Brazilian Journal of Psychiatry
bjp
Revista Brasileira de Psiquiatria

Braz J Psychiatry. 2026;48:e20254164
doi:10.47626/1516-4446-2025-4164
Brazilian Psychiatric Association

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REVIEW ARTICLE

Eating behaviors assessed by the Three-Factor Eating Questionnaire and mental health in adults: a systematic review

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Objective: Since its development by Stunkard & Messik in 1985, the Three-Factor Eating Questionnaire has been used to study eating behaviors, producing scientific evidence on their association with body weight regulation, eating disorders, and mental health. The present systematic review aimed to provide a narrative synthesis of the literature regarding the relationship between cognitive restraint, uncontrolled eating, emotional eating, and mental health in adults.
Methods: Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, five databases were searched for articles published until March 18, 2023. Eligible research investigated eating behaviors, measured by revised versions of Three-Factor Eating Questionnaire, and mental health, measured by psychometric instruments.
Results: A narrative synthesis of 40 cross-sectional articles suggested that anxiety, stress, food cravings, food addiction, and body dissatisfaction are highly associated with uncontrolled and emotional eating. Depression, negative affect, emotion dysregulation, and emotion avoidance were more frequently associated with emotional eating. Mindful and intuitive eating was negatively associated with uncontrolled and, especially, emotional eating. Cognitive restraint was inversely associated with depression but positively associated with disordered eating attitudes and body dissatisfaction.
Conclusion: This review supports the importance of emotion regulation skills in interventions for maladaptive eating behaviors.
Systematic review registration: PROSPERO CRD42023408053

Keywords: Eating behavior; disordered eating; eating disorder; mental health; emotions; body image

Introduction

The Three-Factor Eating Questionnaire (TFEQ), developed by Stunkard & Messik in 1985, is widely used to assess eating behavior related to weight regulation, obesity, and eating disorders.[1,2] Its revised versions, the TFEQ-R18 and TFEQ-R21, assess three domains: cognitive restraint, uncontrolled eating, and emotional eating.[3,4] Cognitive restraint refers to conscious effort to restrict food intake for weight control.[2] Uncontrolled eating reflects a tendency to lose control over eating in response to hunger or external food cues, such as highly palatable foods or social influences.[2] Emotional eating is characterized by eating in response to negative emotions or stress.[5]

Although in everyone experiences these three eating patterns to some degree, their exacerbation contributes to maladaptive behaviors or clinical issues. Cognitive restraint has been linked to disordered eating and eating disorders, and sometimes to weight gain.[6,7] Uncontrolled eating correlates with binge-eating severity, eating disorders, poor psychological health, higher body mass index (BMI), and obesity.[2,8] Emotional eating is strongly associated with binge-eating, persistent of negative emotions, shame, depressive symptoms, greater energy consumption, unhealthy food choices, less awareness of hunger and satiety cues, and higher BMI.[9-15]

Moreover, emotional eating is linked to depression and anxiety, overweight, obesity, and unhealthy eating patterns.[16] Symptoms of depression and anxiety have been associated with binge-eating disorder, bulimia nervosa, anorexia nervosa, and risk factors for eating disorders, such as body dissatisfaction.[17] Negative body image is also linked to eating disorder symptoms, and poorer mental health worldwide.[18]

Despite the well-documented consequences of these eating behaviors (cognitive restraint, uncontrolled eating,

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Submitted Feb 05 2025, accepted Jul 03 2025.

How to cite this article: Yavorivski A, Walker MS, Andrade R, da Silva TL, Feoli AMP. Eating behaviors assessed by the Three-Factor Eating Questionnaire and mental health in adults: a systematic review. Braz J Psychiatry. 2025;47:e20254164. Epub 2025 Aug 30. http://doi.org/10.47626/1516-4446-2025-4164

and emotional eating), which include binge-eating, weight gain, and eating disorder symptoms, their association with psychological outcomes in adults (with or without eating disorders) has not been systematically analyzed or described. Such research is essential for deepening our understanding of the psychological impact of maladaptive eating behaviors and highlights the need for targeted interventions to promote healthier eating patterns and overall well-being.

We conducted a systematic review of the literature to answer the question ''In adults, what is the relationship between the eating behaviors assessed by TFEQ (cognitive restriction, uncontrolled eating, and emotional eating) and mental health?''

Methods

This systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[19] The study protocol (CRD42023408053) was registered in PROSPERO (The International Prospective Register of Systematic Reviews) and was updated on May 22, 2023 due to the changes in the eligibility criteria, which limited psychological variables to the research strategy only.

Search strategy

The search strategy was based on the population, exposition, comparison, and outcome model. On March 16, 2023, searches were conducted in five electronic databases: EMBASE, PubMed, Web of Science, PsycINFO, and LILACS. No filters or time limits were selected except for the 'summaries' filter in PsycINFO. An example of the search strategy is shown in Table 1, and all strategies for each database are shown in Supplementary Table S1.

Eligibility criteria

Observational cross-sectional studies – limited to this design for comparison purposes – in English, Spanish, or Portuguese that met the following criteria were considered eligible for this review: 1) participants aged 18 and older; 2) eating behavior (cognitive restriction, uncontrolled eating, and/or emotional eating) measured by the TFEQ-R18, TFEQ-R21, or translated and culturally adapted versions (the first version of this questionnaire was not included due to the differences in domains); and 3) analysis of the association between eating behavior and quantitative measurement of the psychological outcomes emotions, affect, depression, anxiety, stress, body image, body acceptance, body satisfaction, eating disorders, disordered eating, and/or eating behavior.[1] Studies were excluded for the following reasons: 1) the sample including pregnant women, children, or adolescents; 2) the first version of TFEQ was applied; 3) different study design (i.e., review, systematic review, meta-analysis, letter to the editor, conference abstract, cohort, case-control, case series, non-randomized clinical trial [quasi-experimental], or randomized clinical trial); and 4) full text unavailable.[1,3,4]

Search process

Two independent reviewers, AY and MSW, selected the articles using Rayyan software through the following steps: de-duplication, title and abstract screening, and confirmation of eligibility by reading the full article. Disagreements were resolved by consensus.[20]

Data extraction

The following data were extracted by AY, in consensus with MSW, and compiled using a form: authors, year of publication, country, participant characteristics; TFEQ version applied; instruments used to measure psychological outcomes; and results (reported associations between variables). The results were compatible with the outcomes in measures (questionnaires, scales), times (cross-sectional), and analyses (Pearson's and Spearman's correlations, odds ratio, linear regression, mediation, and moderation analyses). Only results related to the present review's research question were collected. When the statistics were not reported, the authors were contacted. If there was no response, the results were annotated as lacking statistics. Findings with $p < 0.05$ were considered statistically significant. Correlation values of 0.10 were considered weak, 0.30 were considered moderate, and > 0.50 were considered strong.[21]

Quality assessment

The selected articles' methodological quality was analyzed by AY, in consensus with MSW, using the Joanna Briggs Institute tool, a critical appraisal checklist for analytical cross-sectional studies.[22] It consists of eight

Table 1 Search string used to systematically search electronic databases for relevant articles

Search string	Databases searched
(('Three-Factor-Eating-Questionnaire'/exp OR 'Three Factor Eating Questionnaire' OR '3-Factor Eating Questionnaire' OR 'Three Factors Eating Questionnaire' OR 'Three Factor Eating Questionnaire Revised' OR 3FEQ OR TFEQ OR TFEQ-R18 OR TFEQ-R21) OR (('cognitive restraint'/exp OR 'cognitive restraint') AND ('uncontrolled eating'/exp OR 'uncontrolled eating') AND ('emotional eating'/exp OR 'emotional eating'))) AND (psych* OR 'emotion'/exp OR 'emotion' OR 'affect'/exp OR affect OR 'depression'/exp OR depression OR 'anxiety'/exp OR anxiety OR 'mental stress'/exp OR stress OR 'mental stress' OR 'body image'/exp OR 'body image' OR 'body acceptance' OR 'body satisfaction'/exp OR 'body satisfaction' OR 'eating disorder'/exp OR 'eating disorder' OR 'disordered eating' OR 'eating behaviour'))	EMBASE, PubMed, Web of Science, PsycINFO, and LILACS

questions on the following domains: inclusion criteria, sample description, the validity and reliability of exposure and condition measures, identification of confounding factors, analyses adjusted for confounders, the validity and reliability of the outcome analysis, and the adequacy of the statistical analysis. The four answer options are: yes, no, uncertain, or not applicable. "Yes" responses for $>$ 5 items, 3-4 items, and 0-2 items are considered high, moderate, and low methodological quality, respectively.[23]

Data synthesis

AY performed a narrative synthesis to summarize the findings on the association between eating behaviors and psychological outcomes. We opted for a narrative synthesis instead of a meta-analysis due to the heterogeneity of data from multiple measures of psychological variables.

Quality assessment

An independent evaluator applied A MeaSurement Tool to Assess systematic Reviews (AMSTAR) 2, a 16-item checklist that evaluates the methodological quality of systematic reviews across key domains, including protocol registration, the comprehensiveness of the literature search, the study selection and data extraction process, the risk of bias assessment, funding sources, the appropriateness of statistical methods, the assessment of heterogeneity and publication bias, and the interpretation of the results considering study limitations and overall evidence quality. Response options include "yes," "partial yes," or "no." Reviews are considered adequate when all checklist items have been addressed.[24]

Ethics statement

This article does not contain any studies or experiments conducted by any of the authors.

Results

The search resulted in a total of 2,578 studies, of which 40 were selected for this review. The selection flow diagram is shown in Figure 1.

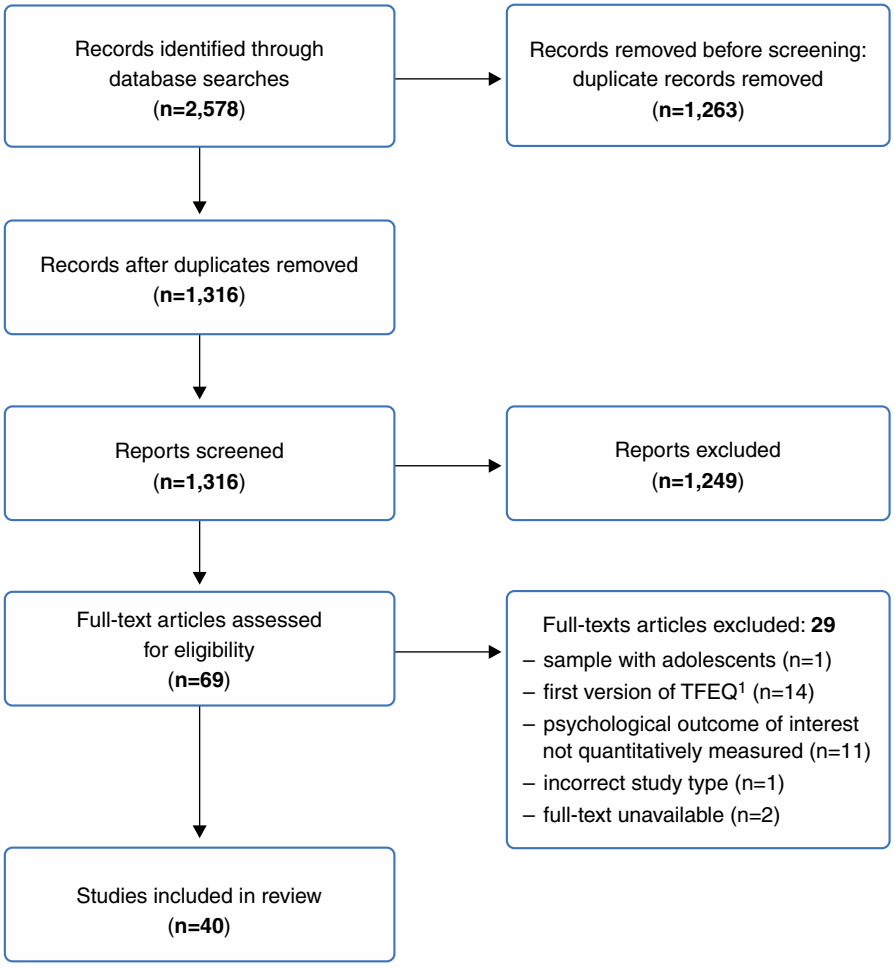


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 flow diagram illustrating the article selection process. TFEQ = Three-Factor Eating Questionnaire.

Characteristics of included articles

Forty cross-sectional studies published between 2010 and 2023 were included, most within the last 4 years (28 articles).The sample sizes ranged from 34 to 6,272 participants, totaling 30,189 participants across all articles. Most of the articles were either from the United States (7), Poland (6), or Brazil (5). The mean age of the participants ranged from 19.6 to 54.8 years. The proportion of female participants ranged from 30.8% to 100%.

Only nine articles included information on race/ethnicity in their sample description. Most studies involved the general population (29 articles), five included health students or professionals, eight included a clinical population (being treated for eating problems, medical conditions, or psychiatric conditions), and three used mixed populations. The most applied version of the TFEQ was the TFEQ-R18 (29 articles).[3] See Supplementary Table S2 for sample characteristics, instruments used to assess psychological variables, and the main findings.

The associations were categorized as anxiety, depression, stress, and emotional functioning (26 articles), food addiction, food cravings, eating disorders, mindful and intuitive eating (20 articles), and body image (five articles).

Anxiety, depression, stress, and emotional functioning

The relationship between anxiety, depression, stress, and other aspects of emotional functioning and eating behaviors was examined in 26 studies. Two studies found small or medium positive correlations with anxiety and cognitive restraint.[25,26] Positive associations between anxiety and uncontrolled eating and emotional eating were more frequent and showed higher correlations.[25-30]

Weak and moderate negative correlations were found between depression and cognitive restraint, and participants with greater depressive symptoms had lower levels of cognitive restraint.[25,27,31] Only one study found a moderate positive correlation between depression and cognitive restraint.[26] Moderate positive correlations were found between depression and uncontrolled eating in two studies.[26,27] Participants with greater depressive symptoms also had higher levels of uncontrolled eating.[31,32] The most related correlate of depression was emotional eating, with moderate correlations and higher levels of depression predicting higher levels of emotional eating.[15,26,27,30-33] A cluster analysis of a clinical sample found a higher prevalence depression symptoms in clusters with more uncontrolled and emotional eating.[34]

One study found a weak positive correlation between stress and uncontrolled eating and a negative correlation with emotional eating.[35] Other studies reported small to moderate correlations between stress and uncontrolled and emotional eating, and that higher levels of stress were associated with higher levels of uncontrolled and emotional eating.[26,36-40] In a sample of women from treatment centers for obesity and eating disorders, there was a strong correlation between stress and emotional eating.[41] In regard to cognitive restraint, only one study found a weak positive correlation with stress.[26]

Some studies examined emotions and emotional experiences, like affect, emotion regulation, mindfulness, and self-compassion. Negative affectivity mediated the relationship between stress management and uncontrolled and emotional eating.[42] Emotional dysregulation was highly correlated with emotional eating in two studies.[41,43] Psychological distress and coping styles influenced variance in emotional eating, with avoidant coping being the only significant individual coping predictor of emotional eating.[44] There was a strong positive correlation between avoidance of internal experiences and emotional eating, whereas there were strong and moderate negative correlations between emotional eating and self-compassion and mindful state, respectively.[43] Likewise, higher levels of acting with awareness and observation predicted lower levels of emotional eating in another study.[30] There were inverse correlations between higher cognitive restraint and lower emotional well-being, and no relationship was observed between loneliness and eating behaviors.[45,46]

Food cravings, food addiction, eating disorders, and mindful and intuitive eating

There were weak and moderate positive correlations between food cravings and cognitive restraint, and strong positive correlations between food cravings and uncontrolled and emotional eating.[47-49] Food addiction studies reported a moderate correlation between food addiction and cognitive restraint and the highest cognitive restraint level in individuals with mild food addiction compared to no, moderate, or severe food addiction, and higher uncontrolled and emotional eating in individuals with more severe food addiction.[50,51]

Six studies investigated the relationship between eating behaviors and eating disorder symptomatology. Restrictive eaters had higher emotional eating and disinhibited eating than non-restrictive eaters.[52] Cognitive restraint and uncontrolled eating were predictors of symptomatic eating attitudes in a sample of nutrition and dietetics students.[53] In a sample of vegan, vegetarian, and omnivorous participants, predictors of "healthy" orthorexia included higher cognitive restraint and lower uncontrolled eating, while for orthorexia nervosa, the predictors were greater cognitive restraint and greater uncontrolled eating.[54] Emotional eaters had a 6.5 times higher risk of night eating syndrome than those without emotional eating.[55] There was a weak negative correlation between emotional eating (measured with the Emotional Eating Questionnaire) and cognitive restraint, and a strong correlation between emotional eating (measured with Emotional Eating Questionnaire) and uncontrolled eating.[56] Uncontrolled eating was strongly correlated with binge-eating symptoms, controlling for BMI, and, in a multiple regression model that explained 57% of the variance in binge-eating symptoms, emotional eating and uncontrolled eating, but not cognitive restraint, independently predicted binge-eating symptoms.[47]

Regarding adaptive eating behaviors, mindful eating was a moderator between: (1) body dissatisfaction and restrictive eating in overweight or obese individuals,

(2) negative emotions and restrictive, emotional, and uncontrolled eating, and (3) emotional dysregulation and restrictive and emotional eating, but not uncontrolled eating.[57,58] Intuitive eating was associated with a 74% lower risk of uncontrolled eating and 89% lower risk of emotional eating. All intuitive eating subscales showed inverse associations with maladaptive eating behaviors, except for unconditional permission to eat.[59] Cognitive restraint risk was inversely associated with unconditional permission to eat and was positively associated with body-food choice congruence; there was a strong negative correlation between unconditional permission to eat and cognitive restriction and a moderate correlation between body-food choice congruence and cognitive restraint.[59,60] There was a strong negative correlation between eating for physical rather than emotional reasons and emotional eating, and a moderate negative correlation between the former and uncontrolled eating.[60] There was a moderate negative correlation between reliance on hunger and satiety cues and emotional eating.[60]

Body image

There was a moderate correlation between cognitive restraint and body dissatisfaction and body dissatisfaction and body image inflexibility had a mediation effect in the relationship between BMI and cognitive restraint.[61,62] There was a moderate correlation between uncontrolled eating and body dissatisfaction, which predicted body dissatisfaction.[57,61] Emotional eating predicted body dissatisfaction in overweight or obese individuals, but not in those with normal weight; there was a moderate correlation between emotional eating and avoidance of social situations related to food and body exposure in overweight or obese individuals, but a weak correlation in individuals with normal weight. There was a moderate correlation between emotional eating and body dissatisfaction.[49,58,61] In a multicultural study, there was a weak negative correlation between emotional eating and body satisfaction, and emotional eating was associated with lower body satisfaction in all countries.[63]

A summary of the results is available in Box 1.

Study quality

All studies were assessed for quality and met the cut-off of 4 or more criteria (moderate or high methodological quality).[23] The summary score for each study is shown in Supplementary Table S2, and a detailed assessment is shown in Supplementary Table S3. Sixteen studies (40%) did not meet the first criterion of clearly defined sample inclusion criteria, and 11 studies (27.5%) did not meet the criterion of describing the participants and setting in detail. Twenty-one studies (52.5%) did not meet the criterion of identifying confounding factors and reporting strategies for dealing with confounding factors, representing the weakest level of methodological quality among the studies in this review. All studies met the following criteria: measuring exposures and outcomes in valid and reliable ways, using objective, standard criteria to measure the condition, and appropriate statistical analysis.

Box 1 Summary of the results of the included studies

- Anxiety, depression, and stress were strongly associated with emotional and uncontrolled eating
- Emotional dysregulation and avoidance of emotions were strongly associated with emotional eating
- Associations between cognitive restraint and psychological outcomes were weaker and less frequent
- Self-compassion and mindfulness were less associated with emotional eating
- All maladaptive eating behaviors were associated with body dissatisfaction

Discussion

This systematic review analyzed the relationship between cognitive restraint, uncontrolled eating, and emotional eating and emotions, affect, depression, anxiety, stress, body image, body acceptance, body satisfaction, eating disorders, disordered eating, and eating behavior in adults. The clinical implications of dysregulated eating styles, particularly uncontrolled and emotional eating, extend beyond mental health outcomes and have a substantial health impact. Uncontrolled eating has been consistently associated with higher BMI and obesity and is a predictive of poorer weight loss maintenance. It has also been implicated in the exacerbation of eating disorder symptomatology, especially in individuals with binge eating patterns. Understanding these associations is crucial, since such eating behaviors have been linked to increased risk of weight gain, eating disorders, and compromised mental health[2,6-8,9-16]

In relation to mental health, the included studies found that anxiety, depression, and stress are strongly related to emotional eating and uncontrolled eating. Additionally, lower levels of cognitive restraint have been observed in cases of depression, depending on the clinical presentation. This is because depression can involve reduced appetite and anhedonia or increased food intake and weight gain. Similarly, emotional dysregulation and avoidance of emotions was highly associated with emotional eating. Similar associations were reported in a systematic review on mental health and emotional eating during the COVID-19 pandemic, in which the risk factors for emotional eating were depression, anxiety, relationship quality, quality of life, and alexithymia, while binge-eating was associated with higher levels of stress.[64]

Dietary restriction may be a cause of emotional eating, since stress or negative emotions can undermine self-control and lead to disinhibition regarding self-imposed restrictions in chronic dieters. [5] Consequently, dieting is considered a risk factor for emotional eating. Although poor emotional regulation may predispose individuals to emotional eating during dieting attempts, those with stronger emotional regulation may not experience this response. In the present review, the association between cognitive restraint and emotional eating was mixed. However, not all emotional eating occurs under restriction. Thus, other possible causes have been described

and were more strongly corroborated with it in our review: depression, emotion dysregulation, and stress.[5]

Emotion regulation is defined as "the set of automatic and controlled processes involved in the initiation, maintenance, and modification of the occurrence, intensity, and duration of emotions."[65] Emotion regulation strategies can be divided into adaptive and maladaptive, and research suggests that dysfunctional eating behaviors may function as maladaptive strategies for regulating emotional states of distress.[65] Emotion regulation skills, such as awareness, clarity, and acceptance of emotions, reappraisal, and problem-solving, have been negatively associated with disordered eating and eating pathology.[65] Otherwise, maladaptive emotion regulation strategies, like rumination and the avoidance and suppression of emotions, were positively associated with disordered eating and overall eating pathology.[65]

The association between dysfunctional eating behaviors and stress may be explained by inversion of the hypothalamic-pituitary-adrenal axis, where instead of a hyperactivation of the stress response and the typical symptom of loss of appetite, there is hypoactivation and an increase in appetite.[5] Stress can inhibit cognitive emotion regulation, rendering individuals more susceptible to emotional processes that can trigger unhealthy eating.[64] Additionally, cortisol stimulates eating by decreasing brain sensitivity to leptin, regulating neuropeptide Y stimulation and reinforcing pathways in the reward system.[66]

In this review, self-compassion and mindfulness were less associated with emotional eating, indicating a possible protective role. This is in line with a meta-analysis of 74 different samples, in which mindfulness was negatively associated with binge-eating, emotional/external eating, and body dissatisfaction, as well as acting with awareness and a nonjudgmental attidude.[67] The authors explained that mindfulness contributes to emotion regulation through decreased emotion avoidance (focusing on the present moment instead of ruminating) and increased interception.[67]

Studies analyzing food craving and food addiction found a greater association with emotional eating and uncontrolled eating than with cognitive restraint, demonstrating a partial intersection between these behaviors. However, there were divergences, especially regarding the motivation. In binge-eating, food eases mental tension, whereas in food addiction, food serves a hedonistic purpose, indicating a possible explanation for the weak association with cognitive restraint.[68]

When associated with uncontrolled eating, cognitive restraint indicated a greater risk of orthorexia nervosa and disordered eating.[53,54] Emotional eating and uncontrolled eating were also associated with binge-eating, as expected, given that negative affect has been described as a trigger for binge-eating. Regarding this, the most innovative studies found mindful eating to be a possible moderator of the relationship between emotions and emotional eating, while intuitive eating was found to be protective against emotional and uncontrolled eating. Intuitive eating interventions have been found to increase the ability to eat for physical rather than emotional reasons, to decrease disordered eating and binge-eating, and to increase adaptive eating behaviors.[69]

Few studies have evaluated the relationship between body image and eating behavior. Even so, it was possible to observe how the three eating behaviors assessed in the TFEQ were associated with body dissatisfaction, especially emotional eating and uncontrolled eating. A counterpoint to body dissatisfaction is the concept of body appreciation, which can be defined as "accepting, holding favorable attitudes toward, and respecting the body, while also rejecting media-promoted appearance ideals as the only form of beauty."[70] In a meta-analysis of 240 studies, body appreciation was negatively associated with eating pathologies, depressive symptoms, and general distress.[71]

Factors such as acceptance, mindfulness, awareness of emotions and body sensations, self-compassion, and focus on well-being have been highlighted as important factors in improved eating behaviors in populations with eating problems. These aspects are treated using third-wave therapies, which invest in experiential processes in addition to cognition. As previously discussed, if emotional eating and uncontrolled eating occur in contexts of anxiety, depression, stress, emotional dysregulation, and body dissatisfaction, learning ways to get in touch with these emotions and regulate them without using food is necessary, since suppressing and trying to control these thoughts and feelings often leads to maladaptive behaviors. In a meta-analysis of 27 articles, third-wave interventions, such as dialectical behavior therapy, acceptance and commitment therapy, schema therapy, mindfulness-based interventions, and compassion-focused therapy led to significant improvement in eating disorder symptoms,[72] which shows that such therapies could help treat maladaptive eating behaviors that are associated with poorer mental health in adults.

Regarding the methodological quality of the included studies, the least met risk of bias criterion was sample description, which lacked important information, such as inclusion and exclusion criteria. The main statistical deficit was identifying and correcting for confounding factors, such as mental disorders, eating disorders, psychiatric medication use, sex, etc. Some studies did not include information on race/ethnicity or gender identity, which limits extrapolation of the results and their representativeness.

One study limitation was our very broad research question, which resulted in many different results and topics to discuss. More specific outcomes could have facilitated comprehension of the results. The studies in this review used different methods to assess mental health and different methods of statistical analysis to determine the association between eating behaviors and psychological variables, which limited comparison between studies, making only a qualitative analysis possible. The other limitation is the inclusion of only cross-sectional studies, which cannot indicate cause and effect. Finally, we used only the TFEQ as a measure of eating behavior, even though several other instruments exist. We did this to specify the studied behaviors, but it does not cover all maladaptive eating behaviors, such as external eating behavior, for example.

In addition to assessing the methodological quality of the included studies, the review's quality was assessed by an independent reviewer (TLS) through the AMSTAR 2 checklist.[24] As shown in Supplementary Table S4, this review fully met 12 of the 16 criteria, partially meeting criterion four (using a comprehensive literature search strategy, which was not fully met because reference lists/bibliographies of included studies or gray literature were not searched). However, it did not meet criterion seven (providing a list of excluded studies and justifying the exclusions) or criterion 10 (reporting on funding sources, because we did not find this point applicable to observational studies). Furthermore, items 11, 12, and 15 which pertain to meta-analysis, did not apply. The complete results are shown in Supplementary Table S4.

The present study helped further our understanding of the relationship between maladaptive eating behaviors and various aspects of mental health, including psychological symptoms, eating behavior, and body image, in addition to identifying potential therapeutic goals. It corroborates the growing body of evidence on the importance of developing emotion regulation skills in interventions for eating pathology. Third-wave therapies and approaches, such as intuitive eating and mindful eating, which may alleviate symptoms of anxiety, depression, stress, emotional dysregulation, food addiction, food craving, binge-eating, and disordered eating, may also lead to improvement in cognitive restraint, uncontrolled eating, and emotional eating. Discovering the most effective therapeutic strategies for these goals and their mechanisms in diverse and better-described samples, in addition to statistical analyses corrected for confounding factors, is needed in future research.

Acknowledgements

This study was supported by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) – Financing Code 001, although it was not otherwise involved. The authors would like to thank librarian Ana Paula Medeiros Magnus for consulting in the search strategy.

Disclosure

The authors report no conflicts of interest.

Data availability statement

The data collection forms and data extracted from the included articles can be provided upon request.

Author contributions

AY: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing.
MSW: Data Curation, Formal Analysis, Methodology.
RA: Writing – original draft, Writing – review & editing.
TLS: Validation, Writing – review & editing.
AMPF: Conceptualization, Methodology, Project administration, Supervision, Writing – review & editing.
All authors have read and approved of the final version to be published.

Handling Editor: Thiago Fidalgo

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