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The Effectiveness of Body Image Flexibility Interventions in Youth: A Systematic Review with Meta-Analysis

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Abstract

Prevention programs that focus on enhancing positive body image may improve health and well-being in young people. Body image flexibility is a promising prevention approach, although its application with youth has yet to be comprehensively investigated. This systematic review evaluated the effectiveness of body image flexibility interventions among adolescents and emerging adults. There were 23 eligible studies ($N = 2764$, 91.3% female) published between 2004 and 2024. Random effects meta-analyses indicated that body image flexibility interventions led to immediate, $g = 0.52$ (13 studies, $n = 1{,}045$), and sustained, $g = 0.27$ (8 studies, $n = 608$, 1-week to 24-month follow-up) improvements in health outcomes and protected against adverse effects of body image threats, $g = 0.33$ (7 studies, $n = 480$), relative to no/minimal intervention controls. Improvements were largely attributable to reductions in body image concerns. Comparison with other evidence-based interventions, including cognitive and dissonance-based programs, suggested comparable effects. Randomized trials and universal programs demonstrated smaller improvements, and there was evidence of potential publication bias. Conclusions are thus limited by the quantity and quality of existing studies, with most focusing on emerging adult females. Recommendations are provided to address these limitations in future research and strengthen the reliability and generalizability of results.

Keywords Body image flexibility · Positive body image · Adolescents · Emerging adults · Intervention · Meta-analysis

Introduction

Body image concerns affect functioning across the lifespan, with young people being particularly vulnerable to adverse impacts on health (Shagar et al., 2018). Body dissatisfaction has been linked to multiple health-comprising behaviors among adolescents, including disordered eating and compulsive exercise, and is predictive of lower quality of life among both males and females (Bornioli et al., 2019; Griffiths et al., 2016; Jankauskiene et al., 2019). Efforts to prevent the progression of body image disturbances can help reduce the incidence of severe psychological disorders, while minimizing individual suffering and associated economic and healthcare costs (Colizzi et al., 2020; Koreshe et al., 2023). Contemporary prevention approaches emphasize the enhancement of positive body image and protective factors alongside reducing risk factors for negative body image (Levine and Smolak, 2016). One such approach is body image flexibility-based interventions that teach skills for contacting negative body image experiences fully and non-judgmentally while staying connected with meaningful areas of life (Sandoz et al., 2019). Although there are

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Preregistration A protocol for the current study was registered with the PROSPERO international prospective register of systematic reviews (CRD42023481589; Brichacek et al., 2023b) prior to study commencement (12 December 2023), and updated on 12 September 2024 to include the quantitative methods used for data synthesis. Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023481589

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existing reviews that offer support for related areas of intervention in adolescents and adults (e.g., mindfulness and acceptance-based therapies; Beccia et al., 2018; Linardon et al., 2017), there is yet to be a synthesis of studies examining the effectiveness of body image flexibility interventions in young people. This review aimed to address this research gap and inform the development of evidence-based prevention strategies for promoting youth health and well-being.

Prevention research over the past two decades has provided important insights into effective methods for reducing body image concerns and their consequences (Ciao et al., 2014). Various approaches have been implemented, including prevention programs delivered irrespective of risk (universal approaches), as well as to those displaying higher risk vulnerabilities (selective approaches) or early signs of disorder (indicated approaches; Haggerty and Mrazek, 1994). Together, this research has found the largest effects for selective programs that involve experiential and interactive elements—versus purely didactic or psychoeducational approaches—and which target established risk factors such as internalization of body ideals or social comparison through dissonance-induction, increasing media literacy, and encouraging positive self-concept (Le et al., 2017; Stice et al., 2007; Watson et al., 2016).

Although promising, there is still scope to improve the efficacy of interventions, including the maintenance of changes over time, and ensure applicability to diverse groups (Stice et al., 2013). Positive body image approaches have received attention in this regard given their potential to enrich prevention efforts by focusing not only on reducing risk factors, but also enhancing protective factors (Guest et al., 2022). Emerging research highlights the intricacy of positive ways of relating to one's body, which extend well beyond low levels of body dissatisfaction (Tylka and Wood-Barcalow, 2015). Positive body image is multidimensional, comprising cognitions, attitudes, and behaviors focused on appreciating and respecting one's body, being aware of and attending to bodily experiences, and responding to situations that may threaten or challenge body image (e.g., seeing appearance ideals, comparing oneself negatively to others, functional limitations) in a self-protective way (Tylka and Wood-Barcalow, 2015). Enhancing positive body image may be particularly important during adolescence and emerging adulthood to prevent the onset of clinical eating and mood disorders and promote optimal development into adulthood (Levine and Smolak, 2016; McGorry and Mei, 2018).

Body image flexibility is a dimension of positive body image that describes an adaptive way of relating to negative body image experiences. Conceptualized as a psychological trait and skillset, body image flexibility involves openly experiencing negative body image thoughts and feelings while connecting with personal values, which may help individuals to regulate negative affective states in response to a body image threat (Webb et al., 2014). Whereas traditional cognitive-behavioral approaches focus on challenging or reframing thoughts, such as by listing positive self-attributes when feeling anxious about one's body, body image flexibility emphasizes mindfulness and acceptance of one's anxiety or distress in the service of staying engaged with meaningful activities (Sandoz et al., 2019). Body image flexibility is associated with higher body appreciation and lower body image and eating concerns in adolescents and emerging adults (Koushiou et al., 2020; Webb et al., 2014), indicating its potential positive effects on health. In this regard, interventions that teach skills to relate flexibly to body-related thoughts and emotions and strengthen other important areas of life might enable young people to move through negative body image experiences without turning to dysfunctional methods of coping (Koushiou et al., 2021; Wu et al., 2019).

Body image flexibility developed out of the accumulating evidence supporting psychological flexibility as a foundational skill for health and well-being (Kashdan and Rottenberg, 2010). Psychological flexibility is a transdiagnostic process that can be strengthened through established interventions, the most prominent being acceptance and commitment therapy (ACT; Macri and Rogge, 2024). ACT aims to enhance psychological flexibility by teaching skills in contacting the present moment (i.e., noticing internal experiences such as thoughts, emotions, and physical sensations as they unfold, without judgement), experiential acceptance (i.e., practicing openness toward internal experiences, even when unwanted or painful), cognitive defusion (allowing thoughts to come and go freely without dominating attention or behavior), self-*as*-context (relating to one's self as a neutral context in which internal experiences unfold), valued living (defining personal values that give life direction and meaning), and committed action (taking purposeful action in line with chosen values, even when it may increase contact with unwanted or painful thoughts and feelings; Hayes et al., 2006).

Interventions that target these processes in the context of threats to body image may likewise contribute to enhancing body image flexibility (Webb, 2019). For example, a review of 20 studies (85% youth-focused) of mindfulness-based eating disorder prevention programs (i.e., skills for contacting the present moment) led to reductions in body image concerns and negative affect, and improvements in body appreciation, relative to controls, and enhanced self-esteem more than empirically-supported dissonance-based interventions (Beccia et al., 2018). Likewise, accumulating evidence supports the effectiveness of mindfulness- and acceptance-based therapies for reducing eating disorder risk factors in adults (Linardon et al., 2017) and improving symptom severity among adolescents with an established eating disorder (Buerger et al., 2021). ACT-based interventions (non-body image-specific) have also shown promise for the prevention

of other mental health problems, such as anxiety and depression, in adolescents (Knight and Samuel, 2022).

These encouraging findings underscore the potential effectiveness of body image flexibility interventions within a prevention framework. However, reviews to date have either focused on singular processes (e.g., mindfulness; Beccia et al., 2018) or included a range of distinct therapeutic modalities (e.g., dialectical behavior therapy, compassion-focused therapy, mindfulness-based cognitive therapy; Linardon et al., 2019), which limit the specific conclusions that can be drawn about body image flexibility as a standalone approach. Additionally, core body image flexibility skills, such as mindfulness, acceptance, and observing and distancing oneself from thoughts and feelings, have been discussed and explored within various contexts that preceded their formal operationalization and implementation in ACT. This dispersed evolution has resulted in varied terminology and disconnection within the literature, making it challenging for researchers and decision makers to consolidate the available information and derive meaningful conclusions.

Current Study

Since enhancing body image flexibility may contribute to the prevention of body image-related problems, there has been increased interested into interventions that address its core processes. However, there have been no reviews of studies examining such interventions in youth, limiting conclusions that can be drawn about the effectiveness of this prevention approach. The purpose of this study was to systematically review and analyze evidence about the effectiveness of interventions that teach body image flexibility skills (including, but not limited to, ACT) in adolescents and emerging adults. Specifically, it aimed to examine how effective body image flexibility interventions are at improving health outcomes in young people, and whether body image flexibility interventions can offer a protective function in the context of a body image threat. An additional aim of the study was to explore how changes in underlying theoretical processes (e.g., body image flexibility and inflexibility) contribute to explaining improvements in health outcomes.

Methods

The methods used in this review followed the guidelines set out in the preferred reporting items for systematic review and meta-analysis (PRISMA) statement (Page et al., 2021) and Cochrane handbook for systematic reviews (Higgins et al., 2023). For the complete PRISMA checklist, see Online Resource 1. A protocol for the current study was registered with the PROSPERO International prospective register of systematic reviews (CRD42023481589; Brichacek et al., 2023b).

Inclusion and Exclusion Criteria

Studies were eligible for inclusion if they were (a) an intervention (controlled or uncontrolled) or experimental study, that (b) specifically targeted or manipulated body image flexibility or one of its processes (e.g., present moment awareness/mindfulness, acceptance, cognitive defusion, self-*as*-context, values connection, or committed action) through the provision of education and/or training in these skill/s, (c) predominately sampled adolescents and emerging adults aged 12 to 25 (or if the study involved adults, the mean age was < 25 years or results were reported separately for a youth subgroup), and (d) reported change statistics for at least one health-related outcome measured pre-post intervention or control comparison. A holistic definition of health was used, so that any indices of physical, psychosocial, or overall/general functioning were included.

Studies that did not report primary research (e.g., systematic review or meta-analysis, book chapter, conference abstract), or that sampled adults (mean age > 25 years) or children (mean age < 12 years), used a non-intervention design or did not report changes in health outcomes (e.g., acceptability and feasibility only), were not body image-specific (e.g., general mindfulness or psychological flexibility), or targeted another domain (e.g., eating) or related yet distinct construct (self-compassion, yoga-based, other positive body image dimensions) were excluded. If body image flexibility (or one of its processes) was combined with another active treatment (e.g., mirror exposure, yoga), the study was included only if the unique effects of body image flexibility could be assessed independent of the other intervention component/s (i.e., compared to the other intervention delivered alone).

Search Strategy

Four databases were searched to identify relevant published and unpublished (e.g., dissertations) English-language articles recorded between January 2004 and August 2024: PsycINFO (EBSCOhost), Scopus, Web of Science, and ProQuest Dissertations and Theses A&I.[1] The search sequence involved searching study titles, abstracts, and keywords for the term "body image flexibility", or "body image" combined with "acceptance and commitment therapy" or a flexibility process (i.e., present moment awareness, acceptance, cognitive defusion, self-*as*-context,

[1] The initial search was completed on 2 December 2023. An updated search was completed on 14 August 2024 to identify any additional publications (see Online Resource 2).

values, committed action) inclusive of variants used across the literature (e.g., mindfulness, decentering). This was then combined with the terms: "experiment", "intervention", "randomi?ed control* trial", "randomi?ed control* study", "program", "workshop", or "training" (see Online Resource 2 for database searches). The reference lists of included studies along with the two most relevant reviews (Beccia et al., 2018; Linardon et al., 2019) were also checked for additional reports not identified by the initial search, although no further eligible studies were identified (see Fig. 1).

Study Selection and Data Extraction

Screening, data extraction, and quality assessment (risk of bias) were conducted using Covidence (https://www.covidence.org/). Study selection followed a multi-stage process. Title and abstracts were first screened to identify

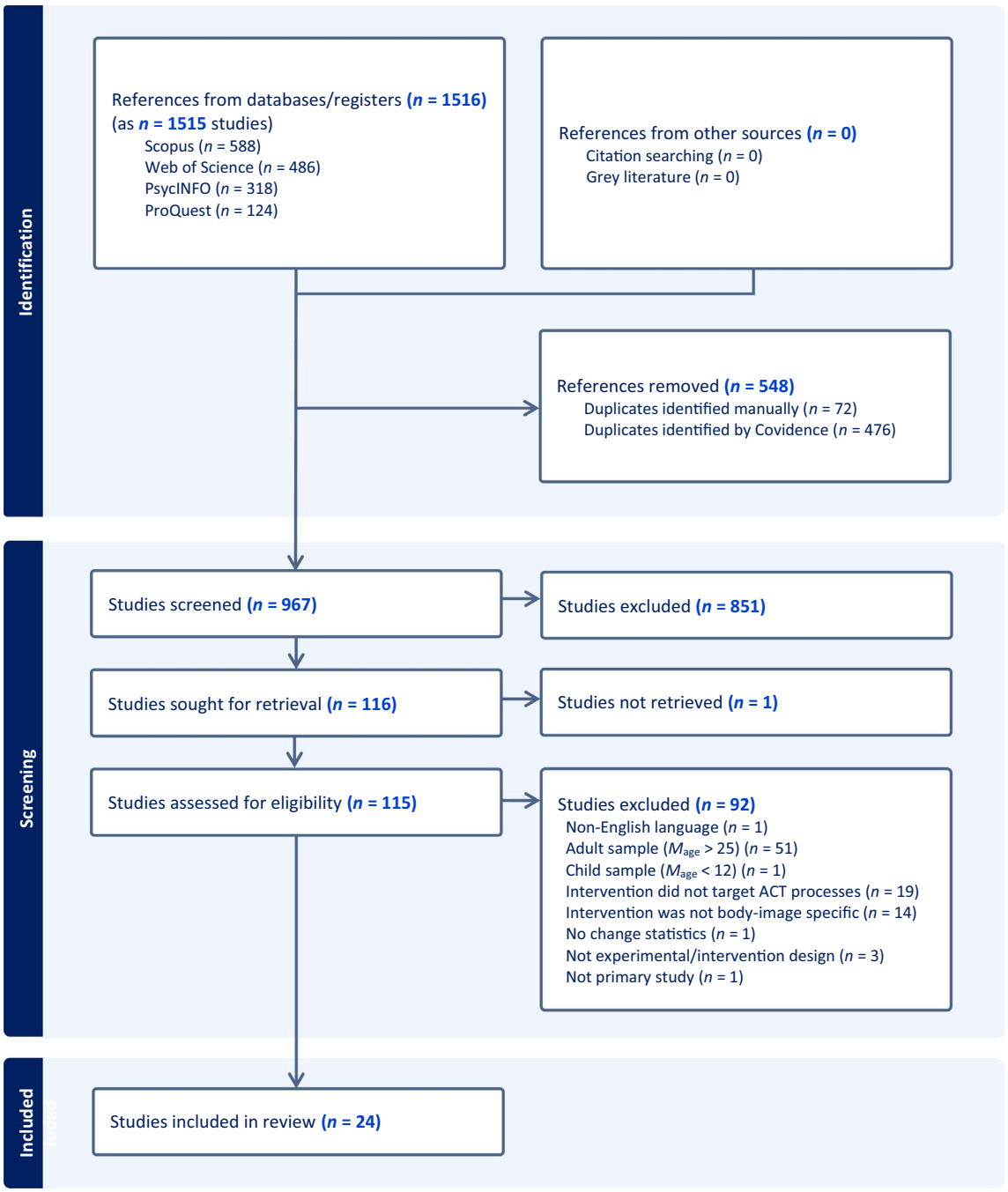

Fig. 1 PRISMA Flow Chart

relevant studies based on inclusion and exclusion criteria. If no exclusion criteria were met at this stage, the study progressed to full-text review. Exclusion criteria were assessed sequentially (as listed in Fig. 1), with the reason for exclusion applied based on the first criteria met. All studies were screened by the first author, with full-texts dual-screened independently by the second author and any discrepancies resolved through discussion. Inter-rater reliability indicated substantial agreement between coauthors (Cohen's $\kappa = 0.79$).

Extracted data included information relating to study design and methodology; participant demographics; description of body image flexibility and comparison interventions (e.g., content, length, format, delivery); assessed outcomes and covariates including measurement instruments; descriptive (sample size, means, and standard deviations) and inferential (effect sizes, *p*-values, confidence intervals) statistics for relevant outcomes; results of any additional analyses exploring subgroups, moderation, or mediating processes; and a summary of the main findings. Additionally, studies were classified as universal or selective[2] prevention, depending on whether or not inclusion criteria specified elevated body image disturbances.

Assessment of Risk of Bias in Included Studies

Relevant criteria from the Agency for Healthcare Research and Quality (AHRQ) were used to assess risk of bias in randomized controlled (RCT) and non-randomized studies of interventions (NRSI; Viswanathan et al., 2017). Studies with potential bias due to methods of randomization or confounding (sequence generation, allocation concealment, balance in baseline characteristics, adjustment for confounding), participant selection (NRSI only), departures from intended interventions, missing data, measurement of outcomes, or selective reporting were rated "Low" if it was unlikely to have affected the results or "High" if it could seriously weaken confidence in the results. If reporting was insufficient to determine risk of bias, it was rated as "Unclear". The risk of bias identified within individual domains informed an overall risk of bias rating for each study, using the following approach: Low (study assessed to be at low risk of bias for all domains), High (study assessed to be at serious risk of bias in at least one domain), or Unclear (insufficient information in two or more domains to inform overall risk of bias). Ratings were completed by the first author, and any uncertainties discussed with the co-authors.

Effect Measures

Intervention effects were calculated as standardized mean differences (SMD) between intervention and relevant comparison conditions to adjust for the variety of measurement instruments used across studies, and reported as Hedges' *g*. SMD were derived from change scores, measured as pre-to-post change (immediate effects) or pre-to-follow-up change (sustained effects). If adjusted means (controlling for baseline measurements) were reported, these values were used instead. If the mean and distribution of change scores or baseline-adjusted values were not reported (as was for most cases), change scores were calculated using the steps outlined in the Cochrane handbook (Higgins et al., 2023). Specifically, change from baseline was calculated by subtracting pre-intervention scores from post-intervention (or follow-up) scores. The correlation between measurement timepoints is needed to calculate the standard deviation of change scores. Because this statistic was not reported–and could not be estimated from any of the included studies–a conservative coefficient of $r = 0.70$ was used to impute the standard deviation of change scores, consistent with the approach used in the review by Linardon et al. (2019).

If descriptive statistics required to calculate the SMD were not reported, study authors were contacted to obtain this information. If not provided, the following alternatives were attempted, in order: (a) use post-intervention or follow-up assessments only ($n = 1$); (b) obtain the effect estimate directly from the original study or through statistical conversion based on reported information (e.g., *t*, df, confidence intervals, or *p*-values; $n = 1$), or (c) exclude from meta-analysis and retain in the non-quantitative synthesis ($n = 1$). To prevent unit of analysis error, if more than one instrument was used to measure the same outcome, SMD and SE were pooled to provide an overall effect estimate. Repeated measures were handled by conducting separate meta-analyses for outcomes measured at the end of intervention (immediate effects) from those measured after a follow-up period (sustained effects); if there were more than two repeated measures, the final follow-up was selected. Outcomes were scored so that a positive SMD favored the body image flexibility intervention over comparator (i.e., reduction in maladaptive and increase in adaptative outcomes).

Data Synthesis

Meta-analyses were completed using SPSS version 29 (https://www.ibm.com/products/spss-statistics). Random effects models with Restricted Maximum Likelihood Estimation were used due to the diversity among participants, interventions, comparators, and outcomes across studies. Additionally, the Knapp-Hartung adjustment to the confidence interval was applied, as recommended for random effects models (Deeks et al., 2023).

Intervention studies that reported change in health outcomes in response to a body image flexibility intervention relative to a control or other evidence-based

[2] In the absence of established definitions or cutoffs for selective and indicated prevention, these were combined into a single classification.

intervention (EBI) were grouped to examine direct effects on health outcomes. Studies that included a body image threat-induction procedure were grouped to examine the potential protective role of body image flexibility interventions. In both cases, an effect estimate was computed for all health outcomes combined (aggregate level). This was followed by meta-analyses stratified for individual outcome domains (e.g., body image concerns), with a minimum of three studies required to calculate a pooled effect estimate. Studies that examined changes in body image flexibility or a flexibility- or inflexibility-related process and/or conducted formal mediation analysis were grouped to explore change processes and their contribution to explaining intervention effects.

Separate meta-analyses compared body image flexibility to no/minimal intervention controls (e.g., assessment only/waitlist, no instruction, or inactive comparison) or another EBI (i.e., media literacy, dissonance-based, or cognitive-behavioral; Le et al., 2017). Only intervention groups relevant to the review were selected. If multiple EBIs were examined in a single study, the comparison group most consistent with other included studies was chosen to minimize potential heterogeneity. Additionally, intervention arms subdivided into groups (e.g., high/low body dissatisfaction, male/female gender) were re-combined using a sequential approach. Single-intervention studies that used pre-post design were not included in the quantitative synthesis; however, are presented separately in accordance with SWiM guidelines (Campbell et al., 2020).

Assessment of Heterogeneity and Publication Bias

Consistency of intervention effects was informed by the I^2 statistic according to the following guidelines for assessing heterogeneity: 0 to 40% (not important), 30 to 60% (moderate), 50 to 90% (substantial), 75 to 100% (considerable; Deeks et al., 2023). For outcomes with substantial or considerable heterogeneity, meta-regression was used to explore potential study and intervention factors that might explain between-study variation. A minimum of 10 studies were required to perform meta-regression (Deeks et al., 2023). Pre-specified categorical predictors were study design (RCT, NRSI/experimental), prevention type (universal, selective), and mean age of participants (*adolescents* aged < 18 years, and *emerging adults* aged > 18 years), while number of sessions was a continuous predictor. Publication bias was investigated by trim-and-fill analyses to account for missing results. If potential publication bias was detected, and substantiated by a visual inspection of funnel plot asymmetry, the bias-adjusted effect estimate was reported instead.

Results

Study Selection and Inclusion

The database searches returned 1,516 records, of which 548 were duplicates. Titles and abstracts of the remaining 967 records were screened, of which 116 progressed to full-text review. The full text for one study was unable to be located in research registers or via the corresponding author, and thus this record was excluded. A further 92 records were excluded as they did not meet eligibility criteria. Where there were multiple publications of a single study, reports were merged if research questions and results overlapped (i.e., an unpublished and published version) and retained separately if each reported unique results. This resulted in a final 23 studies (as 24 reports) eligible for inclusion; 19 were published articles and 5 were unpublished doctoral dissertations (see Fig. 1).

Study Characteristics

Details of the 23 included studies are presented in Table 1. There were 15 RCTs (65%), five experimental studies (22%), two NRSIs (9%), and one single group pre-post design. Studies were conducted across multiple countries, including United States ($n = 10$, 43%), Australia ($n = 5$, 22%), United Kingdom ($n = 2$, 9%), and other countries ($n = 6$, 26%) such as Cyprus, Sweden, Romania, Iran, and China. Participants were mostly university student emerging adults ($n = 19$, 83% had mean age > 18 years), with only four (17%) studies targeting adolescents (mean age < 18 years). Similarly, most studies sampled females exclusively ($n = 19$, 83%), with the remaining four (17%) being mixed gender. The percentage of males in mixed gender samples ranged from 15 to 51%.

The examined interventions were evenly divided across universal ($n = 11$, 48%) and selective ($n = 11$, 48%), with one unclear due to insufficient reporting. There was diversity in intervention delivery and content. Nine (39%) were group-facilitated in-person and 14 (61%) were self-directed mostly in a digital format (e.g., audio-recording or online application). Body image flexibility interventions were offered as single ($n = 10$, 44%) and muti-session interventions ($n = 13$, 57%), ranging from 5-min skills practice to comprehensive therapeutic programs consisting of up to 12, 90-min weekly or bi-weekly sessions. Seven studies (30%) analyzed a full ACT intervention, while the remaining 16 (70%) targeted one or more specific processes, predominantly present moment awareness, acceptance, and cognitive defusion. Most studies ($n = 20$, 87%) included a control comparator, while 10 (44%) also

Table 1 Characteristics of body image flexibility intervention studies included in review

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Atkinson and Wade (2015)	RCT (**EOI**, 1-month follow-up, **6-month follow-up**)	Australia	Female high school students aged 14–18 years ($M = 15.7$, $SD = 0.8$) $N = 156$ (optimal facilitator subset)	Universal	—	Classroom-based, facilitated by primary researcher with extensive training in delivering both interventions	3 × weekly interactive sessions focused on applying mindfulness to body image, including training, experiential practice, and homework tasks.[PM, AC, CD]	Control: Classes-as-usual EBI (cognitive dissonance): 3 × weekly sessions based on the "The Body Project" protocol	Body image concerns • EDE-Q weight/shape concern Affect • PANAS-negative Sociocultural influences • SATAQ-3 pressures and internalization Eating disorder symptoms • DEBQ-Restraint • EDE-Q Change process • CAMM* Other • CIA	Mindfulness intervention delivered by an optimally-trained facilitator led to improvements in weight/shape concern, eating disorder symptoms, and psychosocial impairment relative to control at 6-month follow-up, and led to higher trait mindfulness across all post-intervention timepoints. No differences in health outcomes were evident at EOI or compared to dissonance-based intervention

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Atkinson and Wade (2016)	RCT (**EOI**, 1-month follow-up, **6-month follow-up**)	Australia	Females (university students and general community) aged 17–31 years ($M = 20.6$, $SD = 3.2$) reporting elevated body image concerns $N_{pre} = 44$ $N_{post} = 36$ $N_{follow\text{-}up} = 36$	Selective—total score > 50 on the EDE-Q Weight concern scale, rating moderate fear of 1 kg weight gain, or rating weight as most important	—	University campus, programs facilitated by primary researcher based on detailed facilitator guides	3 × 60-min weekly group sessions focused on applying mindfulness to body image, including training, experiential practice, and homework tasks.[PM, AC, CD]	Control: Assessment only (no intervention) EBI (cognitive dissonance): 3 × 60-min weekly sessions based on "The Body Project" protocol	Body image concerns • EDE-Q weight/shape concern Affect • PANAS-negative Sociocultural influences • SATAQ-3 pressures and internalization Eating disorder symptoms • DEBQ-Restraint • EDE-Q Change process • FFMQ* Other • CIA	Mindfulness intervention led to improvements in weight/shape concerns, internalization, eating disorder symptoms, and psychosocial impairment relative to control at EOI; however, effects were generally not sustained at follow-up. Mindfulness intervention led to higher trait mindfulness at EOI, 1- and 6-month follow-up, relative to both control and cognitive dissonance. Mindfulness did not differ to cognitive dissonance for any other outcomes

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Atkinson et al. (2023)	RCT (**EOI, 3-month follow-up**)	United Kingdom	High school students (51% male, 49% female, < 1% non-binary) aged 13–15 years ($M = 13.6$, $SD = 0.5$) $N_{pre} = 288$ $N_{post} = 260$ $N_{follow\text{-}up} = 249$	Universal	—	Classroom-based, programs facilitated by school-teachers trained by the researchers in the respective interventions	5 × 45-min weekly interactive group sessions based on "The Mindfulness Mode" (adapted for mixed-gender), including training, experiential practice, and homework tasks.[PM, AC, CD]	Control: Classes-as-usual EBI (cognitive dissonance): 5 × 45-min weekly interactive group sessions based on "The Body Project" (adapted for mixed-gender), including role plays, written exercises, and homework tasks	Body image concerns • BES-Appearance and weight* • MBSRQ-body areas satisfaction* • EDE-Q-weight/shape concern Affect • PANAS-C Sociocultural influences • SATAQ-3-Internalization Change process • CAMM* Other • DERS-short form • BILD-Q • WEMBS*	Students receiving mindfulness reported higher positive affect than control at EOI and 3-month follow-up. Among females only, mindfulness also led to improvements in body image, internalization, negative affect, and life disengagement relative to control. Mindfulness and cognitive dissonance interventions were not directly compared; however, cognitive dissonance also led to improvements in body image (males and females) and internalization (females only) relative to control
Fogelkvist et al. (2022)	RCT (**24-month follow-up**)	Sweden	Females in outpatient treatment for a diagnosed eating disorder (subset aged < 25 years at inclusion) $N = 37$	Selective—eating disorder diagnosis with achievement of regular eating Excluded patients with severe psychiatric conditions	—	Specialised eating disorder outpatient treatment centre	2 × individual and 12 × weekly group sessions based on manualised application of ACT self-help book *Lev med din kropp* ("Live with your body").[Full ACT]	EBI (treatment as usual): Tailored individual and group-based cognitive behavioural therapy, interpersonal therapy, and counselling	Eating disorder symptoms • EDE-Q	Participants in the ACT intervention showed greater improvements in eating disorder symptoms from baseline to follow-up compared to participants receiving treatment as usual

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Fuller-Tyszkiewicz et al. (2019)	RCT (**EOI**)	Australia	Female university students and from the community (M_{age} = 24.3, SD = 6.5) N_{pre} = 247 N_{post} = 126	Universal	—	Web-based (online or app), self-directed resources developed by researchers	11 × brief (2 to 3-min) mindfulness skills training videos accessible over 21 days via website or smartphone app.[PM, AC]	Control: Waitlist for intervention	Body image concerns • BI-BCI-satisfaction* • BI-BCI- importance Eating disorder symptoms • EAT-26 Other • RSES*	Mindfulness intervention led to improved body satisfaction relative to waitlist control at EOI. There were no group differences on secondary outcomes (body importance, eating disorder symptoms, or self-esteem)
Karaaziz et al. (2023)	RCT (**EOI, 3-week follow-up**)	Northern Cyprus	University students (59% female, 41% male), 46% aged 21–22 years, 26% 23–24 years, 28% > 25 years N = 39	Universal	—	University campus, program facilitated primary and secondary researchers (clinical psychologists trained in ACT)	8 × 60 to 80-min weekly interactive group sessions focused on learning and applying ACT skills to social appearance anxiety.[Full ACT]	Control: Waitlist for intervention	Body image concerns • SAAS Change process • AAQ-2	Participants in the ACT intervention reported lower social appearance anxiety at 3-weeks follow-up relative to waitlist control. There were no group differences in experiential avoidance at EOI or follow-up

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Karekla et al. (2022)	RCT (**EOI**, 1-month follow-up)	Cyprus	Female high school and university students aged 13–22 years ($M = 15.3$, $SD = 2.2$) reporting elevated body image concerns $N_{pre} = 89$ $N_{post} = 58$ $N_{follow\text{-}up} = 25$ (BFI only)	Selective—score > 52 on the WCS Excluded students who may have had an active eating disorder	—	Online, self-directed. Program developed by researchers	Gamified ACT-based intervention "AcceptME": 6 × 30-min online sessions that used vicarious learning, experiential exercises, and metaphors to teach ACT concepts and skills related to negative body image.[Full ACT]	Control: Waitlist for intervention	Body image concerns • WCS • BSQ-8C • BIAQ Eating disorder symptoms • EDE-Q Change process • BI-AAQ* Other • YQOL-short*	Participants receiving the ACT intervention reported lower weight concerns and eating disorder symptoms, and higher body image flexibility, at EOI relative to waitlist controls. For ACT participants, symptom improvement remained at 1-month follow-up
Merwin et al. (2023) – secondary analysis of Karekla et al. (2022)									Body image concerns • WCS Eating disorder symptoms • EDE-Q Change process • BI-AAQ*	Mediation analysis showed that increased body image flexibility explained treatment improvements in weight concerns, particularly among ACT participants. Increased body image flexibility also predicted lower eating disorder symptoms at 1-month follow-up (among the intervention group)

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Kinsaul (2015)	RCT (**EOI, 1-week follow-up**)	United States	Female undergraduate students (M_{age} = 19.8, SD = 2.1) with elevated body image concerns N = 54 (n = 41 included in meta-analysis)	Selective—score > 4 on two or more items on the EDE-Q weight/shape concern scale	—	University campus, instructions developed by primary researcher	Single session comprising 10-min audio recorded mindfulness exercise and written instructions about how to apply mindfulness to negative body image, practiced by participants during mirror exposure task.[PM, AC]	Control: Mirror exposure task with no instructions (handouts about sleep hygiene and healthy eating were provided)	Body image concerns • BSQ (follow-up) Eating disorder symptoms • EDE-Q (follow-up) Affect • PANAS (EOI) Change process • AAQ-2 (EOI • TMS* (EOI) Other • DERS (follow-up)	Participants who received the mindfulness instructions reported higher experiential avoidance relative to the mirror exposure-only group at EOI (contrary to prediction). The two groups did not differ on any other outcomes at EOI or 1-week follow-up
Lippman (2018)	RCT (**EOI**, 1-month follow-up, **2-month follow-up**)	United States	Female university students aged 18–25 years (M = 19.4, SD = 1.6) reporting elevated body image concerns N_{pre} = 55 N_{post} = 51 $N_{follow\text{-}up}$ = 20	Selective—score > 19 on the PASTAS-trait	—	University campus, programs facilitated by Masters level clinical psychology doctoral students trained in administering the intervention protocols	4 × 60-min weekly interactive group sessions focused on learning and applying ACT skills to negative body image (content adapted from Pearson et al., 2012).[Full ACT]	Control: 4 × 45-min weekly individual sessions of writing about topics related to college adjustment EBI (cognitive dissonance): 4 × 60-min weekly sessions based on "The Body Project" protocol	Body image concerns • PASTAS-state • BIAQ	Participants in the ACT intervention did not differ to those in the control or cognitive dissonance intervention on body image constructs at EOI or either follow-up assessment. Appearance anxiety reduced from session 2 to 4 in the ACT group relative to control

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Luethcke et al. (2011)	RCT (**EOI, 1-month follow-up**)	United States	Female undergraduate students aged 17–21 years ($M = 18.5$, $SD = 0.8$) $N = 168$	Universal—excluded students who may have had an active eating disorder, were pregnant, or body mass index > 30 kg/m2	—	University campus, resources developed by researcher and administered by research assistants	Mindfulness condition: Audio-recorded mindfulness meditation exercise Mindfulness and non-judgmental conditions: [a] instructed to make neutral, non-judgmental descriptions about the body during two separate mirror exposure tasks, 1-week apart. PM, AC	EBI (cognitive dissonance): Instructed to make positive comments about the appearance and/or functionality of their body during mirror exposures	Body image concerns • SBPS* • EDE-Q weight/shape concern • BCQ • BIAQ Eating disorder symptoms • EDE-Q eating pathology composite Other • BDI-2	Participants in all conditions (mindfulness, non-judgmental, cognitive dissonance) reported improvements in weight/shape concern, body checking and avoidance, eating disorder symptoms, and depression at EOI, which were maintained at 1-month follow-up. However, those that received cognitive dissonance instructions reported increased body satisfaction relative to the mindfulness-based groups at EOI and follow-up
Margolis and Orsillo (2016)	RCT (**EOI**)	United States	Female university students aged 18–25 years ($M = 20.2$, $SD = 2.8$) reporting elevated body image concerns $N = 67$	Selective—score > 36 on EDI body dissatisfaction scale	Viewed 16 digital magazine images portraying the female thin-ideal	University campus, resources developed by primary researcher	Single session comprising 15 to 20-min audio-taped acceptance skills training, including an experiential mindfulness practice related to negative body image.PM, AC	Control: No intervention (listened to nature story on radio) EBI (cognitive restructuring): 15 to 20-min audio-recorded training in cognitive restructuring for negative body image thoughts	Body image concerns • VAS body dissatisfaction • VAS body distress • VAS amount defined by appearance	Participants who received training in acceptance and cognitive restructuring reported less body dissatisfaction and distress following the threat relative to the control group

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Pasillas (2008)	RCT (**EOI**)	United States	Female university students (M_{age} = 20.9, SD = 5.5) reporting elevated body image concerns N = 69 (n = 46 included in meta-analysis)	Selective—score > 4 on the OBCS body shame subscale Excluded students with elevated eating disorder symptoms	Viewed digital magazine images portraying the female thin-ideal for 5-min	University campus, resources developed by the researcher	Audiotaped clinical rationale and instructions about how to use acceptance skills in response to a negative body image thought, followed by 5-min experiential practice.[PM, AC]	Control: Audio-recorded instructions to monitor negative body image thoughts for 5-min Other (suppression): [b] audio-recorded instructions to suppress negative thoughts for 5-min	Body image concerns • VAS body distress	There were no differences in body image concerns reported by participants instructed to use acceptance to those instructed to monitor or suppress their thoughts following the body image threat
Rezaeisharif et al. (2021)	RCT (EOI)	Iran	Female high school students aged 14–17 years N_{pre} = 280 N_{post} = not reported	Unclear	—	Not described	8 × 90-min weekly sessions focused on learning and applying ACT skills to body image.[Full ACT]	Control: Not described	Body image concerns • MBSRQ	ACT intervention led to higher body satisfaction relative to control at EOI, controlling for baseline levels
Symons (2015)	RCT (**EOI, 2-month follow-up**)	United States	Female undergraduate students (M_{age} = 19.3, SD = 1.8) reporting elevated body image concerns N_{pre} = 128 N_{post} = 109 $N_{follow\text{-}up}$ = 103	Selective—score > 80 on the BSQ Excluded students with possible eating disorder (body mass index < 18 kg/m^2 and score > 4 on the restraint subscale of the EDE-Q, or self-reported weekly compensatory behaviours)	—	University campus, programs facilitated by trained clinical psychology graduate students	2 × 90-min weekly group sessions focused on psychoeducation about the thin-ideal and application of mindfulness techniques to body image. Included training, experiential practice, and homework tasks.[PM]	Control: No intervention (assessment only) EBT (cognitive dissonance): 2 × 90-min weekly group sessions including dissonance-induction elements from Stice et al. (2001). Included group discussion, role-plays, and homework tasks	Body image concerns • BSQ • BAAS Sociocultural influences • SATAQ-3 pressures and internalization Eating disorder symptoms • EDE-Q • DRES	Mindfulness intervention led to improvements in body dissatisfaction (at 2-month follow-up) and dietary restraint (at EOI and 2-month follow-up) relative to control. Intervention effects did not differ significantly between the mindfulness and cognitive-dissonance intervention groups

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Wade et al. (2009)	RCT (**EOI**)	Australia	Female undergraduate students aged 18–57 years ($M = 24.4$, $SD = 9.4$) $N = 100$ (n = 60 included in meta-analysis)	Universal	Viewed 16 digital magazine images portraying the female thin-ideal for 15-min	University campus, resources developed by the researcher	Instructed to use acceptance skills in response to body-related thoughts and emotions, with a 5-min experiential practice.[AC]	Control: No training/ instruction EBI (cognitive dissonance): Instructed to use dissonance-based strategies for negative body image, followed by 5-min experiential practice Other: [b] Ruminative attention-instructed to focus attention on negative feelings and reactions Distraction-instructed to distract by focusing on more pleasant or neutral thoughts or actions	Body image concerns • VAS weight satisfaction* • VAS appearance satisfaction* • VAS body distress	Acceptance instructions led to improvements in weight and appearance satisfaction (but not body distress) relative to control and ruminative attention following exposure to the body image threat. Intervention effects were similar for the acceptance, cognitive dissonance, and distraction groups
Adams et al. (2013)	Experiment (**EOI**)	United States	Female undergraduate students aged 18–26 years ($M = 20.0$, $SD = 1.8$) who self-identified as smokers $N = 64$ ($n = 33$ included in meta-analysis) [c]	Universal—excluded students with elevated eating disorder, body dissatisfaction, or depressive symptoms	—	University campus, resources developed by primary researcher	Single session comprising 2 × 10-min audio-recorded mindfulness instructions, one listened to before and one during body-related mirror exposure.[PM, AC]	Control: Mirror exposure with no specific instructions	Body image concerns • VAS body dissatisfaction Affect • VAS affect* • PANAS-negative Change process • TMS* Other • VAS smoking urges • QSU-brief	Mindfulness instructions led to less state body dissatisfaction and negative affect, and increased state mindfulness, relative to control. There were no intervention effects on smoking urges

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Atkinson and Wade (2012)	Experiment (**EOI**)	Australia	Female undergraduate students aged 18–57 years ($M = 23.6$, $SD = 9.0$) $N = 80$ ($n = 79$ included in meta-analysis)	Universal	Viewed 16 digital magazine images portraying the female thin-ideal for a total 15-min	University campus, resources developed by the researcher	Single session comprising 10-min acceptance-based skills training video, followed by 5-min practice.[PM, AC, CD, SC]	Control: No training/ instruction	Body image concerns • VAS weight satisfaction* • VAS appearance satisfaction* Affect • PANAS-negative	Mindfulness instructions led to improvements in weight satisfaction relative to control. Participants who were assessed as having properly engaged in acceptance also showed improvements in appearance satisfaction and negative affect relative to control
Clark (2008)	Experiment (**EOI**)	United States	Female undergraduate students ($M_{age} = 20.7$, $SD = 3.7$) $N = 119$ ($n = 78$ included in meta-analysis)	Universal—excluded students with elevated eating disorder or depressive symptoms	Viewed multiple digital images portraying the female thin ideal	University campus, resources developed by the primary researcher	Single session comprising audiotaped instructions to use acceptance skills in response to negative body image. Practiced during, and 5-min after, induction task.[PM, AC, CD]	Control: No training/ instruction Other (rumination): [b] audiotaped instructions to focus attention on negative thoughts and feelings	Body image concerns • VAS body dissatisfaction • BISS* Affect • PANAS-negative Other • VAS depression • SSES*	Acceptance instructions led to lower body image concerns relative to control and rumination instructions following the body image threat among individuals with high baseline body dissatisfaction (BSQ score > 110), but not among those with low baseline body dissatisfaction (BSQ score < 53)

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Mandavia et al. (2015)	Experiment (**EOI**)	United States	Undergraduate students (85% female, 15% male) aged 16 to 55 years ($M = 20.7$, $SD = 5.3$) $N = 254$ ($n = 102$ included in meta-analysis)	Universal	—	University campus, interventions administered according to script by trained researchers	Full defusion: 5-min cognitive defusion skills training, including clinical rationale and training, enhanced with experiential practice (30-s rapid vocal repetition using a self-identified negative body image thought).[CD]	Control: No intervention (5-min reading about growth of trees) Other: [b] Partial defusion- clinical rationale and training in using cognitive defusion Partial distraction- clinical rationale and training in using distraction (focusing on geometric shapes) Full-distraction- clinical rationale and training enhanced with experiential practice	Body image concerns • VAS emotional discomfort • VAS believability • VAS decentering	Participants in the full-defusion condition reported lower emotional discomfort and thought believability, and greater decentering relative to control and distraction conditions. Full-defusion also led to lower thought believability than partial-defusion
Prefit et al. (2020)	Experiment (**EOI**)	Romania	Female undergraduate students aged 19–32 years ($M = 22.1$, $SD = 6.1$) $N = 105$ ($n = 90$ included in meta-analysis)	Universal—excluded students with a self-reported eating disorder diagnosis	Viewed 15 digital magazine images portraying the female thin-ideal	University campus, instructions adapted by the researchers based on previous studies	Single session comprising brief training in using acceptance skills in response to negative body-related thoughts and emotions.[AC]	Control: No training/ instruction EBI (cognitive reappraisal): Training in using cognitive reappraisal (i.e., interpreting body image-related thoughts and emotions in unemotional, realistic terms)	Body image concerns • BISS* Affect • PANAS	Acceptance instructions led to higher body satisfaction, and prevented changes to positive and negative affect, relative to control following the body image threat. Intervention effects were similar for the acceptance and cognitive reappraisal groups

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Atkinson and Diedrichs (2021)	NRSI (**EOI, 1-week follow-up**)	United Kingdom	Female undergraduate students aged 18–48 years ($M = 20.0$, $SD = 2.8$) $N_{pre} = 202$ $N_{post} = 192$ $N_{follow\text{-}up} = 190$	Universal	Viewed 15 digital images portraying the female thin-ideal for a total of 15-min	University campus, resources developed by the researchers based on existing interventions	Single session comprising a 15-min mindfulness skills training video adapted from "The Mindfulness Mode", including experiential practice.[PM, AC, CD]	Control: 15-min viewing of documentary about the thin-ideal EBI (cognitive dissonance): 15-min video adapted from the "The Body Project" dissonance-induction protocol, including written exercises	Body image concerns • VAS weight satisfaction* (EOI) • VAS weight distress (EOI) • VAS appearance satisfaction* (EOI) • VAS appearance distress (EOI) • EDE-Q-weight/shape concern (follow-up) Sociocultural influences • VAS pressures (EOI) • VAS internalization (EOI) • SATAQ-3 pressures and internalization (follow-up) Affect • VAS positive affect* (EOI) • PANAS-negative (follow-up) Change process • BI-AAQ* (follow-up) • FFMQ-short* (follow-up) Other • BAS-2* (follow-up)	Direct intervention effects: Mindfulness micro-intervention led to lower appearance distress and internalization, and more positive mood, relative to control at EOI, as well as lower internalization and greater body appreciation at 1-week follow-up Protective effects: Post-intervention improvements (weight satisfaction, internalization, and pressures) were sustained following exposure to a body image threat 1-week later in the mindfulness intervention group relative to control Effects (EOI, follow-up, and post-induction) were similar for the mindfulness and cognitive dissonance interventions

Table 1 (continued)

Study	Research design	Country	Participants	Prevention type	Body image threat induction	Intervention delivery	Body image flexibility[(skills addressed)]	Comparator	Relevant measures	Relevant results
Fang et al. (2022)	NRSI (**EOI**)	China	University students (53% female, 47% male) aged 18–22 years ($M = 19.6$, $SD = 1.3$) reporting elevated body image concerns $N = 86$	Selective—score > 3 on the NPSS. Excluded students reporting suicidal intent or receiving another treatment (medication or therapy)	—	University campus, facilitated by primary researcher and supervised by an ACT therapist	10 × twice-weekly 90-min group sessions based on an ACT protocol adapted for body image.[Full ACT]	Control: assessment only (no intervention)	Body image concerns • NPSS Change process • AAQ-2 • CFQ	ACT intervention led to lower body image concerns, experiential avoidance, and cognitive fusion relative to control. Mediation analysis showed that reduced cognitive fusion explained the relationship between changes in experiential avoidance and body image improvements
Rogers et al. (2022)	Single group, pre-post (EOI)	United States	Female university students aged 18–24 years ($M = 20.1$, $SD = 1.7$) reporting elevated body image concerns and/or low body appreciation $N = 30$	Selective–score > 52 on the BSQ or < 3 on the BAS-2	—	Virtual/self-directed. Text-message support provided by trained psychology students	8-week text message-facilitated guided self-help intervention using the ACT-based book *Body Kindness*. Involved weekly reading, journaling, and text-message exchange with trained support person (up to 30-min/week).[Full ACT]	n/a	Body image concerns • BSQ Eating disorder symptoms • EDE-Q Other • BAS-2 • IES-2 • MSCS • PBE • SCS-short	The ACT-based GSH intervention led to improvements on all measured health-related outcomes, with change scores indicating moderate to large effects (*d* ranging from -1.26–2.67)

Studies included in meta-analysis are bolded. [PM] = present moment awareness, [AC] = acceptance, [CD] = cognitive defusion, [SC] = self-*as*-context, [VA] = values, [CA] = committed action, [Full ACT] = ACT-based intervention addressing all six processes; *RCT* Randomized controlled trial; *EOI* End of intervention; *NRSI* Non-randomized study of intervention; *EDE-Q* Eating disorder examination questionnaire; *PANAS* Positive and negative affect schedule; *SATAQ* Sociocultural attitudes towards appearance questionnaire; *DEBQ* Dutch eating behavior questionnaire; *CAMM* Child and adolescent mindfulness measure; *CIA* Clinical impairment assessment; *FFMQ* Five facet mindfulness questionnaire; *BES* Body esteem scale; *MBSRQ* Multidimensional body-self relations questionnaire; *DERS* Difficulties in emotion regulation scale; *BILD-Q* Body image life disengagement questionnaire; *WEMBS* Warwick-Edinburgh mental well-being scale; *BI-BCI* Body image and body change inventory; *EAT* Eating attitudes test; *RSES* Rosenberg self-esteem scale; *SAAS* Social appearance anxiety scale; *AAQ* Acceptance and action questionnaire; *WCS* Weight concern scale; *BSQ* Body shape questionnaire; *BCQ* Body checking questionnaire; *BIAQ* Body image avoidance questionnaire; *YQOL* Youth quality of life instrument; *BI-AAQ* Body image acceptance and action questionnaire; *PASTAS* Physical appearance state and trait anxiety scale; *SBPS* Satisfaction with body parts scale; *BDI* Beck depression inventory; *EDI* Eating disorder inventory; *VAS* Visual Analogue Scale; *OBCS* Objectified body consciousness scale; *BAAS* Beliefs about appearance scale; *QSU* Questionnaire of smoking urges; *TMS* Toronto mindfulness scale; *BISS* Body image states scale; *SSES* State self-esteem scale; *BAS* Body appreciation scale; *NPSS* Negative physical self scale; *CFQ* Cognitive fusion questionnaire; *IES* Intuitive eating scale; *MSCS* Mindful self-care scale; *PBE* Physical body experiences questionnaire; *SCS* Self-compassion scale

[a] Mindfulness and non-judgmental groups combined for meta-analysis. [b] Excluded from meta-analysis. [c] Only included body-related interventions

[*] Measure reverse-scored for inclusion in aggregate effect meta-analysis

compared body image flexibility to another EBI. All studies that included a body image threat induction asked participants to view online images depicting the female thin-ideal (for a duration of 5 to 15 min), with four having additional statements to heighten appearance comparison (e.g., "I would like my body to look like this women's body").

Summary of Meta-Analysis

Of the 23 studies, 21 (91%) provided sufficient information to calculate the SMD for at least one outcome and were included for meta-analysis. Fifteen studies (65%) examined the direct effect of a body image flexibility intervention on changing health outcomes. Seven studies (30%) included a body image threat induction and assessed the potential role of body image flexibility interventions in protecting against adverse effects. One study (Atkinson & Diedrichs, 2021) examined direct and protective effects, and thus contributed relevant data to both sets of analyses.

Intervention Studies Examining Changes in Health Outcomes

In addition to the overall (aggregate) effect, there were sufficient studies (i.e., > 3) to calculate a pooled effect estimate for the following outcome domains: Body image concerns, affect (negative and positive), sociocultural influences (perceived appearance pressures and internalization), and eating disorder symptoms at end of intervention (immediate effects) and follow-up (sustained effects).

Immediate Effects The aggregate effect across all health outcomes showed that body flexibility interventions were effective relative to controls (pooled $g = 0.52$, $p < 0.001$) and no more or less effective than other EBIs (pooled $g = -0.06$, $p = 0.401$). Substantial heterogeneity (68%) indicated that the magnitude of improvements relative to controls varied widely across studies (see Table 2). Forest plots for aggregate effect models are displayed in Fig. 2.

When outcome domains were examined separately, body image flexibility interventions showed significant improvements at end of intervention relative to controls for body image concerns (pooled $g = 0.50$, $p = 0.002$), but not for affect (pooled $g_{\text{bias-adjusted}} = 0.29$, $p = 0.130$), sociocultural influences (pooled $g = 0.31$, $p = 0.216$), or eating disorder symptoms (pooled $g_{\text{bias-adjusted}} = 0.20$, $p = 0.392$). However, the direction of effects favored body image flexibility for all outcomes, and effect sizes indicated small yet meaningful improvements (see Table 2). While marginally significant, there was a trend towards body image flexibility producing larger immediate improvements in affect relative to other EBIs (pooled $g_{\text{bias-adjusted}} = 0.19$, $p = 0.053$).

Other health outcomes that contributed to the aggregate effect estimates included: Psychosocial impairment, life disengagement, emotion regulation difficulties, depression, urges to smoke, well-being, and self-esteem. Effect estimates from these individual studies showed that psychosocial impairment was the only outcome for which body image flexibility interventions produced improvements relative to control ($g = 1.00$, $p = 0.024$).

Sustained Effects The aggregate effect across all health outcomes suggested that improvements resulting from body flexibility interventions relative to controls were sustained at follow-up (1-week to 24-months), although the magnitude of effects were slightly attenuated (pooled $g_{\text{bias-adjusted}} = 0.27$, $p = 0.002$). The sustained effects of body image flexibility did not differ to that of other EBIs (pooled $g = 0.07$, $p = 0.600$), with moderate heterogeneity across studies (see Table 2).

Body image concerns were the only outcome domain to have sustained effects relative to controls (pooled $g_{\text{bias-adjusted}} = 0.30$, $p = 0.005$), although effects for affect (pooled $g = 0.15$, $p = 0.276$) and eating disorder symptoms (pooled $g = 0.42$, $p = 0.094$) both favored body image flexibility over control. Additionally, there was a trend towards larger sustained reductions in eating disorder symptoms following body image flexibility interventions than other EBIs (pooled $g = 0.29$, $p = 0.262$).

Other health outcomes that contributed to the aggregate effect at follow-up included: Psychosocial impairment, life disengagement, emotion regulation difficulties, depression, body appreciation, and well-being. Based on individual study effects, body image flexibility led to sustained reductions in psychosocial impairment relative to controls ($g = 0.52$, $p = 0.006$) and improvements in body appreciation relative to controls ($g = 0.39$, $p = 0.026$).

Studies Examining Protection Against Body Image Threats

The aggregate effect showed that body image flexibility interventions were more effective than no/minimal intervention controls for protecting against adverse health outcomes following a body image threat exposure (pooled $g_{\text{bias-adjusted}} = 0.33$, $p = 0.014$), and did not differ from other EBIs (pooled $g_{\text{bias-adjusted}} = -0.01$, $p = 0.892$; see Table 3). Forest plots for aggregate effect models examining protective effects are presented in Fig. 3.

In addition to the overall (aggregate) effect across health outcomes, there were sufficient studies to calculate a pooled effect estimate for protection against body image concerns (relative to controls and other EBIs) and affect (relative to controls only) following a body image threat exposure. Relative to controls, body image flexibility interventions served a protective function for body

Table 2 Summary of findings from intervention studies examining direct changes in health outcomes and processes of change

Outcome domain	Number of studies (total participants)	Pooled effect *g* [95% CI]	Standard error[a]	95% prediction interval	I^2 (degree of heterogeneity)	*N* trim-and-fill imputed studies (adjusted *g*, [95% CI])
Aggregate of health outcomes						
BFI v. Control (EOI)	13 (1045)	**0.52 [0.27, 0.76]**	0.11	− 0.28–1.31	68% (substantial)	0
BFI v. EBI (EOI)	7 (687)	− 0.06 [− 0.20, 0.09]	0.06	− 0.21–0.10	0% (not important)	0
BFI v. Control (follow-up)	8 (608)	**0.29 [0.14, 0.44]**	0.06	0.13–0.45	0% (not important)	**2 (0.27 [0.13, 0.41]**
BFI v. EBI (follow-up)	8 (701)	0.07 [− 0.24, 0.38]	0.13	− 0.49–0.63	41% (moderate)	0
Body image concerns						
BFI v. Control (EOI)	12 (1004)	**0.50 [0.22, 0.78]**	0.13	− 0.38–1.37	72% (substantial)	0
BFI v. EBI (EOI)	7 (686)	− 0.09 [− 0.26, 0.08]	0.07	− 0.27–0.09	0% (not important)	0
BFI v. Control (follow-up)	8 (608)	**0.34 [0.14, 0.54]**	0.09	− 0.07–0.74	26% (not important)	**2 (0.30 [0.12, 0.48])**
BFI v. EBI (follow-up)	7 (664)	− 0.04 [− 0.24, 0.16]	0.08	− 0.34–0.26	13% (not important)	3 (− 0.13 [− 0.35, 0.09])
Affect						
BFI v. Control (EOI)	6 (518)	**0.47 [0.09, 0.86]**	0.15	− 0.50–1.44	65% (substantial)	2 (0.29 [− 0.11, 0.69])
BFI v. EBI (EOI)	4 (410)	**0.21 [0.02, 0.40]**	0.06	− 0.05–0.47	0% (not important)	1 (0.19 [− 0.00, 0.38])
BFI v. Control (follow-up)	4 (444)	0.15 [− 0.20, 0.49]	0.11	− 0.33–0.62	1% (not important)	0
BFI v. EBI (follow-up)	4 (411)	0.03 [− 0.36, 0.42]	0.12	− 0.57–0.63	10% (not important)	1 (− 0.01 [− 0.36, 0.34]
Sociocultural influences						
BFI v. Control (EOI)	5 (526)	0.31 [− 0.28, 0.90]	0.21	− 1.03–1.65	75% (considerable)	0
BFI v. EBI (EOI)	5 (483)	− 0.21 [− 0.70, 0.29]	0.18	− 1.20–0.79	59% (substantial)	1 − 0.30 [− 0.87, 0.28])
BFI v. Control (follow-up)	5 (511)	0.21 [0.00, 0.41]	0.07	− 0.08–0.49	6% (not important)	3 (0.07 [− 0.14, 0.27])
BFI v. EBI (follow-up)	5 (480)	− 0.18 [− 0.44, 0.08]	0.09	− 0.66–0.31	25% (not important)	1 (− 0.19 [− 0.41, 0.03]
Eating disorder symptoms						
BFI v. Control (EOI)	5 (394)	0.42 [− 0.06, 0.90]	0.17	− 0.65–1.49	59% (substantial)	2 (0.20 [− 0.33, 0.74])
BFI v. EBI (EOI)	4 (361)	0.04 [− 0.22, 0.30]	0.08	− 0.31–0.39	0% (not important)	1 (0.10 [− 0.14, 0.35])
BFI v. Control (follow-up)	4 (249)	0.42 [− 0.13, 0.97]	0.17	− 0.71–1.55	34% (not important)	0
BFI v. EBI (follow-up)	5 (394)	0.29 [− 0.33, 0.92]	0.22	− 1.08–1.67	69% (substantial)	0
Inflexibility-related processes						
BFI v. Control (post)	8 (581)	**0.65 [0.20, 1.11]**	0.19	− 0.64–1.94	79% (considerable)	0
BFI v. EBI (EOI)	2 (175)	—				
BFI v. Control (follow-up)	4 (369)	0.17 [− 0.56, 0.90]	0.23	− 1.65–1.98	71% (substantial)	1 (0.04 [− 0.71, 0.79])
BFI v. EBI (follow-up)	3 (313)	− 0.03 [− 1.07, 1.01]	0.24	− 4.93–4.86	66% (substantial)	2 (− 0.35 [− 1.18, 0.48])

[a]Knapp-Hartung adjustment applied for calculation of standard error

Significant effects ($p < .05$) are bolded

image concerns (pooled $g_{\text{bias-adjusted}} = 0.33$, $p = 0.010$) and approached significance for affect (pooled $g_{\text{bias-adjusted}} = 0.26$, $p = 0.092$). Body image flexibility and other EBIs showed similar effects on body image concerns following a body-related threat (pooled $g = -0.00$, $p = 0.994$). The two studies that examined changes in affect also found no differences between body image flexibility interventions relative to cognitive dissonance ($g = -0.01$, n.s) or reappraisal strategies ($g = 0.16$, n.s).

Other health outcomes that contributed to the aggregate estimate for protective effects were sociocultural influences (internalisation and pressures), depression, and self-esteem. Based on effects from these individual studies, body image flexibility interventions were shown to result in lower

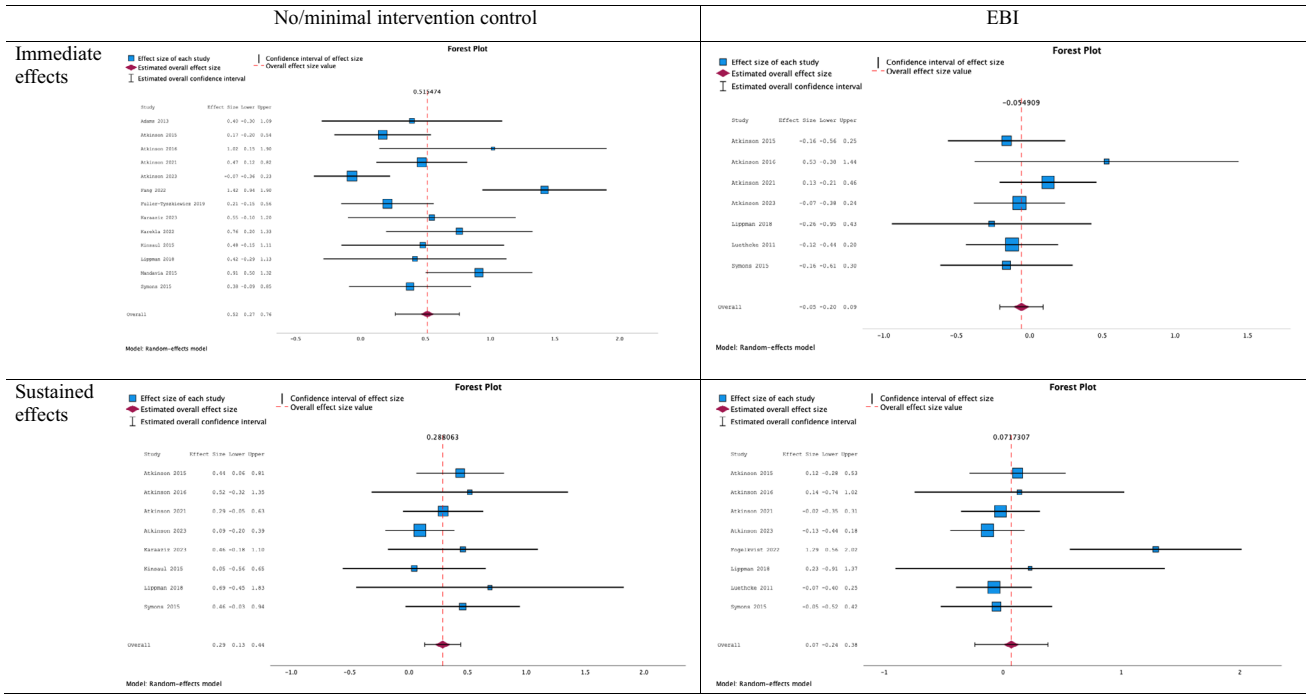

Fig. 2 Forest Plots for Meta-analysis of Intervention Studies Examining Direct Changes in Health Outcomes

internalisation ($g = 0.47$, $p = 0.008$) and pressures ($g = 0.56$, $p = 0.002$) relative to controls.

Changes in Body Image Flexibility and Links to Health Outcomes

Nine studies examined changes in body image flexibility, mindfulness, experiential avoidance, and cognitive fusion (see Table 1 for measurement instruments used). All flexibility- and inflexibility-related processes were combined for meta-analysis, with results showing immediate improvements relative to controls (pooled $g = 0.65$, $p = 0.012$; see Table 2). However, these differences were not sustained at follow-up (pooled $g_{\text{bias-adjusted}} = 0.04$, $p = 0.900$), and there was considerable heterogeneity across studies. Similarly, body image flexibility interventions were not found to significantly reduce inflexibility compared to other EBIs at follow-up (pooled $g_{\text{bias-adjusted}} = -0.35$, $p = 0.304$).

Table 3 Summary of findings from studies examining protection against body image threats

Outcome domain	Number of studies (total participants)	Pooled effect *g* [95% CI]	Standard error[a]	95% prediction interval	I^2 (degree of heterogeneity)	*N* trim-and-fill imputed studies (adjusted ES, [95% CI])
Aggregate of health outcomes						
BFI v. Control	7 (480)	**0.36 [0.12, 0.60]**	0.10	0.11–0.62	0% (not important)	**1 (0.33 [0.09, 0.56])**
BFI v. EBI	4 (279)	0.03 [− 0.19, 0.25]	0.07	− 0.27–0.33	0% (not important)	1 (− 0.01 [− 0.23, 0.20])
Body image concerns						
BFI v. Control	7 (480)	**0.37 [0.14, 0.60]**	0.09	0.12–0.61	0% (not important)	**1 (0.33 [0.11, 0.56])**
BFI v. EBI	4 (279)	− 0.00 [− 0.21, 0.21]	0.07	− 0.29–0.29	0% (not important)	0
Affect						
BFI v. Control	4 (349)	0.32 [− 0.02, 0.66]	0.11	− 0.15–0.80	1% (not important)	1 (0.26 [− 0.07, 0.59])
BFI v. EBI	2 (197)	–				

[a]Knapp-Hartung adjustment applied for calculation of standard error

Significant effects ($p < .05$) are bolded

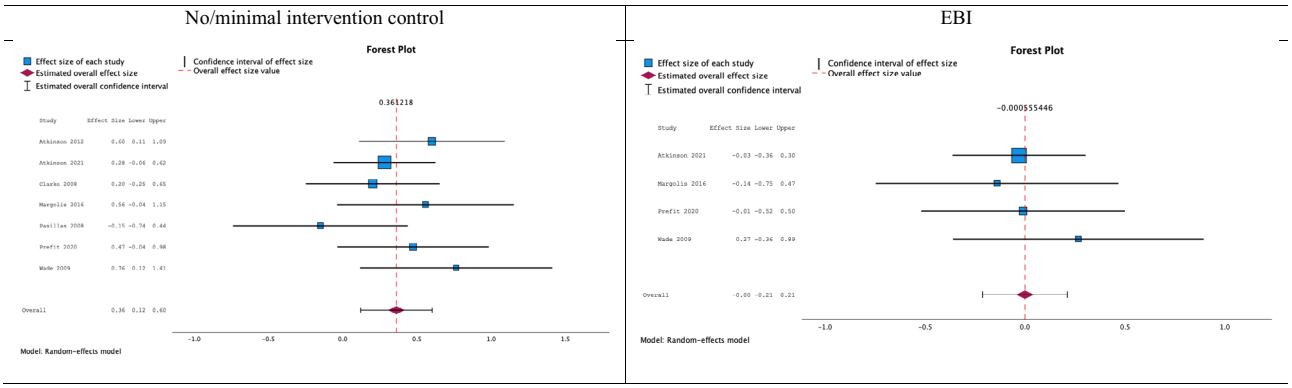

Fig. 3 Forest Plots for Meta-analysis of Studies Examining Protection Against Body Image Threats

There were insufficient studies ($n = 2$) to calculate a pooled effect for immediate changes in flexibility-related processes relative to other EBIs. In one study, changes in mindfulness were larger among females receiving a body image flexibility intervention relative to a dissonance-based intervention ($g = 1.34$, $p = 0.009$), whereas no between-group differences were found in a mixed-gender sample of high school students ($g = -0.11$, $p = 0.492$).

Mediation Studies Three studies conducted mediation analysis examining changes in flexibility- and inflexibility-related processes as mechanisms responsible for intervention-related improvements in health outcomes. Two studies had significant mediating effects, such that reductions in cognitive fusion and increases in body image flexibility explained improvements in body image concerns at end of intervention relative to controls (Fang et al., 2022; Merwin et al., 2023). The third study found that weight-related psychological flexibility was not a significant mediator, however this may have been due to there being no significant differences in body image outcomes between the intervention and control groups at end of intervention or follow-up in this study (Lippman, 2018).

Non-Quantitative Synthesis

Repeated measures effects for single intervention pre-post study designs ($n = 2$) are reported here separately, using Cohen's coefficient *d*. An eight-week guided self-help body image flexibility intervention produced significant reductions in body dissatisfaction and disordered eating, and improvements in body appreciation, intuitive eating, mindful self-care, positive embodiment, and self-compassion ($d = -2.67$ to 1.62, all $ps < 0.01$) among female university students in the United States who were aged 18 to 24 years and reported elevated body image concerns (Rogers et al., 2022). In a second study, six 30-min digital sessions based on ACT led to sustained improvements at one-month follow-up on weight and body concerns, eating disorder symptoms, and body image flexibility ($d = -1.02$ to 0.90, all $ps < 0.001$), but not quality of life ($d = 0.18$, n.s.), among female adolescents in Cyprus who were aged 13 to 25 years and reported elevated body image concerns (Karekla et al., 2022). The study that was excluded from meta-analysis due to missing information also reported improvements in body image concerns following an eight-session ACT intervention relative to the control among Iranian female high-school students aged 14 to 17 years (Rezaeisharif et al., 2021).

Investigating Heterogeneity

Substantial heterogeneity was present for intervention studies examining the immediate effects of body image flexibility interventions compared to controls (see Table 2). Meta-regression showed that study design, $\beta = 0.55$, $t(7) = 3.49$, $p = 0.008$, and prevention type, $\beta = 0.42$, $t(7) = 2.77$, $p = 0.024$, but not mean age of participants, $\beta = 0.14$, $t(7) = 0.84$, $p = 0.427$, or number of sessions, $\beta = 0.05$, $t(7) = 1.71$, $p = 0.126$, explained significant variation in intervention effects across studies, $F(4,8) = 8.38$, $p = 0.006$. NRSI/experimental studies were associated with larger effects than RCTs, and selective interventions delivered to those with elevated body image concerns had larger effects than universal programs. Residual heterogeneity fell within the bounds of non-importance after accounting for these predictors ($I^2 = 10.8\%$). There were insufficient studies to examine predictors of heterogeneity for outcome domains separately.

Risk of Bias Across Studies

The main sources of bias identified across studies were incomplete outcome data, handling of missing data, sequence generation (RCTs only), and intervention adherence (see Fig. 4). Several studies did not report amount of data lost to attrition, and many had insufficient reporting

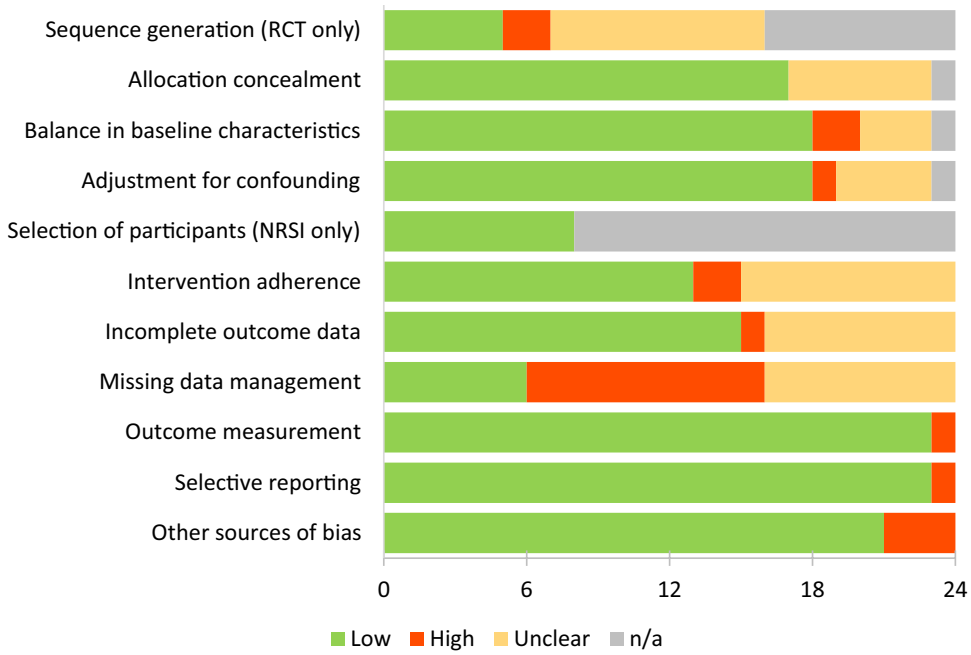

Fig. 4 Summary of Risk of Bias Across Reports of Studies (N = 24)

of, or used inadequate methods to account for, missingness. Only five studies (21%) conducted intent-to-treat analyses using robust methods (e.g., full information maximum likelihood or multiple imputation). Although some studies assessed validity of program administration and/or participant engagement, evaluation of intervention adherence was inconsistent. Additionally, less than half of the RCTs used adequate methods of sequence generation (e.g., a computer-generated random number sequence). Risks of bias due to selective reporting, measurement of the outcome, or selection of participants were generally low. Reasons listed as other sources of bias were potential cross-contamination among intervention groups and unclear reporting of inferential statistics (see Online Resource 3 for risk of bias assessments for individual studies).

Discussion

Body image flexibility is linked to more positive body image and well-being in adolescents and emerging adults (Brichacek et al., 2023a). Since increasing body image flexibility could enhance health outcomes for youth, establishing the effectiveness of such interventions is necessary to inform prevention strategies with this population. This review synthesized findings from 23 studies (15 RCTs) evaluating the effectiveness of body image flexibility interventions for improving health outcomes directly, and protecting against body image threats, in young people. Additionally, it explored whether interventions operated via putative change processes. There was initial evidence to support improvements in health outcomes, protection against exposure to sociocultural body image threats, and reduction in inflexible ways of relating to one's internal experiences. The nature of these effects, as discussed below, build upon existing prevention research in youth to highlight the potential contribution of affect regulation strategies that emphasize acceptance, non-attachment, and values-based living.

Effectiveness of Body Image Flexibility Interventions

Compared to no or minimal intervention controls, body image flexibility interventions led to immediate and sustained improvements in health outcomes. Effects were most pronounced for body image concerns; however, improvements in related domains (affect, eating disorder symptoms, and sociocultural influences) still favored body image flexibility interventions over controls ($g = 0.15$ to 0.47). Along with the direct improvements in health outcomes, body image flexibility interventions also protected against the adverse effects of body image threats. In studies that induced a threat (e.g., exposure to body ideals), concurrent training in body image flexibility skills resulted in less short-term adverse health outcomes, and lower body image concerns specifically. The immediate changes in health outcomes were of a similar size to those previously reported for universal and selective body image interventions utilizing mindfulness techniques (Beccia et al., 2018), with the present findings offering additional evidence of sustained improvements at follow-up.

Body image flexibility interventions also demonstrated similar effectiveness to other EBIs for improving health outcomes directly, and for protecting against the impact of body image threats. This is noteworthy given that comparator interventions predominately utilized cognitive dissonance strategies (e.g., critiquing and challenging unrealistic body ideals), which are the leading approach for the selective prevention of eating disorders (Le et al., 2017; Watson et al., 2016). The small to moderate effect sizes found for body image flexibility (in comparison to no/minimal intervention controls) in the present study were also comparable to that reported for other body image intervention programs (Alleva et al., 2015; Kurz et al., 2022; Le et al., 2017; Stice et al., 2019), lending further support to body image flexibility as a potentially viable prevention strategy for youth.

Although there were no significant differences in health outcomes overall when comparing body image flexibility to other EBIs, when stratified by outcome domains, the direction and size of effects indicated potential nuances. For instance, changes in affect (immediate) and eating disorder symptoms (sustained) were slightly larger for body image flexibility interventions, whereas cognitive and dissonance-based interventions appeared to be more effective at reducing sociocultural appearance ideal internalization and pressures, consistent with their respective objectives (Koreshe et al., 2023). Conclusions are limited by the presence of heterogeneity among the small number of eligible studies; thus, further investigation is needed to ascertain the potential strengths and limitations of various prevention approaches.

Mechanisms of Change

Informed by the ACT model of psychological flexibility (Hayes et al., 2006), body image flexibility interventions aim to change one's way of relating to body-related internal experiences, specifically by increasing flexibility (i.e., the capacity to be present with difficult thoughts, feelings, or sensations, while continuing to live in a way that aligns with one's values even in times of discomfort and distress) and decreasing inflexibility (i.e., resisting, or getting stuck in, negative body-related experiences and disconnecting from important areas of life). As this review identified only three studies that explicitly examined explanatory processes underlying intervention effects, conclusions about the mechanisms responsible for change are tenuous. However, existing studies can be used to inform future research.

Body image flexibility interventions led to immediate reductions in inflexibility-related processes, including those specific to body image, when compared to no intervention. Consistent with the ACT model, there was preliminary evidence that such changes explained concurrent improvements in body image concerns. There was less evidence that reductions in flexibility were responsible for sustained improvements, bringing into question the notion that young people generalize the skills and continue to apply them following intervention completion, although no studies examined mediated change at follow-up. It was also unclear if reductions in inflexibility were attributable to direct training in flexibility skills, as changes did not differ from those observed in other EBIs. Again, findings varied substantially across studies, precluding any definitive conclusions about the mechanisms underlying the observed intervention effects.

Implications for Body Image Prevention

This review highlights important gaps along with innovations relevant to prevention work with adolescents and emerging adults. Body image flexibility interventions can be considered effective for older adolescent and emerging adult females, with particular relevance to those already experiencing heightened levels of body image distress. Results of meta-regression analysis showed that the age of participants did not predict the strength of intervention effects, which may suggest parity in the efficacy of body image flexibility interventions between adolescents and emerging adults. However, as only a minority of studies were focused on adolescents younger than 18 years, further investigation within this age group is required to inform optimal intervention format and delivery. For instance, shorter interventions that emphasize interactive elements can improve acceptability in school settings, and using creative methods to explain abstract concepts may increase understanding and engagement among younger participants (Atkinson et al., 2015; Nicolaou et al., 2022).

Additionally, given the low representation of males and other gender identities within the analyzed studies, it is not yet known whether the findings for females are applicable to other genders. Only one study examined intervention effects for male and female adolescents separately. Although improvements were found across a wider range of health outcomes for female than male adolescents, benefits were reported for both genders, with positive effects for males particularly evident at two-month follow-up (Atkinson et al., 2023).

There was considerable diversity in intervention length, content, and delivery suggesting that body image flexibility interventions may be versatile and adaptable to a range of contexts (e.g., educational settings, group-based programs, online or self-directed). A common element among all examined interventions was the inclusion of experiential skills practice (e.g., applying mindfulness, cognitive defusion, or acceptance to one's own body-related experiences in the moment). One study showed that asking participants to practice a cognitive defusion technique with a self-identified

negative body image thought led to lower ratings of belief in the thought compared to generic training in the technique (Mandavia et al., 2015), while another study found that participants more accurately applied acceptance skills in response to a body image threat if they were first guided through an experiential exercise as opposed to receiving didactic information alone (Atkinson and Wade, 2012). Experiential learning may therefore be critical to body image flexibility skill acquisition and should be considered for intervention design. The potential importance of experiential and interactive activities converges with reported qualitative findings about participants' experiences and preferences (Atkinson and Wade, 2015), and parallels that found for other body image interventions with youth (Beccia et al., 2018; Stice et al., 2007).

It was promising that intervention effectiveness was not dependent on the number of sessions, indicating that even single session interventions can offer meaningful health improvements, at least in the short-term. Micro-intervention approaches have been explored, one example being the development of brief (two- to three-minute) videos to teach body image flexibility skills via an online application (Fuller-Tyszkiewicz et al., 2019). Since body image flexibility interventions were demonstrated to buffer the negative impacts of body image threats, embedding such micro-interventions within contexts where appearance ideals and social comparison are salient (e.g., social media platforms) could serve to mitigate potential health risks in real-time.

There is also scope for integration with existing EBIs. Body image flexibility skills are likely compatible with aspects of media literacy and dissonance-induction (Beccia et al., 2018). For instance, media literacy aims to equip people with skills to critically evaluate and engage with media content in a protective way (e.g., being aware of marketing and advertising strategies, the use of digital enhancement and promotion of body ideals, and selectively engaging with content that is helpful and positive; Kurz et al., 2022). Body image flexibility comprises skills for responding to painful affective experiences that arise from exposure to unhelpful body-related messages, teaching young people how to be present with these experiences while still moving toward valued behaviors (Karekla et al., 2022). Combining these approaches could improve antecedent- and response-focused affect regulation to bolster young people's capacity to deal effectively with body image threats (Wolgast et al., 2011). Likewise, clarifying personal values and connecting with a sense of self that exists beyond transient negative thoughts and feelings about one's body (i.e., self-*as*-context) may enhance one's ability to resist conforming to body image ideals. Such "integrative" approaches could serve to augment the effects of established EBIs.

Limitations of Evidence and Recommendations for Future Research

This review found preliminary evidence to support the effectiveness of body image flexibility interventions in young people. Conclusions are, however, limited by the quantity, quality, and scope of existing studies. The following recommendations are provided to inform and inspire future research to address these limitations to advance prevention science.

Participants

Nearly all included studies (83%) used exclusively female samples, and only a few targeted younger adolescents. The under-representation of those identifying as male or other genders limits the ability to make recommendations about the use of body image flexibility in prevention programs targeting these groups, particularly as body image may be experienced differently in comparison to cis-gender females (Doley et al., 2021; Romito et al., 2021). Future research should thus aim for increased demographic diversity in participants to inform the suitability of body image flexibility approaches in gender inclusive samples and with younger adolescents. Increased attention to specific populations with high levels of body image threats (e.g., those with a visible difference or social and cultural minorities) is also imperative to ensure that these more vulnerable youth have access to evidence-based approaches.

Additionally, while this review focused on adolescents and emerging adults, ACT-based interventions have been adapted for children as young as six years old (Swain et al., 2015). Promoting psychological flexibility early in language development may facilitate the application of these skills later on, when body image issues become more salient (Frisén et al., 2015). Thus, future studies might consider examining whether enhancing psychological flexibility in children and/or parents could have longitudinal benefits for body image outcomes (Steegers et al., 2021).

Interventions

Existing body image flexibility interventions range from those addressing one or several specific processes (e.g., mindfulness/present moment awareness) to full ACT protocols adapted to body image. However, some ACT processes were under-represented (e.g., self-*as*-context, values, committed action), making it difficult to identify their specific role in improving health outcomes. Therefore, future research should aim to address this gap with coverage across each of the six psychological flexibility skills to clarify their respective contributions. It is also necessary to assess intervention adherence, as only half of the studies in the present review reported on fidelity in program implementation and/or participant engagement.

The development and delivery of body image flexibility interventions were largely confined to researchers or clinicians with specific area expertise. Only two studies examined the effectiveness of interventions facilitated by non-expert providers (i.e., school teachers or post-graduate students), demonstrating that, with appropriate training teacher-led interventions can offer a sustainable and cost-effective approach for universal delivery (Atkinson et al., 2023). Expanding options for program delivery increases accessibility, scalability, and affordability, so further exploration of non-expert led interventions that have shown promise within body image prevention research (e.g., peer-led) is recommended (Akers et al., 2021; Stice et al., 2020). Participatory approaches further emphasize the importance of involving intended recipients in the planning and development of health interventions (Larsson et al., 2018). Future studies should therefore consider ways to collaboratively engage young people in intervention development, particularly under-represented groups, so that prevention strategies align with their views, preferences, and values (Doley et al., 2021).

Demonstrating program efficacy and effectiveness is the initial stage of prevention research, and this was the primary question addressed by the current review. Understanding causal mechanisms (theoretical mediators) and conditions for effectiveness (intervention moderators) are necessary to better discern how, when, and for whom body image flexibility interventions work (Gottfredson et al., 2015). The increased availability of measures to assess body image flexibility and inflexibility in youth (Brichacek et al., 2023a) provide scope to address such questions moving forward.

An additional limitation of the available evidence is that all studies focused on modifying individual responses, without addressing broader societal factors that perpetuate problematic attitudes and behaviors. Is important that interventions targeted at the individual level are implemented alongside public health policy, structural, and environmental changes that address these issues at a systemic level (Austin, 2016). Further consideration about how body image flexibility could be promoted within the macro-environmental context (e.g., policy to ensure equal opportunity for participation in valued activities, while establishing family, media, and peer contexts that encourage these pursuits over conforming to narrow appearance ideals) would allow for a more holistic approach to prevention.

Comparisons

It is recommended that future studies employ appropriate randomization and include non-specific (e.g., general information and support) comparisons to control for non-intervention effects such as time, attention, and expectancy (Watson et al., 2016). Future research should also compare body image flexibility interventions to media literacy-based approaches, as these have received the most support at a universal level of prevention (Le et al., 2017; Watson et al., 2016). It would also be worthwhile to investigate outcomes relative to other contemporary positive body image-oriented interventions addressing related concepts such as embodiment, functionality appreciation, and self-compassion (Mahon and Hevey, 2023; Rodgers et al., 2018; Sundgot-Borgen et al., 2020).

Outcomes

The studies identified by this review focused on maladaptive health outcomes and negative body image more than positive body image and well-being. There were insufficient studies to separately examine impacts on adaptive outcomes, however the two studies that measured positive body image (as body appreciation) showed moderate-to-large improvements pre-post intervention (Rogers et al., 2022), which were greater than no/minimal intervention controls (Atkinson and Diedrichs, 2021). Inclusion of a wider variety of measures has the potential to provide a more comprehensive account of health benefits for young people. This is especially important in the context of body image flexibility, where the intention is less about removing or getting rid of body image distress (as per traditional measures of negative body image), and instead focus on enhancing one's capacity to defuse from problematic cognitions, accept painful emotions, and engage with the body and world in a way that is consistent with personal values. Selecting measures sensitive to these nuances (e.g., life engagement and functional outcomes) may further delineate the role of body image flexibility interventions in enhancing health and well-being.

Additionally, future research should include longer follow-up intervals, as two-thirds of the studies only examined changes up to three months post-intervention. It is therefore unclear whether education and training in body image flexibility provides lasting improvements, as is a primary goal of prevention programs. Assessment of body image flexibility during follow-up would also be useful to help clarify whether sustained or ongoing improvements in health outcomes are attributable to continued practice and development of these skills.

Limitations of Review Processes

As the first review to examine the effectiveness of body image flexibility interventions in young people, several limitations should be noted. Meta-analysis could only be performed for a limited number of outcome domains, some of

which had as few as four studies contributing to the pooled effect estimate. Analyses involving fewer studies and participants may have therefore been underpowered to detect significant differences. The small number of studies, and presence of heterogeneity, also contributed to wide prediction intervals, making it difficult to extrapolate findings to future interventions. It was not possible to analyze all predictors of heterogeneity. Therefore, further investigation of variables predicting intervention effects (e.g., differing lengths of follow-up, measurement instruments, and intervention formats), or refinement of inclusion criteria to standardize across these study attributes, may allow for more reliable effect estimates.

Conclusions are further limited by potential biases identified at the study and review level. Studies infrequently reported baseline-adjusted values for outcome measurements. This was addressed using the recommended method of calculating the average and distribution of change scores, which is based on an assumption about the correlation between repeated measures (Higgins et al., 2023). As such, the effect measure may have overestimated actual intervention effects if the imputed value was significantly higher than the true value. Several effect estimates were also found to be inflated due to publication bias. Although efforts were made to include both published and unpublished research, increased use of open-science approaches (i.e., pre-registration of intervention studies) is recommended to reduce under-reporting of small or non-significant effects moving forward (Lochman, 2022).

Additionally, only complete data were extracted for quantitative synthesis (Akl et al., 2015). Since complete case analysis was the most common approach to handling missing participant data in individual studies, and reasons for attrition were infrequently reported or investigated, findings from this review should be considered preliminary as study-level attrition biases are expected to translate into similar risks at the review level. Body image flexibility interventions could be less or even ineffective among non-completers, thus, future studies should include intent-to-treat analyses to strengthen the validity of results (Higgins et al., 2023).

Conclusion

Increasingly, interventions aimed at preventing body image disturbances have focused on enhancing positive body image and protective factors. The present systematic review aimed to consolidate available evidence about interventions that teach body image flexibility skills as an adaptive way of relating to body image distress. The findings support the effectiveness of body image flexibility interventions for improving body image concerns and protecting against adverse effects of body image threats, primarily in emerging adult females. The lack of studies evaluating demographically diverse groups and other health outcomes, along with variation in results across studies, limits more generalized conclusions. However, there were several promising discoveries. Body image flexibility interventions demonstrated sustained improvements in body image concerns at follow-up, with similar effectiveness to other EBIs (i.e., cognitive and dissonance-induction), and were associated with expected changes in targeted ACT processes. There was evidence of their effectiveness across varied contexts, including both universal and selective prevention. Additional high-quality randomized trials are needed to address identified limitations and situate body image flexibility within broader approaches to prevention.

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Authors' Contribution AB conceived of the study and its design, conducted the search, coded the studies, conducted the analysis, and coordinated and drafted the manuscript; JN participated in the design, helped code the studies, contributed to the analysis and interpretation of the data, assisted in the drafting of the manuscript, and provided supervision; KM participated in the design, provided supervision, and reviewed the full manuscript; ER provided supervision and reviewed the full manuscript; and CW provided supervision and reviewed the full manuscript. All authors have read and approved the final manuscript.

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Data Availability Data used in this study are available at: Brichacek et al. (2023). *Systematic review of body image flexibility interventions* (Version 1) [Data set]. University of Canberra. http://doi.org/https://doi.org/10.17632/g7dxpkxrmb.1

Declarations

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process No generative AI or AI-assisted technologies were used in the writing of this manuscript.

Conflicts of interest The authors declare that there are no conflicts of interest.

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