

How effective are psychosocial interventions at improving body image and reducing disordered eating in adult men? A systematic review

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ABSTRACT

Disordered eating and body image concerns significantly impact a growing number of men. This systematic review assessed the evidence of the effectiveness of psychosocial interventions to improve body image and eating pathology in men. Searches were conducted in December 2022 in 13 databases (PsycINFO, MEDLINE, CINAHL Plus, AMED, PubMed, Scopus, Cochrane, EMBASE, ASSIA, British Nursing Index, Wiley and OpenGrey). Studies that quantitatively evaluated psychosocial interventions and reported pre-post body image or disordered eating outcomes in men aged 18 years and over were eligible. Articles including boys, uncontrolled designs, or not in English were excluded. Findings were narratively synthesised and presented according to intervention approach. Quality was assessed using EPHP. Eight studies including six RCTs were reviewed. Five were assessed as being moderate quality and three as weak. Evidence from moderate quality studies suggested that dissonance-based interventions showed promising improvements in body image and disordered eating for up to six months post-intervention in men with and without body dissatisfaction. Evidence for media literacy and psychoeducational interventions was limited. Findings were limited by heterogeneity in outcome measures and homogeneity of participants preventing generalisability. Robust research with longer follow-ups is needed to confirm effectiveness.

1. Introduction

Body image concerns and disordered eating are more common in men than was previously acknowledged (Mitchison & Mond, 2015); as many as 8–90% of men are dissatisfied with their bodies (Fiske et al., 2014; Frederick et al., 2007). Epidemiological challenges and atypical presentation have historically resulted in an under-representation of men in body image and disordered eating research, diagnostic tools, and treatment modalities, which has led to under-diagnosis and under-treatment in men (Murray et al., 2016; Strother et al., 2012). However, there is increasing epidemiological evidence to suggest body image concerns and disordered eating in men are (a) more common than previously considered (Hudson et al., 2007), (b) increasing at an unparalleled rate compared to women (Mitchison et al., 2014), and (c) associated with high levels of distress, psychosocial impairment, and reduced quality of life (Mitchison et al., 2013).

1.1. Body dissatisfaction and disordered eating in men

The increasing rates of eating disturbances in men has been attributed to a rise in body dissatisfaction, a well-acknowledged risk factor of disordered eating in women (Stice & Shaw, 2002) and men (Blashill, 2011). The rise in body dissatisfaction in men has been accredited to increased exposure to objectifying, lean and muscular portrayals of men in the media (Chia & Wen, 2010) which normalises unattainable ideals and highlights a discrepancy between those and one's own body (Lorenzen et al., 2004). Body image concerns and disordered eating in boys and men are more likely to be focused on muscular and lean mesomorphic ideals rather than a drive for thinness (Murray et al., 2016; Neumark-Sztainer & Eisenberg, 2014). There is evidence of cultural differences in aspirations for muscular ideals (e.g., Ugandan men display a lower desire for muscularity compared to an ethnically diverse sample of men from the UK; Thornborrow et al., 2020) and differences based on sexual orientation (e.g., gay men reporting a drive for thinness as well as muscularity; Hunt et al., 2012). Cross-sectional data suggest that men may engage in more muscularity-orientated behaviours compared to

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women (e.g., excessive exercise, steroid abuse), although gay men have also been shown to engage more in behaviours congruent with a drive for thinness (e.g., dieting; Duggan & McCreary, 2004) as well as muscularity (e.g., steroid use; Hunte, 2020) compared to heterosexual men. These gendered aspects, alongside a disproportionate focus on women, have led to calls for the development of new evidence-based interventions to improve body image and disordered eating in men (Matsumoto & Rodgers, 2020).

1.2. Body image and disordered eating interventions

Psychosocial interventions may offer promising improvements in body image and eating concerns by addressing key psychological and social factors associated with their onset and/or maintenance (Costa & Melnik, 2016; Linardon et al., 2018). Approaches range from those that target cognitive drivers (e.g., cognitive behavioural therapy that challenges dysfunctional beliefs; Farrell et al., 2006; dissonance-based programs; Hudson et al., 2021), strengthen valuable skills (e.g., media literacy; Mora et al., 2015), enhance mindfulness or acceptance (e.g., acceptance and commitment-based approaches that encourage psychological flexibility and living according to one's values; Fogelkvist et al., 2020, meditation to build self-compassion; Albertson et al., 2014) or provide psychoeducation for lifestyle or behavioural modification (Yager & O'Dea, 2010).

Dissonance-based programs have received consistent empirical support in women (e.g., Stice et al., 2019; Stice et al., 2021) and aim to challenge appearance ideals through engagement in counter-attitudinal exercises to reduce the pursuit of unrealistic appearance ideals (Seidel et al., 2009; Stice et al., 2000). Media literacy interventions also show promise at improving body image by strengthening the skills that protect against the negative exposure to body ideals shown in the media (Bergsma & Carney, 2008) in boys (Richardson et al., 2009). Support has also been demonstrated for psychoeducational interventions for young women designed to enhance self-esteem and self-efficacy (Martinsen et al., 2014) and promote a healthy lifestyle (e.g., dietary, physical activity; Stice et al., 2013).

There has been a lack of research reviewing the effectiveness of psychosocial interventions in men, with previous research focusing predominantly on girls and women (e.g., Linardon et al., 2018) and adolescent boys (e.g., Buerger et al., 2021). To address this, the aim of this review is to (a) systematically assess the effectiveness of psychosocial interventions at improving body image and reducing disordered eating in men and (b) identify features of effective psychosocial interventions at improving body image and disordered eating in men.

2. Method

This systematic review complies with the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2021) and PRISMA guidelines (Page et al., 2021, 2021). The review protocol is registered (PROSPERO registration; CRD42021245718). The only deviation from this protocol was that the literature searches were conducted later than planned (December 2022).

2.1. Literature search

All literature searches were conducted on 12 December 2022 by the first author in PsycINFO (via EBSCO), MEDLINE (via EBSCO), CINAHL Plus (via EBSCO), AMED (via EBSCO), PubMed, Scopus, the Cochrane Library, EMBASE, ASSIA, British Nursing Index, and the Wiley Online Library. To counter publication bias, a search of grey literature was conducted in OpenGrey. Manual searches of the references of included articles were conducted to identify additional relevant studies.

Search terms were identified based on the current literature on this topic including perusal of systematic reviews on interventions to improve body image and disordered eating in other populations (e.g.,

Lewis-Smith, Diedrichs, Rumsey, & Harcourt, 2015; Stice et al., 2019; Stice et al., 2021). Combinations of terms for population (i.e., "men" and "male"), intervention (e.g., "intervention," "program"), outcome for body image (e.g., "body dissatisfaction," "body appreciation") or outcome for disordered eating (e.g., "eating," "disordered eating") were used (see Supplementary Appendix A).

2.2. Eligibility criteria

Inclusion criteria: studies needed to (a) be written in English; (b) include a psychosocial intervention intending to reduce body dissatisfaction or disordered eating; (c) include at least one quantitative body image or disordered eating measure (pre and post-intervention); (d) include male participants (aged 18 years and over) or mixed gender (if relevant outcomes were reported for men separately); (e) include a control group (either passive e.g., waitlist, or active e.g., alternative intervention); (f); include participants with and without body image concerns, a diagnosed or history of an eating disorder, or any other clinical condition. There were no limits on the date of publication given the infancy of research in this field.

Exclusion criteria: studies were excluded if (a) the intervention was not psychological e.g., dietary, physical activity and pharmaceutical; (b) they included participants aged under 18 years due to the developmental differences between adolescents and adults (McCabe & Ricciardelli, 2004; Toselli et al., 2021). Body image is influenced by various biopsychosocial factors that change over the lifespan (McCabe & Ricciardelli, 2004), so boys and men require age-appropriate interventions conducted in different contexts (Agam-Bitton et al., 2018). Therefore, studies involving boys and men need to be evaluated in separate reviews. Studies were also excluded if; (c) the intervention included weight loss as body image has been shown to be influenced by weight loss (Linardon et al., 2018); (d) they were meta-analyses, systematic reviews and observational, case or dose/response studies without a comparison arm, and qualitative-only designs.

2.3. Study selection

EH screened articles on the title and abstract against the eligibility criteria using Zotero. Full-text articles were screened by EH and LF independently against inclusion and exclusive criteria using Covidence because of its ease in screening full-text papers independently. A system to resolve disagreements was developed and included an independent review by a third author. This was not needed because there was 100% agreement on papers to include in the review.

2.4. Data extraction

The first author (EH) developed a standardised extraction form informed by Cochrane (2014). This was reviewed by LF for adherence to eligibility criteria and completeness. Data were extracted from each article by the first author (EH) and outcome data were extracted independently by LF. Disagreements would be resolved by a third author (CG) but there were no disagreements. Extracted data included study design, participant information, intervention information, outcome measures, satisfaction with intervention, and risk of bias (Table 1). Missing data were addressed by the first author (EH) by contacting the study authors to request missing information (including two follow-ups over a four-week period). Any data that remained missing have been highlighted (Table 1).

2.5. Appraisal of study quality

Quality assessments were conducted independently by the first and third authors (EH and LF) using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies (EPHPP; Thomas et al., 2004). Any discrepancies were discussed until a decision

Table 1
Characteristics of included studies.

Author (year) Country	Study characteristics			Sample characteristics		Intervention characteristics		Outcome measures	Key results		Quality (EPHPP)
	Design	Follow up	Control	Description	Sample size	Description of the program	Delivery/ dose		Body image	Disordered eating	
Dissonance-based interventions											
Almeida et al., (2020) Brazil	RCT	4 and 24 weeks	Assessment only control	Heterosexual university students with body image concerns but did not meet the criteria for a diagnosed eating disorder or muscle dysmorphia Mean age = 20.51 years (<i>SD</i> =2.45)	Intervention <i>n</i> = 89 Assessment only control <i>n</i> = 91	The Body Project: More than Muscles is a program that aims to promote a healthy, realistic body ideal in men with body dissatisfaction.	Group (<i>n</i> = 4–10), in-person on university campus led by the same two facilitators (1 x peer leader and 1 x professional leader, both were also researchers on the study). Delivered in 2 sessions of 120 mins (total = 240 mins)	MBAS-R MUS and BF subscales MDDI including DFS, AI and FI subscales BAS-2 SATAQ-4 including Internalisation thin/low body fat and Muscular/ Athletic subscales EAT-26 DMS	Significant improvements in muscle dysmorphia, body fat and muscularity dissatisfaction, drive for muscularity and body-ideal internalisation in DBI group compared to control at 4-week with small to large effect sizes (<i>d</i> = 0.35–1.10, <i>p</i> < .05) and 24-week follow-up with small to moderate effect size (<i>d</i> = 0.33–0.78, <i>p</i> < .05,) but not post intervention. Body appreciation improved significantly in the DBI group at post intervention compared to control with small effect size (<i>d</i> = 0.40, <i>p</i> < .01). These were maintained at 4-week follow up with large effect size (<i>d</i> = 0.80, <i>p</i> < .001) and 24-week with moderate effect size (<i>d</i> = 0.58, <i>p</i> < .001).	DBI group had significant reductions in disordered eating symptoms compared to control at 4-week with small effect size (<i>d</i> = 0.37, <i>p</i> < .05) and 24-week follow-up with small effect size (<i>d</i> = 0.33, <i>p</i> = >.05) but not post-intervention.	Moderate
Brown & Keel (2015) USA	RCT	4 weeks	Waitlist control	Gay men (college students = 92% and local community = 8%) who did not meet DSM-5 eating disorder criteria Mean age = 21.48 years (<i>SD</i> = 2.53)	Intervention = 47 Waitlist control = 40	The PRIDE Body Project © is an eating disorder prevention program that aims to challenge appearance ideals.	Delivered to groups (<i>n</i> = 4–7) on a university campus, in-person by a clinician (and researcher) and peer leader. Delivered in 2 sessions of 120 mins (total = 240 mins)	BSQ SATAQ-3 Internalisation thin/ low body fat subscale DMS EDE-Q bulimic symptoms composite and restraint subscales	Significant reductions in body dissatisfaction, drive for muscularity and body-ideal internalisation in the DBI group compared to control at post intervention with moderate to large effect sizes (<i>d</i> = 0.61–1.01, <i>p</i> < .05). These improvements were retained at 4-week with moderate	DBI group had significant decreases in eating disorder symptoms compared to control at post intervention with moderate effect sizes (<i>d</i> = 0.52–0.76, <i>p</i> .01) that was maintained at 4-week follow-up with moderate to large effect sizes (<i>d</i> = 0.54–0.84, <i>p</i> < .05). Reductions in body-ideal internalisation	Moderate

(continued on next page)

Table 1 (continued)

Author (year) Country	Study characteristics			Sample characteristics		Intervention characteristics		Outcome measures	Key results		Quality (EPHPP)
	Design	Follow up	Control	Description	Sample size	Description of the program	Delivery/ dose		Body image	Disordered eating	
Brown et al., 2017 USA	RCT	4 weeks	Waitlist control	University students = 96% and from the community = 4% with body image concerns but did not meet DSM-5 eating disorder criteria Mean age = 20.37 years (SD = 2.37)	Intervention = 52 Waitlist = 60	The Body Project: More than Muscles is a program that aims to promote a healthy, realistic body ideal in men.	Delivered to groups (n = 4–10) on a university campus, in-person by facilitators (1 x lead researcher and clinician and 1–2 male peer leaders). Delivered in 2 sessions of 120 mins (total = 240 mins)	MBAS MUS and BF subscales MDDI SATAQ-3 Internalisation general subscale DMS EDE-Q bulimic symptoms composite and restraint subscales	to large effect sizes (d = 0.78–0.86, p.01) follow-up apart from body-ideal internalisation. DBI group had greater decreases in body-ideal internalisation, drive for muscularity and muscle dysmorphia compared to control at post intervention with moderate effect sizes (d = 0.58–0.61, p < .05). Reductions were maintained at the 4-week follow up with small to moderate effect sizes (d = 0.48–0.78, p < .05). Body-ideal internalisation partially mediated reductions in muscle dysmorphia symptoms.	fully mediated reductions in bulimic symptoms. Significant reductions in dietary restraint and bulimic symptoms in the DBI group compared to control at post intervention with moderate to large effect sizes (d = 0.76 – 1.11, p < .01). Reductions were maintained at 4-week follow up with large effect sizes (d = 0.93 – 1.16, p = .01). Body-ideal internalisation partially mediated reductions in bulimic symptoms.	Moderate
Jankowski et al., (2017) United Kingdom	Pilot controlled trial	3 months	Assessment only control	University students Mean age = 20.75 years (SD = 4.59)	Intervention = 74 Assessment only control = 53	The Body Project M aimed to improve body image and disordered eating in men.	Delivered to groups (n = 2–6, M=4) on university campuses, in-person by 1 x lead investigator). Delivered in 2 sessions of 90 mins (total = 180 mins).	MBAS-R BF subscale PACS DMS Muscularity Dissatisfaction and Muscularity Enhancing Behaviours subscales EDE-Q bulimic symptoms composite BAS SATAQ-3-Male	DBI group had improvements in dissatisfaction of body fat and muscularity, body appreciation appearance comparisons and body-ideal internalisation at post-intervention with small to large effect sizes (d = 0.46–0.80, p < .05) compared to control. Improvements in body appreciation, appearance comparisons, dissatisfaction with muscularity and body fat dissatisfaction were sustained at 3-month follow up with moderate effect sizes (d = 0.42–0.62, p < .05).	DBI resulted in reductions in muscular enhancing behaviours at post-intervention with moderate effect size (d = 0.56, p < .05) and 3-month follow up with moderate effect size (d = 0.61, p < .01) compared to control. These were not retained under intention-to-treat analyses. DBI had no effects on bulimic symptoms.	Weak

Table 1 (continued)

Author (year) Country	Study characteristics			Sample characteristics		Intervention characteristics		Outcome measures	Key results		Quality (EPHPP)
	Design	Follow up	Control	Description	Sample size	Description of the program	Delivery/ dose		Body image	Disordered eating	
Kilpela et al., (2016) * USA	RCT	2 and 6 months	Waitlist control	Undergraduate students (men and women) Mean age (men and women) = 19.9 years (<i>SD</i> = 1.2)	Intervention = 85 (36 men) Waitlist = 70 (34 men)	The Body Project is a cognitive dissonance program that aims to improve body image.	Delivered to mixed gender small-groups (<i>n</i> = unknown) on university campuses, in-person by 2–3 peer leaders (including at least one man and one woman peer leader). Delivered in 2 sessions of 120 mins (total = 240 mins).	MBAS SATAQ-4 BPSS-R EDE-Q	Effects were weaker across all outcomes under intention-to-treat analyses. Only improvements in dissatisfaction with muscularity and body-ideal internalisation at post-intervention were retained with small effect sizes ($d = 0.36-0.37, p < .05$). Significant improvements in global body dissatisfaction, dissatisfaction of body fat and muscularity and body satisfaction for men in the mixed gender group compared to control at post-intervention and 2-month follow-up (all $p < .05$). Improvements were retained only for body satisfaction and dissatisfaction with body fat at 6-month follow-up (all $p < .05$). Improvements were marginally significant ($p = .0556$) for global body dissatisfaction at 6-months. No significant effects for men in mixed gender DBI intervention group on appearance-ideal internalisation.	Men in the mixed gender DBI group had no significant effects on eating disorder pathology.	Moderate
Psychoeducational lifestyle modification programs Mellor et al., (2017) Australia	Cluster RCT	3 months	Waitlist control	Middle aged men Mean age of intervention group = 51.40 years (<i>SD</i> = 7.52)	Intervention = 43 Waitlist = 33	The Better With Age program aims to increase health behaviours (e.g. diet and exercise), positive body image, self-efficacy and coping skills.	Delivered to groups ($n = 4-10$), in-person in seven government organisation workplaces by an unknown number of women facilitators (psychologist or	BAS Satisfaction with Function and Satisfaction with Appearance subscales	No significant effects on body satisfaction or body appreciation.	n/a	Weak

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Table 1 (continued)

Author (year) Country	Study characteristics			Sample characteristics		Intervention characteristics		Outcome measures	Key results		Quality (EPHPP)
	Design	Follow up	Control	Description	Sample size	Description of the program	Delivery/ dose		Body image	Disordered eating	
Perelman et al., (2022) USA	RCT	1 month	Assessment only control	College athletes with body dissatisfaction Mean age = 19.5 years (<i>SD</i> = 1.19)	Intervention = 39 Waitlist = 40	The Male Athlete Body Project (MABP) aims to improve eating disorder risk factors including body dissatisfaction, drive for muscularity, body-ideal internalisation and muscle dysmorphia.	doctoral psychology trainees) Delivered in 4 sessions of 90 mins (total = 360 mins). Delivered to groups (<i>n</i> = 2–8) by the first author and another doctoral-level clinician. Delivered in 3 sessions of 80 mins (total = 240 mins).	MBSRQ-AS including five subscales; Appearance Evaluation, Appearance Orientation, Overweight Preoccupation, Self-Classified Weight and the Body Areas Satisfaction Scale DMS SATAQ-4R MDI including six subscales; Diet, Supplement, Physique Protection, Exercise Dependence, Size/Symmetry and Pharmacology.	Intervention group had significant improvements in satisfaction with specific body areas and drive for muscularity at post-intervention and follow up compared to control with moderate effect sizes (<i>d</i> = 0.50–0.64, <i>p</i> < .05). Intervention group had significant reductions in idealisation of the muscular ideal compared to control at post-intervention with a small effect size (<i>d</i> = 0.46, <i>p</i> < .05), but not at follow up.	Significant reductions in use of performance-enhancing nutritional supplement use at follow-up compared to control with a small effect size (<i>d</i> = 0.34, <i>p</i> < .05). No significant effects found for diet regulation, avoiding being viewed by others, preoccupation or maintenance of strict exercise programme, or use of steroids/ synthetic hormones).	Weak
Media literacy interventions											
Media literacy and dissonance-based interventions											
Yager, O'Dea (2010) Australia	Non-randomised controlled trial	6 months*	Active control group receiving didactic health education	Trainee health education and physical education teachers (men and women) Mean age = 21.6 years (<i>SD</i> = 2.3)	Media literacy intervention = 52 (21 men; IG1) Media literacy & Dissonance-based intervention = 49 (19 men; IG2) Didactic health education (control) = 69 (20 men)	Designed to improve body image and reduce body dissatisfaction, disordered eating symptoms and excessive exercise.	Delivered to large groups (<i>n</i> = 49–69), mostly in-person on a university campus and online discussion groups. Facilitated by same two researchers aside from online discussion groups that were largely peer led. Delivered in 48 sessions of 30 mins (total = 1440 mins).	BAR DMS EDE-Q DEBQ Restrictive Eating Subscale EDI Drive for Thinness subscale OEQ	IG1. Significant improvements in drive for muscularity at post-intervention compared to control with small effect size (<i>d</i> = 0.25, <i>p</i> < .001).* *** IG2. Significant improvements in body appearance rating with large effect size (<i>d</i> = 0.87, <i>p</i> < .05) and drive for muscularity* ** at post-intervention	IG1. No significant effects found. IG2. Significant reductions in restrained eating post-intervention with large effect size (<i>d</i> = 0.89, <i>p</i> < .01)	Moderate

Note. Quality: EPHPP = Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies. Outcome measures: Male Body Attitudes Scale (MBAS; Tylka, Bergeron, & Schwartz, 2005, 2015, Thomas et al., 2004), Male Body Attitudes Scale-Revised (MBAS-R; Ryan, Morrison, Roddy, & McCutcheon, 2011), Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS; Cash, 2000), Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairbum, 1987), Muscle Dysmorphic Disorder Inventory (MDDI; Hildebrandt, Langenbucher, & Schlundt, 2004), Body Appreciation Scale (BAS; Avalos, Tylka, & Wood-Barcalow, 2005), Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015), Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000), Socio-cultural Attitudes Towards Appearance Questionnaire

(SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004), Socio-cultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Heinberg, Thompson, & Stormer, 1995), Socio-cultural Attitudes Towards Appearance Questionnaire-4 Revised (SATAQ-4R; Schaefer, Harriger, Heinberg, Soderberg, & Kevin Thompson, 2017), Physical Appearance Comparison Scale (PACS; Thompson et al., 2004), Body Parts Satisfaction Scale-Revised (BPSS-R; Petrie, Tripp, & Harvey, 2002), Body Satisfaction (Reboussin et al., 2000), Body Appearance Rating (BAR; Van Hoorn, Kefford, & O'Dea, 1999), Disordered eating – Eating Attitudes Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982), Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994), Dutch Eating Behaviours Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986), Eating Disorders Inventory (EDI; Garner, 1991), Muscle Dysmorphia Inventory (MDI; Rhea, Lantz, & Cornelius, 2004), Obligatory Exercise Questionnaire (OEQ; Pasman & Thompson, 1988), IGI = Intervention Group 1 media literacy and dissonance-based intervention. IG2 = Intervention Group 2 media literacy and dissonance-based intervention.

* unable to calculate effect sizes for Kilpela et al., 2016 due to unattainable data ** 6 month follow up not reported for men due to inadequate statistical power. *** Cohen's d effect sizes calculated by first reviewer using means and standard deviations and interpreted as small (d=0.20), medium (d=0.50) and large (d=0.80) (Morris, 2007). * **** unable to calculate effect sizes due to unattainable data.

was made on the final rating. The EPHPP provides a global quality rating for each study as either 'weak' (more than one weak rating), 'moderate' (one weak rating), or 'strong' (no weak ratings) based on selection bias, study design, confounders, blinding, data collection methods and attrition. It was chosen because it is suitable to evaluate the methodological quality of RCTs, case-control trials and pre-post intervention designs (Jackson & Waters, 2005), for use in systematic reviews of effectiveness (Deeks et al., 2003), and it has good content and construct validity (Jackson & Waters, 2005; Thomas et al., 2004).

2.6. Appraisal of intervention effectiveness

Interventions were considered effective if there was a statistically significant improvement (*p*-value of <.05), relative to the control on at least one measure of body image or disordered eating for the intervention group at post-intervention or follow-up. Effectiveness was considered in relation to methodological quality as defined by the EPHPP (Thomas et al., 2004). Studies of weak methodological quality were excluded from assessments of effectiveness due to a high risk of bias.

Where possible, effect sizes are presented using Cohen's *d* (Cohen, 2013) and interpreted as small (*d*=0.20), medium (*d*=0.50) and large (*d*=0.80; Morris, 2007). Effect sizes were calculated based on mean and standard deviation data for one study (Yager & O'Dea 2010) and unavailable for another (Kilpela et al., 2016).

2.7. Data synthesis

Studies were assessed for methodological and clinical heterogeneity, and considerable differences were identified (e.g., participant characteristics and outcome measurement). Given this, a meta-analysis was judged to be inappropriate, and a narrative synthesis was conducted (Mays et al., 2005). Data were synthesised by grouping studies based on their intervention approach (e.g., dissonance-based, media literacy, media literacy and dissonance-based, and psychoeducational).

3. Results

The searches of databases yielded 19,155 records (Fig. 1). After screening titles and abstracts, a total of 141 articles remained for full-text analysis. One study met all inclusion criteria aside from reporting findings by gender and was excluded as findings for men were not provided. Eight articles remained that met the inclusion criteria and were included in the final systematic review. These eight articles comprised 791 men, evaluated five interventions and were all peer-reviewed.

3.1. Study characteristics

The studies were conducted in four countries: the USA (Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Perelman et al., 2022), Australia (Yager & O'Dea, 2010; Mellor et al., 2017), Brazil (Almeida et al., 2020) and the UK (Jankowski et al., 2017). All were published in the last twelve years (2010–2022), with three quarters published in the last five years. Sample sizes of men ranged between studies, from 60 to 180 (*M* = 98.9).

3.2. Sample characteristics

The mean ages of participants ranged from 20 to 51 years. Most had a mean of 20–22 years (*n* = 7; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016; Yager & O'Dea, 2010; Perelman et al., 2022). Most included samples of men only (*n* = 6; Almeida et al., 2020; Brown et al., 2017; Jankowski et al., 2017; Mellor et al., 2017; Perelman et al., 2022), and two had mixed-gender samples (35–45% men; Kilpela et al., 2016; Yager & O'Dea, 2010). Samples were 32–87% Caucasian/White, although

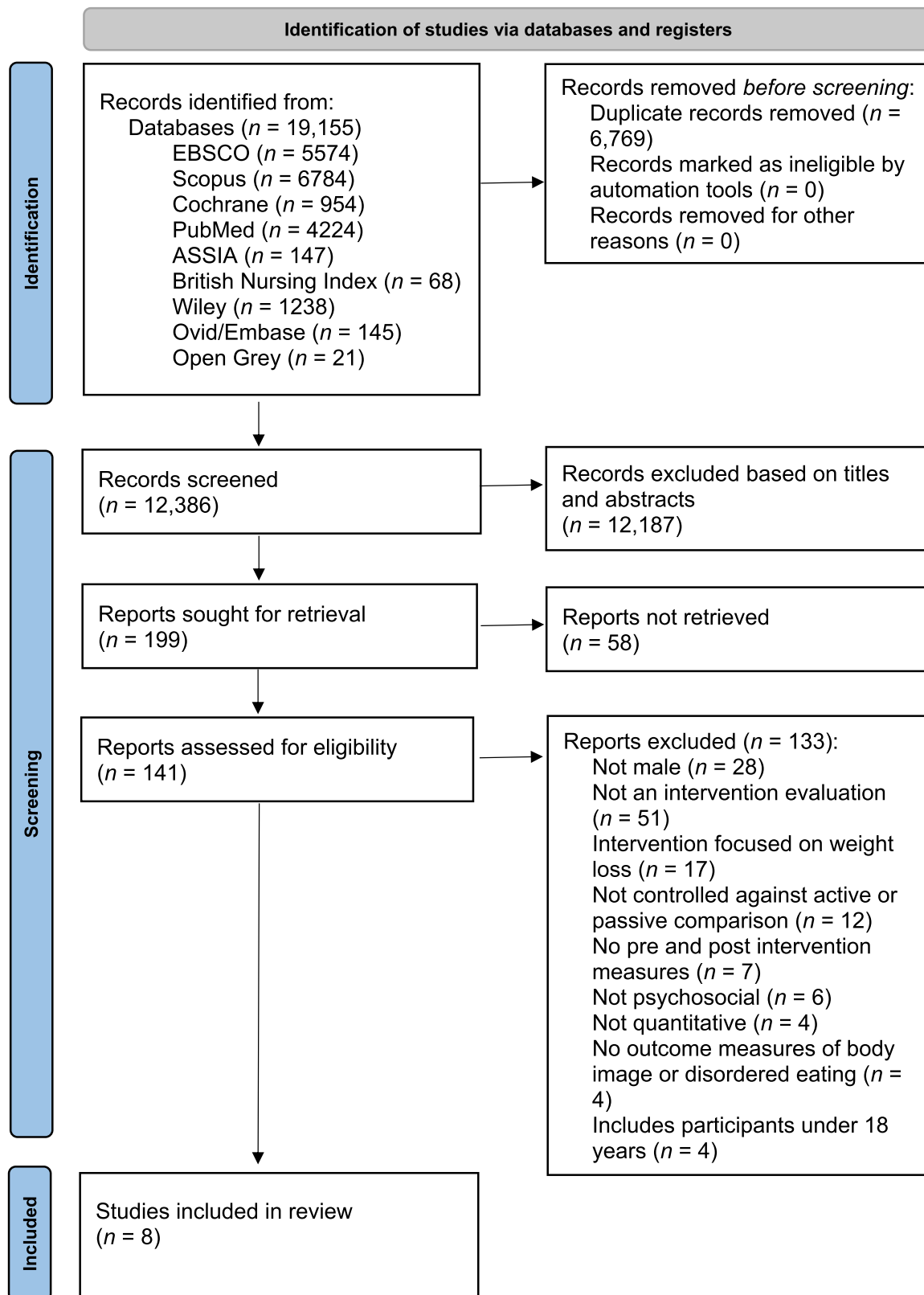


Fig. 1. Study selection process.

ethnicity was not collected in two studies (Mellor et al., 2017; Yager & O’Dea, 2010). Socioeconomic data were collected in one study only (Almeida et al., 2020). BMI was collected in five studies (Almeida et al., 2020; Kilpela et al., 2016; Mellor et al., 2017; Perelman et al., 2022) and ranged from 23 to 28 (normal-overweight). Most recruited participants

from universities ($n = 7$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016; Yager & O’Dea, 2010; Perelman et al., 2022), and included men without specific body image concerns or eating difficulties ($n = 5$; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016; Mellor et al., 2017; Yager &

O'Dea, 2010).

3.3. Intervention characteristics

All studies evaluated group-based interventions. Most evaluated dissonance-based interventions ($n = 5$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016), specifically adaptations of The Body Project; a program where groups critique appearance ideals using verbal, written and behavioural activities (Stice, Chase, Stormer, & Appel, 2001). One study examined two interventions including a media literacy and a media literacy and dissonance-based program (Yager & Dea, 2010), and two evaluated a psychoeducational lifestyle modification program designed to improve health behaviours (e.g., diet, body image, self-efficacy, and coping skills; Mellor et al., 2017; Perelman et al., 2022). Most examined the effectiveness of *standalone* body image programs ($n = 6$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2017; Perelman et al., 2022) aside from Yager & Dea (2010) who examined programs that incorporated body image as part of a wider health curriculum.

Studies mainly evaluated in-person interventions ($n = 7$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016; Perelman et al., 2022; Yager & O'Dea, 2010) but online discussion groups were also used in one (Yager & O'Dea, 2010). Interventions were delivered by clinicians/ psychologists ($n = 4$; Brown et al., 2017; Brown & Keel, 2015; Mellor et al., 2017; Perelman et al., 2022), peer-leaders ($n = 5$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Yager, O'Dea (2010) – online discussion group only) and/or the study researchers ($n = 6$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Perelman et al., 2022; Yager, O'Dea (2010)).

3.4. Assessment of quality

The EPHPP tool (Thomas et al., 2004; Table 2) assessed five studies as moderate quality (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Yager, O'Dea (2010)) and three as weak (Jankowski et al., 2017; Mellor et al., 2017; Perelman et al., 2022). All had strong designs, and most were strong on data collection methods ($n = 6$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017; Kilpela et al., 2016; Perelman et al., 2022) because they relied on validated measures to examine body image and/or disordered eating. All but one study (Yager, O'Dea (2010)) were limited by selection bias as they relied on participants' self-referral and so were unlikely to be representative of the target population. Only two were assessed as strong on withdrawals and dropouts (Almeida et al., 2020; Perelman et al., 2022), and the remaining studies had less than 75% of participants completing the study ($n=6$; Brown & Keel, 2015; Brown et al., 2017; Jankowski et al., 2017; Kilpela et al., 2016; Mellor et al., 2017; Yager, O'Dea (2010)).

Table 2

Assessment of methodological quality using the Effective Public Health Practice Project (EPHPP).

Authors/year	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and dropouts	Global rating
Almeida et al., 2020	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Brown & Keel, 2015	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Brown et al., 2017	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Jankowski et al., 2017	Weak	Strong	Strong	Moderate	Strong	Weak	Weak
Kilpela et al., 2016	Weak	Strong	Moderate	Moderate	Strong	Moderate	Moderate
Mellor et al., 2017	Weak	Strong	Weak	Moderate	Weak	Moderate	Weak
Perelman et al., 2022	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Yager, O'Dea (2010)	Moderate	Strong	Moderate	Moderate	Strong	Weak	Moderate

Global quality rating: strong = no weak ratings, moderate = one weak rating, weak = two or more weak ratings

3.5. Effectiveness of interventions

3.5.1. Dissonance-based interventions

Dissonance-based interventions consistently demonstrated significant reductions in body image concerns in studies of moderate quality ($n = 4$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016). Improvements were seen in global measures such as body dissatisfaction (Kilpela et al., 2016; Brown & Keel, 2015) and specific body elements such as dissatisfaction with muscularity (Kilpela et al., 2016), muscle dysmorphia (Brown et al., 2017), drive for muscularity (Brown & Keel, 2015; Brown et al., 2017) and dissatisfaction with body fat (Kilpela et al., 2016) at post-intervention. These significant effect sizes ranged from medium-large ($d = 0.58-1.01$, $p < .05$), except for Kilpela et al. (2016) where effect sizes were unavailable.

All four moderate quality studies found improvements in body image at follow-up (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016). Reductions in body image concerns were seen at 4-weeks including drive for muscularity (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015), concerns related to muscularity (Almeida et al., 2020; Brown et al., 2017), body fat (Almeida et al., 2020; Brown et al., 2017) and global body dissatisfaction (Brown & Keel, 2015). Compared to post-intervention, generally effect sizes were weaker, ranging from small-large ($d = 0.35-0.86$, $p < .05$). Significant reductions were also maintained at 6-months in muscle dysmorphia, drive for muscularity and dissatisfaction with muscularity and body fat, albeit with small effect sizes ($d = 0.33-0.43$, $p < .05$; Almeida et al., 2020). Reductions were also demonstrated at 6 months in dissatisfaction with body fat (effect sizes unavailable; Kilpela et al., 2016). Effectiveness was *delayed* in Almeida and colleagues (2020), as reductions in negative body image were evident in follow-up but not post intervention.

Of the four moderate quality studies examining the effectiveness of dissonance-based interventions on body image in men, two (Almeida et al., 2020; Kilpela et al., 2016) examined the impact on positive body image, which has been shown to be conceptually distinct from negative body image (Tylka & Wood-Barcalow, 2015). Both studies showed significant improvements including in body satisfaction (effect sizes unknown; Kilpela et al., 2016) and body appreciation ($d = 0.40$, $p < .01$; Almeida et al., 2020) albeit with small effect sizes post-intervention. Improvements were maintained at 4-weeks ($d = 0.80$, $p < .01$; Almeida et al., 2020), 2-months (effect sizes unknown; Kilpela et al., 2016) and at 6-month follow up ($d = 0.58$, $p < .01$; Almeida et al., 2020; unknown effect sizes; Kilpela et al., 2016) with medium-strong effect sizes.

Dissonance-based interventions are designed to enable participants to challenge pressures to conform to appearance ideals and therefore reduce their internalisation of these ideals (Brown & Keel, 2015). Improvements in body ideal internalisation were demonstrated in two moderate quality studies at post intervention ($d = 0.61$, $p < .05$; Brown et al., 2017; Brown & Keel, 2015) with medium effect sizes. Improvements were maintained in one of these studies at 4-weeks but with a smaller effect size ($d = 0.48$, $p < .05$; Brown et al., 2017). Almeida and

colleagues (2020) did not find improvements in body ideal internalisation post-intervention but these were found at 4 weeks ($d = 1.10$, $p < .01$; Almeida et al., 2020) with a large effect size; a pattern that was mirrored by delayed improvements in body concern measures. Findings from Brown and colleagues (2017) found that body ideal internalisation partially mediated reductions in muscle dysmorphia, providing moderate support for targeting body ideal internalisation in men with body image concerns. Mediation analyses were not conducted in other groups including gay men (Brown & Keel, 2015), and those regardless of body image concerns (Kilpela et al., 2016) or sexuality (Jankowski et al., 2017), so these findings are unavailable.

Dissonance-based interventions resulted in reductions in disordered eating in three out of four moderate quality studies (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015), suggesting that these programs show promise at reducing eating pathology in men. Reductions were in specific symptomology including restraint ($d = 0.76$, $p < .01$; Brown et al., 2017; Brown & Keel, 2015) and bulimic symptoms ($d = 0.92$ – 1.11 , $p < .01$; Brown et al., 2017; Brown & Keel, 2015) post-intervention with medium-large effect sizes. These decreases were maintained after 4-weeks ($d = 0.51$ – 1.16 , $p < .05$; Brown et al., 2017; Brown & Keel, 2015), again with medium-large effect sizes. Reductions in global disordered eating was *delayed*, with significant reductions observed at 4- and 24-week follow up ($d = 0.33$ – 0.37 , $p < .05$; Almeida et al., 2020) with small effect sizes but not post-intervention.

These findings suggest that dissonance-based interventions may offer promising improvements in both positive and negative body image, and reductions in disordered eating in men that may be maintained 6-months later. These preliminary findings suggest that these improvements are partially due to the positive impact these programs have on body ideal internalisation.

3.5.2. Media literacy interventions

One study of moderate quality (Yager & O'Dea, 2010) examined the effectiveness of an adapted version of the media literacy body improvement program 'Everybody's Different' (originally developed for teenage girls; O'Dea & Abraham, 2000) and found significant reductions in drive for muscularity at post-intervention ($d = 0.25$, $p < .001$), with a small effect size. Insufficient power meant that effectiveness at 6-months for men could not be ascertained. Additionally, no significant effects were found in positive body image (i.e., body appreciation) or disordered eating.

While these findings provide preliminary moderate evidence that media literacy interventions may result in improvements in body image concerns in men (but not positive body image or disordered eating), caution is needed as effect sizes are small, and the impact over time is unknown. Evidence is limited as it is derived from one study with a specific group of men (i.e., trainee health education/physical education teachers; Yager & O'Dea, 2010).

3.5.3. Dissonance-based interventions with media literacy

In a moderate quality study, Yager and O'Dea (2010) also examined the effectiveness of a media-literacy and dissonance-based intervention and found significant improvements in both negative and positive body image; specifically in drive for muscularity (effect data unavailable) and body appearance rating ($d = 0.87$, $p < .05$), the latter of which exhibited a large effect size. Significant reductions were also seen in restricted eating post-intervention ($d = 0.89$, $p < .01$) with a large effect size. Insufficient power meant that effectiveness at 6 months for men could not be ascertained.

These results provide moderate support that a combined media literacy and dissonance program may result in meaningful improvements in negative and positive body image in men and specific elements of disordered eating (i.e., restricted eating). Evidence is limited as it is derived from one study and not all effect sizes nor relevant statistical data are available.

3.5.4. Psychoeducational lifestyle modification interventions

Two studies of weak quality examined psychoeducational programs to improve body image in men. The Better with Age Program (Mellor et al., 2017) aimed to increase health behaviours (e.g., diet and physical activity), positive body image, self-efficacy, and coping skills in middle-aged men. The Male Athlete Body Project (MABP; Perelman et al., 2022) aimed to reduce known eating disorder risk factors in college-aged athlete men through a psychoeducational behaviour change intervention that challenged athletic body ideals, educated on diet and lifestyle, and used goal setting.

While the Better with Age Program (Mellor et al., 2017) failed to demonstrate any significant effects on body image, the MABP (Perelman et al., 2022) led to significant increases in satisfaction with specific body parts and reduced drive for muscularity (post-intervention and follow-up; $d = 0.50$ – 0.64 , $p < .05$), and reduced internalisation of body image ideals (post-intervention only; $d = 0.46$, $p < .05$) compared to controls. Although improvements were demonstrated, the lack of good quality studies available means that the effectiveness of psychoeducation lifestyle and/or behavioural modification programs cannot be reliably ascertained.

3.6. Features of effective interventions

3.6.1. Intervention features

Standalone body image programs in moderate quality studies were more likely to demonstrate improvements in body image and disordered eating (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016) compared to programs that incorporated these elements as part of wider health curriculums (Yager & O'Dea, 2010). Improvements in body image and reductions in disordered eating were observed in three moderate quality studies evaluating standalone body image interventions ($d = 0.33$ – 1.01 , $p < .05$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015) with small-large effect sizes.

Comparatively, no significant effects were found on body image in broader psychoeducational lifestyle modification programs (Mellor et al., 2017; Perelman et al., 2022), although caution is advised as these studies were assessed as weak quality. Similarly, in a study of moderate quality examining the effectiveness of media literacy or media literacy and dissonance-based content delivered as part of a wider health curriculum to trainee teachers, Yager & O'Dea (2010) found no significant effects in some body image and disordered eating measures. Large effect sizes were demonstrated for improvements in body appearance and reductions in restrained eating ($d = 0.87$ – 0.89 , $p < .05$), although only for the media literacy and dissonance-based program suggesting that type of approach (e.g., dissonance-based) may be more important than whether an intervention was standalone or part of a wider health program.

3.6.2. Participant features

Interventions that targeted men with body image concerns (Almeida et al., 2020; Brown et al., 2017) demonstrated significant improvements in body image ($d = 0.33$ – 0.78 , $p < .05$) and reductions in disordered eating ($d = 0.33$ – 1.16 , $p < .05$), with small-large effect sizes. Similarly, a moderate quality study of gay men without specific body image concerns showed improvements in negative body image and reductions in restraint and bulimic symptomology ($d = 0.51$ – 0.92 , $p < .05$; Brown & Keel, 2015), with medium-large effect sizes. Moderate evidence was also demonstrated for effectiveness of mixed-gender programs where participants' body image concerns were unknown, including promising improvements in negative and positive body image ($d = 0.25$ – 0.87 , $p < .05$; Kilpela et al., 2016; Yager, O'Dea (2010)) with small-large effect sizes, and significant reductions in restrictive eating (although no overall disordered eating) in one moderate study ($d = 0.89$, $p > .01$; Yager, O'Dea (2010)).

3.6.3. Facilitator features

Moderate evidence suggested that interventions delivered by peer-

leaders ($d = 0.25\text{--}1.01, p < .05$; Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Yager & O'Dea, 2010 – online discussion groups only), clinicians/psychologists ($d = 0.51\text{--}1.16, p < .05$; Brown et al., 2017; Brown & Keel, 2015) and/or study researchers ($d = 0.25\text{--}0.92, p < .05$; Almeida et al., 2020; Brown & Keel, 2015; Yager & O'Dea, 2010) all showed promising improvements in body image and reductions in disordered eating, with small-large effect sizes. This suggests that broadly any type of trained facilitator (professional, peer and researcher) may be able to successfully lead these types of interventions for men.

3.7. Intervention acceptability and participant satisfaction

Intervention attrition rates ranged from 66% to 95%. Six studies reported intervention attrition rates of over 86% including those that targeted men with body image concerns (Almeida et al., 2020; Brown et al., 2017); gay men (Brown & Keel, 2015); in mixed-gender programs (Kilpela et al., 2016; Yager, O'Dea (2010)); and men who are college athletes (Perelman et al., 2022). Slightly lower intervention attrition rates were reported in middle-aged men (79%; Mellor et al., 2017) and men at university without known body image concerns (66%; Jankowski et al., 2017).

In the four studies that reported participant satisfaction (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Jankowski et al., 2017), levels of satisfaction were high. The intervention (all cognitive dissonance) was found to be helpful in promoting body image including the participant's own body image, offered high overall program satisfaction, and would be recommended to a friend (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015). In Jankowski et al. (2017), participants gave feedback that the intervention was useful and allowed attendees to share frustrations over appearance pressures. They said it helped raise awareness of important issues and was informative. This suggests broadly that cognitive dissonance-based interventions for body image will be acceptable to various populations of men including those with body image concerns (Almeida et al., 2020; Brown et al., 2017); gay men (Brown & Keel, 2015) and men at university with unknown body image concerns (Jankowski et al., 2017).

4. Discussion

It is increasingly recognised that body image concerns and eating difficulties are more prevalent in men than previously acknowledged (Michison & Mond, 2015; Murray et al., 2017). Psychosocial interventions have shown improvements in body image and eating pathology in adolescent and young women (e.g., Stice et al., 2021), but evidence of their effectiveness in men is limited and, as far as we are aware, has not been systematically reviewed until now. The small number of studies eligible for inclusion in this review ($n = 8$), and the focus of most ($n = 5$) on examining the effectiveness of adaptations of one specific intervention (The Body Project; Stice et al., 2001) shows that research in this field with this population is novel. Due to methodological issues (selection bias, confounding variables, and high attrition), none of the studies were judged as strong methodological quality (five moderate, three weak), impacting on the validity of the findings.

4.1. Summary of findings

Dissonance-based approaches provided the best evidence of effectiveness, which has also been seen in other populations (i.e., girls/women/mixed-gender e.g., Stice et al., 2019). Moderate evidence showed encouraging reductions in body image concerns (body dissatisfaction, muscle dysmorphia, drive for muscularity, dissatisfaction with muscularity and body fat), which were maintained at 6-months post intervention (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016). In two moderate quality studies, promising improvements in positive body image were also seen (body satisfaction

and body appreciation), which were maintained 6-months later (Almeida et al., 2020; Kilpela et al., 2016). This builds on findings from Guest and colleagues (2019) that found limited evidence of the effectiveness (from weak quality studies) of these interventions in improving positive body image in men. Dissonance-based approaches also showed significant reductions in disordered eating in three moderate quality studies, including global disordered eating and specific symptomology (restraint and bulimic symptoms), with reductions observed up to 24-weeks later (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015). Evidence of effectiveness was demonstrated for young adult men (20–22 years) with and without body image concerns regardless of sexuality, and participant satisfaction of the intervention was high.

The potential offered by dissonance-based approaches was not mirrored by the other intervention types examined in this review. However, the approaches in this review are limited when compared to similar reviews in other populations that included dissonance-based, psychoeducational, and media literacy alongside approaches such as acceptance and commitment therapy, self-compassion etc. (e.g., Ella et al., 2019). The psychoeducational programs in this review intended to improve body image in specific populations (including men in their midlife; Mellor et al., 2017 and college athletes; Perelman et al., 2022) and demonstrated small improvements in some measures of body image concern and disordered eating. However, these findings cannot contribute to the understanding of effectiveness owing to methodological weaknesses. It may be beneficial to replicate these evaluations with robust methodologies (with less selection bias, less confounders, and robust data collection methods) to ascertain the effectiveness of these interventions.

A study of moderate quality that evaluated the effectiveness of a media literacy intervention showed reductions in some body image concerns (drive for muscularity) but not others (drive for thinness or obligatory exercise; Yager & O'Dea, 2010). However, these findings are limited by small effect sizes and insufficient power to evaluate the impact at 6-months, therefore should be interpreted cautiously. No significant effects were demonstrated on positive body image or disordered eating, inferring that this approach may not be effective at improving specific aspects of body image or eating pathology. Interestingly, when this media literacy intervention was adapted to include a dissonance-based approach in the same study, significant improvements were demonstrated in both negative and positive body image and restrictive eating symptomology with large effect sizes (Yager & O'Dea, 2010). This suggests that dissonance-based approaches, whether standalone or integrated with others (e.g., media literacy), may offer more promise in ameliorating eating disorder risk factors.

Certain intervention, participant and facilitator features were associated with promising improvements in body image and reductions in disordered eating. Standalone body image improvement programs (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Perelman et al., 2022) showed the most promise compared to those that incorporated body image into wider health programs (Yager & O'Dea, 2010), perhaps because they allow for more dissonance-based activities to increase the impact (Stice et al., 2019). As all interventions were group-based, it was not possible to compare group and individual interventions as in other similar reviews (Guest et al., 2019). Moderate evidence for effectiveness was demonstrated in programs that targeted a variety of populations including men with body dissatisfaction (Almeida et al., 2020; Brown et al., 2017), gay men (Brown & Keel, 2015) and men in mixed-gender studies without known body image issues (Kilpela et al., 2016; Yager & O'Dea, 2010). This contrasts with the findings of similar reviews of women (e.g., Lewis-Smith et al., 2015; Stice et al., 2019), where findings show larger effect sizes in those with body image concerns. Moderate evidence was also demonstrated for a variety of different facilitation models, including peer-leaders (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Kilpela et al., 2016; Yager, O'Dea, 2010 – online discussion groups only), clinicians or psychologists (Brown et al., 2017; Brown & Keel,

2015) and/or study researchers (Almeida et al., 2020; Brown et al., 2017; Brown & Keel, 2015; Yager & O’Dea, 2010).

4.2. Limitations

Firstly, the heterogeneity in body image and disordered eating outcome measures makes it difficult to compare findings across studies. Additionally, most have been conceptualised and validated with young women which may make them less appropriate for assessing these constructs in men (Murray et al., 2016). Secondly, the included studies either demonstrated homogeneity in participants (i.e., White heterosexual young men in Western countries with university education) or failed to collect important sociodemographic and health data (e.g., socioeconomic group, ethnicity, sexuality, clinical eating disorder, BMI). This prevents the generalisability of the results to a wider population. This may be compounded by weaknesses across studies in selection bias that would reduce the likelihood that participants are representative of the target population (Khazaal et al., 2014). This may be strengthened in future studies by using approaches such as random selection of participants from a target population rather than relying on self-referral (although this may be less realistic for this type of psychological research). Thirdly, the homogeneity in delivery (i.e., in-person, in groups of 2–10 people) makes it difficult to assess the effectiveness of remote or individual interventions, which may be of value in terms of cost-effectiveness and accessibility and increasing in use since the Covid pandemic.

Further, as five of the eight studies evaluated the effectiveness of adapted versions of the same dissonance-based intervention to improve body image (The Body Project; Stice et al., 2001), the findings cannot be reliably extrapolated to all dissonance-based programs. Due to the quantification of evidence and the need for a control group to reduce bias, evidence from other types of interventions that are in their infancy but have shown promise in single sample uncontrolled studies or qualitative investigations that also consider intervention acceptability (e.g., acceptance and commitment therapy; Fogelkvist et al., 2020, yoga, Neumark-Sztainer et al., 2018) has not been considered. Additionally, as most of the studies (apart from Mellor et al., 2017) reported some evidence of effectiveness regardless of methodological quality, caution is needed as this suggests there may be publication bias. This, alongside the absence of unpublished studies in the review, imply that the evidence for psychosocial interventions in ameliorating eating disorder risk factors in men may be inappropriately elevated.

Finally, it is possible that other intervention approaches not included in this review could have a positive impact on body image concerns and disordered eating in men. For example, acceptance and commitment-based approaches have shown promising reductions in body image dissatisfaction in adults (in a review of mainly women; Griffiths et al., 2018) and an ability to foster positive body image in adult women (Guest et al., 2019) but this review found no trials with this theoretical approach (nor cognitive behavioural therapy) in men. As such, it might be beneficial to explore its potential at addressing body image concerns and disordered eating in this population in future trials.

4.3. Implications and future research

Findings from this review suggest that psychosocial interventions, specifically those that incorporate a dissonance-based approach, may provide improvements in men’s eating disorder risk factors. Where included, dissonance-based interventions have also been supported in similar reviews with different populations including mixed-gender children, adolescents, and young adults (Le et al., 2017; Watson et al., 2016). Future research should invest in higher quality studies with longer follow-ups (e.g., 3 years; Stice et al., 2008) and reduce selection-bias to indicate effectiveness more conclusively.

Further research is also needed to examine the effectiveness of these approaches in different populations according to culture, clinical

condition (e.g., overweight/obesity), socioeconomic group, men in different age groups such as men in their midlife and older who may present with different body image concerns or eating pathologies (McCabe & McGreevy, 2010). Similarly, further evidence is needed to ascertain effectiveness in populations who may be at greater risk of body image difficulties and/or eating distress (e.g., athletes; Joy et al., 2016) with studies of good methodological quality.

Investment is needed in high-quality studies that examine the effectiveness of interventions beyond those approaches examined here (e.g., acceptance and commitment therapy, self-compassion, functionality-based) as has been explored in other populations (e.g., women; Albertson et al., 2014; Duarte et al., 2017). Given the lack of generalisability of the findings from this review, it is recommended that investigations into the effectiveness of psychosocial interventions include men who are in their midlife and older, those from ethnic minority backgrounds and living in non-Western countries, those with a health condition that might impact on body image or eating pathology, and people with a range of weights/BMIs.

5. Conclusion

This review supports the accumulating evidence from individual studies that psychosocial interventions may help improve body image and reduce disordered eating in young adult men regardless of body image concerns or sexuality, with dissonance-based approaches in standalone body image improvement programs offering the most promise in ameliorating these eating disorder risk factors. Moderate evidence was also demonstrated for media literacy interventions, particularly when using a dissonance-based approach. Investment is needed in studies of higher methodological quality and low selection-bias to confirm the effectiveness of these interventions. Future research examining effectiveness in men who are midlife and older, from different ethnicities and cultures and socioeconomic groups would be beneficial.

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CRediT authorship contribution statement

Emma Hendricks: Conceptualization, Methodology, Resources, Formal analysis, Writing – original draft, Project administration. **Elizabeth Jenkinson:** Supervision, Writing - review & editing. **Laura Falconer:** Formal analysis, Methodology. **Catrin Griffiths:** Supervision, Writing – review & editing.

Declaration of Competing Interest

none.

Data Availability

No data was used for the research described in the article.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.bodyim.2023.08.004](https://doi.org/10.1016/j.bodyim.2023.08.004).

References

- Albertson, E., Neff, K., & Dill-Shackleford, K. (2014). Self-compassion and body dissatisfaction in women: A randomized controlled trial of a brief meditation intervention. *Mindfulness*, 6(3), 444–454. <https://doi.org/10.1007/s12671-014-0277-3>
- Almeida, M., Brown, T., Campos, P., Amaral, A., & Carvalho, P. (2020). Dissonance-based eating disorder prevention delivered in-person after an online training: A randomized controlled trial for Brazilian men with body dissatisfaction. *International Journal Of Eating Disorders*, 54(3), 293–304. <https://doi.org/10.1002/eat.23423>
- Avalos, L., Tylka, T., & Wood-Barcalow, N. (2005). The body appreciation scale: Development and psychometric evaluation. *Body Image*, 2(3), 285–297. <https://doi.org/10.1016/j.bodyim.2005.06.002>
- Bergsma, L., & Carney, M. (2008). Effectiveness of health-promoting media literacy education: A systematic review. *Health Education Research*, 23(3), 522–542. <https://doi.org/10.1093/her/cym084>
- Blashill, A. (2011). Gender roles, eating pathology, and body dissatisfaction in men: A meta-analysis. *Body Image*, 8(1), 1–11. <https://doi.org/10.1016/j.bodyim.2010.09.002>
- Brown, T., & Keel, P. (2015). A randomized controlled trial of a peer-coled dissonance-based eating disorder prevention program for gay men. *Behaviour Research And Therapy*, 74, 1–10. <https://doi.org/10.1016/j.brat.2015.08.008>
- Brown, T., Forney, K., Pinner, D., & Keel, P. (2017). A randomized controlled trial of The Body Project: More Than Muscles for men with body dissatisfaction. *International Journal Of Eating Disorders*, 50(8), 873–883. <https://doi.org/10.1002/eat.22724>
- Buenger, A., Vloet, T., Haber, L., & Geissler, J. (2021). Third-wave interventions for eating disorders in adolescence – systematic review with meta-analysis. *Borderline Personality Disorder And Emotion Dysregulation*, 8(1). <https://doi.org/10.1186/s40479-021-00158-6>
- Cash, T.F. (2000). *The multidimensional body-self relations questionnaire*. MBSRQ User's Manual, Third Revision.
- Chia, S., & Wen, N. (2010). College men's third-person perceptions about idealized body image and consequent behavior. *Sex Roles*, 63(7–8), 542–555. <https://doi.org/10.1007/s11199-010-9833-z>
- Cochrane. (2014). *Data extraction forms: Data collection for intervention reviews template*. www.cochrane.org. Retrieved 14 September 2022, from (<https://dplp.cochrane.org/data-extraction-forms>).
- Cohen, J. (2013). *Statistical Power Analysis for the Behavioral Sciences*. Elsevier Science.
- Cooper, P., Taylor, M., Cooper, Z., & Fairburn, C. (1987). The development and validation of the body shape questionnaire. *International Journal Of Eating Disorders*, 6(4), 485–494. [https://doi.org/10.1002/1098-108x\(198707\)6:4<430.co>2-o](https://doi.org/10.1002/1098-108x(198707)6:4<430.co>2-o)
- Costa, M., & Melnik, T. (2016). Effectiveness of psychosocial interventions in eating disorders: an overview of Cochrane systematic reviews. *Einstein*, 14(2), 235–277. <https://doi.org/10.1590/s1679-45082016rw3120>
- Duarte, C., Pinto-Gouveia, J., & Stubbs, R. J. (2017). Compassionate Attention and Regulation of Eating Behaviour: A pilot study of a brief low-intensity intervention for binge eating. *Clinical Psychology & Psychotherapy*, 24(6), O1437–O1447. <https://doi.org/10.1002/cpp.2094>
- Duggan, S., & McCreary, D. (2004). Body image, eating disorders, and the drive for muscularity in gay and heterosexual men. *Journal Of Homosexuality*, 47(3–4), 45–58. https://doi.org/10.1300/j082v47n03_03
- Fairburn, C., & Beglin, S. (1994). Assessment of eating disorders: Interview or self-report questionnaire. *International Journal Of Eating Disorders*, 16, 363–370. [https://doi.org/10.1002/1098-108x\(199412\)16:4<30.co>2-%23](https://doi.org/10.1002/1098-108x(199412)16:4<30.co>2-%23). Retrieved 17 September 2021, from.
- Farrell, C., Shafan, R., & Lee, M. (2006). Empirically evaluated treatments for body image disturbance: a review. *European Eating Disorders Review*, 14(5), 289–300. <https://doi.org/10.1002/erv.693>
- Fiske, L., Fallon, E., Blissmer, B., & Redding, C. (2014). Prevalence of body dissatisfaction among United States adults: Review and recommendations for future research. *Eating Behaviors*, 15(3), 357–365. <https://doi.org/10.1016/j.eatbeh.2014.04.010>
- Fogelkvist, M., Gustafsson, S., Kjellin, L., & Parling, T. (2020). Acceptance and commitment therapy to reduce eating disorder symptoms and body image problems in patients with residual eating disorder symptoms: A randomized controlled trial. *Body Image*, 32, 155–166. <https://doi.org/10.1016/j.bodyim.2020.01.002>
- Frederick, D., Buchanan, G., Sadehgi-Azar, L., Peplau, L., Haselton, M., Berezovskaya, A., & Lipinski, R. (2007). Desiring the muscular ideal: Men's body satisfaction in the United States, Ukraine, and Ghana. *Psychology Of Men & Masculinity*, 8(2), 103–117. <https://doi.org/10.1037/1524-9220.8.2.103>
- Garner, D. (1991). *Eating Disorder Inventory-2. Professional Manual*. Psychological Assessment Resources.
- Garner, D., Olmsted, M., Bohr, Y., & Garfinkel, P. (1982). The eating attitudes test: Psychometric features and clinical correlates. *Psychological Medicine*, 12(4), 871–878. <https://doi.org/10.1017/s0033291700049163>
- Griffiths, C., Williamson, H., Zucchelli, F., Paraskeva, N., & Moss, T. (2018). A Systematic Review of the Effectiveness of Acceptance and Commitment Therapy (ACT) for Body Image Dissatisfaction and Weight Self-Stigma in Adults. *Journal of Contemporary Psychotherapy*, 48(4), 189–204. <https://doi.org/10.1007/s10879-018-9384-0>
- Guest, E., Costa, B., Williamson, H., Meyrick, J., Halliwell, E., & Harcourt, D. (2019). The effectiveness of interventions aiming to promote positive body image in adults: A systematic review. *Body Image*, 30, 10–25. <https://doi.org/10.1016/j.bodyim.2019.04.002>
- Heinberg, L., Thompson, J., & Stormer, S. (1995). Development and validation of the Sociocultural Attitudes Towards Appearance Questionnaire. *International Journal Of Eating Disorders*, 17(1), 81–89. [https://doi.org/10.1002/1098-108x\(199501\)17:13.0.co>2-y](https://doi.org/10.1002/1098-108x(199501)17:13.0.co>2-y)
- Higgins, J., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M., & Welch, V. (2021). *Cochrane Handbook for Systematic Reviews of Interventions version 6.2* [Ebook]. Cochrane. Retrieved 21 May 2021, from <http://www.training.cochrane.org/handbook>.
- Hildebrandt, T., Langenbucher, J., & Schlundt, D. (2004). Muscularity concerns among men: development of attitudinal and perceptual measures. *Body Image*, 1(2), 169–181. <https://doi.org/10.1016/j.bodyim.2004.01.001>
- Hudson, J., Hiripi, E., Pope, H., & Kessler, R. (2007). The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61(3), 348–358. <https://doi.org/10.1016/j.biopsych.2006.03.040>
- Hudson, T., Amaral, A., Stice, E., Gau, J., & Ferreira, M. (2021). Dissonance-based eating disorder prevention among Brazilian young women: A randomized efficacy trial of the Body Project. *Body Image*, 38, 1–9. <https://doi.org/10.1016/j.bodyim.2021.03.008>
- Hunt, C., Gonsalkorale, K., & Nosek, B. (2012). Links Between Psychosocial Variables and Body Dissatisfaction in Homosexual Men: Differential Relations with the Drive for Muscularity and the Drive for Thinness. *International Journal Of Men's Health*, 11(2), 127–136. <https://doi.org/10.3149/jmh.1102.127>
- Hunte, B. (2020). *The gay men risking their health for the perfect body*. BBC News. Retrieved 14 September 2022, from (<https://www.bbc.co.uk/news/uk-51270317>).
- Jackson, N., & Waters, E. (2005). Criteria for the systematic review of health promotion and public health interventions. *Health Promotion International*, 20(4), 367–374. <https://doi.org/10.1093/heapro/dai022>
- Jankowski, G., Diedrichs, P., Atkinson, M., Fawkner, H., Gough, B., & Halliwell, E. (2017). A pilot controlled trial of a cognitive dissonance-based body dissatisfaction intervention with young British men. *Body Image*, 23, 93–102. <https://doi.org/10.1016/j.bodyim.2017.08.006>
- Joy, E., Kussman, A., & Nattiv, A. (2016). 2016 update on eating disorders in athletes: A comprehensive narrative review with a focus on clinical assessment and management. *British Journal of Sports Medicine*, 50(3), 154–162. <https://doi.org/10.1136/bjsports-2015-095735>
- Khazaal, Y., van Singer, M., Chatton, A., Achab, S., Zullino, D., Rothen, S., et al. (2014). Does Self-Selection Affect Samples' Representativeness in Online Surveys? An Investigation in Online Video Game Research. *Journal Of Medical Internet Research*, 16(7), Article e164. <https://doi.org/10.2196/jmir.2759>
- Kilpela, L., Blomquist, K., Verzijl, C., Wilfred, S., Beyl, R., & Becker, C. (2016). The body project 4 all: A pilot randomized controlled trial of a mixed-gender dissonance-based body image program. *International Journal Of Eating Disorders*, 49(6), 591–602. <https://doi.org/10.1002/eat.22562>
- Le, L. K.-D., Barendregt, J. J., Hay, P., & Mihalopoulos, C. (2017). Prevention of eating disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, 53, 46–58. <https://doi.org/10.1016/j.cpr.2017.02.001>
- Lewis-Smith, H., Diedrichs, P., Rumsey, N., & Harcourt, D. (2015). A systematic review of interventions on body image and disordered eating outcomes among women in midlife. *International Journal Of Eating Disorders*, 49(1), 5–18. <https://doi.org/10.1002/eat.22480>
- Linardon, J., Gleeson, J., Yap, K., Murphy, K., & Brennan, L. (2018). Meta-analysis of the effects of third-wave behavioural interventions on disordered eating and body image concerns: Implications for eating disorder prevention. *Cognitive Behaviour Therapy*, 48(1), 15–38. <https://doi.org/10.1080/16506073.2018.1517389>
- Lorenzen, L., Grieve, F., & Thomas, A. (2004). Brief report: Exposure to muscular male models decreases men's Body satisfaction. *Sex Roles*, 51(11–12), 743–748. <https://doi.org/10.1007/s11199-004-0723-0>
- Martinsen, M., Bahr, R., Borresen, R., Holme, I., Pensgaard, A., & Sundgot-Borgen, J. (2014). Preventing eating disorders among young elite athletes. *Medicine & Science In Sports & Exercise*, 46(3), 435–447. <https://doi.org/10.1249/mss.0b013e3182a702fc>
- Matsumoto, A., & Rodgers, R. (2020). A review and integrated theoretical model of the development of body image and eating disorders among midlife and aging men. *Clinical Psychology Review*, 81, Article 101903. <https://doi.org/10.1016/j.cpr.2020.101903>
- Mays, N., Pope, C., & Popay, J. (2005). Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *Journal of Health Services Research & Policy*, 10(1_suppl), 6–20. <https://doi.org/10.1258/1355819054308576>
- McCabe, M., & McGreevy, S. (2010). Role of media and peers on body change strategies among adult men: Is body size important? (n/a-n/a) *European Eating Disorders Review*. <https://doi.org/10.1002/erv.1063>.
- McCabe, M., & Ricciardelli, L. (2004). Body image dissatisfaction among males across the lifespan. *Journal Of Psychosomatic Research*, 56(6), 675–685. [https://doi.org/10.1016/s0022-3999\(03\)00129-6](https://doi.org/10.1016/s0022-3999(03)00129-6)
- McCreary, D., & Sasse, D. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal Of American College Health*, 48(6), 297–304. <https://doi.org/10.1080/07448480009596271>
- Mellor, D., Connaughton, C., McCabe, M., & Tatangelo, G. (2017). Better with age: A health promotion program for men at midlife. *Psychology Of Men & Masculinity*, 18(1), 40–49. <https://doi.org/10.1037/men0000037>
- Mitchison, D., & Mond, J. (2015). Epidemiology of eating disorders, eating disordered behaviour, and body image disturbance in males: a narrative review. *Journal Of Eating Disorders*, 3(1). <https://doi.org/10.1186/s40337-015-0058-y>
- Mitchison, D., Hay, P., Slewa-Young, S., & Mond, J. (2014). The changing demographic profile of eating disorder behaviors in the community. *BMC Public Health*, 14(1). <https://doi.org/10.1186/1471-2458-14-943>
- Mitchison, D., Mond, J., Slewa-Young, S., & Hay, P. (2013). Sex differences in health-related quality of life impairment associated with eating disorder features: A general

- population study. *International Journal Of Eating Disorders*, 46(4), 375–380. <https://doi.org/10.1002/eat.22097>
- Mora, M., Penelo, E., Gutiérrez, T., Espinoza, P., González, M., & Raich, R. (2015). Assessment of two school-based programs to prevent universal eating disorders: Media literacy and theatre-based methodology in Spanish adolescent boys and girls. *The Scientific World Journal*, 2015, 1–12. <https://doi.org/10.1155/2015/328753>
- Morris, S. (2007). Estimating effect sizes from pretest-posttest-control group designs. *Organizational Research Methods*, 11(2), 364–386. <https://doi.org/10.1177/1094428106291059>
- Murray, S., Griffiths, S., & Mond, J. (2016). Evolving eating disorder psychopathology: Conceptualising muscularity-oriented disordered eating. *British Journal Of Psychiatry*, 208(5), 414–415. <https://doi.org/10.1192/bjp.bp.115.168427>
- Murray, S., Nagata, J., Griffiths, S., Calzo, J., Brown, T., Mitchison, D., et al. (2017). The enigma of male eating disorders: A critical review and synthesis. *Clinical Psychology Review*, 57, 1–11. <https://doi.org/10.1016/j.cpr.2017.08.001>
- Neumark-Sztainer, D., & Eisenberg, M. (2014). Body image concerns, muscle-enhancing behaviors, and eating disorders in males. *JAMA*, 312(20), 2156. <https://doi.org/10.1001/jama.2014.5138>
- Neumark-Sztainer, D., Watts, A., & Rydell, S. (2018). Yoga and body image: How do young adults practicing yoga describe its impact on their body image? *Body Image*, 27, 156–168. <https://doi.org/10.1016/j.bodyim.2018.09.001>
- O'Dea, J., & Abraham, S. (2000). Improving the body image, eating attitudes, and behaviors of young male and female adolescents: A new educational approach that focuses on self-esteem. *J. Eat. Disord.*, 28(1), 43–57. [https://doi.org/10.1002/\(sici\)1098-108x\(200007\)28:13.0.co;2-d](https://doi.org/10.1002/(sici)1098-108x(200007)28:13.0.co;2-d)
- Page, M., McKenzie, J., Bossuyt, P., Boutron, I., Hoffman, T., & Mulrow, C. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Page, M., Moher, D., Bossuyt, P., Boutron, I., Hoffmann, T., Mulrow, C., et al. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ*, n160. <https://doi.org/10.1136/bmj.n160>
- Pasman, L., & Thompson, J. (1988). Body image and eating disturbance in obligatory runners, obligatory weightlifters, and sedentary individuals. *International Journal of Eating Disorders*, 7(6), 759–769. [https://doi.org/10.1002/1098-108x\(198811\)7:63.0.co;2-g](https://doi.org/10.1002/1098-108x(198811)7:63.0.co;2-g)
- Perelman, H., Schwartz, N., Yeoward-Dodson, J., Quiñones, I. C., Murray, M. F., Dougherty, E. N., Townsel, R., Arthur-Cameselle, J., & Haedt-Matt, A. A. (2022). Reducing eating disorder risk among male athletes: A randomized controlled trial investigating the male athlete body project. *International Journal of Eating Disorders*, 55(2), 193–206. <https://doi.org/10.1002/eat.23665>
- Petrie, T., Tripp, M., & Harvey, P. (2002). Factorial and construct validity of the body parts satisfaction scale-revised: An examination of minority and nonminority women. *Psychology of Women Quarterly*, 26(3), 213–221. <https://doi.org/10.1111/1471-6402.00060>
- Reboussin, B., Rejeski, W., Martin, K., Callahan, K., Dunn, A., King, A., & Sallis, J. (2000). Correlates of satisfaction with body function and body appearance in middle- and older aged adults: The activity counseling trial (ACT). *Psychology & Health*, 15(2), 239–254. <https://doi.org/10.1080/08870440008400304>
- Rhea, D. J., Lantz, C. D., & Cornelius, A. E. (2004). Development of the muscle dysmorphia inventory (MDI). *Journal of Sports Medicine and Physical Fitness*, 44(4), 428–435.
- Richardson, S., Paxton, S., & Thomson, J. (2009). Is bodythink an efficacious body image and self-esteem program? A controlled evaluation with adolescents. *Body Image*, 6(2), 75–82. <https://doi.org/10.1016/j.bodyim.2008.11.001>
- Ryan, T., Morrison, T., Roddy, S., & McCutcheon, J. (2011). Psychometric properties of the Revised Male Body Attitudes Scale among Irish men. *Body Image*, 8(1), 64–69. <https://doi.org/10.1016/j.bodyim.2010.10.004>
- Schaefer, L. M., Harriger, J. A., Heinberg, L. J., Soderberg, T., & Kevin Thompson, J. (2017). Development and validation of the sociocultural attitudes towards appearance questionnaire-4-revised (SATAQ-4R). *International Journal of Eating Disorders*, 50(2), 104–117. <https://doi.org/10.1002/eat.22590>
- Seidel, A., Presnell, K., & Rosenfield, D. (2009). Mediators in the dissonance eating disorder prevention program. *Behaviour Research And Therapy*, 47(8), 645–653. <https://doi.org/10.1016/j.brat.2009.04.007>
- Stice, E., & Shaw, H. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology. *Journal Of Psychosomatic Research*, 53(5), 985–993. [https://doi.org/10.1016/s0022-3999\(02\)00488-9](https://doi.org/10.1016/s0022-3999(02)00488-9)
- Stice, E., Chase, A., Stormer, S., & Appel, A. (2001). A randomized trial of a dissonance-based eating disorder prevention program. *International Journal Of Eating Disorders*, 29(3), 247–262. <https://doi.org/10.1002/eat.1016>
- Stice, E., Marti, C., Shaw, H., & Rohde, P. (2019). Meta-analytic review of dissonance-based eating disorder prevention programs: Intervention, participant, and facilitator features that predict larger effects. *Clinical Psychology Review*, 70, 91–107. <https://doi.org/10.1016/j.cpr.2019.04.004>
- Stice, E., Marti, C., Spoor, S., Presnell, K., & Shaw, H. (2008). Dissonance and healthy weight eating disorder prevention programs: Long-term effects from a randomized efficacy trial. *Journal Of Consulting And Clinical Psychology*, 76(2), 329–340. <https://doi.org/10.1037/0022-006x.76.2.329>
- Stice, E., Mazotti, L., Weibel, D., & Agras, W. (2000). Dissonance prevention program decreases thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms: A preliminary experiment. *International Journal Of Eating Disorders*, 27(2), 206–217. [https://doi.org/10.1002/\(sici\)1098-108x\(200003\)27:23.0.co;2-d](https://doi.org/10.1002/(sici)1098-108x(200003)27:23.0.co;2-d)
- Stice, E., Onipede, Z., & Marti, C. (2021). A meta-analytic review of trials that tested whether eating disorder prevention programs prevent eating disorder onset. *Clinical Psychology Review*. , Article 102046. <https://doi.org/10.1016/j.cpr.2021.102046>
- Stice, E., Rohde, P., Shaw, H., & Marti, C. (2013). Efficacy trial of a selective prevention program targeting both eating disorders and obesity among female college students: 1- and 2-year follow-up effects. *Journal of Consulting And Clinical Psychology*, 81(1), 183–189. <https://doi.org/10.1037/a0031235>
- Strother, E., Lemberg, R., Stanford, S., & Turberville, D. (2012). Eating disorders in men: Underdiagnosed, undertreated, and misunderstood. *Eating Disorders*, 20(5), 346–355. <https://doi.org/10.1080/10640266.2012.715512>
- Thomas, B., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. *Worldviews On Evidence-Based Nursing*, 1(3), 176–184. <https://doi.org/10.1111/j.1524-475x.2004.04006.x>
- Thompson, J., van den Berg, P., Roehrig, M., Guarda, A., & Heinberg, L. (2004). The Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3): Development and validation. *International Journal Of Eating Disorders*, 35(3), 293–304. <https://doi.org/10.1002/eat.10257>
- Thornborrow, T., Onwuegbusi, T., Mohamed, S., Boothroyd, L., & Tovée, M. (2020). Muscles and the media: A natural experiment across cultures in men's body image. *Frontiers In Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00495>
- Toselli, S., Grigoletto, A., Zaccagni, L., Rinaldo, N., Badicu, G., Grosz, W., & Campa, F. (2021). Body image perception and body composition in early adolescents: A longitudinal study of an Italian cohort. *BMC Public Health*, 21(1). <https://doi.org/10.1186/s12889-021-11458-5>
- Tylka, T., & Wood-Barcalow, N. (2015). The body appreciation scale-2: Item refinement and psychometric evaluation. *Body Image*, 12, 53–67. <https://doi.org/10.1016/j.bodyim.2014.09.006>
- Tylka, T., & Wood-Barcalow, N. (2015). What is and what is not positive body image? Conceptual foundations and construct definition. *Body Image*, 14, 118–129. <https://doi.org/10.1016/j.bodyim.2015.04.001>
- Tylka, T., Bergeron, D., & Schwartz, J. (2005). Development and psychometric evaluation of the male body attitudes scale (MBAS). *Body Image*, 2(2), 161–175. <https://doi.org/10.1016/j.bodyim.2005.03.001>
- Van Hoorn, U., Kefford, L., & O'Dea, J. (1999). Normal ranges for Body Appearance Ratings. In S. Abraham & N. Lovell, *Clinical Manual for the Eating and Exercise Examination*. Ashwood Medical. Retrieved 26 September 2021, from.
- Van Strien, T., Frijters, J., Bergers, G., & Defares, P. (1986). The Dutch eating behavior questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal Of Eating Disorders*, 5(2), 295–315. [https://doi.org/10.1002/1098-108x\(198602\)5:23.0.co;2-t](https://doi.org/10.1002/1098-108x(198602)5:23.0.co;2-t)
- Watson, H. J., Joyce, T., French, E., Willan, V., Kane, R. T., Tanner-Smith, E. E., ... Egan, S. J. (2016). Prevention of eating disorders: A systematic review of randomized, controlled trials. *International Journal of Eating Disorders*, 49(9), 833–862. <https://doi.org/10.1002/eat.22577>
- Yager, Z., & O'Dea, J. (2010). A controlled intervention to promote a healthy body image, reduce eating disorder risk and prevent excessive exercise among trainee health education and physical education teachers. *Health Education Research*, 25(5), 841–852. <https://doi.org/10.1093/her/cyq036>