavioral dysregulation, often exacerbating cycles of emotional eating, self-monitoring, and physical dissatisfaction (Dong et al., 2023; Habibi Asgarabad et al., 2023).

Binge eating disorder (BED), a form of disordered eating characterized by recurrent episodes of consuming large amounts of food accompanied by feelings of loss of control, is strongly associated with a cluster of psychological traits including anxiety, emotional dysregulation, and low self-concept (Khodabakhsh & Kiani, 2015; Levinson & Rodebaugh, 2012). These individuals often develop a negative body image and engage in maladaptive coping behaviors such as restrictive dieting or compulsive eating, which in turn may heighten their anxiety regarding health and physical appearance. Studies have shown that those with eating pathology are particularly susceptible to health anxiety due to their increased bodily focus and emotional sensitivity to perceived somatic cues (Del Bianco et al., 2023; Quinto et al., 2022).

Alexithymia—a condition marked by difficulty identifying and expressing emotions—is another crucial psychological factor implicated in the development and maintenance of health anxiety (Oussi et al., 2023). Individuals with high alexithymia scores often struggle to distinguish between emotional arousal and physical symptoms, which leads them to interpret internal states catastrophically, thereby increasing their vulnerability to health-related fears (Dong et al., 2023; Ogawa et al., 2024). This difficulty in emotional awareness is also linked to various maladaptive coping strategies such as binge eating and avoidance, further contributing to psychological distress (Terzioğlu & Uğurlu, 2023). Research has established a significant relationship between alexithymia and disordered eating patterns, suggesting that emotional blindness may serve as a psychological pathway through which individuals develop and maintain eating disorders (Abbasi Kamal, 2022; Del Bianco et al., 2023).

Health-promoting lifestyle behaviors, in contrast, are considered protective factors against both physical and psychological distress. Such behaviors include regular physical activity, healthy dietary habits, effective stress management, and responsible health behaviors (Atadokht et al., 2018; Chafjiri et al., 2018). A growing body of research has highlighted the inverse relationship between health-promoting behaviors and anxiety-related symptoms, indicating that individuals who engage in healthy lifestyle practices report lower levels of general and health-specific anxiety (Farivar et al., 2020; A. Fathi et al., 2020). Particularly during the COVID-19 pandemic, health-promoting behaviors have been shown to buffer against health anxiety by enhancing individuals' sense of control and reducing somatic misinterpretations (Ayatollah Fathi et al., 2020; Karamian, 2022).

In contrast, unhealthy eating behaviors such as compulsive overeating, food preoccupation, and lack of dietary control have been identified as risk factors for increased health anxiety, especially among young adults and individuals with emotional instability (Fu et al., 2022; Levinson & Rodebaugh, 2012). Such behaviors often emerge in response to emotional triggers and are reinforced by immediate affect regulation rather than long-term health goals. The presence of unhealthy eating patterns is also associated with higher body dissatisfaction, which can further intensify worry about health and physical appearance (Lyvers et al., 2022; Nishitani et al., 2009).

Body image—the subjective perception and emotional evaluation of one's physical appearance—plays a central role in mediating the relationship between emotional traits and anxiety. Research indicates that individuals with negative body image are more prone to internalizing disorders such as anxiety and depression, particularly when they experience discrepancies between their perceived and ideal body (Dong et al., 2023; Fu et al., 2022). Among individuals with binge eating disorder, body image dissatisfaction is a frequent source of psychological distress and is closely linked to health anxiety, especially when bodily symptoms are interpreted through a lens of defectiveness and inadequacy (Quinto et al., 2022; Zarei Davijani et al., 2022). This link is further intensified when emotional processing deficits, such as alexithymia, hinder the ability to contextualize and cope with such concerns adaptively (Habibi Asgarabad et al., 2023; Lyvers et al., 2022).

Empirical research supports the conceptualization of health anxiety as a multidimensional construct influenced by

both internal and external factors. For instance, Ogawa et al. (2024) found that individuals with heightened sensory sensitivity and alexithymia reported significantly higher levels of dental anxiety—a subclinical expression of health anxiety—highlighting the role of emotional processing in somatic vigilance (Ogawa et al., 2024). Similarly, in a study conducted by Abadi et al. (2024), cognitive analytic therapy was shown to reduce anxiety sensitivity and pain catastrophizing in individuals with chronic pain and alexithymia, underscoring the clinical relevance of addressing emotional clarity in anxiety-prone populations (Abadi et al., 2024).

Taken together, the current literature suggests a dynamic and interactive model where emotional regulation deficits (e.g., alexithymia), behavioral patterns (e.g., unhealthy eating or lack of health-promoting lifestyle), and self-concept distortions (e.g., negative body image) jointly predict elevated levels of health anxiety. Importantly, the mediating role of body image has been emphasized in several studies as a critical link in the psychological chain connecting emotional traits and anxiety outcomes (Dong et al., 2023; Quinto et al., 2022). However, there remains a lack of integrated models that examine these variables simultaneously, particularly in individuals with clinically significant eating pathology. This study aims to model the predictive roles of unhealthy eating behaviors, health-promoting lifestyle, and alexithymia on health anxiety, with the mediating role of body image, within a population of individuals suffering from binge eating tendencies.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a descriptive-correlational design based on a multivariate correlational model. It is classified as applied research in terms of its objective and utilized a quantitative approach, where numerical values were assigned to variables to allow for statistical testing of hypotheses. The model included one criterion variable (health anxiety), three predictor variables (unhealthy eating behaviors, health-promoting lifestyle, and alexithymia), and one mediating variable (body image). The statistical population consisted of all registered members of the Overeaters Anonymous community in Isfahan during the year 2024. The sample size was determined using the participant-to-parameter ratio approach commonly used in structural equation modeling. Based on recommendations in the literature, a ratio of 10 to 20 participants per estimated

parameter is considered suitable. Considering potential attrition and ensuring sufficient power for modeling, 400 participants were selected through available random sampling.

2.2. Measures

Health anxiety was measured using the short-form Health Anxiety Inventory (HAI) developed by Salkovskis and Warwick in 2002. This instrument is composed of 18 items rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater health anxiety. The total score spans from 18 to 90 and is calculated by summing all item responses. The original test developers reported test-retest reliability of 0.90 and Cronbach's alpha coefficients ranging from 0.70 to 0.82. The Iranian version of the questionnaire was first translated by Nargesi in 2011 and validated using the Ahvaz Hypochondria Questionnaire, yielding a correlation coefficient of -0.75. Further studies in Iran, such as that of Abdi (2015), confirmed the reliability of the instrument with a Cronbach's alpha of 0.88.

Unhealthy eating behaviors were assessed using the Eating Attitudes Test (EAT-20) developed by Garner and Garfinkel in 1979. The test consists of 20 items covering three subscales: dieting (items 1–10), bulimia and food preoccupation (items 11–15), and oral control (items 16–20). Items are rated on a 6-point Likert scale from 0 (never) to 5 (always). The internal consistency of the original scale was reported as 0.94, and test-retest reliability after 2–3 weeks was 0.84. In Iranian studies, including work by Khodabakhsh and Kiaei (2014), content validity was supported with a coefficient of 0.67 and Cronbach's alpha of 0.94. Another Iranian study by Kaveh Ghafarkhi and Tabeb Bordbar (2017) found a test-retest reliability of 0.89. In the present study, the Cronbach's alpha was estimated at 0.813, indicating satisfactory internal consistency.

Alexithymia was assessed using the 20-item Toronto Alexithymia Scale (TAS-20) developed by Bagby, Parker, and Taylor (1994). This scale includes three subscales: difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking. Each item is rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Items 1, 3, 5, 8, 11, 17, and 19 assess difficulty identifying feelings; items 2, 6, 9, 16, and 20 assess difficulty describing feelings; and the remaining items assess externally oriented thinking. A total score is also derived by summing all items. The scale has demonstrated strong

psychometric properties, including internal consistency values above 0.85 in international research. In the Persian version, Cronbach's alpha coefficients for the total score and subscales ranged from 0.72 to 0.85. Test-retest reliability across a four-week interval ranged from 0.80 to 0.87. The concurrent validity of the Persian version was confirmed through correlations with measures of emotional intelligence, psychological well-being, and psychological distress. Confirmatory factor analysis supported the three-factor structure in Iranian samples (Besharat, 2007).

Health-promoting lifestyle was measured using the Health-Promoting Lifestyle Profile developed by Walker and Hill-Polerecky in 1997. This questionnaire comprises 54 items across six dimensions: nutrition (items 1–11), physical activity (items 12–24), health responsibility (items 25–32), stress management (items 33–38), interpersonal support (items 39–46), and self-actualization (items 47–54). Responses are recorded on a 4-point Likert scale from 1 (never) to 4 (always), with higher scores indicating healthier lifestyles. The original developers reported content validity and a Cronbach's alpha of 0.94 for the total scale, with subscale reliabilities ranging from 0.79 to 0.94. The three-week test-retest reliability was 0.89. In the Persian adaptation by Mohammadi Zeidi and colleagues (2011), internal consistency coefficients for subscales ranged from 0.79 (nutrition) to 0.91 (stress management), indicating a robust and reliable instrument for measuring lifestyle practices among Iranian participants.

Body image was assessed using a 46-item multidimensional questionnaire developed by Cash in 1997. The items measure various aspects of individuals' thoughts, feelings, and behaviors regarding their physical appearance, encompassing six components. Items 1 to 37 are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire has demonstrated high reliability, with Cronbach's alpha coefficients ranging from 0.77 to 0.91 for men and from 0.77 to 0.90 for women. The one-month test-retest reliability was reported between 0.90 and 0.94 for men and 0.73 to 0.89 for women. In Iran, the validity and reliability of the scale were assessed by Bagheri Pour, who reported Cronbach's alpha coefficients for the subscales ranging from 0.54 to 0.85. Convergent validity was confirmed through significant correlations between the body image subscales and the Cooper Smith Self-Esteem Inventory in both fertile and infertile women, with coefficients ranging from -0.135 to -0.345. The internal consistency of the total scale in the present study was 0.91, further supporting its applicability in the studied population.

2.3.   Data Analysis

Data analysis was performed in two stages: descriptive and inferential statistics. The descriptive stage included frequency distributions, percentage tables, and measures of central tendency and dispersion to characterize the sample and main variables. In the inferential stage, structural equation modeling (SEM) was used to test the research model and hypotheses. Prior to model testing, assumptions for SEM—such as data normality, linearity, multicollinearity, and missing data—were evaluated. Model fit was assessed using a range of fit indices to ensure robustness and reliability of the hypothesized model. SPSS version 26 was used for data preprocessing and descriptive analyses, while AMOS version 21 was employed for SEM and path analysis to evaluate the mediating role of body image in the relationship between the predictor variables and health anxiety.

3.   Findings and Results

The demographic analysis of the participants in this study revealed that the majority were within the age range of 26 to 33 years, accounting for 39.5% of the total sample. This was followed by participants aged 18 to 25 years, who comprised 31.5% of the sample. The lowest representation was observed in individuals aged 42 years and above, making up only 10.5% of the participants. This age distribution indicates a predominance of young and middle-aged individuals among those affected by binge eating disorder. In terms of gender, women constituted a significant majority, representing 76% of the total sample, while men made up only 24%, suggesting a higher prevalence or reporting of binge eating symptoms among women in this population. Regarding educational attainment, the largest proportion of participants held a bachelor's degree (44.5%), followed by those with a master's or doctoral degree (27.5%). Participants with an associate degree accounted for 16%, and those with a high school diploma or less represented 12% of the sample. Economic status was another factor considered, with the majority (62.3%) identifying as having a moderate economic status. Participants with good economic standing made up 23%, and those reporting a poor economic status constituted 14.8% of the sample. Finally, the marital status distribution showed that single individuals formed the largest group at 53%, followed by married participants at 39.5%, and divorced individuals at 7.5%, indicating that the majority of individuals with binge eating disorder in this study were unmarried.

Table 1

Descriptive Statistics of Research Variables

Variable / Component	Mean	Standard Deviation
Health Anxiety (Total)	79.62	13.45
Unhealthy Eating Behaviors (Total)	45.81	10.27
Binge Eating	15.24	4.31
Food Preoccupation	17.68	3.95
Poor Eating Control	12.89	4.11
Health-Promoting Lifestyle (Total)	123.47	18.83
Physical Activity	18.92	5.14
Healthy Nutrition	21.53	4.96
Health Responsibility	19.27	4.65
Stress Management	20.74	5.07
Positive Interpersonal Relationships	22.15	4.48
Spiritual Growth	20.86	5.22
Alexithymia (Total)	63.38	9.75
Difficulty Identifying Feelings	25.64	5.43
Difficulty Describing Feelings	18.12	4.18
Externally Oriented Thinking	19.62	4.81
Body Image (Total)	72.55	11.92
Appearance Concern	24.41	4.78
Dissatisfaction with Body Parts	26.83	5.06
Negative Evaluation of the Body	21.31	4.22
Body Comparison	20.28	4.61
Preoccupation with Defective Appearance	22.65	5.04
Avoidance of Social Situations	19.49	4.37

The descriptive statistics presented in Table 1 illustrate the central tendency and variability of the main research variables and their components. The mean score for overall health anxiety was relatively high at 79.62 with a standard deviation of 13.45, indicating a considerable degree of variability among participants. In terms of unhealthy eating behaviors, the total mean was 45.81 (SD = 10.27), with the binge eating subscale showing a mean of 15.24, food preoccupation at 17.68, and poor control over eating at 12.89, suggesting noticeable engagement in maladaptive eating patterns. The health-promoting lifestyle score averaged 123.47 (SD = 18.83), with physical activity (M = 18.92), nutrition (M = 21.53), and stress management (M = 20.74) among the most prominent dimensions. The mean score for total alexithymia was 63.38 (SD = 9.75), reflecting difficulties in emotional processing, particularly in identifying feelings (M = 25.64) and describing them (M = 18.12). Finally, the average body image score was 72.55 (SD = 11.92), with notable concerns related to body part dissatisfaction (M = 26.83), appearance concern (M = 24.41), and preoccupation with perceived defects (M = 22.65). These findings collectively demonstrate diverse psychological and behavioral characteristics among individuals with binge eating disorder in this sample.

Table 2

Correlation Between Main Research Variables

Variable	Health Anxiety	Unhealthy Eating Behaviors	Health-Promoting Lifestyle	Alexithymia	Body Image
Health Anxiety	1.00				
Unhealthy Eating Behaviors	0.48*	1.00			
Health-Promoting Lifestyle	-0.36*	-0.40*	1.00		
Alexithymia	0.42*	0.38*	-0.35*	1.00	
Body Image	0.50*	0.46*	-0.30*	0.44*	1.00

The results presented in Table 2 reveal significant correlations among the main variables of the study. Health anxiety showed a positive and statistically significant correlation with unhealthy eating behaviors (r = 0.48, p <

0.01), indicating that higher levels of maladaptive eating patterns are associated with greater anxiety about health. Similarly, a positive correlation was found between health anxiety and alexithymia (r = 0.42, p < 0.01), as well as between health anxiety and body image dissatisfaction (r = 0.50, p < 0.01), suggesting that difficulties in emotional expression and negative perceptions of body image are linked to heightened health-related anxiety. Conversely, health anxiety was negatively correlated with a health-promoting lifestyle (r = -0.36, p < 0.01), indicating that individuals with healthier habits reported lower levels of health anxiety.

Unhealthy eating behaviors were positively correlated with alexithymia (r = 0.38, p < 0.01) and body image dissatisfaction (r = 0.46, p < 0.01), and negatively associated with a health-promoting lifestyle (r = -0.40, p < 0.01), reinforcing the interplay between emotional dysfunction, poor self-image, and maladaptive eating patterns. Likewise, alexithymia was positively correlated with body image issues (r = 0.44, p < 0.01) and negatively with health-promoting lifestyle (r = -0.35, p < 0.01), indicating that emotional unawareness may be linked to both poor lifestyle choices and negative body perception. Overall, the pattern of correlations supports the theoretical model suggesting interconnectedness among emotional regulation, health behavior, self-perception, and anxiety in individuals with binge eating disorder.

Prior to conducting the structural equation modeling, key statistical assumptions were examined and met to ensure the appropriateness of the analysis. First, the assumption of normality was assessed through skewness and kurtosis indices for all observed variables, with skewness values ranging from -0.78 to 0.61 and kurtosis values between -0.91 and 1.14, all within the acceptable range of ±2, indicating univariate normality. Linearity was confirmed through scatterplots that demonstrated linear relationships among the main variables. Multicollinearity was evaluated using the Variance Inflation Factor (VIF), with all VIF values falling between 1.32 and 1.78 and Tolerance values above 0.56, which indicated no significant multicollinearity concerns. Additionally, Mahalanobis distance was used to detect multivariate outliers, with all cases falling within the critical χ^2 threshold (df = 5, p < 0.001), suggesting no influential outliers. Finally, missing data analysis revealed less than 2% missingness per variable, and Little's MCAR test was non-significant (χ^2 = 28.61, df = 30, p = 0.53), indicating that the data were missing completely at random. These results collectively supported the suitability of the data for proceeding with structural modeling.

Table 3

Goodness-of-Fit Indices for the Proposed Structural Model

Fit Index Name	Abbreviation	Value	Acceptable Threshold
Relative Chi-Square	CMIN/DF	2.71	Less than 3
Root Mean Square Error of Approximation	RMSEA	0.073	Less than 0.10
Parsimonious Normed Fit Index	PNFI	0.933	Greater than 0.90
Comparative Fit Index	CFI	0.942	Greater than 0.90
Parsimonious Comparative Fit Index	PCFI	0.988	Greater than 0.90
Incremental Fit Index	IFI	0.940	Greater than 0.90
Goodness-of-Fit Index	GFI	0.922	Greater than 0.90

The results presented in Table 3 indicate that the proposed structural model demonstrated an acceptable and strong overall fit to the data. The relative chi-square index (CMIN/DF) was 2.71, which falls below the recommended upper limit of 3, suggesting a good level of model parsimony relative to the chi-square value. The RMSEA value of 0.073 indicated a reasonable approximation error, well below the threshold of 0.10, and suggests an acceptable fit between the hypothesized model and the observed data. Furthermore, all other comparative and incremental indices, including CFI (0.942), IFI (0.940), GFI (0.922), PNFI (0.933), and PCFI (0.988), exceeded the conventional cutoff value of 0.90, indicating a well-fitting and parsimonious model. These results collectively confirm the structural model's adequacy in representing the relationships among health anxiety, unhealthy eating behaviors, health-promoting lifestyle, alexithymia, and body image in individuals with binge eating disorder.

Table 4

*Direct, Indirect, and Total Effects of Predictor Variables on Health Anxiety*

Predictor Variable	Effect Type	B	β	p	t	Total Effect
Unhealthy Eating Behaviors (DEB)	Direct	0.31	0.23	<0.001	5.62	
	Indirect via BI	0.19	0.14	<0.001	4.83	0.37
Health-Promoting Lifestyle (HPL)	Direct	-0.24	-0.18	0.002	-3.14	
	Indirect via BI	-0.16	-0.12	0.004	-2.91	-0.30
Alexithymia (AI)	Direct	0.40	0.29	<0.001	6.10	
	Indirect via BI	0.23	0.17	<0.001	5.21	0.46

The results in Table 4 reveal that all direct and indirect paths are statistically significant ($p < 0.01$). Unhealthy eating behaviors had a direct effect on health anxiety ($\beta = 0.23$, $t = 5.62$) and also significantly influenced it indirectly through body image ($\beta = 0.14$, $t = 4.83$), resulting in a total effect of 0.37. Health-promoting lifestyle showed a protective effect, with a significant negative direct effect ($\beta = -0.18$, $t = -3.14$) and an additional indirect effect through body image ($\beta = -0.12$, $t = -2.91$), giving a total effect of -0.30. Alexithymia had the strongest overall impact on health anxiety, both directly ($\beta = 0.29$, $t = 6.10$) and indirectly ($\beta = 0.17$, $t = 5.21$), with a combined total effect of 0.46. These results confirm the mediating role of body image and support the hypothesized structural model.

Figure 1

Standardized Parameters of the Structural Model
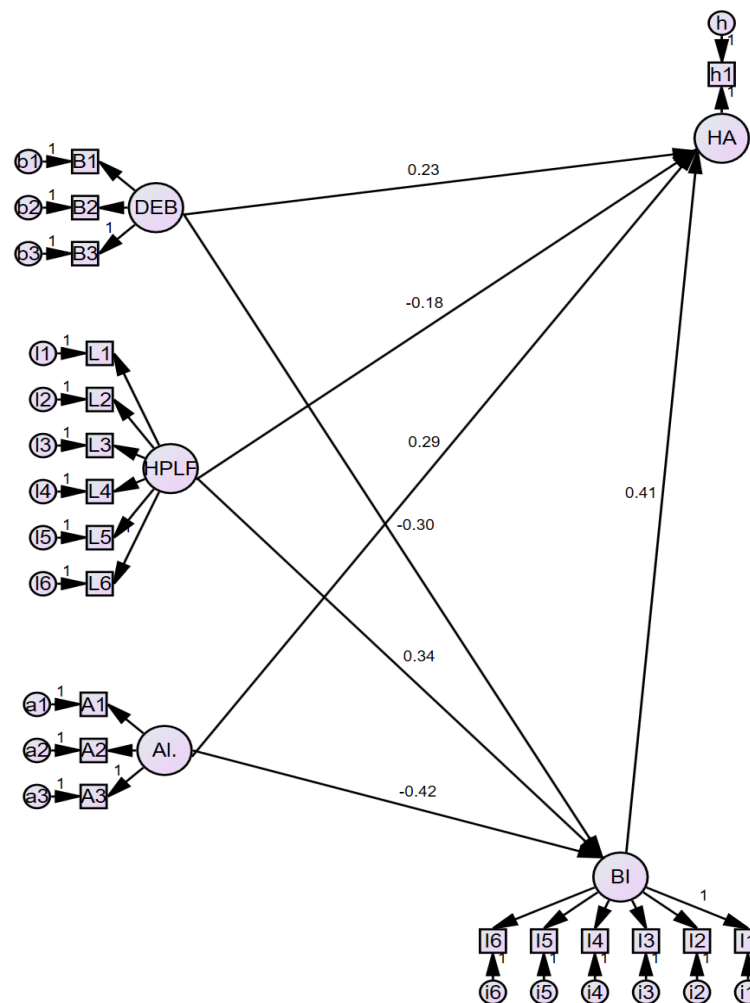
4. Discussion and Conclusion

The present study aimed to investigate a structural model of health anxiety based on the predictive roles of unhealthy eating behaviors, health-promoting lifestyle, and alexithymia, with the mediating role of body image among individuals with binge eating disorder. The results confirmed that all three predictor variables significantly influenced health anxiety, both directly and indirectly through body image. The model demonstrated good fit indices and supported the hypothesis that body image dissatisfaction serves as a significant mediating mechanism in the relationship between these variables and health anxiety.

The findings indicated that unhealthy eating behaviors had a significant direct effect on health anxiety and also exerted a notable indirect influence through body image dissatisfaction. This supports existing literature which demonstrates that maladaptive eating patterns, such as binge eating and food preoccupation, are closely tied to somatic concerns and psychological distress (Levinson & Rodebaugh, 2012). When individuals repeatedly engage in cycles of overeating followed by guilt or shame, they become more sensitive to bodily sensations, often interpreting normal bodily changes as indicators of illness. This interpretation fuels health anxiety, particularly when accompanied by dissatisfaction with physical appearance. Khodabakhsh and Kiani (2015) also found that disordered eating behaviors significantly predicted anxiety levels, highlighting the shared mechanisms of body awareness, emotional dysregulation, and somatic misinterpretation in this population (Khodabakhsh & Kiani, 2015).

The role of a health-promoting lifestyle as a negative predictor of health anxiety was also validated. Participants who reported more engagement in healthy behaviors—such as regular exercise, good nutrition, stress management, and interpersonal support—had lower levels of health anxiety. Additionally, these behaviors indirectly reduced health anxiety by improving body image. This aligns with previous research suggesting that engagement in health-promoting behaviors improves not only physical outcomes but also psychological resilience and body satisfaction (Atadokht et al., 2018; A. Fathi et al., 2020). A healthy lifestyle contributes to better regulation of emotions, increased sense of control, and more accurate interpretation of bodily cues, which collectively decrease the likelihood of catastrophic interpretations associated with health anxiety (Farivar et al.,

2020). Chafjiri et al. (2018) also reported that educational interventions targeting health-promoting behaviors among older adults significantly reduced their levels of anxiety and health-related worry (Chafjiri et al., 2018).

Alexithymia emerged as the strongest predictor of health anxiety in this model. It had both a substantial direct impact and an indirect effect through body image dissatisfaction. Individuals with higher levels of alexithymia, who struggle to recognize and describe their emotions, are more likely to misinterpret somatic sensations, contributing to heightened health concerns. This is consistent with findings from Abadi et al. (2024), who emphasized the link between alexithymia and elevated anxiety sensitivity, particularly in chronic pain populations (Abadi et al., 2024). Similarly, Ogawa et al. (2024) identified alexithymia as a significant predictor of dental anxiety due to the individual's impaired ability to regulate fear responses to ambiguous bodily cues (Ogawa et al., 2024). Del Bianco et al. (2023) also observed that individuals with higher levels of alexithymia exhibited greater dyscontrol in eating behaviors, further reinforcing the connection between emotional unawareness and anxiety-related maladaptive patterns (Del Bianco et al., 2023).

The mediating role of body image in the relationship between all three predictors and health anxiety was supported across the model. Body image dissatisfaction amplified the effects of unhealthy eating behaviors and alexithymia, while reducing the buffering effect of a healthy lifestyle. This suggests that body image plays a central role in shaping how individuals perceive, interpret, and emotionally respond to bodily experiences and health-related cues. Research by Fu et al. (2022) showed that internalized media pressure negatively affected eating behavior through body esteem and social physique anxiety, reinforcing the notion that distorted body image exacerbates psychological vulnerability (Fu et al., 2022). Additionally, Quinto et al. (2022) demonstrated that body dissatisfaction, when combined with alexithymia, significantly worsened anxiety and depressive symptoms in dermatological patients, highlighting the generalizability of this finding beyond eating disorders (Quinto et al., 2022).

Moreover, the positive relationship between alexithymia and body dissatisfaction found in this study reflects the mechanisms proposed by Oussi et al. (2023), who noted that individuals with low emotional awareness may rely more heavily on external appearance as a reference for self-evaluation, leading to chronic dissatisfaction (Oussi et al., 2023). Lyvers et al. (2022) also reported that alexithymia correlates with excessive social comparison and online body

monitoring, both of which may reinforce negative body image and associated anxiety (Lyvers et al., 2022). In contrast, those with greater lifestyle awareness and health responsibility tend to report higher self-esteem and less vulnerability to social physique anxiety (Ayatollah Fathi et al., 2020; Karamian, 2022), which mediates the impact of external appearance on psychological outcomes.

Taken together, the model presented in this study captures a nuanced psychological framework in which emotional processing deficits (alexithymia), behavioral patterns (unhealthy eating), and self-care (lifestyle) interact with cognitive-evaluative factors (body image) to shape health anxiety. The indirect pathways identified indicate that interventions solely focused on surface behaviors like eating control may be insufficient unless body image dissatisfaction and emotional processing are also addressed. These findings underscore the need for integrative clinical strategies targeting emotion regulation, body image, and lifestyle in tandem, especially among those suffering from BED.

Despite the valuable findings, this study has several limitations that warrant consideration. First, the use of self-report questionnaires may introduce social desirability bias and restrict the depth of responses related to sensitive constructs such as body image or alexithymia. Second, the cross-sectional design of the study limits causal inferences. While structural modeling allows for hypothesized directionality, temporal sequencing cannot be confirmed without longitudinal data. Third, the sample consisted exclusively of individuals registered with the Overeaters Anonymous community in a single region, which may limit the generalizability of the results to broader populations, including clinical samples or individuals with subclinical symptoms. Finally, cultural and gender-related factors were not directly examined in this study, although they may play a significant role in the experience and expression of health anxiety, body dissatisfaction, and emotional regulation.

Future research should employ longitudinal and experimental designs to establish the directionality and causality of the relationships identified in this study. Tracking changes in health anxiety and body image over time, particularly before and after intervention, would provide stronger evidence for mediation effects. Researchers should also consider incorporating qualitative methods, such as in-depth interviews, to better understand how individuals with BED subjectively experience the links between eating, emotions, and anxiety. Expanding the demographic diversity of samples, especially across different cultural,

socioeconomic, and gender groups, will also enhance the external validity of findings. Finally, it would be valuable to explore the role of other potential mediators and moderators, such as perfectionism, self-esteem, or social comparison, to capture a more comprehensive psychological profile.

In clinical practice, professionals working with individuals affected by binge eating and health anxiety should adopt an integrative approach that simultaneously targets emotional regulation, body image dissatisfaction, and lifestyle habits. Interventions such as cognitive-behavioral therapy (CBT), dialectical behavior therapy (DBT), or emotion-focused therapy may be particularly effective in addressing alexithymia and helping individuals articulate and manage their emotional experiences. Additionally, body image rehabilitation techniques, including mirror exposure and cognitive restructuring, should be incorporated to reduce the emotional distress linked to physical appearance. Health promotion programs should also be integrated into therapy, focusing on nutrition education, exercise motivation, and stress management. Such a holistic, multidimensional approach will likely yield more sustainable outcomes in reducing health anxiety and enhancing the quality of life for individuals with binge eating disorder.

Authors' Contributions

All authors significantly contributed to this study.

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.

Declaration of Interest

The authors report no conflict of interest.

Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the study and participated in the research with informed consent.

References

Abadi, D. B. N., Badihi, M., Rabiee, Z., & Shokrolahi, M. (2024). Effectiveness of Cognitive Analytic Therapy on Anxiety Sensitivity and Pain Catastrophizing in Patients With Chronic Pain and Alexithymia. *The Journal of Tolooebehdasht*. https://doi.org/10.18502/tbj.v22i6.15212

Abbasi Kamal, R., Sobhe, Afsane. (2022). Comparison of Automatic Thoughts and Alexithymia with Anxiety in People with Hypertension and People without Hypertension in Zanjan. *Journal of Health Promotion Management*, *11*(1), 61-71. http://jhpm.ir/article-1-1298-en.html

Atadokht, A., Rahimi, S., & Valinejad, S. (2018). The Role of Health Promoting Lifestyle and Religious Orientation in Predicting Quality of Life and Death Anxiety in Elders. *Aging Psychology*, *4*(2), 143-154. https://jap.razi.ac.ir/article_1002_95c4fa89589ff102cf5b267 50ae19b54.pdf

Chafjiri, R. T., Shirinkam, F., & Karimi, H. (2018). Investigating the effect of education on health-promoting lifestyle among the elderly of Ramsar in 2017. *Journal of Family Medicine and Primary Care*, *7*(3), 612-617. https://doi.org/10.4103/jfmpc.jfmpc_306_17

Del Bianco, C., Ulivi, M., Liguori, C., Pisani, A., Mercuri, N. B., Placidi, F., & Izzi, F. (2023). Alexithymia, impulsiveness, emotion, and eating dyscontrol: similarities and differences between narcolepsy type 1 and type 2. *Sleep and Biological Rhythms*, *21*(1), 39-50. https://doi.org/10.1007/s41105-022-00414-4

Dong, Z., Zhou, J., Conti, A., Westwood, S. J., Fu, X., Liu, Q., Yuan, Y., Huang, X., Qiu, C., Zhang, X., & Tang, W. (2023). Association between alexithymia and non-suicidal self-injury in psychiatric patients: the mediating role of self-esteem and the moderating role of emotional intelligence. *Journal of psychiatric research*, *162*, 57-64. https://doi.org/10.1016/j.jpsychires.2023.04.006

Farivar, M., Azizi Aram, S., & Basharpour, S. (2020). The Role of Health-Promoting Behaviors and Health Beliefs in Predicting COVID-19 Anxiety Among Nurses. *Quarterly Journal of Nursing Management*, *9*(4), 10-11. http://ijnv.ir/browse.php?a_id=777&sid=1&slc_lang=en&ftx t=0

Fathi, A., Sadeghi, S., Maleki Rad, A. A., Rostami, H., & Abdolmohammadi, K. (2020). Effect of Health-promoting Lifestyle and Psychological Well-being on Anxiety Induced by Coronavirus Disease 2019 in Non-medical Students [Original Atricle]. *Journal of Arak University of Medical Sciences*, *23*(5), 698-709. https://doi.org/10.32598/jams.23.Cov.1889.2

Fathi, A., Sadeghi, S., Maleki Rad, A. A., Sharifi Rahnmo, S., Rostami, H., & Abdolmohammadi, K. (2020). The Role of Cyberspace Use on Lifestyle Promoting Health and Coronary Anxiety in Young People. *ijpcp*, *26*(3), 332-347. https://doi.org/10.32598/ijpcp.26.3415.1

Fu, T., Wang, J., Xu, S., Yu, J., & Sun, G. (2022). Media Internalized Pressure and Restrained Eating Behavior in College Students: The Multiple Mediating Effects of Body Esteem and Social Physique Anxiety. *Frontiers in psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.887124

Habibi Asgarabad, M., Salehi Yegaei, P., Jafari, F., Azami-Aghdash, S., & Lumley, M. A. (2023). The relationship of alexithymia to pain and other symptoms in fibromyalgia: A systematic review and meta-analysis. *European Journal of Pain*, *27*(3), 321-337. https://doi.org/10.1002/ejp.2064

Karamian, H. (2022). *Investigating the Mediating Role of Health-Promoting Behaviors in the Relationship Between Coping Strategies and Health Anxiety During the COVID-19 Pandemic*

Khodabakhsh, M. R., & Kiani, F. (2015). The role of anxiety and alexithymia in predicting disordered eating behaviors among students:implication for health promotion [Applicable]. *Shenakht Journal of Psychology and Psychiatry*, *1*(3), 63-73. http://shenakht.muk.ac.ir/article-1-88-en.html

Levinson, C. A., & Rodebaugh, T. L. (2012). Social Anxiety and Eating Disorder Comorbidity: The Role of Negative Social Evaluation Fears. *Eating behaviors*, *13*(1), 27-35. https://doi.org/10.1016/j.eatbeh.2011.11.006

Lyvers, M., Salviani, A., Costan, S., & Thorberg, F. A. (2022). Alexithymia, Narcissism and Social Anxiety in Relation to Social Media and Internet Addiction Symptoms. *International journal of psychology*, *57*(5), 606-612. https://doi.org/10.1002/ijop.12840

Nishitani, N., Sakakibara, H., & Akiyama, I. (2009). Eating behavior related to obesity and job stress in male Japanese workers. *Nutrition*, *25*(1), 45-50. https://doi.org/10.1016/j.nut.2008.07.008

Ogawa, M., Saito, A., Karukivi, M., & Lahti, S. (2024). Associations of Sensory Sensitivity, Pain Catastrophizing, and Alexithymia With Dental Anxiety. *European Journal of Oral Sciences*, *132*(2). https://doi.org/10.1111/eos.12973

Oussi, A., Hamid, K., & Bouvet, C. (2023). Managing emotions in panic disorder: A systematic review of studies related to emotional intelligence, alexithymia, emotion regulation, and coping. *Journal of Behavior Therapy and Experimental Psychiatry*, *79*, 101835. https://doi.org/10.1016/j.jbtep.2023.101835

Quinto, R. M., De Vincenzo, F., Graceffa, D., Bonifati, C., Innamorati, M., & Iani, L. (2022). The Relationship between Alexithymia and Mental Health Is Fully Mediated by Anxiety and Depression in Patients with Psoriasis. *International journal of environmental research and public health*, *19*(6), 3649. https://doi.org/10.3390/ijerph19063649

Terzioğlu, M. A., & Uğurlu, T. T. (2023). Social Media Addiction in Medical Faculty Students; The Relationship With Dissociation, Social Anxiety, and Alexithymia. *Pamukkale Medical Journal*. https://doi.org/10.31362/patd.1321281

Zarei Davijani, A., Dabiri, S., Jabbari Moghadam, S., Fakhri, P., & Molaraza, Z. (2022). Prediction of Social Anxiety Based on Childhood Trauma with the Mediating Role of Alexithymia in Adolescents. 2nd National Conference on Child and Adolescent Clinical Psychology, Ardabil.