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Review

Effects of mindfulness and mindful eating on food intake and appetite: a systematic review and meta-analysis

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ABSTRACT

Mindfulness, mindful eating and intuitive eating practices are associated with healthier eating and lower body weight. However, experimental research in this area has shown mixed effects on food intake and theoretical accounts are underdeveloped. This systematic review and meta-analysis aimed to examine the effect of mindfulness, mindful eating and intuitive eating interventions on food intake and appetite (hunger and fullness) in adults and children and compare effects across different subgroups to investigate potential mechanisms of action. Five electronic databases (PsycINFO, MEDLINE, EMBASE, Web of Science and Scopus) were searched for studies that experimentally manipulated mindfulness and/or mindful eating and/or intuitive eating, included a non-mindfulness control group and measured food intake (kcal or grams or percentage consumed or number of pieces consumed) and/or appetite (using visual analogue scales). Forty-one articles assessing mindfulness and mindful eating interventions were included (no relevant intuitive eating interventions were identified). Random-effects meta-analyses showed that mindfulness/mindful eating reduced food intake ($n = 46$ studies, SMD = -0.24, 95% CI [−0.35, −0.12], $p < 0.001$) but had no statistically significant effect on appetite ($n = 11$ studies). There were no significant subgroup differences observed between studies with different settings, interventions or food intake measures. However, effect sizes were substantially larger in laboratory-based studies. Overall, findings indicate that mindfulness and mindful eating reliably reduce food intake in controlled settings, but currently there is no evidence they influence appetite. The review underscores the need for higher quality and more ecologically valid studies using sensitive, real-world measures of appetite and food intake, and further work to clarify the mechanisms of action underpinning the effects of mindfulness and mindful eating.

1. Introduction

The aim of this review is to explore the effects of mindfulness, mindful eating, and intuitive eating on food intake and appetite. To provide context, we first define these key constructs. Mindfulness is a multi-faceted construct commonly described by three core features: present moment awareness (intentionally focusing on current bodily sensations, thoughts, and emotions), acceptance (approaching experiences with non-judgment, non-reactivity, and openness) and decentering (viewing thoughts and feelings as temporary and distinct from oneself) (Tapper, 2022). These processes are interrelated, with present moment awareness naturally leading to acceptance and decentering through repeated practice (Bishop et al., 2004; Brown & Ryan, 2003; Shapiro et al., 2006). 'Mindful eating' refers to the application of mindfulness to eating-related thoughts, emotions, bodily sensations and behaviors (Tapper, 2022). However, there is no single agreed definition, and both measurement tools and interventions vary in the constructs and practices they include (Mantzios, 2023; Tapper, 2022). 'Intuitive eating' is an approach to eating with four core features: 1) unconditional permission to eat, 2) eating for physical rather than emotional reasons,

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3) relying on internal hunger and satiety cues to determine when and how much to eat, and 4) honoring one's health, or practicing 'gentle nutrition' (Tylka, 2006). Arguably there is considerable overlap between mindful eating and intuitive eating (Warren et al., 2017), particularly in their shared focus on internal bodily awareness.

Multiple reviews have assessed studies examining the effects of extended or multi-component mindful or intuitive eating based interventions on longer term outcomes such as body weight, binge eating, emotional eating, development of eating disorders, eating behavior, stress, impulsive eating, physical activity and/or other biopsychosocial outcomes (Carriere et al., 2018; Carrière et al., 2022; Mercado et al., 2021; Dunn et al., 2018; Fuentes Artiles et al., 2019; Godsey, 2013; Katterman et al., 2014; Lyzwinski et al., 2018a, 2018b; Mantzios & Wilson, 2015; Omiwole et al., 2019; O'Reilly et al., 2014; Rogers et al., 2017; Ruffault et al., 2017; Sosa-Cordobés et al., 2023; Tapper, 2017; Turgon et al., 2019; Warren et al., 2017; Zhang et al., 2021). However, these reviews have reported inconsistent findings. Some have found that mindfulness, mindful eating and/or intuitive eating can aid weight loss (Carriere et al., 2018; Daniela Mercado et al., 2021; Dunn et al., 2018; Godsey, 2013; Lyzwinski et al., 2018b; Mantzios & Wilson, 2015; Rogers et al., 2017; Zhang et al., 2021), reduce binge eating (Katterman et al., 2014; O'Reilly et al., 2014; Ruffault et al., 2017), emotional eating (Katterman et al., 2014; Mantzios & Wilson, 2015; O'Reilly et al., 2014), stress (Lyzwinski et al., 2018a), and eating disorder (Omiwole et al., 2019; Turgon et al., 2019), and increase physical activity (Ruffault et al., 2017), while others have concluded that these types of intervention approaches have limited or uncertain efficacy (Fuentes Artiles et al., 2019; Sosa-Cordobés et al., 2023; Tapper, 2017). In addition, many of the systematic reviews with meta-analyses have reported moderate to high heterogeneity across studies, suggesting considerable variability in the observed effect sizes (Carriere et al., 2018; Fuentes Artiles et al., 2019; Mercado et al., 2021; Sosa-Cordobés et al., 2023). As a result, it remains unclear why mindful or intuitive eating based interventions appear beneficial in some contexts but not others, and which factors may account for these divergent outcomes.

By contrast, few reviews have explored the acute effects (i.e., the immediate or short-term effects) of specific types of mindful or intuitive practices on outcomes such as food intake and appetite (Mantzios, 2023; Tapper, 2017, 2022; Warren et al., 2017). We argue that this type of dismantling approach is important to help identify mechanisms of action underpinning effects which could in turn help inform the development of more effective interventions (Tapper, 2017, 2022). To date, four narrative reviews (Mantzios, 2023; Tapper, 2017, 2022; Warren et al., 2017) and three systematic reviews have examined acute effects of mindfulness, mindful eating or intuitive eating practices on food intake and/or appetite (Grider et al., 2021; Kao, Ling, Alanazi, Atwa, & Liu, 2025; Robinson et al., 2013). Robinson et al. (2013) focused on the effects of 'attentive eating' (i.e. sensory eating) on subsequent food intake in a systematic review and meta-analysis. Across 24 studies, they found significant reductions in subsequent food intake when participants ate attentively. However, the review was predominantly focused on cognitive influences on food intake (as opposed to mindfulness), the review is now dated and does not consider more recent studies. Grider et al. (2021) explored the effects of 13 randomized controlled trials of mindful eating and intuitive eating interventions and found little evidence for significant effects on energy intake or diet quality. However, they excluded single session experimental studies and noted that most studies were of poor methodological quality with a high risk of bias. Finally, Kao et al. (2025) explored the effects of mindfulness-based interventions on 'obesogenic eating behaviors' and found evidence for significant reductions in appetite, energy intake, and sweet intake. However, only 11 studies were included in their review, and the review had a number of significant limitations. Previous reviews have typically examined appetite alongside a wide range of outcomes, which may have resulted in appetite related studies receiving less focused attention or being overlooked. The primary aim of our review was to examine the effects of mindfulness, mindful eating and intuitive eating practices on appetite and food intake. Unlike previous systematic reviews, ours focused exclusively on mindfulness, mindful eating, and intuitive eating, with outcome measures limited to acute food intake and appetite. We included any study measuring food intake in kcal, grams, percentage consumed, or number of pieces consumed (either objectively or via self-report) and/or measuring appetite using visual analogue scales. All studies were required to have at least one control or comparison intervention. Importantly, we also extended previous reviews by including a series of theoretically informed subgroup analyses designed to better understand the effects of mindful eating.

Theory is critical for the development and understanding of effective interventions but theory-based explanations for mindful eating effects remain underdeveloped (Tapper, 2022). One potentially useful account is Monitor and Acceptance Theory (MAT; Lindsay & Creswell, 2017). MAT states that, when used in isolation, present moment awareness may enhance the vividness of experiences and heighten affective reactivity. According to MAT, it is the combination of present moment awareness with acceptance that leads to beneficial outcomes. To test this prediction, we compared the effects of manipulations that included present moment awareness of the body or internal bodily sensations in isolation with those that included these together with acceptance.

Other relevant theory relates to working memory and meta-awareness (Jha et al., 2019; Tapper, 2022). A key component of mindfulness is attention regulation, which is thought to improve working memory capacity (Jha et al., 2019). Working memory, in turn, supports emotion regulation and decision-making (Barkus, 2020; Bechara & Martin, 2004; Hinson et al., 2003; Schmeichel & Tang, 2015), both of which could help promote healthy eating. We tested this by comparing the relative efficacy of interventions that do or do not include an element of attention regulation, i.e., noticing when attention has wandered and returning it to the intended target. This comparison is also important because, more immediately, this type of attention regulation could elicit meta-awareness and decentering from food-related thoughts and feelings.

Additionally, Tapper (2022) identified six practices commonly used in mindful eating interventions and delineated how these practices map onto the key features of mindfulness. Three of these practices related to present moment awareness: awareness of the sensory properties of food such as taste and texture (hereafter termed 'sensory eating'); awareness of internal bodily sensations such as hunger and fullness; awareness of internal and external cues that elicit eating or the urge to eat. The other three practices related to acceptance and decentering: acceptance of cravings; acceptance and/or decentering from food-related thoughts; decentering from cravings. Tapper (2022) identified two of these practices, sensory eating and decentering, as potentially having stronger evidence bases for behavior change. As such, we were interested in whether interventions that included these practices would lead to greater reductions in food intake relative to other mindfulness-based practices.

To provide additional theoretical, methodological and practical insights, we conducted six further subgroup analyses. First, we examined whether effects were more pronounced when food intake and appetite were measured concurrently to the mindfulness practice, immediately following it, or after a delay. This is important because observed differences have implications for the types of mechanisms involved. For example, effects on concurrent or immediate intake could occur because of increased food habituation, sensory-specific satiety or cognitive priming of health goals. By contrast, delayed effects may be more likely to occur via processes relating to satiety or memory (Seguias et al., 2025).

Second, we explored whether effects differed based on the type of food served within the trial, i.e. a snack versus whole meal. Again, given the different types and quantities of foods served at these different eating occasions, observed differences could help identify the types of mechanisms involved. Differences would also have important practical implications for mindful eating interventions.

Third, as previously noted, Grider et al. (2021) included studies incorporating combined interventions (e.g., mindful eating practices in combination with other advice to reduce portion size). Therefore, we separated interventions that only manipulated mindful eating practices from those that also manipulated non-mindfulness-based components such as nutritional education or social support. This subgroup analysis allowed us to explore whether there is an independent effect of mindful eating interventions on food intake, over and above effects related to non-mindfulness-based components.

Fourth, Warren et al. (2017) reported that a large number of studies were conducted under controlled, laboratory conditions, while relatively few studies were conducted under real-world conditions. Therefore, we compared the effect size between laboratory studies and studies conducted in free living humans.

Fifth, a majority of studies in this area are conducted on an adult population. By contrast, studies in children are relatively few and often use mindful eating interventions to promote intake of target foods (e.g., fruits and vegetables) (Bennett et al., 2020). Therefore, we also conducted a subgroup analysis stratifying studies conducted in adults from studies conducted in children.

Sixth, Seguias et al. (2025) reported different outcomes following mindful eating interventions for the dieting and non-dieting groups. Specifically, non-dieters experienced greater hunger and showed a larger reduction in food intake compared to dieters. Based on this, we planned to compare dieters with non-dieters.

Table 1
Sub-components of mindfulness, mindful eating, and intuitive eating.

	Sub-components
Mindfulness	1. Present moment awareness general 2. Present moment awareness of the body 3. Acceptance 4. Decentering 5. Attention regulation
Mindful eating	1. Present moment awareness of the sensory properties of food ('sensory eating') 2. Present moment awareness of internal bodily sensations relating to hunger, fullness and eating 3. Present moment awareness of cues that elicit eating or the urge to eat 4. Present moment awareness of food-related thoughts. 5. Present moment awareness of cravings. 6. Acceptance of feelings of hunger and/or cravings 7. Acceptance of food-related thoughts 8. Decentering from feelings of hunger and/or cravings 9. Decentering from food-related thoughts 10. Attention regulation
Intuitive eating	1. Offering oneself absolute authorization to consume food when experiencing hunger, without imposing any limitations or restrictions 2. Consuming food based on physiological needs rather than emotional impulses 3. Utilizing internal hunger and satiety cues as indicators for determining the timing and quantity of food consumption 4. Prioritizing one's well-being or engaging in mindful eating habits

2. Methods

This systematic review was registered in PROSPERO (ID: CRD42022346160 (https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=346160). The review followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 statement (see PRISMA Check).

2.1. Eligibility criteria

Eligibility requirements were established based on the Participants, Intervention, Comparator, and Outcomes (PICO) framework (McKenzie et al., 2023).

2.1.1. Participants

Studies with healthy participants in all age groups were included. Patient groups such as those with binge eating disorder, anorexia nervosa, cancer or diabetes were excluded.

2.1.2. Intervention

All studies that manipulated mindfulness, mindful eating, or intuitive eating were included (Table 1). Studies had to have a minimum of one experimental arm and one control/comparator arm.

2.1.3. Comparator/control

Studies with a group of individuals who were not subjected to any form of intervention or subjected to a 'control' intervention that was not connected to mindfulness, mindful eating, or intuitive eating were eligible for inclusion.

2.1.4. Outcome measures

The primary outcome variable was food intake (measured in kcal, grams, percentage consumed, or number of pieces consumed) in experimental groups compared to control groups. This was further coded as: i) concurrent intake (where the food intake occurred at the same time as the intervention), ii) immediate intake (where intake occurred up to 20 min following the intervention), or iii) delayed intake (where intake was between 2 and 3 h following the intervention). There were no studies recording intake 20 min to 2 h following the intervention. The secondary outcome variables were change in appetite ratings measured using visual analogue scales (VAS) for hunger, fullness, or satiety (Stubbs et al., 2000). Studies were eligible if they reported on food intake or appetite (rather than requiring both). Food intake could be measured objectively or via self-report (i.e., 24-h dietary recalls and food frequency questionnaires) so long as the outcome was recorded in kcal, grams, percentage consumed, or number of pieces consumed.

2.2. Information sources and search strategy

Appropriate studies were selected for inclusion through searches of five electronic databases: Ovid PsychINFO, MEDLINE, Embase, Web of Science, and Scopus. We applied a mix of essential key terms and Medical Subject Headings (MeSH) related to mindfulness, mindful eating, and intuitive eating. Our searches covered articles, pertaining to human studies, from all accessible years, without any limitations on dates (see Supplementary Methods) but they were only included if they were published in English language. We also conducted a manual search of the reference lists in the publications discovered by the electronic search, as well as any relevant literature identified by the team. The first search was conducted in July 2022 and an updated search was conducted on 13th November 2025.

2.3. Data collection

The articles from five electronic databases were imported into Rayyan (https://rayyan.qcri.org/welcome), a web and mobile application designed for systematic reviews (Ouzzani et al., 2016).

2.4. Selection of studies

Qing Zhang (QZ) transferred all the sources to Rayyan and removed any duplicate entries with Khaleda Ahmadyar (KA). QZ, KA, and Ge Chen (GC) used a feature called 'maximum collaborator decision' to ensure each article was independently screened by at least two reviewers at both abstract and full-text stages. Screening was conducted in a blinded format and following this, QZ lifted the blind setting to reconcile decisions. Discrepancies were resolved through discussion and any remaining disagreements were adjudicated by senior investigators (Katy Tapper, Dani Ferriday, and Elanor Hinton). A final reference screening was conducted to identify any omitted studies.

2.5. Data extraction

Data were extracted by two independent reviewers (KA and QZ) to reduce bias and potential error using a data extraction form encompassing study information, participant characteristics, intervention characteristics, control/comparison group, outcome measures, method, and findings. Inter-rater agreement was initially 70% which is lower than minimum acceptable interrater agreement of 80%, with 100% agreement reached after discussion of inconsistencies with investigators.

2.6. Risk of bias

Robinson et al. (2021, 2022) argue that current generic risk of bias tools fail to encompass all crucial elements of laboratory eating studies. Consequently, a checklist consisting of eight criteria was developed by including relevant components from two existing tools used to assess the quality of studies, the Downs and Black (Downs & Black, 1998) and the revised Cochrane risk-of-bias tool for randomized trials (RoB 2; Sterne et al., 2019). The criteria were as follows: 1) researchers blinded to group allocation OR interactions limited or tightly scripted, 2) participants blinded to group allocation or study aims, 3) participants randomized to conditions (or counterbalanced if within subjects), 4) key methodological details present, 5) food intake measured objectively, 6) study was pre-registered, 7) control and experimental conditions matched for factors not specific to mindfulness and 8) included a manipulation check. In accordance with Haynes et al. (2018), a single answer of 'Yes' (scored as 1) or 'No' (scored as 0) was given for each criterion in each study. Scores were then summed to give a total out of 8 for each study, with higher scores indicating a lower risk of bias. Two reviewers (KA and QZ) assessed each study independently and then discussed inconsistencies, leading to an inter-rater agreement of 81%. The remaining inconsistencies were resolved via discussion with senior investigators (KT, DF, and ECH). The eight criteria and study evaluations can be found in Supplementary Table 1.

2.7. Data synthesis

2.7.1. Effect of mindfulness, mindful eating and intuitive eating on food intake and appetite

For food consumption, we collected the mean and standard deviation of energy intake in kilocalories (kcal), grams, percentage consumed, or number of pieces consumed from both the experimental and control groups for each individual study. We also obtained the total number of participants in each condition. This allowed for the calculation of standardized mean difference scores (SMDs) in energy intake. Additionally, a 95% confidence interval was calculated for these estimates, comparing the experimental interventions with the control condition.

For appetite, every study was divided into four sub-groups based on VAS ratings: immediate hunger, immediate fullness, delayed hunger, and delayed fullness. The VAS ratings in each study consisted of either 10 mm or 100 mm scales. Thus, we obtained the mean and standard deviation of VAS appetite ratings from both the control and experimental conditions, as well as the total number of participants in each condition, for each study within each sub-group. We computed SMDs in appetite ratings (in mm) and a 95% confidence interval for these estimates between the experimental interventions and control condition.

The results were analyzed using inverse variance meta-analyses and forest plots were produced in Review Manager (version 5.4) (Review Manager Revman, 2020). For the analysis, SMDs were calculated by dividing the mean difference by the pooled standard deviation. For food intake outcome, a positive SMD indicates that the experimental group consumed more than the control group, whereas a negative SMD indicates that the experimental group consumed less than the control group. For appetite outcomes, a positive SMD indicates greater hunger or fullness in the experimental group compared with the control group, whereas a negative SMD indicates the opposite. The magnitude of the SMD reflects the extent of the difference between the groups, with a larger SMD indicating a greater difference. An SMD of 0.2 is typically interpreted as a small effect size, 0.5 as moderate, and 0.7 as large (Cohen, 1988).

Heterogeneity was assessed using I^2 and random effects meta-analyses were examined to explore the changes in food intake and appetite. The following approximate guides were used to interpret the I^2 statistics for assessing heterogeneity in this meta-analysis: 0% to 40%: insignificantly important; 30% to 60%: potentially indicative of moderate heterogeneity; 50% to 90%: potentially indicative of substantial heterogeneity; 75% to 100%: significantly high heterogeneity (Deeks et al., 2019).

Publication bias was assessed in the analyses by visually inspecting the funnel plot for effect size asymmetry, conducting Egger's test of asymmetry (Egger et al., 1997), and applying the Trim and Fill procedure (Duval & Tweedie, 2000). In the context of the Egger's test, if the intercept substantially deviates from zero ($p < 0.10$), it indicates the presence of bias.

Funnel plots, which visually illustrate the relationship between the effect estimates of studies and their sample sizes, can be a useful tool for assessing the validity of meta-analyses. This figure utilises the assumption that the accuracy of calculating the actual treatment effect tends to improve as the sample sizes in individual studies become higher (more precision). Smaller studies typically show a greater range of values at the bottom end of the graph, whereas larger studies tend to result in a narrower distribution of data. Without bias, the plot will have a symmetrical shape like an inverted funnel. In contrast, the existence of bias frequently results in skewed and unbalanced funnel plots (Egger et al., 1997), i.e. missing small studies with null effects or effects in the opposite direction proposed.

2.7.2. Sub-group analyses

Sub-group analyses were performed as described in the introduction. Studies were stratified by the subgroup of interest, and separate SMDs were calculated for each subgroup. Significant differences between subgroups was assessed using the Chi-square test with non-overlapping 95% confidence intervals taken as further indicative of meaningful differences between subgroups.

3. Results

3.1. Study selection

Fig. 1 presents the PRISMA flow diagram illustrating the study selection procedure. We identified 6400 articles from the initial database search in 2022, and 3422 articles from the updated search in 2025. After removing duplicates, 4469 articles remained. An additional 3 articles were suggested for screening by members of the review team therefore a total of 4472 articles were screened for relevance based on their title and abstract. We identified 120 articles for full text screening, of which 79 were excluded because they either had no relevant measure of food intake or appetite ($n = 33$), were conference abstracts or thesis papers ($n = 24$), did not have a relevant intervention or control group ($n = 19$), were missing relevant data about the outcome measures ($n = 2$) or were missing information about the manipulation ($n = 1$). A number of articles contributed more than one eligible study, therefore in total 46 studies across 41 articles were included in the review.

3.2. Study characteristics

The descriptive information of the included studies is presented in

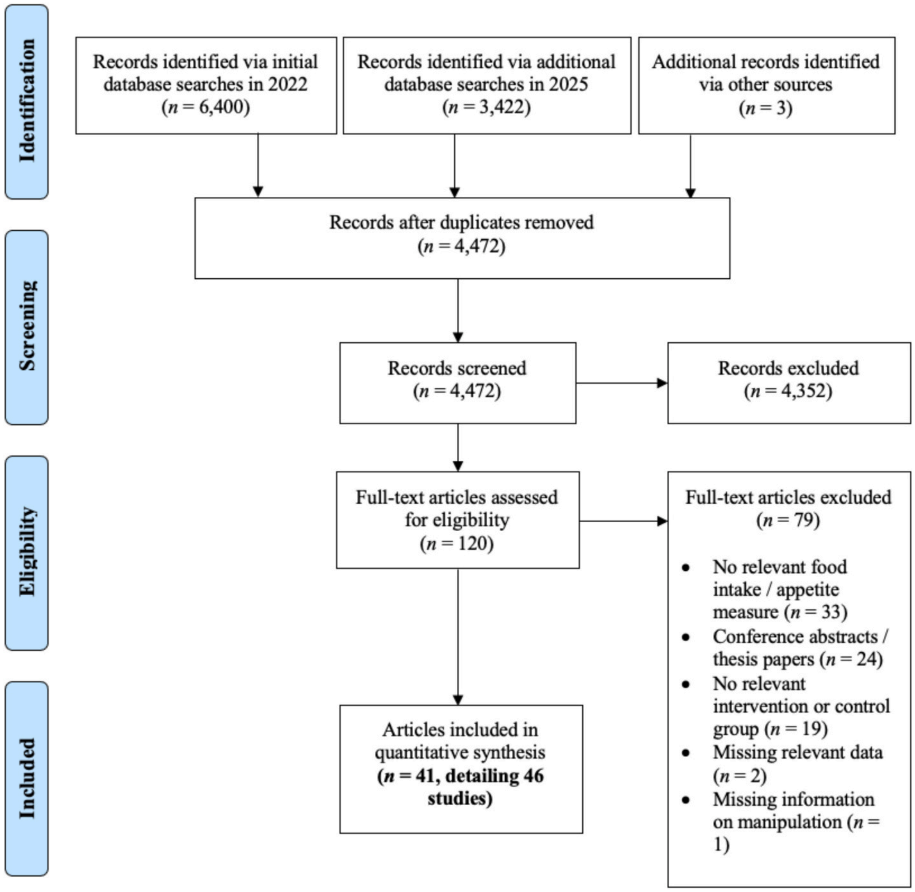

Fig. 1. PRISMA flow chart of the study selection procedure.

Table 2. All studies were reported in published journal articles. Twenty-four studies were conducted in the UK, eight studies were conducted in the USA, four in the Netherlands, five in Spain, two in Australia, one in Belgium, one in Canada, and one in Brazil. All but two of the studies employed a between-subjects design. Thirty-three studies were lab-based experimental studies, and 13 were intervention studies ranging from 3 days to 6 months.

In total the studies reported data from 3581 participants, with the number of participants in each study ranging from 24 to 213. Four studies comprised child participants and 42 comprised adult participants. In studies conducted in children the mean age ranged from 6 to 10 years, and in adults age ranged from 20 to 51 years. Participant gender was reported in 44 of 46 studies and ranged from 0% to 100% women. Fifteen studies included only female participants, one study included only male participants, and 28 studies included both men and women. Mean Body Mass Index (BMI) was reported in 34 of 46 studies and ranged from 16.89 kg/m^2 to 37.3 kg/m^2. In children, mean BMI was reported in only two studies, with a mean of 17.12 kg/m^2. In adults, mean BMI ranged from 21.53 kg/m^2 to 37.3 kg/m^2.

A mindful eating intervention was employed in 27 studies, and a mindfulness intervention was employed in 10 studies. Nine studies employed interventions with both mindfulness and mindful eating components. We did not identify any studies with an intuitive eating intervention that were eligible for inclusion. Details of the specific components in each study are presented in Supplementary Tables 2 and 3.

Forty-five of the 46 studies included a measure of food intake (primary outcome) and 11 studies included a measure of appetite (secondary outcome). Of the eleven studies measuring appetite, all of them measured immediate hunger, 6 also measured immediate fullness, and 5 also measured delayed hunger. Only 1 study had a measure of delayed fullness. Several studies contributed more than one unique comparison group therefore there were a total of 54 comparisons for the food intake outcome, 13 comparisons for immediate hunger, 8 comparisons for immediate fullness, and 5 comparisons for delayed hunger. Food intake was measured objectively in the laboratory in 34 studies and self-reported in 9 studies. In two studies both an objective and self-reported measure were reported.

3.3. Primary outcome

3.3.1. Food intake

Fig. 2 presents a forest plot of all 45 studies (54 comparisons) examining the effect of mindfulness and mindful eating interventions on food intake. There was a significant overall effect, with mindfulness/mindful eating interventions resulting in a reduction in food intake (SMD: -0.24; 95% CI: -0.35, -0.12; $z = 4.07$; $p < 0.001$; $I^2 = 62\%$) vs. control. There was moderate heterogeneity across comparisons.

3.4. Subgroup analyses

3.4.1. Present moment awareness of the body/bodily sensations with and without acceptance

Thirty-two of the 54 comparisons incorporated a component of ‘present moment awareness of the body’ or ‘present moment awareness of internal bodily sensations relating to hunger, fullness and eating’. An overall effect was observed across the 32 comparisons, suggesting that within studies that included these components mindfulness/mindful eating reduced food intake (SMD: -0.17; 95% CI: -0.32, -0.02; $z = 2.21$; $p = 0.03$; $I^2 = 64\%$). The studies were split into two subgroups; those that included a component of acceptance (15 comparisons) and those that did not (17 comparisons). Although, as predicted, studies with

Table 2
Descriptive information of included studies.

Reference	Participants				Study Information		Outcome Measures	
	N	Age	Gender (% women)	BMI (kg/m²)	Study design and schedule	Manipulation	Food intake	Appetite
Ahmadyar et al. (2024)	137	21	87%	22.6	Between-subjects, single experimental session	10-min mindfulness body scan audio	Subsequent ad libitum intake of snack food	–
Allirot et al. (2018)	70	35	100%	22.79	Between-subjects, single experimental session	7-min mindful eating video	Subsequent ad libitum intake of snack food	Immediate hunger and fullness ratings
Arch et al. (2016)	102	21	42.1%	–	Between-subjects, single experimental session	5–7-min mindful eating audio	Subsequent ad libitum intake of snack food	–
Bennett et al. (2020)	63	10	69%	–	Cluster-randomized controlled trial, one experimental session per day for five days	5-min mindful breathing audio; 5-min mindful raisin-eating audio	Subsequent ad libitum intake of a novel fruit	–
Cavanagh et al. (2014)	96	20	100%	21.53	Between-subjects, single experimental session	6-min mindful eating audio while eating a raisin	Subsequent ad libitum intake of a meal	–
Chang et al. (2018)	97	21	95.9%	23.54	Between-subjects, single experimental session	4-min decentering task in response to images of food	Subsequent ad libitum intake of snack food	–
de Tomas et al. (2020)	101	9	58%	17.39	Between-subjects, single experimental session	1-h mindful eating workshop consisting of mindfulness audios and mindful eating exercises	Subsequent ad libitum intake of a meal	–
Dutt et al. (2019)	74	21	–	–	Between-subjects, single experimental session	12-min guided mindfulness breathing audio	Subsequent ad libitum intake of snack food	–
Fisher et al. (2016)	40	30	100%	25.4	Between-subjects, single experimental session	10-min guided breath awareness meditation	Subsequent ad libitum intake of snack food	Immediate hunger and fullness ratings
Gayoso et al. (2021)	96	9	–	16.89	Between-subjects, one experimental session per week for three weeks	1-h mindful eating workshop consisting of mindfulness audios and mindful eating exercises	Subsequent ad libitum intake of a meal	–
Hsu and Forestell (2021)	126	21	69.8%	23.24	Between-subjects, single experimental session	15-min mindfulness meditation audio	Subsequent ad libitum intake of snack food	–
Higgs and Donohoe (2011)	29	20	100%	23.3	Between-subjects, two experimental sessions, 2 h apart	3-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate and delayed hunger ratings
Hinojosa-Aguayo & González (2022)	45	20	100%	22.59	Between-subjects, single experimental session	3-min cognitive defusion audio	Subsequent ad libitum intake of snack food	–
Hinton et al. (2021)	65	27	75%	22.4	Between-subjects, single experimental session	Rating fullness or taste every 1.5 min while eating lunch	Subsequent ad libitum intake of snack food	Immediate hunger and fullness ratings
Hong et al. (2018)	65	6	49.2%	–	Between-subjects, four experimental sessions per week for four weeks	30-min sessions consisting of mindfulness and mindful eating exercises	Concurrent ad libitum intake of vegetables	–
Hussain et al. (2020)	120	24	75.8%	22.3	Between-subjects, single experimental session	Self-distanced or self-immersed adapted Mindful Construal Diary (MCD) while eating	Concurrent ad libitum intake of snack food	–
Hussain et al. (2021)	85	20	84.7%	24.54	Between-subjects, single experimental session	Mindful Construal Reflection (MCR) task while eating	Concurrent ad libitum intake of snack food	–
Iturbe et al. (2024)	128	51	70%	37.3	Randomized controlled trial, fifteen intervention sessions across 20 weeks	2-h ACT and mindfulness group intervention sessions consisting of education and meditations	Subsequent 24-h dietary recall	–
Jenkins and Tapper (2014)	135	21	71.5%	–	Between-subjects, two experimental sessions five days apart	Mindbus metaphor (cognitive diffusion) or urge surfing strategy (acceptance) when craving chocolate	Subsequent ad libitum intake of snack food	–
Jordan et al. (2014)	60	20	50%	–	Between-subjects, single experimental session	15-min body scan audio	Subsequent ad libitum intake of snack food	–
Kao et al. (2025)	35	38	85%	32.69	Randomized controlled trial, nine intervention sessions across 18 weeks	30–45-min motivational interviewing sessions delivered over Zoom/telephone consisting of mindfulness and mindful eating exercises	Subsequent 24-h dietary recall	–
Long et al. (2011)	27	21	100%	23.8	Within-subjects, one experimental session per week for three weeks	30-min mindful eating audio while eating a meal	Concurrent ad libitum intake of a meal	–
Masih et al. (2020)	34	36	66.5%	25.25	Between subjects, one intervention session per week for 8 weeks	30-min class consisting of 20-min guided muscle relaxation exercise or mindfulness meditation	Subsequent ad libitum intake of a meal	–
Mantzios et al. (2019)	121	20	95%	23.87	Between-subjects, single experimental session	4-min mindful eating audio while eating chocolate; 4-min MCD while eating chocolate	Subsequent ad libitum intake of snack food	–
Mantzios et al. (2020)	128	21	64.8%	24.73	Between-subjects, single experimental session	Mindful eating audio while eating chocolate	Subsequent ad libitum intake of snack food	–

(continued on next page)

Table 2 (*continued*)

Reference	Participants				Study Information		Outcome Measures	
	N	Age	Gender (% women)	BMI (kg/ m^2)	Study design and schedule	Manipulation	Food intake	Appetite
Marchiori and Papies (2014)	110	21	70.9%	22.3	Between-subjects, single experimental session	14-min body scan audio	Subsequent ad libitum intake of snack food	–
Martin et al. (2017)	53	39	71.9%	32.6	Randomized controlled trial, three intervention sessions across 6 weeks	4-h Mindful Decision-making or Mindful-Eating workshop and two 1-h booster workshops	Change in 24-h dietary recall from baseline to 6 weeks	–
Palascha et al. (2021)	213	22	100%	22	Between-subjects, single experimental session	4-min body scan audio	–	Immediate hunger and fullness ratings
Robinson et al. (2014)	48	33	100%	29.3	Between-subjects, two experimental sessions 2–3 h apart	3-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate and delayed hunger ratings
Sant'Anna et al. (2020)	52	37	100%	32.25	Randomized controlled trial, one intervention session per week for 8 weeks	2-h mindfulness intervention sessions consisting of education and meditations	Subsequent 24-h dietary recall	–
Seguias and Tapper (2018)	51	24	52.9%	23.39	Between-subjects, two experimental sessions 2 h apart	2.5-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate hunger and fullness ratings
Seguias and Tapper (2022)	99	22	100%	22.3	Randomized controlled trial, three-day online intervention	Daily messages on smartphone app prompting awareness of sensory properties of food and access to mindful eating audio	Daily 24-h dietary recall	–
Seguias et al. (2025) Study 1	57	28	64%	–	Between-subjects, single experimental session	1.5-min mindful eating audio while eating a snack	Subsequent ad libitum intake of snack food	–
Seguias et al. (2025) Study 2	60	27	73%	–	Between-subjects, single experimental session	3-min mindful eating audio while eating a snack	Subsequent ad libitum intake of snack food	–
Seguias et al. (2025) Study 3	90	21	100%	–	Between-subjects, single experimental session	3-min mindful eating audio while eating a snack	Subsequent ad libitum intake of snack food	–
Seguias et al. (2025) Study 4	167	26	100%	–	Between-subjects, single experimental session	4-min mindful eating audio while eating a snack	Subsequent ad libitum intake of snack food	Immediate hunger
Simonson et al. (2020)	24	24	50%	29.1	Between-subjects, three experimental sessions, 2 to 4 days apart	Mindful eating audio while eating a meal	Concurrent ad libitum intake of a meal	–
Spadaro et al. (2018)	46	45	87%	32.5	Randomized controlled trial, one intervention session per week for 6 months	1-h intervention sessions consisting of Mindfulness-Based Stress Reduction programme	Subsequent daily energy intake using FFQ	–
Tapper and Seguias (2020)	48	44	100%	25.48	Between-subjects, single experimental session	Written instructions to pay attention to the sensory properties of food while eating lunch and throughout the rest of the day	Subsequent ad libitum intake of snack food, and subsequent 24-h dietary recall for half day period	–
Timmerman & Brown (2012)	35	50	100%	31.8	Randomized controlled trial, one intervention session per week for 6 weeks	2-h intervention sessions consisting of education and mindful eating meditations	Subsequent 24-h dietary recall	–
Van De Veer et al. (2016) Study 2	117	20	68.4%	–	Between-subjects, single experimental session	4-min body scan audio	Subsequent ad libitum intake of snack food	–
Van De Veer et al. (2016) Study 4	85	21	83.5%	–	Between-subjects, single experimental session	4-min body scan audio	Subsequent ad libitum intake of snack food	–
Whitelock et al. (2018) Study 1	108	29	52.8%	25.75	Between-subjects, two experimental sessions 3 h apart	3-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate and delayed hunger ratings
Whitelock et al. (2018) Study 2	147	33	100%	25.18	Between-subjects, two experimental sessions 3 h apart	3-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate and delayed hunger and fullness ratings
Whitelock, Kersbergen, et al. (2019)	34	29	0%	23.73	Within-subjects, two experimental sessions 3 h apart, repeated after 7 days	10-min mindful eating audio while eating lunch	Subsequent ad libitum intake of snack food	Immediate and delayed hunger ratings
Whitelock, Gaglione, et al. (2019)	107	44	73.9%	35.55	Randomized controlled trial, 8-week online intervention	Attentive eating smartphone application consisting of mindful eating audio	Subsequent ad libitum intake of snack food, and 24-h dietary recall	–

acceptance exhibited a greater effect size (SMD: -0.22; 95% CI: −0.49, 0.05) compared to studies without acceptance (SMD: -0.12; 95% CI: −0.27, 0.04), this difference was not significant, $x^2 = 0.42$, df = 1, $p = 0.52$, $I^2 = 0\%$.

3.4.2. *Attention regulation*

Of the 54 comparisons, 10 included an attention regulation component and 44 did not. Contrary to predictions, the effect size was greater in magnitude among studies without an attention regulation component (SMD: -0.27, 95% CI: −0.40, −0.14) compared to with it (SMD: -0.11;

Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Ahmadyar 2024	34.79	24.06	67	33.16	23.88	70	2.5%	0.07 [−0.27, 0.40]
Allirot 2018	275.55	202.9807	35	388.82	248.4162	35	2.0%	−0.49 [−0.97, −0.02]
Arch 2016	196.68	135.24	33	259.65	159.23	36	2.0%	−0.42 [−0.90, 0.06]
Bennett 2020 Mindful Breathing	51.32	45.76	20	18.48	29.58	10	1.3%	0.77 [−0.01, 1.56]
Bennett 2020 Mindful Raisin Eating	51.47	48	23	18.48	29.58	10	1.3%	0.74 [−0.03, 1.51]
Cavanagh 2014	273.41	153.24	32	319.91	150.05	64	2.2%	−0.31 [−0.73, 0.12]
Chang 2018	5.39	3.7	33	5.7	8.42	27	1.9%	−0.05 [−0.56, 0.46]
de Tomas 2022	421.83	205.02	50	470.95	233.57	51	2.3%	−0.22 [−0.61, 0.17]
Dutt 2019	2.21	3.67	38	5.33	6.82	36	2.1%	−0.57 [−1.03, −0.10]
Fisher 2016	0.7	0.75	20	2.2	1.75	20	1.5%	−1.09 [−1.76, −0.42]
Gayoso 2021	295.27	166.52	46	393.37	181.85	49	2.3%	−0.56 [−0.97, −0.15]
Higgs 2011	26.22	15.97	10	53.38	28	10	1.0%	−1.14 [−2.10, −0.18]
Hinojosa-Aguayo 2022	30.65	16.68	23	27.23	17.15	22	1.7%	0.20 [−0.39, 0.78]
Hinton 2021 Fullness	249	236	22	255	208	10	1.3%	−0.03 [−0.77, 0.72]
Hinton 2021 Taste	279	231	22	255	208	11	1.4%	0.10 [−0.62, 0.83]
Hong 2018	2.15	0.73	31	1.33	0.95	34	1.9%	0.95 [0.44, 1.47]
Hsu 2021	280.75	225.16	63	254.37	188.17	63	2.5%	0.13 [−0.22, 0.48]
Hussain 2020 Self-distanced MCD	76.88	59.34	40	170.25	136.19	20	1.8%	−1.00 [−1.57, −0.43]
Hussain 2020 Self-immersed MCD	98.25	103.92	40	170.25	136.19	20	1.8%	−0.62 [−1.16, −0.07]
Hussain 2021	48.22	67.55	43	94.48	102.95	42	2.2%	−0.53 [−0.96, −0.09]
Iturbe 2024	1,529	456.5	64	1,619.9	415.9	64	2.5%	−0.21 [−0.55, 0.14]
Jenkins 2014 Acceptance	51.78	111.43	45	44.02	75.56	22	1.9%	0.08 [−0.43, 0.59]
Jenkins 2014 Cognitive Defusion	13.43	31.28	45	44.02	75.56	23	1.9%	−0.60 [−1.11, −0.09]
Jordan 2014	149.17	91.11	27	197.58	90.24	29	1.9%	−0.53 [−1.06, 0.01]
Kao 2025	1,456.37	602.24	20	2,017.18	667.24	15	1.4%	−0.87 [−1.57, −0.17]
Long 2011	443.4	182.9046	27	425.8	177.7084	27	1.9%	0.10 [−0.44, 0.63]
Mantzios 2019 MCD	1	1.16	40	1.63	1.14	20	1.8%	−0.54 [−1.09, 0.01]
Mantzios 2019 Mindful Raisin Exercise	0.74	1.11	40	1.63	1.14	21	1.8%	−0.78 [−1.33, −0.24]
Mantzios 2020 First Intake	16.44	15.76	32	26.64	18.38	32	2.0%	−0.59 [−1.09, −0.09]
Mantzios 2020 Second Intake	5.11	10.2	32	6.38	8.54	32	2.0%	−0.13 [−0.62, 0.36]
Marchiori 2014	171.51	95.04	55	190.78	122.97	55	2.4%	−0.17 [−0.55, 0.20]
Martin 2017 Mindful Decision-Making	444.3	653.35	8	624.1	660.1	17	1.2%	−0.26 [−1.11, 0.58]
Martin 2017 Mindful Eating	444.3	653.35	9	264.7	634.65	19	1.2%	0.27 [−0.52, 1.07]
Masih 2020	3,190	1,359	17	3,104	1,291	17	1.5%	0.06 [−0.61, 0.74]
Robinson 2014	250	92	25	356	185	23	1.7%	−0.72 [−1.31, −0.14]
Sant'Anna 2022	1,222	435	28	1,380	480	24	1.8%	−0.34 [−0.89, 0.21]
Seguias 2018	112.3	70.24	26	203.2	88.05	25	1.7%	−1.13 [−1.72, −0.53]
Seguias 2022	1,594	425	33	1,543.5	530.8386	66	2.2%	0.10 [−0.32, 0.52]
Seguias 2025 Study 1	33	24	29	56	20	28	1.8%	−1.03 [−1.58, −0.47]
Seguias 2025 Study 2	20	15	33	23	17	27	1.9%	−0.19 [−0.70, 0.32]
Seguias 2025 Study 3	17	11	32	24.5	13.3971	58	2.2%	−0.59 [−1.03, −0.15]
Seguias 2025 Study 4	25	17	59	29.1667	20.8654	108	2.6%	−0.21 [−0.53, 0.11]
Simonson 2020	700.08	300.66	8	861.46	299.4	8	0.9%	−0.51 [−1.51, 0.49]
Spadaro 2018	1,380.4	674.9508	22	1,602.7	721.6197	21	1.7%	−0.31 [−0.91, 0.29]
Tapper 2020 Half-day Period	839	496	11	759	403	12	1.2%	0.17 [−0.65, 0.99]
Tapper 2020 Taste-test	166	105	11	144	96	12	1.2%	0.21 [−0.61, 1.03]
Timmerman 2012	1,417.1	330.1	19	1,782	400.1	16	1.4%	−0.98 [−1.69, −0.27]
Van de Veer 2016 Study 2	37.2	25.69	40	32.2701	20.5065	77	2.3%	0.22 [−0.16, 0.60]
Van de Veer 2016 Study 4	22.37	15.06	43	24.86	18.07	42	2.2%	−0.15 [−0.57, 0.28]
Whitelock 2018 Study 1	365.03	221.99	34	364.145	192.615	74	2.3%	0.00 [−0.40, 0.41]
Whitelock 2018 Study 2	328.46	157.58	70	334.73	145.73	77	2.5%	−0.04 [−0.36, 0.28]
Whitelock 2019a	419.97	193.45	34	375.25	204.44	34	2.0%	0.22 [−0.25, 0.70]
Whitelock 2019b Self-report	1,831.46	869.28	26	1,720.15	716.04	27	1.9%	0.14 [−0.40, 0.68]
Whitelock 2019b Taste-test	162.24	109.59	27	125.09	105.15	27	1.9%	0.34 [−0.20, 0.88]
Total (95% CI)			**1762**			**1819**	**100.0%**	**−0.24 [−0.35, −0.12]**

Heterogeneity: $Tau^2 = 0.10$; $Chi^2 = 137.67$, df = 53 (P < 0.00001); $I^2 = 62\%$

Test for overall effect: Z = 4.07 (P < 0.0001)

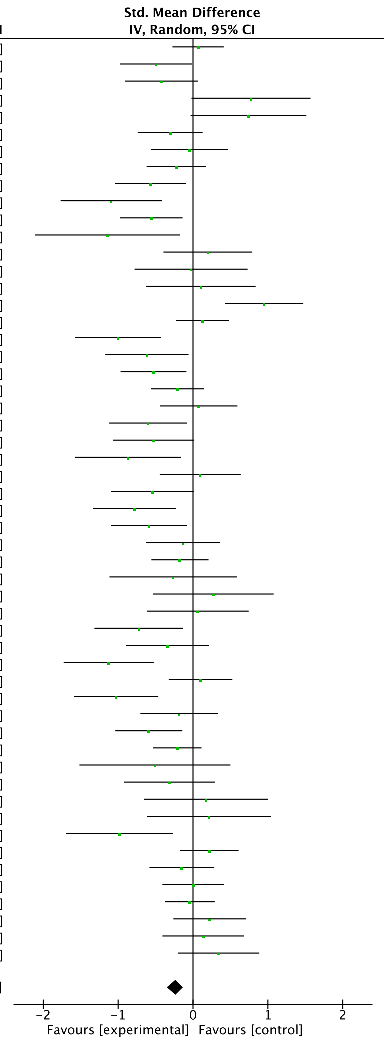

Fig. 2. Forest plot of all studies exploring the effect of mindfulness/mindful eating on food intake.

95% CI: −0.33, 0.12), but this difference was not significant, $x^2 = 1.46$, df = 1, $p = 0.23$, $I^2 = 31.4\%$.

3.4.3. Sensory eating

The 54 comparisons were divided into those that included sensory eating in isolation (17 comparisons), those that included it in combination with other mindfulness and/or mindful eating components (19 comparisons), and those that did not include the component at all (18 comparisons). There were no significant subgroup differences observed between studies that included the component in isolation (SMD: -0.30, 95% CI: −0.49, −0.11), those that included it in combination with other components (SMD: -0.22, 95% CI: −0.43, −0.01) and studies without the component (SMD: -0.19, 95% CI: −0.38, −0.00), $x^2 = 0.65$, df = 2, $p = 0.72$, $I^2 = 0\%$.

3.4.4. Time from intervention to food intake measure in acute experimental studies

Of the 54 comparisons, there were 38 comparisons that involved acute experimental studies. The 38 comparisons were divided into groups based on the time from the intervention to the food intake measure. There were 6 comparisons that measured concurrent intake (SMD: -0.25; 95% CI: −0.84, 0.33), 25 that measured subsequent intake up to 20 min following the intervention (immediate; SMD: -0.27; 95% CI: −0.41, −0.14), and 7 that measured subsequent intake between 2 and 3 h following the intervention (delayed; SMD: -0.32; 95% CI: −0.71, 0.07). There were no significant differences between the three groups, $x^2 = 0.05$, df = 2, $p = 0.97$, $I^2 = 0\%$.

3.4.5. Food type

Forty-four of the 54 comparisons measured intake of a snack or a meal and a significant pooled effect was observed (SMD: -0.23; 95% CI: −0.36, −0.10; $z = 3.55$; $p < 0.05$; $I^2 = 67\%$). The 44 comparisons were split into groups based on the type of food offered in the study. Thirty-eight comparisons measured intake of a snack (SMD: -0.23; 95% CI: −0.38, −0.09) while 6 measured intake of a meal (SMD: -0.26; 95% CI: −0.46, −0.06), with no significant subgroup differences between the two, $x^2 = 0.05$, df = 1, $p = 0.82$, $I^2 = 0\%$.

3.4.6. Additional non-mindfulness components

Of all 54 comparisons measuring food intake, there were 42 comparisons with interventions consisting solely of mindfulness or mindful eating components, and 12 comparisons that involved additional non-mindfulness components in the intervention, such as self-compassion or nutrition education. We found no significant difference between interventions with (SMD: -0.40; 95% CI: −0.62, −0.18) and without (SMD: -0.19; 95% CI: −0.31, −0.06) additional non-mindfulness components despite a greater pooled effect size in the former group, $x^2 = 2.73$, df = 1, $p = 0.10$, $I^2 = 63.3\%$.

3.4.7. Laboratory versus non-laboratory measures

The 54 comparisons were split into two subgroups based on whether they measured food intake in a laboratory (39 comparisons) or outside the laboratory (15 comparisons). Although the effect size was greater in laboratory studies (SMD: -0.30; 95% CI: −0.42, −0.18; $p < 0.001$), than non-laboratory studies (SMD: -0.03; 95% CI: −0.30, 0.24; $p = 0.82$; $I^2 = 68\%$), and only the former showed a significant overall effect, the subgroup comparison was not statistically significant ($x^2 = 3.14$, df = 1, $p = 0.08$, $I^2 = 68.2\%$).

3.4.8. Studies in adults versus children

There were 49 comparisons across 41 studies in adults and 5 comparisons across 4 studies in children. There were no subgroup differences identified between studies in children and studies in adults, $x^2 = 3.02$, df = 1, $p = 0.08$, $I^2 = 66.9\%$. However, the difference in effect size between the two groups was substantial. Evidence indicated that mindfulness/mindful eating interventions reduced food intake in adults (SMD: -0.28; 95% CI: −0.38, −0.17; $z = 5.03$; $p < 0.001$; $I^2 = 53\%$) but not in children (SMD: 0.29; 95% CI: −0.34, 0.93; $z = 0.91$; $p = 0.36$; $I^2 = 86\%$). Forest plots for all subgroup analyses are presented in Supplementary Figs. 1 to 9.

3.5. Secondary outcome

3.5.1. Appetite

No overall effect was observed across studies that measured the effect of mindfulness and/or mindful eating on immediate hunger (SMD: -0.06; 95% CI: −0.19, 0.07; $z = 0.91$; $p = 0.36$; $I^2 = 5\%$; Fig. 3), immediate fullness (SMD: 0.02; 95% CI: −0.15, 0.18; $z = 0.19$; $p = 0.85$; $I^2 = 0\%$; Fig. 4) or delayed hunger (SMD: -0.19; 95% CI: −0.43, 0.05; $z = 1.52$; $p = 0.13$; $I^2 = 22\%$; Fig. 5).

3.6. Risk of bias

Of the 46 included studies, only 7 studies attempted to reduce researcher influence via blinding or through the use of a script. Most studies ($n = 30$) attempted to blind participants to group allocation or to the study aims by using a cover story. All but 5 of the studies randomized participants to conditions (or counterbalanced order if using a within-subjects design). Furthermore, all but 4 studies provided key methodological details. These four studies lacked information about participant randomisation and blinding. Food intake was measured objectively in 34 studies, while 9 studies provided a self-reported measure and 2 studies included both an objective food intake measure and a self-reported measure. One study was included in the review for the appetite outcomes only and therefore did not include a food intake measure.

Only 11 of the 46 studies were pre-registered. Twenty-nine studies employed control groups that were well matched to the intervention group for factors not specific to mindfulness, but that may affect the outcomes. Sixteen studies failed to match the control group for factors such as relaxation, attention, and contact time. One study included two intervention groups, one which was well matched to the control group and one which was not well matched. Only 8 studies had a manipulation check that closely matched what those in the experimental group were asked to do.

Twenty-one studies were identified as having a low risk of bias. These studies met the critical risk of bias criteria, which included 1) ensuring participants were blinded to study conditions or research aims, 2) ensuring random allocation of participants to conditions, 3) reporting key methodological details, 4) objectively measuring food intake, and 5) ensuring the experimental and control groups were matched for factors not specific to mindfulness. While pre-registration was also deemed significant, its inclusion as a key risk of bias criteria was impractical due to the limited number of pre-registered studies.

3.7. Quality of evidence

To assess the overall quality of evidence, an additional meta-analysis incorporating only the 21 studies identified as having low risk of bias was conducted (Supplementary Fig. 9). The analysis included 22 comparisons, and a significant overall effect was observed, indicating that mindfulness/mindful eating interventions led to a reduction in food intake in studies with low risk of bias (SMD: -0.25; 95% CI: −0.37, −0.12; $z = 3.90$; $p < 0.001$; $I^2 = 40\%$).

3.8. Publication bias

There was no evidence of publication bias for the food intake outcome. The funnel plot is presented in Supplementary Fig. 10 and shows that the data were symmetrical. Egger's test for funnel plot asymmetry was not significant ($z = -0.59$, $p = 0.55$) and the Trim and Fill analysis did not impute any missing studies. Trim and Fill analysis identified 4 missing effect sizes for the immediate hunger outcome (Supplementary Fig. 11). The inclusion of these studies changed the pooled SMD to −0.00 [−0.12 to 0.12]. However, Egger's test for funnel plot asymmetry was not significant ($z = -0.94$, $p = 0.35$). Similarly, Egger's test for funnel plot asymmetry was not significant ($z = 0.82$, $p = 0.41$) for the immediate fullness outcome, though Trim and Fill analysis identified one missing effect size (Supplementary Fig. 12). The inclusion of this study changed the pooled SMD to −0.02 [−0.19 to 0.14]. The presence of potential publication bias for both the immediate hunger and fullness outcomes do not influence the findings as no overall effects were identified. There were no influential cases identified for any of the outcomes. Publication bias was not conducted for delayed hunger as there were only five effect sizes.

4. Discussion

Across forty-five studies we found evidence that mindfulness and mindful eating interventions brought about small reductions in food intake. There was no indication of publication bias, and the effect remained significant when limiting the analysis to studies with low risk of bias. Although effect sizes varied across the subgroups tested, no

	Experimental			Control				Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI
Allirot 2018	2.09	1.7748	35	2.66	2.3664	35	7.4%	−0.27 [−0.74, 0.20]
Fisher 2016	47	26.6	20	57.9	22.6	20	4.3%	−0.43 [−1.06, 0.19]
Higgs 2011	12.889	8.49	10	13.4	11.037	10	2.2%	−0.05 [−0.93, 0.83]
Hinton 2021 Fullness	9.59	11.6	22	14.24	19.06	10	3.0%	−0.32 [−1.07, 0.43]
Hinton 2021 Taste	9.59	15.17	22	14.24	19.06	11	3.2%	−0.27 [−1.00, 0.45]
Palascha 2021 Early Symptoms	6.83	12.47	53	6.83	13.48	53	11.1%	0.00 [−0.38, 0.38]
Palascha 2021 Late Symptoms	11.7	11.99	53	9.25	9.24	54	11.1%	0.23 [−0.15, 0.61]
Robinson 2014	13.4	14	25	20.9	18.5	23	5.1%	−0.45 [−1.03, 0.12]
Seguias 2018	1.37	1.17	26	0.78	0.77	25	5.3%	0.58 [0.02, 1.15]
Seguias 2025 Study 4	31	24	59	30.537	26.8782	108	15.4%	0.02 [−0.30, 0.34]
Whitelock 2018 Study 1	15.74	14.55	34	17.405	16.5883	74	9.8%	−0.10 [−0.51, 0.30]
Whitelock 2018 Study 2	16.74	18.66	70	19.87	21.82	77	14.8%	−0.15 [−0.48, 0.17]
Whitelock 2019a	16.12	15.5	34	17.62	19.12	34	7.3%	−0.09 [−0.56, 0.39]
Total (95% CI)			**463**			**534**	**100.0%**	**−0.06 [−0.19, 0.07]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 12.64$, df = 12 (P = 0.40); $I^2 = 5\%$
Test for overall effect: Z = 0.91 (P = 0.36)

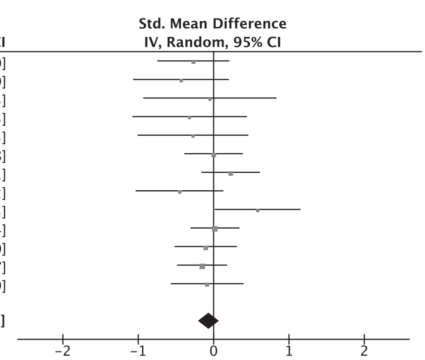

Fig. 3. Forest plot of studies exploring the effect of mindfulness/mindful eating on immediate hunger.

Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Allirot 2018	6.7	1.834	35	6.27	2.2481	35	12.1%	0.21 [−0.26, 0.68]
Fisher 2016	48	25.1	20	35.4	20.1	20	6.7%	0.54 [−0.09, 1.18]
Hinton 2021 Fullness	80.71	13.96	22	78.24	12.38	10	4.8%	0.18 [−0.57, 0.93]
Hinton 2021 Taste	79.23	12.07	22	78.24	12.38	11	5.1%	0.08 [−0.64, 0.80]
Palascha 2021 Early Symptoms	61.38	16.08	53	64.19	18.19	53	18.4%	−0.16 [−0.54, 0.22]
Palascha 2021 Late Symptoms	18.06	14.81	53	20.47	16.7	54	18.6%	−0.15 [−0.53, 0.23]
Seguias 2018	4.25	0.82	26	4.52	0.94	25	8.8%	−0.30 [−0.85, 0.25]
Whitelock 2018 Study 2	60.9	26.57	70	58.12	27.48	77	25.5%	0.10 [−0.22, 0.43]
Total (95% CI)			**301**			**285**	**100.0%**	**0.02 [−0.15, 0.18]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 6.65$, df = 7 (P = 0.47); $I^2 = 0\%$
Test for overall effect: Z = 0.19 (P = 0.85)

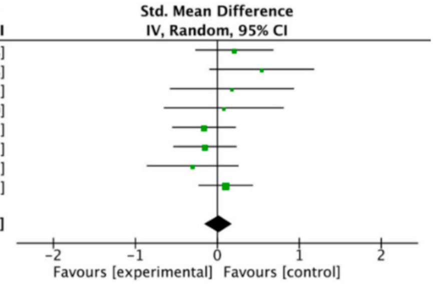

Fig. 4. Forest plot of studies exploring the effect of mindfulness/mindful eating on immediate fullness.

Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Higgs 2011	27.444	19.98	10	45.9	17.201	10	6.1%	−0.95 [−1.88, −0.01]
Robinson 2014	35.8	23	25	42.7	27.1	23	14.9%	−0.27 [−0.84, 0.30]
Whitelock 2018 Study 1	41.21	25.08	34	48.81	24.2582	74	25.0%	−0.31 [−0.72, 0.10]
Whitelock 2018 Study 2	50.71	28.1	70	49.14	24.6	77	34.1%	0.06 [−0.26, 0.38]
Whitelock 2019a	40.59	23.48	34	44.38	24.16	34	19.8%	−0.16 [−0.63, 0.32]
Total (95% CI)			**173**			**218**	**100.0%**	**−0.19 [−0.43, 0.05]**

Heterogeneity: $Tau^2 = 0.02$; $Chi^2 = 5.14$, df = 4 (P = 0.27); $I^2 = 22\%$
Test for overall effect: Z = 1.52 (P = 0.13)

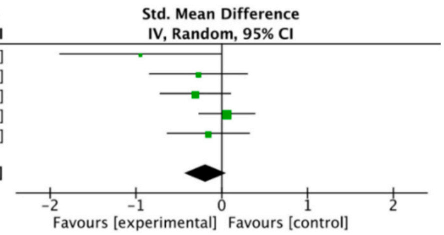

Fig. 5. Forest plot of studies exploring the effect of mindfulness/mindful eating on delayed hunger.

significant subgroup differences were observed across studies with different types of settings, interventions or food intake measures. Data from eleven studies showed no significant effects of mindfulness and mindful eating on hunger or fullness.

4.1. Effects on food intake

The significant effects of mindfulness and mindful eating on food intake align with those reported by Warren et al. (2017) and Kao et al. (2025). However, they differ from Grider et al. (2021), who found no significant effect of mindful eating interventions on dietary intake. This may be because our review included laboratory-based experimental research, whilst Grider et al. (2021) focused solely on randomized controlled trials and long-term intervention studies. In line with this, our sub-group analyses showed no significant effects in studies conducted outside the laboratory, whereas significant effects were observed in laboratory-based studies. Although subgroup differences were not statistically significant, and therefore these findings should be interpreted cautiously, the marked differences in effects sizes provide a plausible account for the discrepancy between our findings and those of Grider et al. (2021).

There are several possible reasons for the observed pattern between laboratory and non-laboratory studies. First, laboratory studies allow for more precise measurement of food intake. Reductions in food intake observed in these studies were small and may be difficult to detect by the type of self-report measures typically used in non-laboratory-based studies. Over time, small, consistent reductions in intake will be clinically meaningful, but developing measures that are sufficiently sensitive to detect such changes outside the laboratory setting remains a challenge. Food intake tends to be measured concurrently or immediately after mindfulness practices in laboratory studies, but this is not the case in non-laboratory studies. Therefore, mindfulness practices having acute short-term effects on food intake may explain the difference in findings between laboratory vs. non-laboratory studies.

Another possibility is that participants compensate for short term reductions in food intake by increasing their food intake at later time points. Over the course of a day acute reductions to food intake caused by manipulations of food properties (e.g., portion size, energy density) are in part compensated for at later meals (Robinson et al., 2022; Robinson et al., 2023). It is feasible that such compensatory eating may occur in response to mindfulness eating driven reductions in acute food intake. Finally, mindfulness manipulations may be more effective when administered in laboratory settings due to reduced distractions and higher levels of participant adherence. The use of adherence measures and manipulation checks in non-laboratory studies could help establish whether this is a factor.

4.2. Subgroup analyses

The findings revealed no significant differences in effect sizes between studies that used present moment awareness in isolation and those that combined it with acceptance. This fails to support MAT (Lindsay & Creswell, 2017), which states that acceptance is critical for mitigating the heightened affective reactivity that may occur with increased present moment awareness. However, the pattern of results was in the predicted direction with studies incorporating an acceptance component showing a higher pooled effect size than those without. There were only eleven studies incorporating an acceptance component so the analysis may have been underpowered. More studies directly contrasting mindful eating practices with and without acceptance would be informative.

Likewise, there was no difference between studies that used an attention regulation component and those that did not. This suggests that attention regulation, while theoretically linked to improvements in working memory, emotion regulation and meta-awareness (Jha et al., 2019; Tapper, 2022), may not be a prerequisite for effective mindfulness and mindful eating interventions. However, it is worth noting that even in studies where attention regulation was not explicitly emphasized, participants may have naturally engaged in such regulation. It is also possible that the benefits of attention regulation only emerge after repeated practice, which may explain the lack of effects observed in these studies, most of which involved only a single mindfulness session. Future research could investigate whether attention regulation occurs without explicit instructions and whether its potential benefits only become apparent after repeated practice.

Given the various operationalizations of mindfulness and mindful eating in the literature, a key aim of this review was to compare effects across different practices. Interestingly, there were no differences in effects between studies that used sensory eating in isolation, in combination with other strategies, or not at all. Effect sizes showed little variation between the three subgroups. This suggests that the overall effect observed was unlikely to be solely driven by this particular mindful eating strategy. Similarly, although the subgroup analysis focusing solely on studies with the 'present moment awareness of the body/bodily sensations' component was significant, it yielded a very small effect size. The planned subgroup analysis on studies with the decentering component could not be conducted due to the limited number of studies. Consequently, no definitive conclusions can be made regarding which specific mindfulness or mindful eating practices are more effective. Future studies directly comparing the effects of different types of mindful eating and mindfulness practices on intake would be beneficial.

The subgroup analyses also showed no differences in effects between studies incorporating additional non-mindfulness components, such as self-compassion or nutrition education, and those exclusively employing mindfulness and/or mindful eating strategies. This finding is reassuring as it rules out the possibility that intervention effects are being driven by non-mindfulness components. However, of note is that the pooled effect size of studies incorporating additional non-mindfulness components displayed a greater reduction in food intake compared to those solely focused on mindfulness/mindful eating strategies, suggesting that the use of additional components may enhance the effects of the intervention.

4.3. Appetite

There was no effect of mindfulness/mindful eating on either immediate or delayed hunger, or immediate fullness. This is noteworthy, considering one of the potential mechanisms through which mindfulness and mindful eating might influence food intake is via appetite (Tapper, 2022). However, the results of this review found no evidence to support such an effect. One possible explanation is that most participants already recognize their hunger and fullness signals but often disregard them, leading them to overeat. Instead of influencing hunger and satiety, mindfulness practices may instead help people eat in accordance with these signals. This notion aligns with the perspective that eating is largely automatic (Cohen & Farley, 2008), and mindfulness and mindful eating may mitigate eating automaticity by transforming the decision to continue eating into a conscious rather than automatic one (Tapper, 2017; Teper et al., 2013). Exploring the effects of mindfulness/mindful eating on eating automaticity could offer further insights into this phenomenon.

4.4. Intuitive eating

The review found no intuitive eating studies that met the eligibility criteria, preventing definitive conclusions about the impact of intuitive eating interventions on food intake and appetite. This lack of studies may be due to the review's requirement for an intuitive eating manipulation, whereas most studies in this field assess intuitive eating using questionnaires such as the Intuitive Eating Scale (IES). Among the few studies that included an intuitive eating intervention, food intake measurements were absent, with a focus instead on food quality. This is consistent with previous reviews by Warren et al. (2017) and Grider et al. (2021), which also found limited research on intuitive eating interventions and food intake, with some studies emphasizing eating behaviors or BMI rather than food intake. Given that intuitive eating aims to improve eating behavior and diet quality rather than reduce food intake, future research could explore its impact on food intake to determine if it leads to unintentional reductions in consumption. As the focus is on diet quality, consumption of high energy dense foods could be explored in particular. As noted above, it is difficult to accurately measure food intake outside the laboratory, but consistent reductions are typically reflected in weight loss which can be measured objectively.

4.5. Strengths, limitations and methodological recommendations

A key strength of this review is its theoretically informed dismantling approach, designed to help further our understanding of the processes via which mindful eating practices might exert effects on food intake. This type of understanding is essential for the effective development of mindful eating interventions across diverse contexts. Although some of the comparisons we aimed to test were underpowered, the framework we developed could help guide future empirical research and reviews.

A key limitation of the review is that the majority of study participants were women. This limits the generalizability of the findings as men may engage differently with mindfulness and mindful eating practices. Gender-specific differences in eating behaviors have also been documented in previous research (Kiefer et al., 2005). It is therefore important for future research to explore the effects of mindfulness and mindful eating interventions on food intake in men to better understand any gender-specific differences. The review also identified only four studies conducted with children, two of which aimed to increase intake while two aimed to reduce it. This variability in intervention goals may have contributed to a lack of clear overall effects. There is a need for future research to establish more conclusive findings in children, with a particular emphasis on distinguishing between interventions designed to increase versus decrease intake in order to more accurately assess their efficacy.

Another limitation of the current review is that the risk of bias analysis indicated that nearly all the included studies were susceptible to some degree of bias. Out of the forty-six studies examined, only one met all the quality criteria. Most studies were not pre-registered, heightening the risk of selective reporting. Most studies also failed to use procedures to reduce researcher influence (i.e. blinding researchers to group allocation or using a script to standardize researcher-participant interactions). Additionally, most studies did not use an appropriate manipulation check making it difficult to determine whether the mindful manipulation achieved its intended effects. To mitigate bias risks, future studies should strive to preregister hypotheses and analyses plans, limit risks of researcher influence (via blinding and/or the use of limited or scripted interactions), and incorporate manipulation checks.

A final limitation is the exclusion of clinical samples. As such, the findings may not be generalizable to clinical populations, and future reviews should consider including clinical samples to better understand the applicability of mindful eating interventions in these groups.

5. Conclusions

This was the first systematic review and meta-analysis of the effects of mindfulness and mindful eating studies on food intake and appetite. The results showed that mindfulness and mindful eating interventions significantly reduced food consumption, albeit with a small effect size. Contrary to expectations, there was no evidence that mindful eating or mindfulness influenced appetite. This was also the first review to use meta-analysis to test predictions about potential mechanisms of action underpinning the effects of mindfulness on eating. We found no evidence to support MAT (Lindsay & Creswell, 2017), or working memory-based accounts. However, these analyses may have been underpowered. The review highlights the need for higher-quality studies as well as research exploring the effects of mindfulness on appetite and the impact of intuitive eating on energy intake. These findings provide valuable insights for future research, suggesting the need for more nuanced studies across diverse populations and environments, as well as exploring the mechanisms behind these interventions and improving their real-world application.

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Declaration of competing interest

No conflict of interest is identified by the authors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cpr.2026.102780.

Data availability

Data will be made available on request.

References

Ahmadyar, K., Robinson, E., & Tapper, K. (2024). The effect of a mindfulness-based body scan exercise on food intake during TV watching. *Appetite, 192*, 107131. https://doi.org/10.1016/j.appet.2023.107131

Allirot, X., Miragall, M., Perdices, I., Baños, R. M., Urdaneta, E., & Cebolla, A. (2018). Effects of a brief mindful eating induction on food choices and energy intake: External eating and mindfulness state as moderators. *Mindfulness, 9*, 750–760. https://doi.org/10.1007/s12671-017-0812-0

Arch, J. J., Brown, K. W., Goodman, R. J., Della Porta, M. D., Kiken, L. G., & Tillman, S. (2016). Enjoying food without caloric cost: The impact of brief mindfulness on laboratory eating outcomes. *Behaviour Research and Therapy, 79*(9kp, 0372477), 23–34. https://doi.org/10.1016/j.brat.2016.02.002

Barkus, E. (2020). Effects of working memory training on emotion regulation: Transdiagnostic review. *PsyCh Journal, 9*(2), 258–279. https://doi.org/10.1002/pchj.353

Bechara, A., & Martin, E. M. (2004). Impaired decision making related to working memory deficits in individuals with substance addictions. *Neuropsychology, 18*(1), 152. https://doi.org/10.1037/0894-4105.18.1.152

Bennett, C., Copello, A., Jones, C., & Blissett, J. (2020). Children overcoming picky eating (COPE)—A cluster randomised controlled trial. *Appetite, 154*(6jw, 8006808), Article 104791. https://doi.org/10.1016/j.appet.2020.104791

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., … Velting, D. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3), 230. https://doi.org/10.1093/clipsy.bph077

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Carriere, K., Khoury, B., Gunak, M. M., & Knauper, B. (2018). Mindfulness-based interventions for weight loss: A systematic review and meta-analysis. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity, 19*(2), 164–177. https://doi.org/10.1111/obr.12623

Carrière, K., Siemers, N., & Knäuper, B. (2022). A scoping review of mindful eating interventions for obesity management. *Mindfulness, 13*(6), 1387–1402. Scopus. https://doi.org/10.1007/s12671-022-01883-x

Cavanagh, K., Vartanian, L. R., Herman, C. P., & Polivy, J. (2014). The effect of portion size on food intake is robust to brief education and mindfulness exercises. *Journal of Health Psychology, 19*(6), 730–739. https://doi.org/10.1177/1359105313478645

Chang, B. P. I., Mulders, M. D. G. H., Cserjesi, R., Cleeremans, A., & Klein, O. (2018). Does immersion or detachment facilitate healthy eating? Comparing the effects of sensory imagery and mindful decentering on attitudes and behavior towards healthy and unhealthy food. *Appetite, 130*(6jw, 8006808), 256–267. https://doi.org/10.1016/j.appet.2018.08.013

Cohen, D., & Farley, T. A. (2008). Peer reviewed: Eating as an automatic behavior. *Preventing Chronic Disease, 5*(1).

Cohen, J. (1988). *Statistical power analysis for the Behavioral sciences* (2nd ed.). Routledge. https://doi.org/10.4324/9780203771587

Deeks, J. J., Higgins, J. P., Altman, D. G., & Cochrane Statistical Methods Group. (2019). Analysing data and undertaking meta-analyses. In *Cochrane handbook for systematic reviews of interventions* (pp. 241–284).

Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology & Community Health, 52*(6), 377–384. https://doi.org/10.1136/jech.52.6.377

Dunn, C., Haubenreiser, M., Johnson, M., Nordby, K., Aggarwal, S., Myer, S., & Thomas, C. (2018). Mindfulness approaches and weight loss, weight maintenance, and weight regain. *Current Obesity Reports, 7*(1), 37–49. https://doi.org/10.1007/s13679-018-0299-6

Dutt, S., Keyte, R., Egan, H., Hussain, M., & Mantzios, M. (2019). Healthy and unhealthy eating amongst stressed students: Considering the influence of mindfulness on eating choices and consumption. *Health Psychology Report, 7*(2), 113–120. https://doi.org/10.5114/hpr.2019.77913

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56*(2), 455–463. https://doi.org/10.1111/j.0006-341X.2000.00455.x

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ (Clinical Research Ed.), 315*(7109), 629–634. https://www.jstor.org/stable/25175671.

Fisher, N., Lattimore, P., & Malinowski, P. (2016). Attention with a mindful attitude attenuates subjective appetitive reactions and food intake following food-cue exposure. *Appetite, 99*(6jw, 8006808), 10–16. https://doi.org/10.1016/j.appet.2015.12.009

Fuentes Artiles, R., Staub, K., Aldakak, L., Eppenberger, P., Ruhli, F., & Bender, N. (2019). Mindful eating and common diet programs lower body weight similarly: Systematic review and meta-analysis. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity, 20*(11), 1619–1627. https://doi.org/10.1111/obr.12918

Gayoso, L., de Tomas, I., Téllez, R., Maiz, E., & Etxeberria, U. (2021). Mindfulness-based eating intervention in children: Effects on food intake and food-related behaviour during a mid-morning snack. *Mindfulness, 12*(5), 1185–1194. Scopus. https://doi.org/10.1007/s12671-020-01587-0

Godsey, J. (2013). The role of mindfulness based interventions in the treatment of obesity and eating disorders: An integrative review. *Complementary Therapies in Medicine, 21*(4), 430–439. https://doi.org/10.1016/j.ctim.2013.06.003

Grider, H. S., Douglas, S. M., & Raynor, H. A. (2021). The influence of mindful eating and/or intuitive eating approaches on dietary intake: A systematic review. *Journal of the Academy of Nutrition and Dietetics, 121*(4), 709–727.e1. https://doi.org/10.1016/j.jand.2020.10.019

Haynes, A., Kersbergen, I., Sutin, A., Daly, M., & Robinson, E. (2018). A systematic review of the relationship between weight status perceptions and weight loss attempts, strategies, behaviours and outcomes. *Obesity Reviews, 19*(3), 347–363. https://doi.org/10.1111/obr.12634.

Higgs, S., & Donohoe, J. E. (2011). Focusing on food during lunch enhances lunch memory and decreases later snack intake. *Appetite, 57*(1), 202–206. https://doi.org/10.1016/j.appet.2011.04.016

Hinojosa-Aguayo, I., & González, F. (2022). Cognitive defusion as strategy to reduce the intensity of craving episodes and improve eating behavior. *The Spanish Journal of Psychology, 25*, e1. https://doi.org/10.1017/SJP.2021.47

Hinson, J. M., Jameson, T. L., & Whitney, P. (2003). Impulsive decision making and working memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 29*(2), 298. https://doi.org/10.1037/0278-7393.29.2.298.

Hinton, E. C., Leary, S. D., Comlek, L., Rogers, P. J., & Hamilton-Shield, J. P. (2021). How full am I? The effect of rating fullness during eating on food intake, eating speed and relationship with satiety responsiveness. *Appetite, 157*(6jw, 8006808), Article 104998. https://doi.org/10.1016/j.appet.2020.104998

Hong, P. Y., Hanson, M. D., Lishner, D. A., Kelso, S. L., & Steinert, S. W. (2018). A field experiment examining mindfulness on eating enjoyment and behavior in children. *Mindfulness, 9*, 1748–1756. https://doi.org/10.1007/s12671-018-0916-1

Hsu, T., & Forestell, C. A. (2021). Mindfulness, depression, and emotional eating: The moderating role of nonjudging of inner experience. *Appetite, 160*(6jw, 8006808), Article 105089. https://doi.org/10.1016/j.appet.2020.105089

Hussain, M., Egan, H., Keyte, R., & Mantzios, M. (2020). Exploring the role of self-kindness in making healthier eating choices: A preliminary study. *International Journal of Behavioral Medicine, 28*(5), 664–669. https://doi.org/10.1007/s12529-020-09942-0

Hussain, M., Egan, H., Keyte, R., & Mantzios, M. (2021). Mindful construal reflections: Reducing unhealthier eating choices. *Mindfulness, 12*(7), 1757–1767. Scopus. https://doi.org/10.1007/s12671-021-01638-0

Iturbe, I., Urkia-Susin, I., Echeburúa, E., Barbón, A. M., & Maiz, E. (2024). An acceptance and commitment therapy and mindfulness group intervention for the psychological and physical well-being of adults with body mass indexes in the overweight or obese range: The Mind&Life randomized controlled trial. *Journal of Contextual Behavioral Science, 34*, 100827. https://doi.org/10.1016/j.jcbs.2024.100827.

Jenkins, K. T., & Tapper, K. (2014). Resisting chocolate temptation using a brief mindfulness strategy. *British Journal of Health Psychology, 19*(3), 509–522. https://doi.org/10.1111/bjhp.12050

Jha, A. P., Denkova, E., Zanesco, A. P., Witkin, J. E., Rooks, J., & Rogers, S. L. (2019). Does mindfulness training help working memory 'work' better? *Current Opinion in Psychology, 28*, 273–278. https://doi.org/10.1016/j.copsyc.2019.02.012

Jordan, C. H., Wang, W., Donatoni, L., & Meier, B. P. (2014). Mindful eating: Trait and state mindfulness predict healthier eating behavior. *Personality and Individual Differences, 68*, 107–111. https://doi.org/10.1016/j.paid.2014.04.013

Kao, T. S. A., Ling, J., Alanazi, M., Atwa, A., & Liu, S. (2025). Effects of mindfulness-based interventions on obesogenic eating behaviors: A systematic review and meta-analysis. *Obesity Reviews, 26*(3), Article e13860. https://doi.org/10.1111/obr.13860

Kao, T. S. A., Ling, J., Alanazi, M., Bara, N., & Barnes Najor, J. (2025). Feasibility and preliminary effects of the mindful healthy family project among rural families. *Health Psychology and Behavioral Medicine, 13*(1), 2446368. https://doi.org/10.1080/21642850.2024.2446368.

Katterman, S. N., Kleinman, B. M., Hood, M. M., Nackers, L. M., & Corsica, J. A. (2014). Mindfulness meditation as an intervention for binge eating, emotional eating, and weight loss: A systematic review. *Eating Behaviors, 15*(2), 197–204. https://doi.org/10.1016/j.eatbeh.2014.01.005

Kiefer, I., Rathmanner, T., & Kunze, M. (2005). Eating and dieting differences in men and women. *Journal of Men's Health and Gender, 2*(2), 194–201. https://doi.org/10.1016/j.jmhg.2005.04.010.

Lindsay, E. K., & Creswell, J. D. (2017). Mechanisms of mindfulness training: Monitor and Acceptance Theory (MAT). *Clinical Psychology Review, 51*, 48–59. https://doi.org/10.1016/j.cpr.2016.10.011.

Long, S., Meyer, C., Leung, N., & Wallis, D. J. (2011). Effects of distraction and focused attention on actual and perceived food intake in females with non-clinical eating psychopathology. *Appetite, 56*(2), 350–356. https://doi.org/10.1016/j.appet.2010.12.018

Lyzwinski, L. N., Caffery, L., Bambling, M., & Edirippulige, S. (2018a). A systematic review of electronic mindfulness-based therapeutic interventions for weight, weight-related behaviors, and psychological stress. *Telemedicine Journal and E-Health: The Official Journal of the American Telemedicine Association, 24*(3), 173–184. https://doi.org/10.1089/tmj.2017.0117

Lyzwinski, L. N., Caffery, L., Bambling, M., & Edirippulige, S. (2018b). Relationship between mindfulness, weight, and weight-related behaviors in college students: A systematic review. *Alternative and Complementary Therapies, 24*(5), 202–214. https://doi.org/10.1089/act.2018.29182.lnl

Mantzios, M. (2023). Mindful eating: A conceptual critical review of the literature, measurement and intervention development. *Nutrition and Health, 29*(3), 435–441. https://doi.org/10.1177/02601060231153427

Mantzios, M., Egan, H., & Asif, T. (2020). A randomised experiment evaluating the mindful raisin practice as a method of reducing chocolate consumption during and after a mindless activity. *Journal of Cognitive Enhancement, 4*, 250–257. https://doi.org/10.1007/s41465-019-00159-y

Mantzios, M., Skillett, K., & Egan, H. (2019). Examining the effects of two mindful eating exercises on chocolate consumption. *European Journal of Health Psychology, 26*(4), 120–128. https://doi.org/10.1027/2512-8442/a000040

Mantzios, M., & Wilson, J. C. (2015). Mindfulness, eating behaviours, and obesity: A review and reflection on current findings. *Current Obesity Reports, 4*(1), 141–146. https://doi.org/10.1007/s13679-014-0131-x

Marchiori, D., & Papies, E. K. (2014). A brief mindfulness intervention reduces unhealthy eating when hungry, but not the portion size effect. *Appetite, 75*(6jw, 8006808), 40–45. https://doi.org/10.1016/j.appet.2013.12.009

Martin, L. M., Espel-Huynh, H. M., Marando-Blanck, S., Evans, B. C., Forman, E. M., Butryn, M. L., … Herbert, J. D. (2017). Trusting homeostatic cues versus accepting hedonic cues: A randomized controlled trial comparing two distinct mindfulness-based intervention components. *Journal of Contextual Behavioral Science, 6*(4), 409–417. https://doi.org/10.1016/j.jcbs.2017.09.002

Masih, T., Dimmock, J. A., Epel, E., & Guelfi, K. J. (2020). An 8-week relaxation program consisting of progressive muscle relaxation and mindfulness meditation to reduce stress and attenuate stress-driven eating. *Applied Psychology. Health and Well-Being, 12*(1), 188–211. https://doi.org/10.1111/aphw.12179

McKenzie, J., Brennan, S., & Ryan, R. (2023). *Cochrane handbook for systematic reviews of interventions version 6.4 (updated August 2023)*. Cochrane. https://training.cochrane.org/handbook/current/chapter-03.

Mercado, D., Robinson, L., Gordon, G., Werthmann, J., Campbell, I. C., & Schmidt, U. (2021). The outcomes of mindfulness-based interventions for obesity and binge eating disorder: A meta-analysis of randomised controlled trials. *Appetite, 166*(6jw, 8006808), Article 105464. https://doi.org/10.1016/j.appet.2021.105464

Omiwole, M., Richardson, C., Huniewicz, P., Dettmer, E., & Paslakis, G. (2019). Review of mindfulness-related interventions to modify eating behaviors in adolescents. *Nutrients, 11*(12). https://doi.org/10.3390/nu11122917

O'Reilly, G. A., Cook, L., Spruijt-Metz, D., & Black, D. S. (2014). Mindfulness-based interventions for obesity-related eating behaviours: A literature review. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity, 15*(6), 453–461. https://doi.org/10.1111/obr.12156

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—A web and mobile app for systematic reviews. *Systematic Reviews, 5*, 1–10. https://doi.org/10.1186/s13643-016-0384-4.

Palascha, A., van Kleef, E., de Vet, E., & van Trijp, H. C. M. (2021). The effect of a brief mindfulness intervention on perception of bodily signals of satiation and hunger. *Appetite, 164*(6jw, 8006808), Article 105280. https://doi.org/10.1016/j.appet.2021.105280

Review Manager (Revman). (2020). *Version (5.4). The Cochrane Collaboration*. Available at: revman.cochrane.org.

Robinson, E., Aveyard, P., Daley, A., Jolly, K., Lewis, A., Lycett, D., & Higgs, S. (2013). Eating attentively: A systematic review and meta-analysis of the effect of food intake memory and awareness on eating. *The American Journal of Clinical Nutrition, 97*(4), 728–742. https://doi.org/10.3945/ajcn.112.045245

Robinson, E., Foote, G., Smith, J., Higgs, S., & Jones, A. (2021). Interoception and obesity: A systematic review and meta-analysis of the relationship between interoception and BMI. *International Journal of Obesity, 45*(12), 2515–2526. https://doi.org/10.1038/s41366-021-00950-y

Robinson, E., Kersbergen, I., & Higgs, S. (2014). Eating 'attentively' reduces later energy consumption in overweight and obese females. *The British Journal of Nutrition, 112*(4), 657–661. https://doi.org/10.1017/S000711451400141X

Robinson, E., Khuttan, M., McFarland-Lesser, I., Patel, Z., & Jones, A. (2022). Calorie reformulation: A systematic review and meta-analysis examining the effect of manipulating food energy density on daily energy intake. *International Journal of Behavioral Nutrition and Physical Activity, 19*(1). https://doi.org/10.1186/s12966-022-01287-z. Article 1.

Robinson, E., Patel, Z., & Jones, A. (2023). Downsizing food: A systematic review and meta-analysis examining the effect of reducing served food portion sizes on daily energy intake and body weight. *British Journal of Nutrition, 129*(5), 888–903. https://doi.org/10.1017/S0007114522000903

Rogers, J. M., Ferrari, M., Mosely, K., Lang, C. P., & Brennan, L. (2017). Mindfulness-based interventions for adults who are overweight or obese: A meta-analysis of physical and psychological health outcomes. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity, 18*(1), 51–67. https://doi.org/10.1111/obr.12461

Ruffault, A., Czernichow, S., Hagger, M. S., Ferrand, M., Erichot, N., Carette, C., … Flahault, C. (2017). The effects of mindfulness training on weight-loss and health-related behaviours in adults with overweight and obesity: A systematic review and meta-analysis. *Obesity Research & Clinical Practice, 11*(5 Suppl 1), 90–111. https://doi.org/10.1016/j.orcp.2016.09.002

Sant'Anna, E. M., Paiva, S. P. C., Santos, R. P., Rodrigues, A. M. S., Davis, N. A., Nery, S. F., … Reis, F. M. (2020). Mindfulness-based program to support lifestyle modification and weight loss in infertile women: Randomized controlled trial. *Journal of Psychosomatic Obstetrics and Gynecology*. https://doi.org/10.1080/0167482X.2020.1823962 (Sant'Anna, Paiva, Santos, Nery, Reis) Department of Obstetrics and Gynecology, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil.

Schmeichel, B. J., & Tang, D. (2015). Individual differences in executive functioning and their relationship to emotional processes and responses. *Current Directions in Psychological Science, 24*(2), 93–98. https://doi.org/10.1177/0963721414555178

Seguias, L., Ferriday, D., Hinton, E. C., McCaw, T., & Tapper, K. (2025). Mindful eating and food intake: Effects and mechanisms of action. *Journal of Experimental Psychology. Applied, 31*(3), 168–187. https://doi.org/10.1037/xap0000530

Seguias, L., & Tapper, K. (2018). The effect of mindful eating on subsequent intake of a high calorie snack. *Appetite, 121*(6jw, 8006808), 93–100. https://doi.org/10.1016/j.appet.2017.10.041

Seguias, L., & Tapper, K. (2022). A randomized controlled trial examining the effects of mindful eating and eating without distractions on food intake over a three-day period. *Nutrients, 14*(5). https://doi.org/10.3390/nu14051043

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*(3), 373–386. https://doi.org/10.1002/jclp.20237

Simonson, A. P., Davis, K. K., Barone Gibbs, B., Venditti, E. M., & Jakicic, J. M. (2020). Comparison of mindful and slow eating strategies on acute energy intake. *Obesity Science & Practice, 6*(6), 668–676. https://doi.org/10.1002/osp4.441

Sosa-Cordobés, E., Ramos-Pichardo, J. D., Sánchez-Ramos, J. L., García-Padilla, F. M., Fernández-Martínez, E., & Garrido-Fernández, A. (2023). How effective are mindfulness-based interventions for reducing stress and weight? A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health, 20*(1). https://doi.org/10.3390/ijerph20010446. Article 1.

Spadaro, K. C., Davis, K. K., Sereika, S. M., Gibbs, B. B., Jakicic, J. M., & Cohen, S. M. (2018). Effect of mindfulness meditation on short-term weight loss and eating behaviors in overweight and obese adults: A randomized controlled trial. *Journal of Complementary and Integrative Medicine, 15*(2). https://doi.org/10.1515/jcim-2016-0048

Sterne, J. A., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., … Eldridge, S. M. (2019). RoB 2: A revised tool for assessing risk of bias in randomised trials. *BMJ, 366*. https://doi.org/10.1136/bmj.l4898

Stubbs, R. J., Hughes, D. A., Johnstone, A. M., Rowley, E., Reid, C., Elia, M., … Blundell, J. (2000). The use of visual analogue scales to assess motivation to eat in human subjects: A review of their reliability and validity with an evaluation of new hand-held computerized systems for temporal tracking of appetite ratings. *British Journal of Nutrition, 84*(4), 405–415. https://doi.org/10.1017/s0007114500001719

Tapper, K. (2017). Can mindfulness influence weight management related eating behaviors? If so, how? *Clinical Psychology Review, 53*(cnx, 8111117), 122–134. https://doi.org/10.1016/j.cpr.2017.03.003

Tapper, K. (2022). Mindful eating: What we know so far. *Nutrition Bulletin*. https://doi.org/10.1111/nbu.12559. Scopus.

Tapper, K., & Seguias, L. (2020). The effects of mindful eating on food consumption over a half-day period. *Appetite, 145*(6jw, 8006808), Article 104495. https://doi.org/10.1016/j.appet.2019.104495

Teper, R., Segal, Z. V., & Inzlicht, M. (2013). Inside the mindful mind: How mindfulness enhances emotion regulation through improvements in executive control. *Current Directions in Psychological Science, 22*(6), 449–454. https://doi.org/10.1177/0963721413495869

de Tomas, I., Maiz, E., Goiri, F., Yu, K., Toran-Pereg, P., Castrillo, P., & Etxeberria, U. (2020). Mindful eating: Effects of a brief induction in the choice and intake of food in children. *Current Psychology*, 1–11.

Timmerman, G. M., & Brown, A. (2012). The effect of a mindful restaurant eating intervention on weight management in women. *Journal of Nutrition Education and Behavior, 44*(1), 22–28. https://doi.org/10.1016/j.jneb.2011.03.143

Turgon, R., Ruffault, A., Juneau, C., Blatier, C., & Shankland, R. (2019). Eating disorder treatment: A systematic review and meta-analysis of the efficacy of mindfulness-based programs. *Mindfulness, 10*(11), 2225–2244. https://doi.org/10.1007/s12671-019-01216-5

Tylka, T. L. (2006). Development and psychometric evaluation of a measure of intuitive eating. *Journal of Counseling Psychology, 53*(2), 226. https://doi.org/10.1037/0022-0167.53.2.226.

Van De Veer, E., Van Herpen, E., & Van Trijp, H. C. (2016). Body and mind: Mindfulness helps consumers to compensate for prior food intake by enhancing the responsiveness to physiological cues. *Journal of Consumer Research, 42*(5), 783–803. https://doi.org/10.1093/jcr/ucv058.

Warren, J. M., Smith, N., & Ashwell, M. (2017). A structured literature review on the role of mindfulness, mindful eating and intuitive eating in changing eating behaviours: Effectiveness and associated potential mechanisms. *Nutrition Research Reviews, 30*(2), 272–283. https://doi.org/10.1017/S0954422417000154

Whitelock, V., Gaglione, A., Davies-Owen, J., & Robinson, E. (2019). Focused attention during eating enhanced memory for meal satiety but did not reduce later snack intake in men: A randomised within-subjects laboratory experiment. *Appetite, 136*(6jw, 8006808), 124–129. https://doi.org/10.1016/j.appet.2019.01.021

Whitelock, V., Higgs, S., Brunstrom, J. M., Halford, J. C. G., & Robinson, E. (2018). No effect of focused attention whilst eating on later snack food intake: Two laboratory experiments. *Appetite, 128*(6jw, 8006808), 188–196. https://doi.org/10.1016/j.appet.2018.06.002

Whitelock, V., Kersbergen, I., Higgs, S., Aveyard, P., Halford, J. C. G., & Robinson, E. (2019). A smartphone based attentive eating intervention for energy intake and weight loss: Results from a randomised controlled trial. *BMC Public Health, 19*(1), 611. https://doi.org/10.1186/s12889-019-6923-x

Zhang, D., Lee, E. K. P., Mak, E. C. W., Ho, C. Y., & Wong, S. Y. S. (2021). Mindfulness-based interventions: An overall review. *British Medical Bulletin, 138*(1), 41–57. https://doi.org/10.1093/bmb/ldab005