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Modifiable Transdiagnostic Risk and Protective Factors as Potential CBT Augmentation Targets for Eating Disorders: An Updated Umbrella Review

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ABSTRACT

Objective: A focus on transdiagnostic targets is one of the key strategies for developing effective, efficient, and scalable treatments for mental health conditions. We conducted an umbrella review of recent meta-analyses (August 2022 to May 2026) to update our understanding of critical transdiagnostic intervention targets that could inform cognitive behavioral therapy augmentation.

Method: We included prospective cohort, randomized controlled trials, and longitudinal data adopting the search strategy in Hazzard et al. (2023), who previously identified concern over mistakes, perfectionism, and low self-esteem as transdiagnostic targets across depression, anxiety and eating disorders. Six databases were searched including MEDLINE, PsycINFO, Scopus, JBI Database of Systematic Reviews and Implementation Reports, Cochrane Database of Systematic Reviews, and ProQuest Dissertations & Theses Global. The protocol for this review was registered with PROSPERO (CRD420261295232).

Results: One hundred and fifty-two meta-analyses were included in this review, of which 44 (29%) contributed to 13 meta-meta-analyses. The remaining findings were synthesized narratively. Despite a plethora of meta-analyses since 2022, no new transdiagnostic targets have emerged. Significant meta-meta-analytic findings were confined to depression, where physical activity (prospective cohort data) was associated with reduced depressive symptoms, and cognitive biases (longitudinal data) were associated with increased depressive symptoms.

Discussion: A disproportionate dominance of depression research may stymie the progress of identifying transdiagnostic targets that are also of relevance to eating disorders. A strong emphasis on physical activity may be contraindicated for eating disorder prevention, especially among youth. Further research effort should be directed toward identifying psychological targets across domains beyond depression.

Interest in transdiagnostic risk and protective factors is increasing (Dalglish et al. 2020), for at least three reasons. First, guidelines addressing co-occurring mental health conditions in the treatment of eating disorders (Wade et al. 2024) suggest one option is to focus on transdiagnostic risk and protective factors

that present as an obstacle to early change. The most frequently co-occurring DSM-5 conditions across eating disorders include depression and anxiety, affecting one half to two-thirds of patients (Udo and Grilo 2019). Second, targeting transdiagnostic factors has the potential to improve efficiency and dissemination

This meta-review was preregistered at PROSPERO: <https://www.crd.york.ac.uk/PROSPERO/view/CRD420261295232>.

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Summary

- No new transdiagnostic targets emerged since 2022.
- Eating disorder is underrepresented in the transdiagnostic literature.
- Cognitive biases emerged as the only transdiagnostic target with both strong theoretical coherence and empirical support within the depression literature, warranting replication across broader outcome domains.
- Popularity in using physical activity to address mood may pose an unintended risk for young people at risk of developing an eating disorder.

of interventions (Hazzard et al. 2023). Third, transdiagnostic interventions are also relevant to youth with elevated psychological distress without meeting diagnostic criteria, where such interventions show small but significant benefits compared to control groups (Radunz et al. 2025; effect sizes 0.11–0.21 across depression, anxiety, and quality of life).

One of the few systematic reviews to identify and compare *multiple* candidate transdiagnostic factors is an umbrella review (Hazzard et al. 2023) of modifiable risk and protective factors. This review identified concern over mistakes and low self-esteem as the only risk factors that were statistically significant across depressive, anxiety, and eating disorder psychopathology. A further four additional potential risk factors were suggested as potential candidates, three of which were dimensions of perfectionism. Of these, personal standards was a significant risk factor for depression and anxiety, not eating disorders, while socially prescribed perfectionism was a significant risk factor only for depression. Since this umbrella review, the field has continued to develop particularly with an increased interest in using transdiagnostic approaches (Wade and O'Dea 2026). The current umbrella review therefore provided an update of modifiable causal transdiagnostic risk and protective factors informed by Hazzard et al.'s search strategy, given it has been 4 years since the last search was conducted. To make this most useful for eating disorder researchers and clinicians, and to identify those factors with the greatest potential to improve intervention outcomes, we narrowed the focus specifically to modifiable risk and protective factors that can inform therapy augmentations in cognitive behavioral therapy (CBT). We use this information to suggest specific strategies of relevance to people with eating disorders.

1 | Method

1.1 | Search Strategy and Selection Criteria

The present study replicated Hazzard et al.'s (2023) search terms from August 3, 2022, on the 28 January 2026, with a further search conducted on 4th May 2026. This review is registered in PROSPERO (Registration ID: CRD420261295232). We searched the same databases (except for Embase, which was unavailable), that is, MEDLINE, PsycINFO, Scopus, JBI

Database of Systematic Reviews and Implementation Reports, and Cochrane Database of Systematic Reviews. As required by journal policy, we also included a search of the gray literature using the ProQuest Dissertations & Theses Global database. The search was restricted to peer-reviewed meta-analyses of human studies published in English. The search syntax for each database is provided in Appendix S1. Table S1 compares the search strategy and eligibility criteria from Hazzard et al. (2023) with those used in this updated review, including the rationale for any changes.

1.2 | Eligibility Criteria

1.2.1 | Study Type

Peer reviewed published meta-analyses, or meta-analytic review or network meta-analyses of longitudinal studies and randomized control trials (RCTs) meeting all criteria detailed below were eligible for inclusion. Gray literature sources (e.g., dissertations) were included. Meta-analyses that included a mix of cross-sectional and longitudinal studies without providing separate longitudinal/RCT data were excluded. Retaining RCTs is a key difference of our search from Hazzard's protocol and the effect sizes of the intervention targeting a specific risk factor, (e.g., social media use, on depression, anxiety, and eating disorder) are reported separately from those of longitudinal studies. Systematic reviews without meta-analysis, meta-analysis of data not identified via systematic reviews, and umbrella reviews or equivalent were excluded (Hazzard et al. 2023).

1.2.2 | Risk/Protective Factors

The current study focuses on modifiable risk and protective factors that can inform potential targets and augmentations for individual CBT for eating disorders. Consequently, we excluded several categories of factors. First, environmental factors such as pollution, noise, and food insecurity. Second, past adverse events such as bullying or trauma, as our focus was on psychological risk factors arising from these experiences (e.g., interpretation bias, avoidance, selective attention) rather than the events themselves. Third, relationships with specific others that are not easily modifiable in individual therapy, such as parental warmth and parental psychological control. Fourth, external non-modifiable factors, such as low birth weight and maternal education. Fifth, factors outside of CBT, such as attachment styles neurological (e.g., reduced striatal reward processing), physiological or biological (e.g., metabolic syndrome) factors.

1.2.3 | Population

Meta-analyses focused exclusively on populations with potentially unique etiology of psychopathology were excluded (Hazzard et al. 2023). For example, individuals with psychopathology associated with a medical condition (e.g., cancer, chronic pain, diabetes, etc.), medical procedures, pregnancy (e.g., prenatal, antenatal, post-partum), as well as

specialized populations (e.g., elite athletes, medical students, healthcare professionals, military personnel). Elderly populations were included except when the risk/protective factor was likely a consequence of aging and not readily modifiable in therapy (e.g., cognitive frailty, or memory impairment). Meta-analyses including participants of any age, sex/gender/sexual orientation, race/ethnicity, nationality, or weight status were eligible.

1.2.4 | Outcomes

Meta-analyses that included outcomes pertaining to the three broad domain of distress (i.e., depression, anxiety, or eating disorders) were eligible. Outcomes need to be measured by validated scales specific to the distress, such as using the Patient Health Questionnaire-9 (PHQ-9) for depression, Generalized Anxiety GAD-7 for anxiety, EDEQ for eating disorder symptoms, or the Depression, Anxiety and Stress Scale-21 (DASS-21) that measured multiple distress within the same scale. Meta-analyses which focused exclusively on

outcomes pertaining to a highly specific subtype of psychopathology (e.g., test anxiety, math anxiety, and pre-operative anxiety) were excluded.

1.2.5 | Publication Year

To avoid duplication with Hazzard et al. (2023) we only included studies published after August 2022.

1.2.5.1 | Screening. The selection procedure is shown in Figure 1 and followed Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) standards (Page et al. 2021). Papers retrieved from the six electronic databases were downloaded and duplicates were subsequently removed. Two independent assessors (Y.Z. and M.R.) screened study titles and abstracts (managed by Covidence) to examine whether they related broadly to the question of interest. Conflicts were discussed between the two authors in consultation with the senior author (T.W.) until a consensus was reached. A similar process was used for full-text articles, where Y.Z.

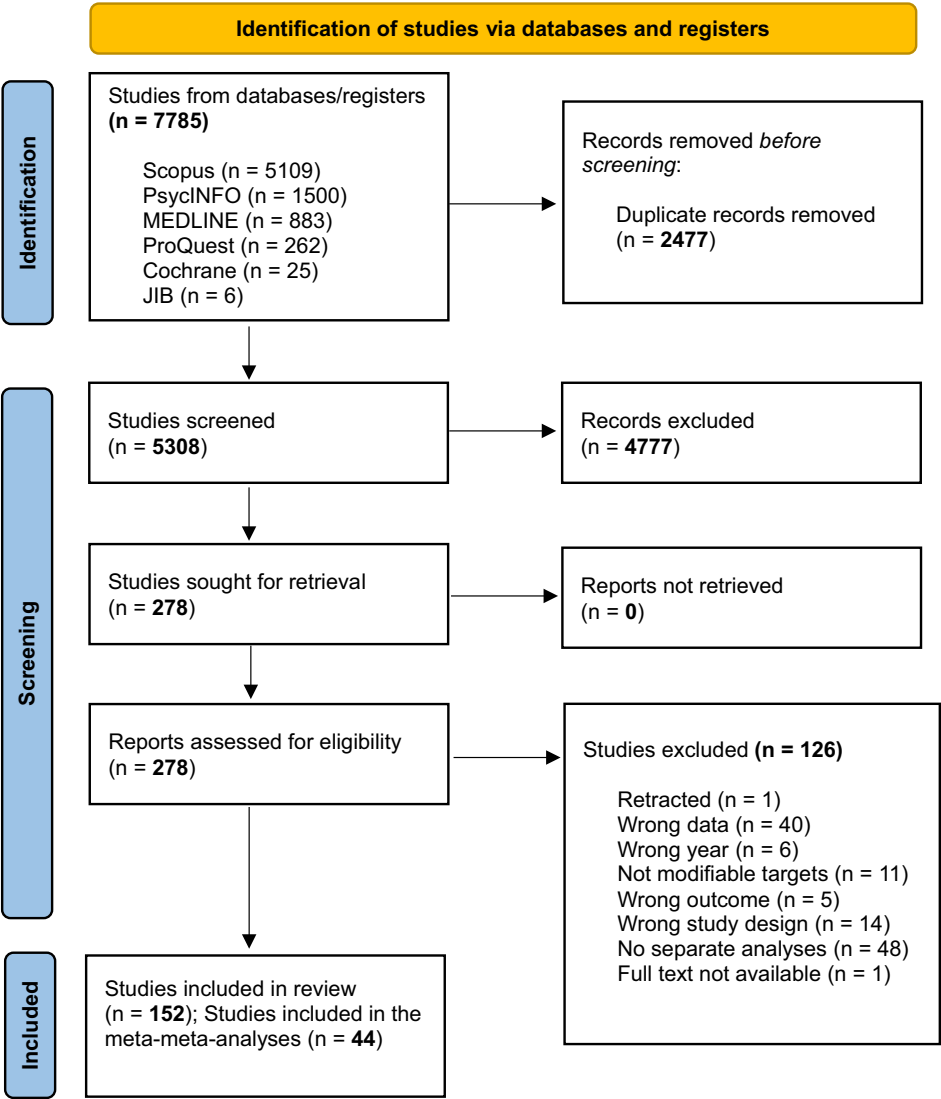


FIGURE 1 | PRISMA diagram of study selection process.

screened all full texts and MR screened 20% to cross-check accuracy. The inter-rater agreement at title and abstract was $\kappa = 0.65$ and at full-text screening $\kappa = 0.90$.

1.3 | Data Extraction Process

The first author extracted the information required for the meta-meta-analysis and narrative review from all eligible meta-analysis, and the second author extracted data from 20 meta-analyses. The information extracted by the second author aligned 100% with the information extracted by the first author. To pool effect sizes from eligible meta-analyses, the sample size, pooled effect sizes and 95% confidence intervals were extracted for the identified process and psychological outcome. The following information was extracted from each meta-analysis: country of first author, number of included studies, designs of included primary studies (e.g., RCT, cohort, or other longitudinal study), transdiagnostic risk or protective factors targeted and psychological outcomes.

We grouped the included meta-analyses into four clusters based on the study design of their primary studies: (1) broad behavioral interventions, where the targeted risk or protective factor was unspecified (e.g., physical activity interventions); (2) interventions that target an identified risk or protective factor (e.g., mindfulness), (3) prospective cohort studies, and (4) other longitudinal observational studies. Meta-analyses within a cluster were included in the meta-meta-analyses if they contributed at least five effect sizes (n) across at least two meta-analyses (k). Following data extract, we also coded meta-analyses based on their potential risk or protective factors into ten broad categories: (1) Physical activity, (2) Mindfulness, (3) Religiosity, (4) Cognitive or affective, (5) Technology use, (6) Nutrition or diet, (7) Interpersonal, (8) Drug use or smoking, (9) Sleep, (10) Exposure to nature, and (11) Other (i.e., Art and Pet-related interventions).

1.4 | Quality Assessment

The quality of included systematic reviews and meta-analyses was assessed by two authors (Y.Z. and M.R.) using a measurement tool for systematic reviews, the 16-item Assessment of Multiple Systematic Reviews (AMSTAR-2; Shea et al. 2017). Items are rated as either “Yes,” “Partial,” or “No.” Reviews are rated with an overall confidence level: “high confidence” for one non-critical weakness, “moderate confidence” for more than one non-critical weakness, “low confidence” for one critical weakness, and “critically low confidence” for more than one critical weakness (De Santis and Kaplan 2020). Critical weaknesses are identified in the following items: Item 2 (availability of a review protocol), Item 4 (comprehensive literature search), Item 7 (list of excluded studies), Item 9 (risk of bias assessment), Item 11 (application of appropriate meta-analytical methods), Item 13 (discussion of risk of bias), and Item 15 (assessment of publication bias). Inter-rater agreement for the quality assessment was substantial ($\kappa = 0.68$), with an overall percentage agreement of 86.9%.

1.5 | Statistical Analysis

1.5.1 | Meta-Meta-Analysis

To obtain a pooled effect size for processes and a psychological outcome, multilevel meta-analyses were conducted to account for non-independence in effect sizes. We reversed the effect size of studies on sedentary behaviors and traditionally “unhealthy” diets (e.g., fast food/ultra-processed etc.) so that the overall effect indicated a positive association between physical activity and diets on mental health. These analyses were conducted using R, a free software environment for statistical analyses (R Core Team 2021), using the approach outlined by Harrer et al. (2021). The metafor package (Viechtbauer 2010) was used to run the multi-level models and produce forest plots. For meta-analyses not reporting correlation coefficients and 95% confidence intervals, effect sizes (e.g., Hedge's g , odds ratio) were converted to correlation coefficients using the metaConvert package in the R statistical software.

1.5.2 | Heterogeneity

Heterogeneity denotes whether the variability in effect sizes across studies is greater than what would be expected due to random error alone (Cuijpers 2016). Heterogeneity was assessed using both the Q and I^2 statistics, which were obtained using the metafor package (Viechtbauer 2010) and dmetar package (Harrer et al. 2021), respectively. The Q statistic is a measure of weighted squared deviation around the weighted mean effect size, with a significant result suggesting that variability is unlikely to be due to chance (Laird et al. 2017). The I^2 statistic is a measure of the proportion of total study variation that is due to heterogeneity. A value of 0 indicates no variance between study estimates is due to heterogeneity, values of 30 or less indicate mild heterogeneity, whereas values above 50 are indicative of notable heterogeneity (Higgins and Thompson 2002).

1.5.3 | Publication Bias

The Egger's regression intercept was used to test for evidence of publication bias (Egger et al. 1997), whereby standardized effect sizes are regressed against their precisions and a regression intercept of zero is expected if there is no publication bias, with a significant result suggesting presence of publication bias. We followed advice from Viechtbauer (2010) on extending Egger's test to multilevel meta-analyses by including sample variance as a moderator. A significant moderation suggests publication bias may be present. This method has been used in other multilevel meta-analyses (Radunz et al. 2023; de Valle et al. 2021; Habeck and Schultz 2015).

1.6 | Lived Experience Involvement Statement

No specific efforts were undertaken to involve persons with lived experience in the study design or execution, or in the preparation of this manuscript.

2 | Results

2.1 | Description of Included Studies

As shown in Figure 1, after removal of duplicates, 5308 studies were assessed for eligibility at the title and abstract screening, with a total of 278 assessed for full-text eligibility and 152 published between 2022 and 2026 meeting inclusion criteria. Included studies were conducted across 23 countries, with the largest representations from China ($n=67$), Iran ($n=11$) and Australia, and United Kingdom ($n=10$). The number of primary studies included within each meta-analysis ranged from 3 (Koo et al. 2025) to 531 (Shin et al. 2022), which may reflect the large differences in the breadth of the underlying evidence bases.

Across the 152 meta-analyses, three broad outcomes were represented: depression ($n=135$), anxiety ($n=69$), and eating disorders ($n=7$), with many studies reporting on more than one domain. Depression was by far the most studied outcome, appearing in the majority of included meta-analyses (88.81%), while eating disorders were notably underrepresented, with only six studies reporting extractable eating disorder outcomes (4%; Wang et al. 2024; Vicent et al. 2023; Krauss et al. 2023; Liu et al. 2025; Alcaraz-Ibáñez et al. 2023; Paranjothy and Wade 2024). Table 1 reports on the total count of meta-analyses investigating each of our 11 potential risk/protective factors categories (e.g., physical activity, mindfulness, and religiosity) across each psychological outcome (depression, anxiety, eating disorders).

2.2 | Narrative Synthesis

Narrative synthesis was provided for meta-analyses of broad behavioral interventions with unspecified targets, as well as

TABLE 1 | Count of broad mechanisms categories investigated in each psychological outcome.

Transdiagnostic target	Depression	Anxiety	Disordered eating
(1) Physical activity	59	29	—
(2) Mindfulness	11	10	1
(3) Religiosity	1	1	—
(4) Cognitive or affective	12	8	5
(5) Technology use	5	1	1
(6) Nutrition or diet	32	11	—
(7) Interpersonal	3	—	—
(8) Drug use or smoking	3	3	—
(9) Sleep	2	2	—
(10) Exposure to nature	4	3	—
(11) Other (Art and Pet)	3	1	—
Total	135	69	7

other meta-analyses that were not eligible for inclusion in the meta-meta-analyses.

2.2.1 | Broad Behavioral Interventions

This category included interventions for which the primary pathway underlying any observed effects was not explicitly specified or examined in the included meta-analyses. The category was used to avoid making assumptions about the specific risk or protective factors targeted by broad behavioral interventions. Physical activity or related interventions were by far the most extensively researched in this category in meta-analyses that include RCTs, with 52 meta-analyses reporting on various forms of exercise across depression ($k=47$) and anxiety ($k=27$), with many meta-analyses assessing both depression and anxiety, none in eating disorders. Most investigated general exercise or physical activity ($k=23$), followed by Traditional Chinese Exercises such as Taichi, Qigong, Baduanjin, and Yijinjing and other mind-body exercise ($k=15$), yoga only ($k=3$), Pilates only ($k=2$), interval training ($k=2$), dance ($k=2$), walking ($k=2$), resistance training ($k=2$), aquatic exercise ($k=1$).

Thirteen meta-analyses examined nutritional/diet related interventions across depression ($k=13$) and anxiety ($k=3$). The nutritional factors investigated included prebiotics and/or probiotics ($k=5$), various other supplementation (e.g., n-3 fatty acids, magnesium, creatine, iron, $k=4$), mediterranean diet ($k=2$), ketogenic diet ($k=1$), unspecified dietary interventions ($k=2$).

Other meta-analyses containing these broad behavioral interventions included nature-based interventions ($k=4$), art-based ($k=1$), pet-assisted ($k=1$), and a written emotional disclosure intervention ($k=1$).

2.2.2 | Intervention Targeting an Identified Mechanism

Identified factors in this category included mindfulness ($k=10$ in depression, $k=9$ in anxiety and $k=1$ in eating disorder). This is followed by related factors such as intolerance of uncertainty (Wilson et al. 2023) and self-compassion (Han and Kim 2023) in both depression and anxiety, attention bias such as interpretation bias and dysfunctional attitudes in depression (Domhardt et al. 2025), and sleep (Zhang et al. 2026) in anxiety. One behavioral factor, social connection, was reported in depression (Alvarez et al. 2025).

2.2.3 | Cohort Studies

There were considerably more meta-analyses consisting of cohort studies in depression ($k=31$) compared to anxiety ($k=9$, 8 of which also investigated depression outcomes). There was only one meta-analysis (of mixed designs, included one cohort study) in eating disorders on social media use (Ahmed et al. 2024). In depression, diet or nutrition was the most examined ($k=13$), followed by physical activity ($k=8$), of which three investigated sedentary behaviors and one investigated occupational physical activity. Other behavioral factors such as sleep ($k=3$), screentime ($k=2$), cigarette smoking ($k=1$), green spaces exposure ($k=1$), were investigated. additionally interpersonal (emotional support $k=1$, social isolation $k=1$). Overall, these studies seem to suggest physical activity,

TABLE 2 | Meta-meta-analyses of interventions that target a psychological mechanism on depression and anxiety outcomes.

Mechanism	N meta-analysis (Total ES)	Effect size hedges g (95% CI)	p	I ² between study (95% CI)	Cochran's Q	Eggers' test (funnel plot asymmetry)
Depression						
Mindfulness	7 (Total ES = 154)	−0.15 (−0.53., 0.23)	0.39	Level 1 = 0.89%. Level 2 = 49.55%. Level 3 = 49.55%. Total I ² = 99.11%.	1551.75, p > 0.001*	p = 0.11
Attention Bias	2 (Total ES = 17)	−0.19 (−2.20., 1.83)	0.64	Level 1 = 64.14%. Level 2 = 17.93%. Level 3 = 17.93%. Total I ² = 35.86%.	1.56, p = 0.21	p = 0.21
Anxiety						
Mindfulness	8 (Total ES = 121)	−0.06 (−0.46., 0.34)	0.73	Level 1 = 5.04%. Level 2 = 47.48%. Level 3 = 47.48%. Total I ² = 94.96%.	208.25, p > 0.001*	p = 0.03*

Note: *denotes significance at $p < 0.05$.

emotional support, and nature may reduce the risks of depression whereas short sleep/daytime naps, sedentary behaviors, social isolation, screen time, and cigarette smoking are associated with increased odds of depressive symptoms.

In anxiety, there were five meta-analyses consisting of cohort studies on diet-related topics (i.e., sugar consumption, green tea consumption, adherence to EAT-Lancet Diet, vegetarian diet, ultra-processed food diet), and other lifestyle factors such as short sleep duration ($k=1$), physical activity ($k=1$) and nature exposure ($k=1$).

2.2.4 | Other Longitudinal Observational Studies

The shared factors that were investigated in more than one domain of distress in meta-analyses consisting of longitudinal studies (with effect sizes) included physical activity ($k=3$ in depression, Hou et al. 2025; Jiang et al. 2024; Zhang et al. 2022; and $k=1$ in anxiety, Zhang et al. 2022), smoking or cannabis use ($k=2$ in depression, Crabb et al. 2025; Churchill et al. 2025; and anxiety respectively, Burke et al. 2024; Lowe et al. 2024), cognitive biases ($k=2$ in depression, $k=1$ in anxiety), goal attainment (Diaconu-Gherasim et al. 2024), gender non-conformity (Xu et al. 2024), perfectionism ($k=1$ in depression and eating disorder; Sorjonen and Melin 2025; Vicent et al. 2023), and self-esteem ($k=1$ in depression and eating disorders; Son et al. 2025; Krauss et al. 2023), hope ($k=2$ in depression and $k=1$ in anxiety, Gallagher et al. 2025; Tang et al. 2024; Richardson et al. 2026).

In depression only, other related factors investigated were perception of major life events (Haehner et al. 2024) and other lifestyle factors included nutrition ($k=2$, e.g., fiber intake and healthy diet; Aslam et al. 2024; Orlando et al. 2022), social media use (Ahmed et al. 2024; Shin et al. 2022). There was one meta-analysis that examined religiosity (Aggarwal et al. 2023),

school connectedness (Meng et al. 2025), and one on social and therapeutic horticulture (Wood et al. 2025).

In anxiety only, other factors investigated included coping (Dong et al. 2025). In eating disorders only, one study examined self-criticism (Paranjothy and Wade 2024) and one examined social physique anxiety (Alcaraz-Ibáñez et al. 2023).

2.3 | Meta-Meta-Analyses

A total of 46 meta-analyses contributed data to a total of 13 meta-meta-analyses. Results from all meta-meta-analyses are summarized below.

2.3.1 | Interventions That Target an Identified Protective or Risk Factor

A total of two meta-meta-analyses were conducted for interventions targeting an identified factor on depression outcomes, namely mindfulness and cognitive bias. For mindfulness, a total of 7 meta-analyses were included with a total of 154 effect sizes, revealing a non-significant effect of mindfulness-based interventions on depression (Hedge's $g = -0.15$; 95% CI: -0.53 , 0.23 , $p = 0.39$). High levels of heterogeneity were present as highlighted in Table 2. For cognitive bias, a total of two meta-analyses contributing 17 independent effect sizes were analyzed. Findings revealed a non-significant effect of cognitive bias interventions on depression outcomes (Hedge's $g = -0.19$; 95% CI: -2.20 , 1.83).

One meta-meta-analysis was conducted to examine the effects of mindfulness-based interventions on anxiety outcomes. Findings revealed a non-significant effect of mindfulness-based interventions on anxiety ($r = -0.06$; 95% CI: -0.46 , 0.34), with high levels of heterogeneity present (Total $I^2 = 94.96\%$) and significant publication bias found (see Supporting Information for funnel plot).

TABLE 3 | Summary of meta-meta-analyses of *prospective cohort studies* investigating transdiagnostic mechanisms on depression outcomes.

Mechanism	N meta-analysis (Total ES)	Effect size r (95% CI)	p	I^2 between study (95% CI)	Cochran's Q	Eggers' test (funnel plot asymmetry)
Sleep	2 (Total ES = 5)	0.015 (−0.06., 0.10)	0.26	Level 1 = 7.69%. Level 2 = 46.15%. Level 3 = 46.15%. Total I^2 = 92.31%.	13.00, $p < 0.001^*$	$p = 0.01^*$
Exercise	6 (Total ES = 30)	−0.07 (−0.12., −0.02)	0.01*	Level 1 = 18.03%. Level 2 = 40.98%. Level 3 = 40.98%. Total I^2 = 81.97%.	31.70, $p < 0.001^*$	$p = 0.49$
Nutrition	8 (Total ES = 133)	−0.02 (−0.07., 0.03)	0.53	Level 1 = 3.27%. Level 2 = 48.37%. Level 3 = 48.37%. Total I^2 = 96.73%	245.81, $p < 0.001^*$	$p = 0.01^*$

Note: *denotes significance at $p < 0.05$.

2.3.2 | Prospective Cohort Studies

A total of three meta-meta-analyses were conducted to examine the pooled effect of prospective cohort meta-analyses examining sleep, exercise and nutrition on depression outcomes. Findings from our meta-meta-analyses revealed a significant effect of physical activity ($r = -0.07$; 95% CI: $-0.12.$, -0.02 , $p = 0.01$) on depression outcomes, as highlighted in Table 3. Heterogeneity was present across all three meta-meta-analyses of prospective cohort studies, as highlighted by significant Cochran's Q values and total I^2 values ranging from 92% to 95%. Publication bias was present for the meta-meta-analyses of sleep and nutrition on depression, as evidenced by significant Egger's tests. A funnel plot of publication bias is presented in the [Supporting Information](#).

2.3.3 | Longitudinal and Prospective Observational Studies

A total of six transdiagnostic factors were meta-analyzed to evaluate their impact on depression outcomes, namely social media use, exercise, attention biases, hope, smoking and nutrition (Table 4). Cognitive bias was the only transdiagnostic factor in longitudinal and prospective observational studies to emerge as having a significant effect on depression outcomes ($r = 0.22$; 95% CI: $-0.01.$, 0.44 , $p = 0.05$). Significant heterogeneity was present.

Smoking/cannabis use was the only transdiagnostic factor meta-analyzed to evaluate their effect on anxiety outcomes. A non-significant effect of smoking/cannabis on anxiety outcomes was found ($r = 0.15.$, $-0.38.$, 0.69 , $p = 0.34$). All results are presented in Table 4.

2.4 | Quality Assessment

Quality assessment using the AMSTAR-2 tool (Supporting Information B) of the 44 meta-analyses included in the

meta-meta-analyses demonstrated 25 meta-analyses (54%) were rated as “critically low confidence.” A total of 15 meta-analyses (34%) received a “low confidence” rating, whereas only 4 meta-analyses (9%) were rated as “high confidence.” The most frequently unmet critical item was Item 7, which requires the provision of a list of excluded studies with reasons; 33 meta-analyses (75%) did not provide this information. Item 2, concerning the documentation of a protocol and deviations, was not reported by 10 meta-analyses (23%), whereas accounting for risk of bias when discussing studies (item 13) was absent from 12 meta-analyses (27%). Five meta-analyses (11%) received a “Partial” rating for not conducting a comprehensive literature search (item 4). All meta-analyses utilized appropriate statistical methods (item 11), whereas three meta-analyses (6%) did not assess publication bias (item 15).

3 | Discussion

We aimed to summarize new meta-analytic evidence on modifiable risk and protective factors associated with depression, anxiety and eating disorders published since Hazzard et al. (2023). Despite the appearance of 152 new meta-analyses, not only were no new transdiagnostic targets identified, eating disorders were severely underrepresented, making identifying a true transdiagnostic target unlikely. Only six meta-analyses provided extractable effect sizes (4% of 152) in eating disorders, compared to 88.81% for depression. The asymmetry substantially limits transdiagnostic synthesis and is compounded by high heterogeneity, a common challenge in umbrella reviews (Fernandez et al. 2025).

Depression was the most frequently examined outcome, followed by anxiety. Few new meta-analyses investigated potential transdiagnostic targets in eating disorders. Indeed, eating disorders were frequently omitted in the consideration of transdiagnostic treatments, focused only on depression and anxiety (Cuijpers et al. 2023, Radunz et al. 2025). Similarly, transdiagnostic factors were commonly examined only in relation to depression and anxiety (e.g., Antuna-Cambor et al. 2024). This

TABLE 4 | Meta-meta-analyses of longitudinal and prospective studies on depression and anxiety outcomes.

Mechanism	N meta-analysis (Total ES)	Effect size hedges g (95% CI)	p	I ² between study (95% CI)	Cochran's Q	Eggers' test (funnel plot asymmetry)
Depression						
Social media	2 (Total ES = 52)	0.12 (−0.10., 0.34)	0.09	Level 1 = 4.63%. Level 2 = 47.68%. Level 3 = 47.68%. Total I ² = 95.37%.	0.02, p = 0.88	p = 0.88
Exercise	3 (Total ES = 46)	−0.04 (−0.08., 0.04)	0.07	Level 1 = 26.24%. Level 2 = 36.88%. Level 3 = 36.88%. Total I ² = 73.76%.	16.91, p > 0.001*	p = 0.84
Attention biases	4 (Total ES = 190)	0.22 (−0.01., 0.44)	0.05*	Level 1 = 1.64%. Level 2 = 49.18%. Level 3 = 49.18%. Total I ² = 98.36%.	314.33, p > 0.001*	p = 0.34
Hope	2 (Total ES = 28)	−0.09 (−1.05., 0.90)	0.80	Level 1 = 1.09%. Level 2 = 49.46%. Level 3 = 49.46%. Total I ² = 98.91%.	139.08, p > 0.001*	p = 0.35
Smoking/ cannabis	2 (Total ES = 97)	−0.02 (−1.48., 1.44)	0.91	Level 1 = 1.78%. Level 2 = 49.11%. Level 3 = 49.11%. Total I ² = 98.22%.	56.20, p > 0.001*	p > 0.001*
Nutrition	2 (Total ES = 7)	−0.03 (−0.14., 0.08)	0.16	Level 1 = 87.36%. Level 2 = 6.32%. Level 3 = 6.32%. Total I ² = 12.64%.	0.18, p > 0.68	p = 0.67
Anxiety						
Smoking/ cannabis	2 (Total ES = 20)	0.15 (−0.38., 0.69)	0.34	Level 1 = 9.69%. Level 2 = 45.15%. Level 3 = 45.15%. Total I ² = 90.3%.	8.89, p > 0.001*	p = 0.18

Note: *denotes significance at p < 0.05.

omission is notable among youth given that 82% of eating disorders emerge before age 25, with one-third emerging between the ages of 18 and 25 (Solmi et al. 2022). In adolescents and emerging adults, DSM-5 eating disorders affect one in six females and one in 40 males (Silén et al. 2020).

Despite the omission of eating disorders, many of the identified factors have established or emerging relevance to eating disorders. To facilitate interpretation of these findings within an eating disorder context, Table 5 summarizes evidence linking factors identified in the depression and anxiety literature to eating disorders and their potential implications for CBT augmentation in eating disorders. This synthesis highlights potentially shared modifiable targets that warrant further investigation with eating disorder populations.

A notable recent trend is the examination of lifestyle factors, particularly physical activity and nutrition, in depression and anxiety. Physical activity emerged as a significant protective

factor in meta-analyses of prospective cohort studies in depression. However, the use of physical activity interventions may be contraindicated for some youth at risk of eating disorders, given the high prevalence of driven or compulsive exercise among adolescents (Schaumberg et al. 2023; Levallius et al. 2017), and its association with later eating disorder symptoms (Schaumberg et al. 2023). The growing emphasis on lifestyle interventions, particularly physical activity, may warrant caution especially among vulnerable youths, particularly considering the pervasive sociocultural messages promoting weight loss and fitness (Omar 2025; Sharp et al. 2023; Scheiber et al. 2023). Nevertheless, evidence suggests that physical activity can be a valuable adjunct to eating disorder treatment when delivered in a structured, supervised, and individualized manner (see Table 5 for a summary of the evidence and clinical recommendations specific to physical activity). The value of using a transdiagnostic lens when examining these risk and protective factors is to ensure that no inadvertent harm is done.

TABLE 5 | Transdiagnostic factors identified in our review and relevance to CBT augmentation in eating disorders.

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Perfectionism. Supported for depression and eating disorders in <i>longitudinal studies</i>	Theory: Perfectionism is a core maintaining mechanism in the transdiagnostic model of EDs (Fairburn et al. 2003). Level 1 evidence (meta-analysis): - Both perfectionistic concerns and strivings are strongly associated with ED pathology (Limburg et al. 2017). - Robinson and Wade (2021) found CBT-Perfectionism interventions were effective reducing ED pathology with large effect sizes in weight concerned emerging adults. Other evidence: - ED symptoms predict subsequent perfectionism (Claus et al. 2025).	- Assess perfectionism routinely and incorporate perfectionism in the ED formulation if relevant - Provide psychoeducation about perfectionism - Conduct behavioral experiments around making mistakes, repeated checking, reassurance-seeking, or over-preparation etc. - Explicitly target self-critical thinking using attention retraining. - Explicitly target self-worth contingent upon achievements with exercise such as the “pie chart”. - Skills to manage experience of shame following perceived imperfection, for example, emotion regulation, acceptance, mindfulness.
Self-esteem. Supported for depression and eating disorders in <i>longitudinal studies</i>	Theory: Core low self-esteem is a core maintaining mechanism in the transdiagnostic model of EDs (Fairburn et al. 2003). Level 1 evidence (meta-analysis): A longitudinal association between low self-esteem and subsequent disordered eating exist such that low self-esteem leads to increased ED symptoms (Colmsee et al. 2021).	Explicitly address feelings of inadequacy and low self-worth using: Positive evidence logging; Behavioral experiment testing negative core beliefs; Self-compassion exercises; Cognitive restructuring.
Mindfulness. Supported for anxiety and eating disorders in targeted <i>intervention studies</i>	Theory: Mood intolerance is a core maintaining mechanism in the transdiagnostic model of EDs (Fairburn et al. 2003). Level 1 evidence (meta-analysis): Mindfulness had an inverse relationship with ED psychopathology, with mindfulness facets of non-judging and acting with awareness having the strongest negative associations (Sala et al. 2020)	Use mindfulness as one facet of teaching mood toleration skills—provide psychoeducation on mindfulness (especially non-judging and acting with awareness) and incorporate mindfulness exercises in: emotion regulation (e.g., urge surfing, noticing and naming emotions without judging); enhancement of psychological flexibility (e.g., notice rigid thoughts about food/body without judgment); reduction of automatic behaviors (e.g., use mindfulness to notice triggers of disordered eating and respond deliberately rather than automatically).

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TABLE 5 | (Continued)

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Self-criticism. Supported for eating disorders in <i>longitudinal studies</i> .	Theory: Self-criticism is hypothesized to be the “active ingredient” of perfectionism (Dunkley et al. 2020) and perfectionism is a core maintaining mechanism in the transdiagnostic model of EDs (Fairburn et al. 2003). Level 1 evidence (meta-analysis): A positive association exist between self-criticism and disordered eating (Paranjothy and Wade 2024).	• Behavioral experiment to test whether self-criticism/self-compassion support better support goal pursuit. • Cognitive defusion from self-critical thoughts • Evidence gathering, logging positive data to challenge self-critical beliefs • Explicitly target self-critical thinking using attention retraining.
Cognitive bias. Supported for anxiety in <i>longitudinal studies</i> .	Level 1 evidence: • A meta-analysis showed that ED groups have a cognitive bias toward food stimuli based on the Stroop test compared to healthy controls (Brooks et al. 2011). • Meta-review on attentional bias in EDs summarizes evidence for attentional avoidance and vigilance in EDs depending on stimulus properties (low vs. high-calorie food; high-body mass vs. low-body mass index photos) and attentional avoidance of food stimuli in those with AN (Stott et al. 2021).	• Cognitive Bias Modification Training exercises/online modules (see Rowlands et al. 2022). • Attention retraining exercises.
Intolerance of uncertainty. Supported for depression and anxiety in <i>intervention studies</i> .	Level 1 evidence (meta-analysis): • Women with EDs reported significantly higher levels of intolerance of uncertainty than healthy control, a difference significantly larger for women with AN or BN (Brown et al. 2017). • Moderate associations of intolerance anxiety with various mental illnesses including EDs ($r=0.4$, McEvoy et al. 2019).	• Behavioral experiments, for example, using a “lottery” approach to the daily selection of “fun foods”; reduction of body checking behaviors (weighing, mirror use). • Worry postponement. • See latest translation research from Morriss (2025): Cognitive restructuring; Behavioral exposures; Mindfulness techniques (e.g., attentional monitoring, decentring, and acceptance).
Self-compassion. Supported for depression and anxiety in <i>intervention studies</i> .	Level 1 evidence: • Meta-analytic evidence shows higher self-compassion was associated with lower eating pathology, reduced body image concerns, and greater positive body image (Turk and Waller 2020) and a negative association exists between self-compassion and disordered eating (Paranjothy and Wade 2024). • A randomized trial showed CBT and compassion-focussed therapy (CFT) produced similar large reductions in ED symptoms and that CFT has superior maintenance of benefits for patients with childhood trauma at one-year follow-up (Vrabel et al. 2024).	• Psychoeducation about threat, drive and soothing systems, validating the need for self-compassion to achieve valued goals—see Gilbert (2014). • Imagery rescripting • Compassionate imagery • Self-compassion behavioral experiment • Self-compassion letter writing

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TABLE 5 | (Continued)

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Social physique anxiety. Supported for eating disorders in <i>longitudinal studies</i> .	Level 1 evidence (meta-analysis): Large ($r = 0.51$) associations between social physique anxiety (i.e., social anxiety from experiencing or anticipating negative interpersonal evaluations of their own body) with ED symptoms (Alcaraz-Ibáñez et al. 2023). This relationship was shown to be stronger among individuals experiencing body image disturbances.	- Collect evidence about the type of body image concerns experienced by the client and choose CBT techniques that match these, for example, psychoeducation about societal biases, body neutrality, “feeling fat”; imagery rescripting, behavioral experiments about body checking and/or avoidance), surveys, exposure (Waller et al. 2019). - Use cognitive dissonance techniques (Becker and Stice 2017) and encourage individuals to speak and act in ways that assume both ignoring that others may be judging their body and giving no value to such appraisals” (Alcaraz-Ibáñez et al. 2023, 139).
Hope. Supported for depression and anxiety in <i>longitudinal studies</i> .	Emerging evidence: - A population-based study showed optimism is negatively associated with emotional eating and uncontrolled eating (Robert et al. 2020). Further, optimistic individuals were less likely to be underweight or obese and had a lower ED risk. - Patients with AN had similar level of positive future-oriented cognitions and significantly more negative future-oriented cognitions compared to controls, whereas patients with BN had both fewer positive future-oriented cognitions and more negative future-oriented cognitions compared to control (Godley et al. 2001).	- Adopt a hopeful stance throughout treatment using motivational enhancement (e.g., “what would recovery make possible in your life?”, or “what are you hoping will be different in 6 months” etc.)—see the MANTRA workbook https://www.mantraweb.co.uk/workbook. - Identify meaningful life goals and write reminders of positive future possibilities to support motivation for recovery. - Use cognitive restructuring to target hopeless cognitions. - Keep a “recovery wins” logs to strengthen agency and hope by recording actions taken, challenges faced, lesson learned. - Incorporate lived experience perspectives by providing opportunities to hear from individuals who have recovered from an eating disorder.
Sleep. Supported for depression and anxiety in <i>cohort studies AND anxiety</i> in <i>intervention studies</i> .	Level 1 evidence (meta-analysis): - Degasperi et al. (2024) found poorer sleep efficiency and quality, as well as total sleep time and slow wave sleep in individuals with EDs compared to healthy controls. - Eating pathology, loss of control eating, and excess exercises are significantly associated with poorer sleep quality and higher insomnia symptoms (Opitz et al. 2026).	See Pacella et al. (2026) for specific recommendations, consider incorporating CBT-I in treating sleep problems, common components may include: - Sleep psychoeducation. - Sleep hygiene strategies. - Sleep diaries. - Sleep efficiency training.

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TABLE 5 | (Continued)

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Physical activity. Supported for depression and anxiety in cohort studies AND other longitudinal studies.	Level 1 evidence (meta-analysis): • RCTs show that exercise-based interventions were associated with a large effect size reduction in binge eating disorders symptoms (Raisi et al. 2023). • Exercise or mind–body exercise (e.g., qigong, tai chi, yoga) was not more effective than control in reducing depression symptoms, harmful exercise habits, eating behaviors or emotional regulation skills (Martinez-Calderon et al. 2025). However, some reduction of pre-meal negative affect has been observed using yoga in a RCT among individuals in a residential eating disorder program (Pacanowski et al. 2017). • A systematic review proposed a set of guidelines to incorporate exercise therapeutically into ED treatment such as create a written contract of how exercise will be used, monitor medical status, and create a graded exercise program (Cook et al. 2017). • A recent scoping review suggested that adapted physical activities or exercise can be safely incorporated into ED treatment, helping to reduce dysfunctional physical activities while producing positive or neutral effects on eating disorder psychopathology. Among people with AN, adaptive physical activities improved physical fitness with no influence on body weight or body composition unless progressive resistance training was conducted (Mathisen et al. 2023). Other evidence: A large longitudinal cohort study found that adolescents who exercised for weight loss reported higher ED cognitions and behaviors than those who don't, and such exercise was predictive of development of eating disorder behaviors (e.g., fasting and purging) later in adolescence (Schaumberg et al. 2023).	See suggestions in Mathisen et al. (2023), Cook et al. (2017), Schaumberg et al. (2024), and Calogero and Pedrotty-Stump (2010). Key points summarized below: • Distinguish between maladaptive forms of exercise (e.g., unsupervised, unstructured, compulsive, or excessively intense exercise) and adaptive forms of exercise that are structured, supervised, and recovery-oriented, rather than eliminating exercise entirely from the individual's life. • Consult with guidelines such as Safe Exercise at Every State (SEES, Quesnel and Cooper 2005) and incorporate assessment, step up/down approach based on risks, and psychological interventions (e.g., introducing flexibility, expand coping skills, values, foster joy in exercise) in treatment. • Cultivate a mindful approach to exercise (i.e., movement with purpose, self-compassion, acceptance, awareness and joy).
Nutrition. Supported for depression and anxiety in cohort studies and depression in longitudinal studies.	Level 1 evidence: • A systematic review identified a significant association between ultra-processed food consumption and bulimic-type EDs (Pereira et al. 2024). Other evidence: • Bertoli et al. (2015) found that adherence to the mediterranean diet has been found to be inversely associated with binge eating disorder. • A narrative review (Almoraie et al. 2025) suggested that university students are at risk of developing poor eating habits due to economic conditions, time constraints, and food environment and lack of nutritional information, all of which increase of the risks of eating disorders.	Consult the “Recovery from eating disorder for life” Food Guide (REAL food guide, Hart et al. 2018) to educate patients on healthy eating and nutrition adequacy.

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TABLE 5 | (Continued)

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Social connection. Supported for depression in <i>intervention studies</i>. SOCIAL ISOLATION. Supported for depression in <i>cohort studies</i>. EMOTIONAL SUPPORT. Supported for depression in <i>cohort studies</i>	Level 1 evidence: A systematic review showed an association exists between loneliness and EDs (Levine 2012). Other evidence: - A population-based study found that loneliness in early-middle adolescence prospectively predicted disordered eating and dieting among boys, whereas the relationship is bidirectional among girls (Cortés-García et al. 2022). - A qualitative study suggested while certain social interactions can be unhelpful (e.g., family trivializing the disorders, overly focused on food), social support was helpful for recovery (e.g., empathetic friends, compassion, understanding providers) (Linville et al. 2012). A scoping review identified an association between loneliness with one or more eating behaviors that would usually be considered harmful, for example, lower overall diet quality (Hanna et al. 2023).	- Incorporate loneliness in the formulation of eating disorders (if relevant), consider whether it is a trigger of disordered eating (e.g., binging). - Use cognitive restructuring to challenge beliefs that contribute so social withdrawal and disconnection (e.g., “no one understands what I’m going through”). - Use surveys, behavioral experiments or graded exposure to challenge unhelpful beliefs in connecting with others. - Use behavioral activation and incorporate pleasant activities involving connecting with others. - Use expanding self-identity tasks that include social goals (e.g., attend games night at least once a month, join a club).
Pet ownership. Supported in depression in <i>cohort studies</i>.	Emerging evidence: A recent qualitative paper explored the experience of pet ownership among adults experiencing eating disorders (Ellis et al. 2026). These researchers found that pets may contribute to challenges at the start of recovery (e.g., sharing food with pets to reduce food intake, excuse to engage in unhealthy exercise, barrier to engage in inpatient treatment) and then becoming more beneficial in the later stages of recovery (e.g., emotion regulation, distraction, providing unconditional acceptances regardless of the owners’ body shape or weight, offering motivation to recover, etc.)	Exploring the role of a pet in patients’ recovery journeys such as: - Having a pet present before or after eating for emotion regulation, or distraction from using post-eating purging. - Aligning feeding pets with patients’ mealtimes, stabilizing eating patterns and routines. - Observing and learning from pets’ non-judgmental and intuitive eating behaviors. - Using mindful walking in nature with dogs. - Spend time with pets to give permission to rest and reduce the urge to exercise. - Motivational writing about recovery and enhanced care of pets. - Allow pet visit during inpatient care/presence during telehealth appointment.
Exposure to nature. Supported for depression and anxiety in <i>cohort studies</i>.	Emerging evidence: A critical narrative review highlighting the positive impact of nature exposure on healthier body image outcomes (Swami 2024).	- Set up behavioral activation in natural settings (e.g., going for a walk, spending time in green spaces). - Encourage nature-based emotion regulation activities (e.g., horticulture, outdoor mindfulness exercise), with others if possible.

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TABLE 5 | (Continued)

Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Cigarette smoking. Supported for depression in <i>cohort studies</i> .	Emerging evidence: - Individuals with BED and BN are significantly more likely to be life-time smokers than health controls (Solmi et al. 2016). - In adolescents, smoking cigarettes was found to be a significant risk factor for engaging more disordered eating in males (Croll et al. 2002).	- Conduct functional analysis of smoking or substance use and association with disordered eating (incorporate into formulation if it is used to cope with negative affect, stress or body image concerns). - Conduct motivational interviewing with these health behaviors. - Provide psychoeducation about smoking/substance use and weight control.
Cannabis use. Supported for depression and anxiety in <i>longitudinal studies</i> .	Level 1 evidence (meta-analysis): A 6% prevalence of cannabis abuse/dependence in AN (AN-BP = 4% vs. AN-R = 0%) and 14% prevalence of cannabis use of individuals with AN (Devroe et al. 2021).	
Social media use. Supported for depression in <i>longitudinal studies</i> AND eating disorders in <i>cohort studies</i> .	Level 1 evidence (meta-analysis): - A positive correlation exists between social networking site use and disordered eating behaviors (Zhang et al. 2021). - Appearance-based social media use has a small, negative correlation with body image longitudinally (de Valle et al. 2021).	- Assess social media use and incorporate it into the case formulation where relevant. - Psychoeducation re media literacy (e.g., understanding how algorithms shape content exposure, recognizing the use of filters and other forms of image manipulation, and identifying the commercial incentives underlying social media content). - Conduct behavioral experiments by manipulating social media exposure and monitoring its impact on thoughts, emotions, and behaviors. - Modify the digital environment (e.g., curate one's feed and remove content that does not support mental wellbeing).
Coping. Supported for anxiety in <i>longitudinal studies</i> .	Level 1 evidence: - A systematic review showed that people with EDs have more negative, avoidant and emotion-focused coping strategies whereas people without EDs have more positive coping strategies (Jiménez-Padilla et al. 2025). Other evidence: - ED patients engage in more self-criticism, social withdrawal, and inadequate emotion-focused coping compared to control (Lobera et al. 2009). AN patients tend to score higher on self-criticism, whereas BN patients tend to score higher on impulsivity (Lobera et al. 2009). - Fitzsimmons and Bardone-Cone (2011) found that emotion-oriented coping moderated the relationship between anxiety and eating pathology.	- Assess self-criticism, avoidant coping, social withdrawal, problem-solving skills, and incorporate these coping strategies in case formulation when relevant. - Increase adaptive coping repertoire (e.g., problem-solving, seeking social support, stress-management, assertive communication). - Conduct behavioral experiment or exposure to reduce avoidant coping strategies. - Teach the client problem solving skills.

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Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
Goal attainment. Supported for depression in <i>cohort studies</i> .	Emerging evidence: Lethbridge et al. (2011) found that ED patients displayed more conditional goal setting (i.e., the belief that attainment of a specific lower-order goal, such as attaining a specific body shape or weight goal, is crucial to the achievement of an abstract higher-order goal, such as happiness).	• Use cognitive restructuring to challenge conditional goal-setting beliefs. • Identify values beyond appearance, weight or shape. • Shift from performance- to mastery-oriented goals (e.g., outcome goals such as getting good grades versus process goals such as study for one hour each weekday). • Develop goal flexibility (e.g., multiple pathways to attain a goal, adjusting/re-prioritizing goals, setting stretching but not unattainable goals).
Religious/spirituality. Supported for depression in <i>longitudinal studies</i> .	Level 1 evidence: A systematic review identified an association between “strong and internalized religious beliefs” and lower levels of disordered eating, psychopathology and body image concern (Akrawi et al. 2015) Other evidence: Qualitative studies revealed that while many women believed religion and spirituality contributed to the development and maintenance of their eating disorders, it was also an important component in their recovery (Richards et al. 2018). Specifically, Marsden et al. (2007) found that appetitive control held moral connotations among religious women experiencing an eating disorder and that negative self-image was based more on sin than body-image.	• CBT formulation should incorporate moral perfectionism, guilt and shame, self-punishment, beliefs about purity, discipline or virtue if relevant. • Incorporate spirituality as a coping strategy (e.g., use of prayer, meditation, community support). • Identify values and leverage protective aspect of religious identity (e.g., intrinsic self-worth, belonging, hope, compassion). • Utilize positive social support in religious networks.
Gender nonconformity. Supported for depression and anxiety in <i>longitudinal studies</i> .	Emerging evidence: Bell et al. (2019) found eating in secret, weight-based self-worth, and body image concerns to be of frequent prevalence in sexual and gender diverse populations. Additional risk factors such as negative affect, perceived stigma and low self-compassion were identified.	• Address stigma-related cognitions or beliefs from experiences of discrimination, rejection or marginalization. • Incorporate emotion-regulation techniques to improve negative affect, especially if gender-based trauma exists. • Gender-affirming body neutrality work. • Recognize increased likelihood of neurodivergence and adapt CBT accordingly.

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Factors emerging from research in this updated umbrella review	Evidence—relevance to eating disorders (EDs)	CBT-ED augmentation application for therapists
School connectedness. Supported for depression in <i>longitudinal studies</i> .	Emerging evidence: Croll et al. (2002) found that adolescents who experience disordered eating reported significantly lower level of school connectedness compared to those who don't. Further, school connectedness is a protective factor (OR = 0.69, 95% CI [0.57–0.83]) among males (Croll et al. 2002).	For school-age patients, actively consider the role of school/school environment as part of the recovery context: • Conduct behavioral activation focused on school engagement. • Cognitive restructuring of school/belonging beliefs (e.g., “I don't fit in at school”). • Actively engage teachers or other supportive school figures (e.g., wellbeing teachers) in promoting recovery (e.g., broadening identity outside of eating disorder, identify future schooling goals, engaged in student activities/clubs/leaderships).

Note: AN, anorexia nervosa; BN, bulimia nervosa; ED, eating disorder; RCT, randomized controlled trials.

Among psychological factors, mindfulness and other cognitive factors were investigated extensively. Despite the popularity of mindfulness in research and clinical practice, our meta-meta-analyses found largely non-significant effects across study types. The only significant psychological factor was cognitive biases in depression longitudinal data. This finding was based on two meta-analyses, that is, Vos et al. (2025) which investigated cognitive bias, and Tang et al. (2024) which investigated negative future-related thinking. The former study showed significant effects for interpretation bias and memory bias but not attention bias. Tang et al. investigated hopelessness, reversed positive expectations/optimism, and reversed hope. Together, these findings suggest that negative biases in interpreting past events and predicting future events may contribute to the development and maintenance of depression, highlighting several promising intervention targets.

Several limitations should be considered. Study quality was low with 54% of meta-analyses rated as “critically low confidence”. Publication bias was detected in several meta-meta-analyses (e.g., sleep in prospective cohort studies and nutrition in longitudinal studies in depression; mindfulness interventions in anxiety). Finally, the concentration of meta-analyses from China (44.67%) may skew the literature toward specific topics (e.g., popularity in physical activity and diet) and limit generalizability. Importantly, in addition, restricting inclusion to factors modifiable within CBT may have excluded potentially important transdiagnostic factors in youth psychopathology e.g., parental expressed emotions; that could be targeted in other treatment approaches.

Taken together, future research should (1) broaden the search for psychological factors relevant to eating disorders; (2) shift away from a focus on lifestyle intervention trials toward longitudinal, mechanism-focused designs, and (3) prioritize replication of cognitive bias across domains, as it currently appears to be the only theoretically coherent (e.g., Fairburn et al. 2003) and viable transdiagnostic target in this review.

In conclusion, our review found no new transdiagnostic targets since 2022, reflecting limitations in the evidence base and a broader mismatch between theoretical ambition and empirical yield. Not much has changed since Fusar-Poli et al. (2019, 192) and colleagues suggested that “to date, transdiagnostic approaches have not delivered a credible paradigm shift that can impact classification and clinical care”. The near absence of testing of potential transdiagnostic factors relevant to eating disorders continues to limit meaningful transdiagnostic synthesis and may have the potential to cause harm in populations of youth (adolescents and emerging adults), where disordered eating affects one in five females. Future research should include measures of eating disorder symptoms, in addition to depression and anxiety, as the most minimally acceptable approach to transdiagnostic studies.

Author Contributions

Yuan Zhou: conceptualization, methodology, data curation, formal analysis, writing – original draft, writing – review and editing, project administration. **Marcela Radunz:** conceptualization, methodology, data curation, formal analysis, writing – original draft, writing – review and editing. **Tracey D. Wade:** conceptualization, methodology, funding acquisition, resources, supervision, writing – review and editing.

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Conflicts of Interest

T.D.W. is an editor of the International Journal of Eating Disorders and co-author of this article. T.D.W. was excluded from editorial decision-making related to the acceptance of this article for publication in the journal.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** Search Strategies. **Supporting Information: B** Quality assessment using AMSTAR-2 tool. **Supporting Information: C** Funnel plots of publication bias. **Table S1:** Comparison of the search strategy and eligibility criteria used in Hazzard et al. (2023) and the current updated umbrella review current search strategy, including the rationale for modifications.