



# Systematic Literature Review on Psychological Treatment Methods for Substance use Disorder and Food Addiction

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## Abstract

Substance use disorder (SUD) and food addiction have acquired increasing focus in recent years among researchers. The increased prevalence of anxiety, addiction, and obesity in these disorders raises the need to evaluate the effectiveness of treatment methods to alleviate their symptoms. As both SUD and food addiction share behavioural components and overlapping neural patterns, there is potential to adapt treatment approaches from one disorder to the other. This study systematically reviewed the literature in the past decade, focusing on the efficacy of various psychological treatments using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The present research reviewed a total of 48 empirical studies. The results of this review found very limited research on food addiction treatment, with only two studies considering this issue. In contrast, the results identified two central and common psychological treatment methods for SUD: concurrent treatment of post-traumatic stress disorder (PTSD) and substance use disorders using prolonged exposure and computer-assisted delivery of cognitive-behavioural therapy. Taken together, the findings suggest the need for future research on the adaptation of psychological treatments for SUD to food addiction due to the potential shared mechanisms and the limited availability of treatments for food addiction.

**Keywords** Systematic review · SUD · Addiction · CBT · Food addiction · Substance use disorder · Treatment transfer · Mindfulness intervention

## Introduction

Addiction exists on a spectrum of severity, ranging from mild to severe, with varying impacts on individuals' lives (McMurran, 1994). This variability of addiction highlights the need for personalised treatment approaches tailored to an individual's specific symptoms and circumstances. Building on this concept, Griffiths' (2005) components model

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of addiction identified shared underlying mechanisms across different forms of addiction, such as substance use disorder (SUD) and other addictive disorders such as food addiction. Recognising these commonalities suggests that treatment frameworks developed for one type of addiction could inform treatment methods for another, supporting a more integrated approach to addressing addictive behaviours.

The proposed shared components model includes features of salience, mood modification, tolerance, withdrawal, conflict, and relapse. First, SUD and food addiction share salience (Griffiths, 2005), which refers to the dominance of the addictive behaviour in a person's life, where thoughts become more frequent and cravings intensify. Salience in SUD can reflect an increase in focus on drug-related stimuli, often leading to a diminished awareness of other rewards (Taebi et al., 2022). In food addiction, salience may be manifested as a form of increased preoccupation with the next high-calorie meal (Wiss et al., 2020). That is, individuals often find themselves planning meals, thinking about food during work or social activities, and having intense cravings that override other responsibilities.

Furthermore, mood modification is another commonality between SUD and food addiction (Griffiths, 2005). Addicted individuals use substances and consume food to alter their emotional state. Mood modification is described as a subjective experience resulting from engaging in an addictive activity (Griffiths, 2005), that can lead to the experience of a 'high', relieving stress, and allowing individuals to escape from uncomfortable situations. In SUD, mood modification is described as disturbances in emotion regulation (Stellern et al., 2023), whereas food addiction leads individuals to experience a 'buzz' (i.e. a feeling of heightened pleasure that individuals experience after consuming certain foods, most often those high in sugar, fat or salt) after a satisfying meal, use food as a reward or seek an escape from negative emotions such as anxiety, stress and/or sadness (Meadows et al., 2017).

Closely related to mood modification is the concept of tolerance. Griffiths (2005) described tolerance as the need to increase the level of addictive behaviour to achieve the same effects before being habituated. In SUD, for example, an individual suffering from alcohol use disorder would need to consume more drinks over time to experience the same feeling that they felt when they first began drinking (Elvig et al., 2021). Although research on tolerance in food addiction remains limited, anticipatory responses to food may provide insights. Food-related stimuli, such as the sight or smell of food, trigger a compensatory response in the form of cephalic insulin secretion, which helps a food addict's body prepare for incoming nutrients (Gearhardt et al., 2009). Similar to the compensatory mechanisms seen with drugs of abuse, this insulin response reduces glucose levels, leading to cravings for foods high in fat and sugar (Gearhardt et al., 2009). Over time, the individual will require greater quantities of these high-fat, high-sugar foods to achieve the same rewarding effects (Gordon et al., 2018). This is similar to the gradual increase in drug use seen in SUD, where the body becomes accustomed to the substance, needing larger doses to achieve the same effect (Volkow & Blanco, 2023). These common processes (i.e., physical adaptations and the need for higher consumption) demonstrate that tolerance is a core feature shared by SUD and food addiction.

Withdrawal symptoms are also shared between SUD and food addiction. Those symptoms are unpleasant feelings that arise when the addictive activity is discontinued or abruptly reduced (Griffiths, 2005). In SUD, particularly during opioid withdrawal, symptoms start with agitation, anxiety and muscle aches, followed by dilated pupils, nausea, and vomiting (Pergolizzi Jr et al., 2020). Similarly, food addicts experience negative physical and emotional consequences after stopping the addictive activity (Parnarouskis et al.,

2022). For example, irritability, headaches, and sluggishness are common when high-caloric fat and sugar intake are reduced (Parnarouskis et al., 2022).

A further shared component is conflict. Griffiths (2005) described a confrontation between interpersonal conflict and intrapsychic conflict. In SUD, more specifically in people experiencing SUD, conflict arises in personal relationships with family and friends, as well as with colleagues at work and in a variety of social activities (Daley, 2013). Similarly, in food addiction, personal relationships are often impacted. Research identified a positive correlation between loneliness and eating habits, indicating that individuals may use food as a coping mechanism for social isolation. This complex personal relationship may give rise to additional difficulties, such as challenges in interpersonal relationships (Dinçyurek et al., 2018).

The final commonality is relapse (i.e., the repeated return to the maladaptive behaviour (Griffiths, 2005)). In SUD, for example, individuals addicted to smoking who abstain for a long period of time often revert to their full-time smoking habits after tasting a few cigarettes (Lee et al., 2021). Similarly, the weight loss literature shows that the majority of individuals experiencing food addiction regain weight and fall back into sub-optimal eating habits (Gearhardt et al., 2009). These repeated returns to maladaptive behaviours highlight the persistent and relapsing nature of both SUD and food addiction.

In addition to the work in behavioural science (Griffiths, 2005), neuroscience research supports the idea of shared components between SUD and food addiction, showing similar brain regions activated during the addiction cycle in both conditions. Research on addiction neurocircuitries identified the basal ganglia, extended amygdala and prefrontal cortex as critical regions involved in different phases of addiction. Specifically, the basal ganglia are linked to the binge/intoxication phase, the extended amygdala is associated with the withdrawal/negative affect stage, and the prefrontal cortex is involved in the preoccupation/craving phase (Lindgren et al., 2018). These findings highlight how distinct neural regions contribute to the progression of addictive behaviours.

The binge/intoxication cycle is closely tied to the dopamine (DA) pathways and opioid peptides in the dorsal striatum, and the nucleus accumbens (NAc) (Lindgren et al., 2018; Olsen, 2011). Studies on drug abuse revealed significant brain alterations in the NAc, a structure of the basal ganglia that integrates information from cortical and limbic regions to mediate goal-directed behaviours, including altered dopamine signalling that reduces dopamine receptor availability and impairs reward processing (Scofield et al., 2016). In SUD, dysregulation of the NAc leads to major disruptions in goal-driven behaviour. In food addiction, the endogenous opioid systems interact with dopamine pathways, which are closely associated with the NAc and are responsible for motivation and reward, thereby promoting and enhancing food consumption (Barbano & Cador, 2007).

In addition, activation of the extended amygdala contributes to the negative emotional response associated with addiction withdrawal, including the stria terminalis, central nucleus of the amygdala, transition zone in the medial part of the NAc (Barbano & Cador, 2007). Research on SUD points to a reduction in dopaminergic activation as a key factor, suggesting that individuals with SUD experience a decrease in the sensitivity of the neural reward centre. Similar findings are observed in food addiction, where a depletion of dopamine in the ventrolateral neostriatum dominates individuals suffering from that condition (Salamone & Correa, 2012).

Lastly, the craving circuit in both SUD and food addiction engages the prefrontal cortex, the hippocampus and the insula (Barbano & Cador, 2007), as part of the activation of the dopamine and the reward systems. In SUD, drugs of abuse raise dopamine levels either through direct pharmacological effects or indirectly via the opioid, nicotine,

$\gamma$ -aminobutyric acid (GABA) or cannabinoid systems (Barbano & Cador, 2007). Food stimuli, on the other hand, can influence the endogenous opioids and cannabinoids systems in individuals who experience food addiction based on palatability, thereby leading to a delayed increase in dopamine after a peak of glucose and insulin levels (Barbano & Cador, 2007; Kalon et al., 2016). The food addiction literature suggests that hypothalamic dopamine is involved in appetite modulation and food intake, while dopamine receptors in the perifornical hypothalamus are associated with suppression of food intake. Finally, the neo-striatal dopamine is associated with sensorimotor and motor aspects of food intake, specifically related to food handling and oral motor function (Salamone & Correa, 2012).

Taken together, the shared mechanisms underlying SUD and food addiction suggest that treatment approaches may be transferable across different types of addictions. This systematic literature review critically examines psychological treatments for both SUD and food addiction. By focusing on the past decade when the concept of behavioural addiction was formally recognised (Wolff et al., 2016) and included in the DSM-5 (Polychronopoulos et al., 2014), this review aims to identify effective treatment methods and evaluate their potential transferability.

## Method

### Inclusion and Exclusion Criteria

To systematically evaluate the applicability of SUD treatments and food addiction treatments, this review used the patient, intervention, comparison, outcome (PICO; Eriksen & Frandsen, 2018) framework. Initially, this study aimed to identify treatment methods for SUD, sugar addiction and food addiction. With the PICO framework, the review focused on adults experiencing these conditions, assessing behavioural and psychological methods. The primary outcome was to map different treatment strategies and to explore associations between these addiction types. However, as the research evolved, the focus shifted towards a translational approach, where examining how SUD treatments could potentially be adapted for food addiction. Thus, instead of merely identifying existing treatment methods, the systematic review now emphasises the applicability and transferability of effective treatment methods.

The retrieved studies were eligible for subsequent review if they (1) included adult participants (18 years or older); (2) included only psychological treatments for SUD, food addiction and/or sugar addiction; (3) were published in English, Portuguese or French (languages the authors spoke); (4) were published in peer-reviewed journals; (5) used standardised psychometric test to measure symptoms; and (6) reported post-treatment effects.

As for the exclusion criteria, studies were not selected for the review if they (1) comprised reviews, case studies ( $n = 1$ ), protocols, pre-registrations, editorials/commentaries or feasibility studies; (2) employed only qualitative research methods; (3) included children, adolescents and/or animals; (4) recruited participants experiencing comorbid anorexia and/or bulimia or any other diagnosed eating disorder; and (5) emphasised weight loss strategies as the primary outcome of the psychological treatment administered (e.g. calorie restriction and/or nutritional intervention), as this review does not aim to focus on weight loss outcomes.

## Data Sources and Search Strategy

This review was pre-registered with PROSPERO in February 2024 (CRD42024501495). In this pre-registration, the aim was to understand similarities and differences between SUD, sugar addiction and food addiction, as well as to understand which psychological treatment methods are employed for each distinct addiction.

To systematically review the existing literature, we adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Liberati et al., 2009). The literature search involved screening and retrieving electronic journal articles through three academic databases: PubMed, PsycArticle and PsycINFO, a similar approach to previous systematic literature reviews in the addiction field (Fernandez et al., 2020; Hamonniere & Varescon, 2018; Şalvarlı & Griffiths, 2022). A comprehensive search in English, French and Portuguese was conducted. The adopted search strategy used for PubMed was the following: *'food addiction'(Title/Abstract) OR 'sugar addiction'(Title/Abstract) OR 'eating beh\*(Title/Abstract) OR 'substance use disorder'(Title/Abstract) AND (psychological(Title/Abstract) OR treatment\*(Title/Abstract) OR post\*(Title/Abstract) OR brain (Title/Abstract))*. Furthermore, the search in PsycArticle and PsycINFO databases used the following keywords in the title section: *'food addiction' OR 'sugar addiction' OR 'substance use disorder' AND 'psychological' OR 'treatment\*' OR 'post\*' OR 'brain'*, while focusing on the following headings: food addiction, addiction, substance use disorder, eating behaviour, substance use treatment.

## Study Selection and Data Extraction

The initial screening of journal articles was conducted by the first author (SH), while the last author and primary supervisor (HMP) reviewed the inclusion and exclusion decisions. Any disagreements during this stage of the study selection process were discussed and resolved through verbal discussion.

After screening the titles and abstracts of the identified studies, a full-text screening of the eligible journal articles was conducted against the inclusion and exclusion criteria; in a similar manner to the initial screening, SH reviewed the full texts and HMP reviewed 10% of the screened journal articles to ensure thoroughness and accuracy in the screening process. Any disparities were discussed and resolved based on the inclusion and exclusion criteria pre-determined.

Following this procedure, full data extraction was conducted on articles that passed the first stage, including authors' names, country (data collection), general focus of the study, psychological treatment method delivered, treatment characteristics, treatment length, type of addiction treated, gender, age, sample size, sample characteristics, standardised psychometric test used to measure the addiction, follow-up, measure findings and statistical technique utilised. See Fig. 1 to view the PRISMA flowchart indicating the full search strategy and the screening process.

## Quality Assessment Process

The quality of the included studies was systematically reviewed using the Newcastle Ottawa Quality Scale (NOS; *Ottawa Hospital Research Institute, n.d.-a, n.d.-b*) to ensure the methodological rigour of the review process. This assessment focused on three key

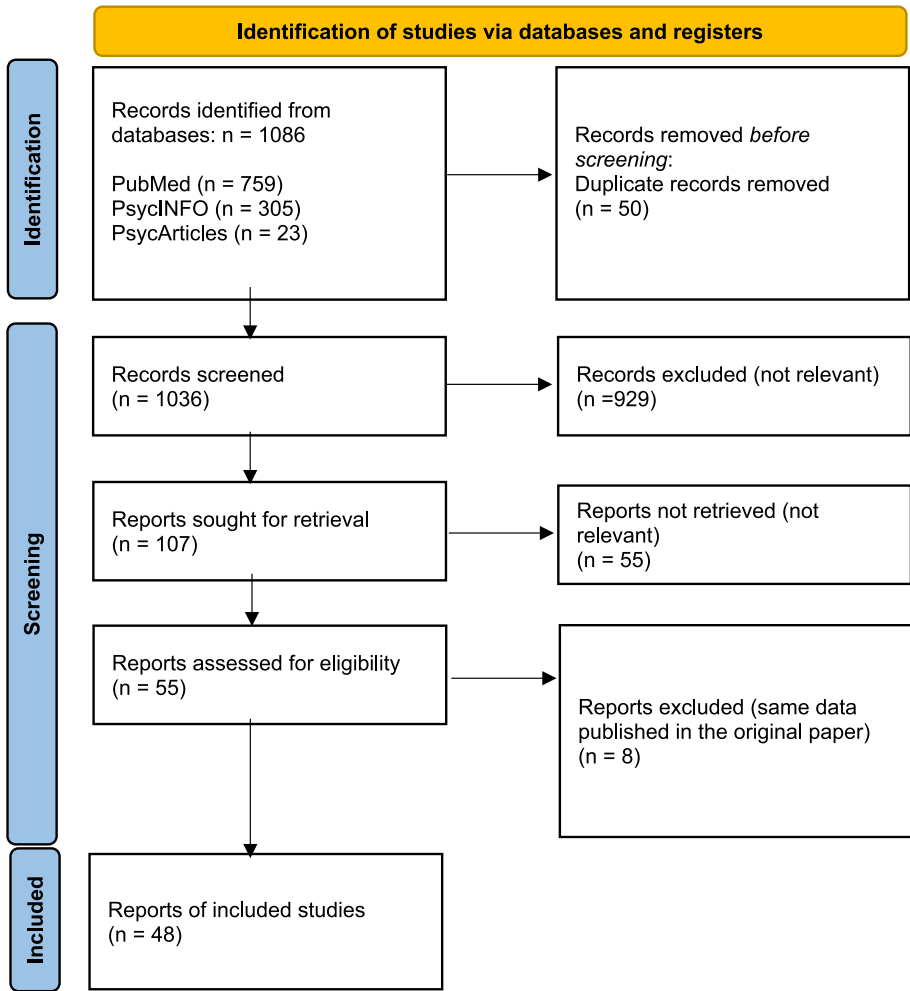


Fig. 1 PRISMA flowchart

areas, namely selection of participants, comparison of study groups and outcome measurement. We did not perform a formal GRADE assessment, and instead, risk of bias was appraised using the NOS to inform a brief narrative summary of confidence. The NOS framework allows for a structured and objective evaluation of study design and risk of bias. This quality assessment was integrated into this study to enhance the validity of findings and provide a clearer understanding of the strength of the respected selected studies.

## Results

### Overview

The literature search initially identified a total of 1,086 journal articles, with 758 journal articles in PubMed, 305 in PsycINFO, and 23 in PsycArticles. After removing 50 duplicate records, 1,036 unique records were screened. During the first screening stage, 929 journal articles were excluded based on irrelevance to the topic, leaving 107 articles to be assessed for retrieval. Out of these 107 journal articles, 55 studies were excluded due to irrelevance, while 52 journal articles were assessed for eligibility. Finally, eight journal articles were excluded because they contained the same data published in the original papers. As a result, 48 studies were deemed eligible and included in the final review. See Fig. 1 for more details.

### Study Characteristics

Across all 48 eligible studies, the total number of participants recruited included 6,855 individuals. Sample sizes ranged from 21 (Morasco et al., 2016) to 538 (Winhusen et al., 2013) participants. Thirty-six studies were conducted in the United States of America (USA), 3 in the Netherlands, two studies in Australia and one in Sweden, Spain, Denmark, Canada, Norway, Brazil and in the United Kingdom (UK).

The majority of studies focused on SUD ( $n=46$ ; 95.83%) and only 2 studies on food addiction. This study did not find any studies on sugar addiction. Table 1 shows all included study characteristics. Measures of SUD were identified through Time Follow-Back ( $n=36$ ), Addiction Severity Index (ASI;  $n=2$ ), Substance Use Inventory (SUI;  $n=2$ ), Measurement of Addiction for Triage and Evaluation (MATE;  $n=1$ ), Substance Dependence Scale ( $n=1$ ), Daily Drinking Questionnaire (DDQ;  $n=1$ ), and Structured Clinical Interview for DSM-IV (SCID;  $n=1$ ). Measures in the food addiction articles were Modified Yale Food Addiction Scale Version 2.0 (mYFAS 2.0) and the Yale Food Addiction Scale 2.0. If present, follow-up periods in the studies varied from 2 weeks to 12 months ( $n=41$ ).

### Types of Psychological Treatments

Given the nature of the eligible studies, the following three categories of treatment methods were observed: mindfulness, cognitive behavioural therapy (CBT), and other behavioural therapies. This categorisation aligns with the literature reviewed and the nature of each treatment approach. Nine journal articles for SUD had mindfulness as the psychological treatment method, twelve on CBT, and twenty-six included other behavioural treatments (see Table 2). This distribution across therapies provides insights into which therapeutic approaches are most frequently delivered (i.e. CBT and mindfulness). Moreover, this study found 22 journal articles that treated SUD comorbidities (simultaneously multiple disorders; see Table 2), which highlights the complexity of SUD and the need for holistic approaches that address multiple aspects of a patient's mental health, and not SUD in isolation.

In the field of food addiction, in which only two journal articles were identified, Cassin et al. (2020) investigated how a seven-session tele-CBT intervention could improve

**Table 1** Quality assessments (n=48) using the Newcastle-Ottawa assessment scale

Study	Selection	Compara- bility	Outcome	Quality assessment score
<i>Mindfulness treatments</i>				
Amaro et al., 2014	3	1	1	5
Back et al., 2019	3	1	1	5
Badour et al., 2017	3	1	0	4
Price et al., 2019	3	0	0	3
Ruglass et al., 2017	3	1	1	5
Tripp et al., 2020	3	1	0	4
Villagr�-Lanza & Gonz�lez Men�ndez, 2013	3	1	1	5
Killeen et al., 2023	3	1	1	5
Machado et al., 2020	3	0	1	4
<i>Cognitive Behavioural Therapy (CBT) treatments</i>				
Cassin et al., 2020	3	1	1	5
Kiluk et al., 2018	3	1	1	5
van Emmerik-van Oortmerssen et al., 2019	3	1	0	4
Walhout et al., 2022	3	1	1	5
Paris et al., 2018	3	1	1	5
Siegel et al., 2017	3	1	0	4
Buckner et al., 2019	2	1	0	3
Wolitzky-Taylor et al., 2018	3	1	1	5
Kelpin et al., 2022	3	1	1	5
McGovern et al., 2015	2	1	0	4
Morasco et al., 2016	3	1	1	5
Siegel et al., 2017	3	1	1	5
Tetrault et al., 2020	3	1	0	4
<i>Other behavioural treatments</i>				
Ilgen et al., 2016		3	1	2
Bell et al., 2017	3	1	2	6
Kehle-Forbes et al., 2019	3	1	1	5
Forray et al., 2019	4	1	1	6
Paquette et al., 2023	3	1	2	6
Thylstrup et al., 2015	3	1	2	6
Short et al., 2021	3	1	1	5
Vederhus et al., 2014	3	1	1	5
Wenze et al., 2015	3	1	2	6
O'Farrell et al., 2017	3	1	1	5
Walker et al., 2017	3	1	1	5
Winhusen et al., 2014	3	1	1	5
Schumm et al., 2014	3	1	1	5
Brigham et al., 2014	3	1	1	5
Norman et al., 2019	3	1	1	5
Daros et al., 2024	3	1	2	6
Philips et al., 2018	3	1	2	6
Burrows et al., 2021	3	1	1	5

**Table 1** (continued)

Study	Selection	Comparability	Outcome	Quality assessment score
Venner et al., 2020	3	1	1	5
Morley et al., 2013	3	1	1	5
Tracy et al., 2020	3	1	2	6
Worden et al., 2015	3	1	1	5
Pott et al., 2022	3	1	1	5
Cather et al., 2018	3	1	1	5
Wenze et al., 2015	3	1	1	5
van Dam et al., 2013	3	1	1	5

Note: 0–2 points were considered poor quality, 3–4 points were deemed fair quality, 5–6 points were classified as good quality and 7–8 points were rated as very good quality

symptoms of food addiction and Burrows et al. (2021) tested whether a 7-week FoodFix intervention, based on motivational interviewing (i.e. other behavioural therapies) could help to reduce food addiction.

This review identified COPE (Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure) and CBT4CBT (Computer-Assisted Delivery of Cognitive-Behavioural Therapy) as the most commonly psychological treatment administered psychological treatments for SUD (Kelpin et al., 2022; Kiluk et al., 2018; Tetrault et al., 2020; Paris et al., 2018; Badour et al., 2017; Ruglass et al., 2017; Tripp et al., 2020 and Back et al., 2019). This finding supports the validity and efficacy of these methods. Specifically, the focus in COPE's on integrating prolonged exposure therapy for PTSD with SUD treatment highlights the importance of trauma in the treatment of addiction. CBT4CBT's computer-assisted approach argues that digital interventions can enhance accessibility and standardisation of therapy.

## Study Outcomes

**Mindfulness Treatments** Seven of the nine mindfulness studies showed a significant decrease in SUD symptoms after treatment (Amaro et al., 2014; Back et al., 2019; Badour et al., 2017; Price et al., 2019; Ruglass et al., 2017; Tripp et al., 2020; Villagr -Lanza & Gonz lez Men ndez, 2013). Among those, one focused on Acceptance and Commitment Therapy (Villagr -Lanza & Gonz lez Men ndez, 2013), one on Mindfulness awareness in body-oriented therapy (Price et al., 2019), one on Moment-by-Moment in Women's Recovery: A Mindfulness-Based Approach to Relapse Prevention (MBRP-W, (Amaro et al., 2014) and four explored COPE (Back et al., 2019; Badour et al., 2017; Ruglass et al., 2017; Tripp et al., 2020). Only two studies were identified as not showing significant results after mindfulness treatment. Killeen et al. (2023) found no significant differences after an eight session Mindfulness-Based Relapse Prevention (MBRP) to a 12-step facilitation treatment, and Machado et al. (2020) found no significant differences after eight sessions of MBRP that were integrated with outpatient SUD treatment protocol. The findings suggest the potential effectiveness of mindfulness-based treatments in reducing SUD symptoms, with

**Table 2** Overview of the study characteristics ( $n = 48$ )

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
<i>Mindfulness treatments</i>									
Amaro et al., 2014	USA	Investigating the efficacy of MBRP for culturally diverse low-income women in SUD treatment	Moment-by-Moment in Women's Recovery: A Mindfulness-Based Approach to Relapse Prevention (MBRP-W)	9 sessions	SUD	33.90 (7.30)	318	Addiction Severity Index (ASI)	6 and 12 months
Back et al., 2019	USA	Investigating the effectiveness of an integrated treatment that incorporates PE (concurrent treatment of PTSD and substance use disorders using prolonged exposure or COPE) among veterans	COPE	12 sessions	SUD	40.40 (10.70)	81	Addiction Severity Index (ASI)	3 and 6 months
Badour et al., 2017	USA	Testing whether W-S and B-S SUDS and B-S craving habituation predicted change in PTSD symptoms and substance use during COPE	Substance Use Disorders Using Prolonged Exposure (COPE)	12 sessions	SUD	39.72 (10.98)	54	Timeline Follow-back	No

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Price et al., 2019	USA		Examining the immediate pre-post effects of the mind-body intervention Mindful Awareness in Body-oriented Therapy (MABT) as an adjunct to women's substance use disorder (SUD) treatment	MABT	8–10 sessions	SUD	35 (NA)	187	Timeline Follow-back
Ruglass et al., 2017	USA		Testing the efficacy of COPE, an integrated psychosocial treatment, for the common comorbidity of PTSD and SUD	Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE)	12 sessions	SUD	44.82 (9.09)	110	Substance Use Inventory (SUI)
									3 months

Table 2 (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Tripp et al., 2020	USA	Examining (a) week to week symptoms during treatment; (b) the relationship between PTSD symptom severity and subsequent week alcohol use and the reciprocal relationship (i.e. alcohol use and subsequent week PTSD symptom severity); and (c) whether COPE and SS showed a different association between PTSD symptom severity and subsequent week alcohol use and the reciprocal relationship	COPE and Seeking Safety (SS)	12–16 sessions	SUD	41.00 (12.60)	107	SUI	No
Villagrà-Lanza & González Menéndez, 2013	Spain	Investigating the efficacy of ACT as a treatment for substance addiction in incarcerated women	Acceptance and Commitment Therapy (ACT)	16 sessions	SUD	32.00 (6.20)	31	Addiction Severity Index (ASI)	6 months
Killeen et al., 2023	USA	Comparing the 12-step facilitation (TSF) to Mindfulness-Based Relapse Prevention (MBRP) as aftercare in the treatment of SUDs in veterans who had completed an intensive outpatient treatment program	MBRP	8 sessions	SUD	53.20 (9.90)	204	Timeline Follow-back	3, 6 and 10 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Machado et al., 2020	Brazil		Exploring the contribution of a mindfulness-based intervention as an adjunct to outpatient substance use disorder treatment	Mindfulness-based Relapse Prevention (MBRP)	8 sessions	SUD	44.00 (11.20)	42	Timeline Follow-back 3 months
<i>CBT treatments</i>									
Cassin et al., 2020	Canada	Examining clinical correlates of food addiction among post-operative bariatric surgery patients, to compare the clinical characteristics of patients with food addiction and those without food addiction and to examine whether Tele-CBT improves food addiction symptomatology among those with food addiction	Tele-CBT	7 sessions	Food addiction	48.40 (8.51)	100	The Modified Yale Food Addiction Scale Version 2.0 (mYFAS 2.0)	6 months
van Emmerik-van Oortmersen et al., 2019	Netherlands	Investigating the efficacy of integrated CBT for ADHD in adult patients who also had SUD	Integrated Treatment (CBT/Integrated)	15 sessions	SUD	35.10 (8.90)	119	Timeline Follow-back	2 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Kiluk et al., 2018	USA	Evaluating a web-based CBT intervention in a heterogeneous sample of treatment-seeking substance users found those assigned to either CBT4CBT with minimal clinical monitoring or clinician-delivered CBT had greater reductions in frequency of any drug or alcohol use compared with standard treatment	Assessing whether those assigned to CBT4CBT-Spanish had a significantly greater reduction in days of their primary substance use over time than did those who received standard treatment only	Computer-based cognitive behavioural therapy (CBT4CBT)	12 sessions	SUD	35.90 (12.00)	137	Timeline Follow-back
Paris et al., 2018	USA	Assessing whether those assigned to CBT4CBT-Spanish had a significantly greater reduction in days of their primary substance use over time than did those who received standard treatment only	Assessing whether those assigned to CBT4CBT-Spanish had a significantly greater reduction in days of their primary substance use over time than did those who received standard treatment only	Computer-based training for cognitive behavioural therapy (CBT4CBT-Spanish)	7 sessions	SUD	42.90 (11.50)	92	Timeline Follow-back
Walhout et al., 2022	Netherlands	Introducing and evaluate a manualised group treatment intervention developed specifically for patients with ASD and co-occurring SUD	Introducing and evaluate a manualised group treatment intervention developed specifically for patients with ASD and co-occurring SUD	CBT	12 sessions	SUD	36.80 (11.65)	57	Measurement of addiction for triage and evaluation (MATE)

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up	
Wolitzky-Taylor et al., 2018	USA		Developing a brief, group-based CBT program for anxiety disorders that was delivered by SUD counsellors using a CALM-like model: a computerised, therapist directed, highly structured and interactive program	CALM ARC	7 sessions	SUD	35.89 (11.77)	75	Timeline Follow-back	
Buckner et al., 2019	USA	Testing the utility of integrated cannabis and anxiety reduction treatment (ICART) that integrates FSET for anxiety disorders with MET-CBT for CUD to simultaneously treat CUD and anxiety disorders	Motivation Enhancement Therapy/Cognitive Behaviour Therapy for Cannabis Use Disorders (MET-CBT) and Integrated Cannabis and Anxiety Reduction Treatment (ICART)	MET-CBT = 9 sessions; ICART = 12 sessions	SUD	23.21 (7.50)	55	Timeline Follow-back	No	
Kelpin et al., 2022	USA		Testing the efficacy of CBT4CBT for women in residential treatment for SUDs	Computer-based training for cognitive behavioural therapy (CBT4CBT)	6–10 sessions	SUD	41.20 (12.10)	63	Timeline Follow-back	1 and 3 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
McGovern et al., 2015	USA	Comparing the effect of Integrated Cognitive Behavioural Therapy (ICBT) plus standard care, individual addiction counselling plus standard care, and standard care alone on substance use and PTSD symptoms	ICBT	8–12 sessions	SUD	36.22 (10.10)	221	Timeline Follow-back	3 and 6 months
Morasco et al., 2016	USA	Testing the feasibility and acceptability of a unique integrated treatment, CBT-ep.sud for chronic pain and SUD in patients with hepatitis C virus (HCV)	CBT for patients with both chronic pain and SUD (CBT-ep.sud)	10 sessions	SUD	57.60 (6.30)	21	Timeline Follow-back	3 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Siegel et al., 2017	USA	Examining how negative mood regulation expectancies (NMR) change after group ICBT treatment for depression and substance use and whether changes in NMR expectancies were related to changes in symptoms of PTSD, depression, and substance use after ICBT	ICBT	24 sessions	SUD	47.26 (11.97)	123	Timeline Follow-back	No
Tetrault et al., 2020	USA	Investigating the feasibility trial of CBT4CBT (computer-based training for cognitive behavioural therapy), a validated, web-based intervention for SUD	Computer-based training in cognitive behavioural therapy (CBT4CBT)	7 sessions	SUD	43.52 (11.70)	58	Timeline Follow-back	No

*Other behavioural treatments*

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Thylstrup et al., 2015	Denmark	Testing the efficacy of the ILC program, a short-term, highly structured psychoeducational intervention in patients with SUD with comorbid anti-social personality disorder (ASPD)	Impulsive Lifestyle Counseling program (ILC)	6 sessions	SUD	32.21 (8.90)	142	Addiction Severity Index (ASI)	3 and 9 months
Venner et al., 2021	USA	Testing the efficacy of a culturally tailored EBT that combined Motivational—> Alaska Native participants and American Indian participants Interviewing and the Community Reinforcement Approach (MICRA) versus treatment as usual (TAU) in people with SUD	Motivational Interviewing and Community Reinforcement Approach (MICRA)	16–20 sessions	SUD	32.16 (9.86)	79	Timeline Follow-back	4, 8 and 12 months
Philips et al., 2018	Sweden	Examining the feasibility and effectiveness of MBT for concurrent borderline personality disorder (BPD) and SUD	Mentalisation-based treatment (MBT)	18 months	SUD	36.70(9.60)	46	Timeline Follow-back	No

Table 2 (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Paquette et al., 2023	USA	Testing the effect of LETS ACT delivered in small groups in an outpatient SUD treatment setting and investigated the added benefit of a smartphone-enhanced version on substance use outcomes	Life Enhancement Treatment for Substance Use (LETS ACT) and Smartphone-Enhanced LETS ACT	6 sessions	SUD	40.29 (11.06)	206	Timeline Follow-back	1, 3, 6 and 12 months
Winhusen et al., 2014	USA	Evaluating the impact of concurrently providing smoking-cessation and SUD treatment to cocaine- and/or methamphetamine-dependent patients	TAU with smoking-cessation treatment (TAU + SCT)	10 sessions	SUD	36.40 (10.00)	538	Timeline Follow-back	3 and 6 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Magidson et al., 2022	USA	Evaluating Act Healthy (AH), an integrated behavioral intervention to reduce substance use and improve medication adherence, compared to supportive counseling (SC) plus Life-Steps medication adherence counseling on substance use, craving, adherence-related outcomes and depression over one year	AH	8 sessions	SUD	45.00 (7.81)	61	Timeline Follow-back	1, 3, 6 and 12 months
Ilgen et al., 2016	USA	Investing psychotherapeutic approach that combines CBT and acceptance-based principles in SUD patient to improve pain	ImpPAT (improving pain during addiction treatment)	10 sessions	SUD	51.70 (9.50)	129	Timeline Follow-back	3, 6 and 12 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Norman et al., 2019	USA	Comparing integrated prolonged exposure (I-PE) therapy, using the Concurrent Treatment for PTSD and Substance Use Disorder Using Prolonged Exposure (COPE) protocol, with the most widely used integrated coping skills (I-CS) therapy, Seeking Safety (SS)	I-PE (integrated prolonged exposure) and integrated coping skills (I-CS)	12–16 sessions	SUD	41.60 (12.60)	119	Timeline Follow-back	3 and 6 months
Bell et al., 2017	USA	Determining the feasibility of an outpatient study of cognitive remediation for an SUD sample in terms of treatment adherence and follow-up rates	Cognitive remediation therapy (CRT)	3 months	SUD	52.55 (8.55)	48	Timeline Follow-back	6 months
Kehle-Forbes et al., 2019	USA	Evaluating the comparative effectiveness of integrating versus phasing evidence-based psychotherapies for SUD and PTSD among veterans with co-occurring SUD/PTSD	Motivational Enhancement Therapy (MET) & Prolonged exposure (PE)	16 sessions	SUD	44.10 (13.05)	183	Timeline Follow-back	6 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Forray et al., 2019	USA	Examining the impact of SBIRT delivered electronically or by a clinician in reproductive health clinics on sub-groups of primary and secondary users of cigarette, alcohol and illicit drugs	Electronic Screening, Brief Intervention, and Referral to Treatment (e-SBIRT)	1 session	SUD	35 (11.33)	439	Timeline Follow-back	1, 3 and 6 months
van Dam et al., 2013	Netherlands	Investigating the effectiveness of a SWT for comorbid posttraumatic stress disorder (PTSD) and severe substance use disorder (SUD)	Structured Writing Therapy (SWT)	10 sessions	SUD	42.30 (9.00)	34	Timeline Follow-back	3 months
Short et al., 2021	USA	Investigating the efficacy of BBTI among trauma-exposed cannabis users with elevated insomnia symptoms	Brief Behavioural Treatment for Insomnia (BBTI)	4 sessions	SUD	20.70 (3.82)	56	Timeline Follow-back	3 months

Table 2 (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Vederhus et al., 2014	Norway	Comparing a motivational intervention (MI) focused on increasing involvement in 12-Step groups (TSGs; e.g. Alcoholics Anonymous) versus brief advice (BA) to attend TSGs	MI	2 × weekly	SUD	41.50 (13.50)	140	Timeline Follow-back	6 months
Wenze et al., 2015	USA	Investigating the efficacy of a telephone-based intervention targeting clinical outcomes at a vulnerable point in care (i.e. the transition from hospital to outpatient treatment) in an acutely ill sample with bipolar disorder (BD)-SUD	Integrated Treatment Adherence Program	11 phone calls + 4 in person sessions	SUD	46.90 (10.93)	30	Timeline Follow-back	6 months
O'Farrell et al., 2017	USA	Comparing BCT with IBT for drug-abusing women	Behavioural couples therapy (BCT) and individually based therapy (IBT)	BCT = 13 sessions and IBT = 26 sessions	SUD	41.80 (10.35)	61	Timeline Follow-back	3, 6 and 12 months

Table 2 (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Walker et al., 2017	USA	Investigating the efficacy of a brief, telephone-delivered MIF intervention for untreated soldiers with an AUD	Motivational interviewing with feedback (MIF)	1 session	SUD	28.00 (6.30)	242	Daily Drinking Questionnaire (DDQ)	3 and 6 months
Winhusen et al., 2014	USA	Evaluating the association between smoking abstinence and illicit stimulant abstinence in cocaine- and/or methamphetamine-dependent participants receiving smoking-cessation treatment	Smoking-cessation treatment (SCT)	10 sessions	SUD	36.58 (9.2)	498	Timeline Follow-back	3 and 6 months
Schumm et al., 2014	USA	Comparing BCT with IBT among women with AUD	Behavioural couples therapy (BCT) and individually based therapy (IBT)	BCT = 13 sessions and IBT = 26 sessions	SUD	44.42 (8.08)	105	Timeline Follow-back	12 months
Brigham et al., 2014	USA	Determining if adding CRAFT-T to opioid detoxification followed by outpatient would improve treatment retention and drug use outcomes	Community Reinforcement Approach and Family Training for Treatment Retention (CRAFT-T)	12 sessions	SUD	35.85 (10.75)	104	Timeline Follow-back	14, 26 and 38 weeks

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Daros et al., 2024	USA	Evaluating the feasibility, acceptability, and potential efficacy of iDBT in a sample of treatment-seeking individuals with SUDs often presenting with additional mental health symptoms	Internet-delivered dialectical behavioural therapy (iDBT)	8 sessions	SUD	34.10 (11.90)	72	Substance Dependence Scale	12 weeks
Burrows et al., 2021	Australia	Assessing the feasibility of offering a personality-targeted Motivational Interviewing (MI) intervention to adults with addictive-eating behaviours in order to improve their symptoms and dietary profiles	FoodFix	3 sessions	Food addiction	42.60 (12.20)	49	YFAS 2.0	3 months
Morley et al., 2013	Australia	Evaluating a psychological intervention specifically designed to target suicide risk and comorbid drug and alcohol use	Behavioural intervention package (OCB)	6 months	SUD	36.00 (11.15)	185	Timeline Follow-back	6 months

**Table 2** (continued)

Study	Country	General focus	Treatment method	Treatment length	Addiction type	Age (mean (SD))	Sample size	Addiction measure	Follow-up
Tracy et al., 2020	USA	Testing the preliminary efficacy of MAP in reducing substance use and associated barriers to successful treatment outcomes	Mentorship for Addiction Problems (MAP)	12 sessions	SUD	47.00 (13.00)	65	Timeline Follow-back	13–24 weeks
Worden et al., 2015	USA	Investigating a brief treatment aimed at reducing anxiety sensitivity (AS) and substance use	Brief AS-based intervention	6 sessions	SUD	42.60 (12.10)	21	Timeline Follow-back	3 months
Pott et al., 2022	UK	Investigating the feasibility and clinical outcomes of BA facilitated by drug and alcohol treatment workers for patients with elevated depression symptoms	Behavioural activation (BA)	6 sessions	SUD	42.30 (6.50)	34	Timeline Follow-back	12 and 24 weeks
Cather et al., 2018	USA	Investigating the effectiveness of the NAVIGATE program in the Recovery After Initial Schizophrenia Episode-Early Treatment Program (RAISE-ETP)	NAVIGATE program	3–12 sessions	SUD	23.10 (5.10)	404	Structured Clinical Interview (SCID)	2 year

Note: Study characteristics showing authors, country of study, general study focus, treatment method, treatment length, addiction type, age (mean (SD)), sample size, addiction measure, follow-up, acronyms: *PTSD* (post-traumatic disorder), *CALM ARC* (CALM for Addiction Recovery Centers),

certain approaches, such as COPE and ACT, demonstrating consistent positive effects, while variability in outcomes suggests a need to explore certain factors influencing treatment success.

**CBT Treatments** Five of the CBT journal articles showed significant improvement in SUD symptoms (Emmerik-van Oortmerssen et al., 2019; B. Kiluk et al., 2018; Paris et al., 2018; Walhout et al., 2022; Wolitzky-Taylor et al., 2018), whereas six did not (Buckner et al., 2019; Kelpin et al., 2022; McGovern et al., 2015; Morasco et al., 2016; Siegel et al., 2017; Tetrault et al., 2020). Among these six, two studies focused on SUD comorbidities (i.e., attention deficit hyperactivity disorder [ADHD]) (Emmerik-van Oortmerssen et al., 2019) and autism spectrum disorder (ASD) (Walhout et al., 2022). For food addiction, Tele-CBT showed promising results in Cassin et al. (2020), with mYFAS 2.0 scores significantly lower in the treatment group compared to the control. These findings indicate that CBT approaches can significantly improve SUD symptoms, particularly when addressing comorbidities such as ADHD and ASD, while some results showcase variability in effectiveness.

**Other Behavioural Treatments** Eleven studies found other behavioural treatments to be effective, while 14 studies showed other behavioural treatments as non-effective (see Table 2). Treatments identified included Impulsive Lifestyle Counselling (ILC; Thylstrup et al., 2015), Motivational Interviewing and Community Reinforcement Approach (MICRA; Venner et al., 2020), Mentalisation-Based Treatment (MBT; Philips et al., 2018), Life Enhancement Treatment for Substance Use (LETS ACT; Paquette et al., 2023), Smoking Cessation Treatment (SCT; Winhusen et al., 2013), Improving Pain During Addiction Treatment (ImPAT; Igen et al., 2016), Integrated Prolonged Exposure (I-PE; Norman et al., 2019), Cognitive Remediation Therapy (CRT; Bell et al., 2017), Motivational Enhancement Therapy (MET; Kehle-Forbes et al., 2019), Electronic Screening Brief Intervention and Referral to Treatment (e-SBIRT; Forray et al., 2019), Motivational Intervention (MI; Vederhus et al., 2014), Motivational Interviewing with Feedback (MIF; Walker et al., 2017), Structured Writing Therapy (SWT; van Dam et al., 2013), Brief Behavioural Treatment for Insomnia (BBTI; Short et al., 2021), Integrated Treatment Adherence Program (Wenze et al., 2015), Behavioural Couples Therapy (BCT) and Individually-Based Therapy (IBT; O'Farrell et al., 2017; Schumm et al., 2014), Community Reinforcement Approach and Family Training for Treatment Retention (CRAFT-T; Brigham et al., 2014), Internet-Delivered Dialectical Behavioural Therapy (iDBT; Daros et al., 2024), Behavioural Intervention Package (OCB; Morley et al., 2014), intervention to treat Anxiety Sensitivity (AS) and SUD (Worden et al., 2015), Behavioural Activation (BA; Pott et al., 2022), NAVI-GATE program (Cather et al., 2018), and Mentorship for Addiction Problems (MAP; Tracy et al., 2020). The mixed effectiveness of behavioural treatments for SUD suggests the importance of tailoring psychological treatments to individual needs, addressing comorbidities as well as refining delivery methods to improve outcomes.

Some studies investigating SUD comorbidities include antisocial personality disorder (ASPD; Thylstrup et al., 2015), borderline personality disorder (BPD; Philips et al., 2018), PTSD (Norman et al., 2019), insomnia (Short et al., 2021), bipolar disorder (BD; Wenze et al., 2015), depression and suicide ideation (Morley et al., 2014), anxiety (Worden et al., 2015), and schizophrenia (Cather et al., 2018). This suggests that SUD often co-occur with a wide range of psychiatric conditions, highlighting the complexity of SUD and the need for integrated treatment approaches that address both the addiction and its comorbidities.

The only behavioural treatment identified for food addiction was the FoodFix. The FoodFix treatment, investigated by Burrows et al. (2021), focuses on a behavioural system to reduce food addiction. Key findings did not show a significant reduction in YFAS 2.0 scores following treatment.

## Quality Assessment of Included Studies

The NOS focused on selection of participants, comparability and outcome. With a maximum of eight points awarded per study, this review scored journal articles 0–2 points in case of ‘poor’ quality, 3–4 points for ‘fair’, 5–6 points for ‘good’, and 7–8 points for ‘very good’. Table 2 shows the details of the quality assessments. Nine articles (18.75%) were rated ‘fair’, and 39 (81.25%) were rated ‘good’.

## Discussion

This systematic literature review investigated the existing literature on mindfulness, CBT, and behavioural treatments for SUD and food addiction. While this review primarily focused on SUD treatments, the limited data on food addiction, with only two studies included, suggests that there is a need for further investigation into how evidence-based SUD treatments may be adapted for food addiction. Shared behavioural mechanisms fit the framework of addiction (Griffiths, 2005) and shared neural mechanisms rely on the common alteration of DA and the reward network (Olsen, 2011; Fulton et al., 2000). The reviewed studies included bi-modal effects of treatments, where a single intervention produces dual, distinct outcomes, with some articles some showing significant symptom reductions, while others demonstrate minimal or no improvement.

The potential transferability of treatment from SUD to food addiction is particularly intriguing as both conditions often involve patterns of self-medication (Davis, 2013; Turner et al., 2018), reward-seeking (Heitzeg et al., 2015; Leigh & Morris, 2018), and difficulties with impulse control (Heitzeg et al., 2015; Loxton, 2018). Effective treatments for SUD that target these mechanisms, such as CBT and mindfulness-based treatments, could therefore provide effective frameworks for addressing food addiction. CBT is centred around training self-control to support maintaining abstinence, or harm reduction (Ray et al., 2020), while mindfulness treatments help pay attention to the present moment in a purposeful way without judging oneself (Kabat-Zinn, 2023).

The current literature shows strong evidence supporting the effectiveness of CBT for SUD (B. D. Kiluk, 2019). According to Abrams and Niaura (1987), SUD is based on social learning theory, indicating that alcohol and drug use is a learned behaviour. Individuals suffering from SUD develop deficiencies in affective, behavioural and cognitive coping skills to handle distressing and negative emotions (B. D. Kiluk, 2019). A primary aim of CBT for SUD is to help individuals gain greater control over sub-optimal behaviours, reduce impulsivity by seeking immediate reward through alcohol or drug use by controlling cravings, and enhance decision-making skills (Sofuoglu et al., 2013).

Similarly, mindfulness treatment for SUD puts great emphasis on regulating cravings (Korecki et al., 2020). A key learning is to disassociate oneself from the upcoming feelings associated with cravings. By gaining control of their attention through mindfulness

and meditation, affected individuals can observe and accept the present moment (Zgierska et al., 2009). For example, meditation helps to separate a given experience from an associated emotion (Kutz et al., 1985).

Research on food addiction, although more restricted compared to SUD, adopts a similar approach. It recognises the role of underlying emotional and psychological triggers (Ghiță et al., 2019; Parylak et al., 2011) and uses similar treatment components. CBT is found to be effective (Schulte et al., 2017), especially in helping affected individuals to regulate their emotions and to manage their cravings (Beadman et al., 2015). CBT in food addiction assists respondents in recognising emotional triggers that contribute to overeating and equips them with strategies to manage these triggers without turning to food, thereby fostering long-term behaviour change and symptom reduction (N. Gearhardt et al., 2011).

The COPE and CBT4CBT treatments, while the most frequently reported psychological treatments for SUD and prominent in the literature, could provide a strong foundation for adaptation to food addiction treatments. While the studies directly targeting food addiction employed TELE-CBT and FoodFix, the principles underlying COPE and CBT4CBT, including addressing coping mechanisms, cognitive restructuring and behavioural interventions, are highly relevant to reducing food addiction symptoms.

Surprisingly, the review did not identify any research on sugar addiction, suggesting that it may not be regarded as a significant concern or that there is limited demand for treatment in this area. One potential reason may be that sugar addiction research is still relatively in its infancy and may not be yet a pressing issue in terms of global public health. However, this could also be a reflection of the poor conceptualisation regarding the construct of food addiction itself. SUD, as mentioned in Markus et al. (2017), is understood through the validation of the DSM criteria for SUD and food addiction symptoms are validated via YFAS (Gearhardt et al., 2009). Nevertheless, some animal research on sugar addiction is available (Avena et al., 2012; Hoebel et al., 2009; Kendig, 2014; Kenny, 2011). This research indicates that high-fat (Bocarsly et al., 2011), high-sugar (Avena et al., 2008) and high-fat and high-sugar foods (Johnson & Kenny, 2010) are linked to food addiction characteristics. During goal-directed sugar consumption, dopamine release in the mesolimbic system enhances salience, and motivation for sugar. Gradually, seeking and consuming sugar becomes a habit, where changes in the pre-frontal cortex, together with the ventral, and dorsal striatum are visible (Westwater et al., 2016). However, these findings cannot be directly adapted to humans due to the biological differences between the species.

Overall, this study has several strengths. First, it provides a unique perspective by evaluating the potential applicability of SUD treatments to food addiction, rather than just comparing existing treatment methods. Additionally, the present review takes a bi-directional perspective, which examines both behavioural mechanisms and neurobiological underpinnings. However, this study has several potential limitations. First, some of the reviewed studies had low sample sizes, suggesting potentially limited external validity due to the underrepresentation of the populations investigated. Although the majority of studies were rated as 'good' on the NOS quality assessment conducted, recurring methodological limitations and substantial heterogeneity may reduce confidence in the findings, resulting in an overall low-to-moderate certainty and highlighting the need for larger and more rigorously controlled trials. Caution is advised when interpreting such findings as they may lack generalisability to broader populations and should be reproduced with a larger sample to make important inferences. Additionally, this study only reviewed studies published in English, French, and/or Portuguese, potentially missing important evidence not published in one of these languages. Furthermore, no grey literature search was conducted, which

could also signify omission of important studies. Another potential key limitation of this study was that while SUD and food addiction share common mechanisms, the effectiveness of SUD treatments such as COPE may not be fully transferable to food addiction due to the key role of food for survival purposes. This complicates behavioural treatments such as COPE, which rely on exposure therapy principles that work well for substances but may need adaptation and future research for food addiction. Finally, the amount of food addiction literature reviewed was significantly lower compared to SUD studies.

Taken together, the present review suggests the need for further research on the adaptation of psychological treatments for SUD to food addiction. This study reviewed previous research on SUD and food addiction along with their respective psychological treatments. Given the shared mechanisms between SUD and food addiction, transferring SUD treatments to address food addiction appears feasible. The most frequently cited psychological treatments for SUD were CBT4CBT and COPE, which could serve as models for adaptation to food addiction treatment. This review highlights the underrepresentation of sugar addiction research and calls for a clearer definition of the condition to develop effective psychological treatments.

**Data Availability** Data is available upon request by contacting the corresponding author.

## Declarations

**Competing Interests** The authors declare no competing interests. This research was self-funded.

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