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Review

Is self-compassion relevant to the pathology and treatment of eating and body image concerns? A systematic review and meta-analysis

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HIGHLIGHTS

- Self-compassion is associated with negative body image and eating pathology.
- Self-compassion interventions reduce eating and body image concerns.
- The role of self-compassion is robust across personal characteristics and settings.

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ABSTRACT

Eating disorders are severe mental health conditions, with substantial consequences for health and quality of life. Such disorders are strongly associated with body image concerns. It is important to consider treatments that might enhance our ability to treat such cases. Recently, there has been a growing body of research on self-compassion in relation to such problems. However, we are not yet clear about the extent of such effects, given the range of studies and methodologies used. Therefore, a systematic literature review was carried out using four key databases. Meta-analysis was used to reach conclusions about the size of the effects and moderators. Random-effects meta-analyses were conducted with 59 studies. Higher self-compassion was associated with lower eating pathology, reduced body image concerns, and greater positive body image, with medium to strong effect sizes (respectively, $r = -0.34$, $r = -0.45$, $r = 0.52$). Furthermore, self-compassion interventions for eating pathology and body image were effective, and superior to control groups (respectively, $g = 0.58$, $g = 0.39$). These findings support the role of self-compassion in understanding and addressing eating and body image concerns. Self-compassion appears to be an adaptive emotion regulation strategy in eating disorders and body image.

1. Introduction

Eating disorders can be severe mental health conditions, associated with significant physical and psychological impairment. The lifetime prevalence of eating disorders varies across cultures, ranging from 0.2% to 13.1% (Cho et al., 2007; Preti et al., 2009; Solmi, Hotopf, Hatch, Treasure, & Micali, 2016; Stice, Marti, & Rohde, 2013). The existing literature has identified a number of potential risk factors, with body image concerns as a key predictor (Polivy & Herman, 2002). Eating pathology and body image are critical elements of eating disorders (Waller & Mountford, 2015).

Various treatments are effective in the treatment of eating disorders (National Institute for Health and Care Excellence, 2017). Recent studies have reported a remission rate of about 45 to 70% (e.g., Couturier, Kimber, & Szatmari, 2013; Fairburn et al., 2015; Södersten, Bergh, Leon, Brodin, & Zandian, 2017). However, as there are still individuals who do not achieve remission, treatment developments are still necessary. A key area suggested for such development is to address the affective component of eating disorders directly (e.g., Engel et al., 2013; Goss & Allan, 2014; Wonderlich et al., 2008). The evidence underpinning such an approach comes from a number of functional accounts of eating disorders (Haynos & Fruzzetti, 2011; Heatherton & Baumeister, 1991; Lavender et al., 2014; Leehr et al., 2015; McCarthy, 1990; McManus & Waller, 1995; Smyth et al., 2007), suggesting that disordered eating behaviours can be a coping response to negative emotions (e.g., suppress/block/distract).

Both escape theory (Heatherton & Baumeister, 1991) and affect regulation models (Lavender et al., 2014; McCarthy, 1990) assume that binge-purge episodes can serve the function of coping with negative affect, by producing short-term relief. A functional analysis of binge-

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eating by McManus and Waller (1995) suggested that binging acts to block negative emotions. Similarly, the transactional model of emotion dysregulation in anorexia nervosa suggests that disordered eating behaviours (e.g., restriction, extreme exercise) might function to suppress negative emotions or distract from negative emotions (Haynos & Fruzzetti, 2011; Smyth et al., 2007). Neurobiological theories are also relevant, as they emphasize the role of hormones and neurotransmitters in how negative emotions might trigger binge eating (Leehr et al., 2015). Thus, a range of theoretical models stress the critical role of emotions in eating disorders.

Self-compassion has been proposed to be an adaptive way of regulating such emotions (Gilbert, 2019; Neff, 2003a). Self-compassion is conceptualized by Neff (2003a) as understanding one's own pain in a non-judgmental way and seeing suffering as a part of a shared human experience. It involves three components: self-kindness (vs self-judgment); common-humanity (vs isolation); and mindfulness (vs over-identification) (Neff, 2003a). In contrast, Gilbert (2009) conceptualizes 'compassion' as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it" (p.13). In Gilbert's evolutionary theory, compassion consists of six elements - sensitivity, sympathy, empathy, motivation/ caring, distress tolerance, and non-judgment.

Self-compassion might reduce the use of dysfunctional attempts to regulate emotions in eating disorders. Neff (2003a) suggested that self-compassionate individuals are less likely to experience their emotions adversely. With self-compassion, instead of escaping from negative emotions or pushing them away, those emotions are acknowledged as valid and important. Therefore, self-compassionate people are less likely to engage in avoidance/escape or suppression of emotions. Indeed, compassion training can activate brain areas that have been associated with positive emotions (Klimecki, Leiberg, Ricard, & Singer, 2014). Gilbert's model suggests that individuals who are less compassionate have difficulties generating and activating self-soothing emotions. These individuals are not able to regulate threat-based emotions, and therefore they overeat as a way of calming emotional states.

Recent studies have also suggested that self-compassion can: buffer against risk factors for eating and body concerns (e.g., Ferreira, Matos, Duarte, & Pinto-Gouveia, 2014; Stutts & Blomquist, 2018); prevent the initial occurrence of risk factors (e.g., Ferreira, Pinto-Gouveia, & Duarte, 2013; Marta-Simões, Ferreira, & Mendes, 2016); and reduce existing eating and body image problems (e.g., Breines, Toole, Tu, & Chen, 2014; Kelly & Carter, 2015). However, the variability in treatment targets (e.g., body image, eating behaviours, eating attitudes) and methodologies means that it is difficult to draw clear conclusions from the literature. Braun, Park, and Gorin (2016) undertook a systematic review of the role of self-compassion in eating and body image issues, and concluded that self-compassion may protect against eating and body image concerns. However, given the research that has emerged since then and the need to quantify the effects of self-compassion, it is appropriate to update that systematic review and to present a meta-analysis of the degree to which self-compassion is associated with and impacts on eating and body image concerns.

The first aim of this systematic review and meta-analysis was to investigate the association of self-compassion with levels of eating and body image concerns. The second aim was to determine whether self-compassion-related interventions are effective in enhancing eating and body image concerns. Based on the literature, it is hypothesized that:

1. Low self-compassion will be associated with high eating pathology
2. Self-compassion interventions will reduce eating pathology
3. Self-compassion will be positively associated with positive body image
4. Self-compassion will be negatively associated with body image concerns
5. Self-compassion interventions will positively enhance healthy body image.

Table 1
Research terms used for the literature review: "AND" was used to show that papers required having one term from each column, while "OR" was used to show that any of those keywords is enough for eligibility.

Body Experience Terms	Compassion Terms	Eating and Body Terms
Objectification	Compassion	Eating
OR	OR	OR
Self-objectification	Self-compassion	Eating pathology
OR	OR	OR
Objectified	Self-warmth	Eating disorders
OR	OR	OR
Body surveillance	Self-kindness	Disordered eating
OR	OR	OR
Objectified body	Self-compassionate	Eating symptoms
OR		OR
Body preoccupation		Eating symptomatology
OR		OR
Body monitoring		Anorexia
OR		OR
Body checking		Bulimia
OR		OR
Body shame		Bulimic
OR		OR
Body appreciation		Binge
OR		OR
Body comparison		Binging
		OR
		Binge-eating
		OR
		Purging
		OR
		Purge
		OR
		Restriction
		OR
		Diet
		OR
		Restrained eating
		OR
		OSFED
		OR
		EDNOS
		OR
		Compulsive exercise
		OR
		Exercise
		OR
		Body dissatisfaction
		OR
		Body image

2. Method

2.1. Identification and selection of studies

A literature search was conducted (up to 19th December 2019), using four electronic databases (PsycINFO, PubMed, ProQuest, Web of Science). The search terms (see Table 1) were used in a three-component strategy (Body Experience Terms; Compassion Terms; Eating and Body Terms). Additionally, the reference lists of identified studies were manually screened and previous reviews of self-compassion in the context of eating and body concerns were searched, in order to identify any other relevant studies.

2.2. Eligibility criteria

Studies were included if: (i) they used quantitative designs (e.g., experimental, correlational); (ii) they were written in English; and (iii) they were published in peer-reviewed journals. Papers for the correlational component of the analyses had to have used a validated or standardised measure of self-compassion and eating and/or body image variables.

Eating pathology refers to unhealthy eating attitudes and behaviours (e.g., binging and purging), and it can be measured by a number of validated tools (e.g., Eating Disorder Examination - Questionnaire [EDE-Q; Fairburn & Beglin, 1994]). Body image is the individual's subjective evaluation of their own physical appearance (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Positive and negative body image appear to be distinct constructs, both dimensionally and qualitatively (Tylka & Wood-Barcalow, 2015). Positive body image involves protective attitudes and behaviours regarding one's own body (e.g., appreciation and acceptance - Tylka & Wood-Barcalow, 2015), whereas negative body image centres on negative subjective evaluation of one's physical body (Stice & Shaw, 2002).

Intervention studies had to use an identified self-compassion intervention, and address eating and/or body image. No age or gender restriction was imposed. Both clinical and non-clinical samples were included. Papers were excluded if: they did not measure either self-compassion or eating and/or body image outcome variables; they primarily focused on body dysmorphic disorder; or the patients had identified neurological or psychotic disorders. Book chapters, reviews, and qualitative papers were also excluded. Finally, studies were excluded if they did not provide sufficient data to calculate effect sizes.

2.3. Data extraction

For the meta-analysis, reported correlations of self-compassion with eating pathology and body image were extracted to test hypothesis 1. To test hypotheses 3 and 4, positive body image variables (e.g., body appreciation or body satisfaction) and body image concerns (e.g., body shame or body dissatisfaction) were extracted from each paper where these were reported. The following data were also extracted from each study, to test for moderators - year of publication, design, and sample characteristics (gender, age, and clinical status and BMI).

To test hypotheses 2 and 5, outcome data from self-compassion interventions (means, standard deviations/standard errors and sample sizes) were extracted for eating pathology and body image. Studies were included if they used either the Self-Compassion Scale (SCS; Neff, 2003b) or the Self-Compassion Scale-Short Form (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011), as they are the only validated measures of self-compassion. Any psychometrically validated measure of eating pathology or/and body image concerns was used.

2.4. Quality assessment

The quality of included studies was assessed, in order to inform the critique of current literature and to inform areas for future directions (rather than to remove any studies from the review). Methodological quality was examined using the Effective Public Health Practice Project (EPHPP) assessment tool for quantitative studies. The EPHPP has demonstrated good inter-rater reliability and construct validity (Thomas, Ciliska, Dobbins, & Micucci, 2004). All studies were checked for a range of components - selection bias, study design, confounders, blinding, data collection method, and attrition. Each component was rated as weak, moderate, strong, or not applicable. Each study was given an overall score based on the number of components meeting criteria. A paper rating of 'strong' indicated no weak component ratings, 'moderate' indicated one weak component rating, and 'weak' indicated two or more weak component ratings).

2.5. Data analyses

2.5.1. Effect size coding

Effect sizes (r values) were directly obtained from correlational studies to examine the association between self-compassion and eating pathology and body image. Effect sizes were interpreted according to Cohen's (1992) guidelines: $r = 0.10$ as small, $r = 0.30$ as medium, and $r = 0.50$ as large. In the case of one study (Barnett & Sharp, 2016 – study 2), the scoring of the effect size was reversed, as examination of the scoring criteria used suggested that it had been scored incorrectly in the original paper. Removal of this study did not reduce the overall effect size.

For intervention studies, when studies had both within-subject comparisons and between-subject comparisons, we included only the between-subject comparisons. A single group pre-post study shows the effect of an intervention on a group, whereas randomized and non-randomized group comparison studies indicate the effects of the intervention on the experimental group compared to the control group. Therefore, meta-analyses were conducted separately based on research design. Effect sizes were taken directly from the study, where they were provided. Otherwise, for single group pre-post studies, the following formula was used to calculate the effect size (d):

$$d = \frac{|m_1 - m_2|}{\sqrt{s_1^2 + s_2^2 - (2rs_1s_2).}}$$

Where not provided in the studies, the value of 'r' (correlation between the two conditions) was assumed conservatively to be 0.7 (Rosenthal, 1993). If studies reported only the Standard Error (SE) instead of Standard Deviation (S), S was obtained from SE by multiplying by the square root of the sample size.

For group comparison studies, effect sizes were calculated by using the following formulas.[1] If the two groups had an equal number of participants

$$d = \frac{|m_1 - m_2|}{\sqrt{\frac{s_1^2 + s_2^2}{2}}}$$

Or, if the two groups differed in sample size;

$$d = \frac{|m_1 - m_2|}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}}$$

Effect sizes were calculated from first available post-intervention time point. Only one out of five group comparison studies for eating pathology had an active control group. Therefore, all such effect sizes were calculated based on the wait-list control group. Similarly, effect sizes were calculated using the wait-list control group for body image studies, due to only six studies having had active control groups.

Obtained Cohen's d effect sizes were converted to Hedge's g, to correct for small sample bias (Hedges & Olkin, 1985). Effect sizes were interpreted using Cohen's convention, where 0.2 is indicative of a small effect, 0.5 a moderate effect, and 0.8 a large effect (Cohen, 1992).

2.5.2. Independence of effect sizes

Some of the included studies reported multiple effect sizes for outcome measures. Multiple effect sizes within the same study violate the assumption of independence in meta-analytic modelling. Therefore, if studies reported more than one measure of eating and/or body concerns, we selected and used the primary key outcome measure. The most widely used self-report measures (e.g., EDE-Q for eating psychopathology) took precedence. For example, Kelly and Stephen (2016) reported The Body Appreciation Scale (BAS) and The Body Areas Satisfaction Scale as measures of body image. Most other included studies used the BAS (e.g., Andrew, Tiggemann, & Clark, 2016; Homan & Tylka, 2015; Kelly, Miller, & Stephen, 2016). Therefore, the BAS was used, to provide consistency across studies. In cases where studies did not use those common outcome measures, we selected the measure that was most strongly related to self-compassion. For instance, Stutts and Blomquist (2018) reported eating pathology using nine items relating to compensatory behaviours in eating pathology, drawn from the ADD

[1] Effect sizes were calculated by using following website: https://memory.psych.mun.ca/models/stats/effect_size.shtml

Health Survey (http://www.cpc.unc.edu/projects/addhealth) and eight items from the Eating Loss of Control Scale (ELOCS; Blomquist et al., 2014). As self-compassion has been suggested as a healthy emotional regulation practice (Berking & Whitley, 2014), the ELOCS was chosen for meta-analysis as it is associated with greater emotion dysregulation (Blomquist et al., 2014).

2.5.3. Meta-analytic model

Meta-analysis was carried out using *Meta-Essentials* (Suurmond, van Rhee, & Hak, 2017). Due to a wide range of the characteristics of samples and the interventions included in this meta-analysis, a random-effects model was used to take into consideration between-study and within-study variance. Heterogeneity of effect sizes was examined using the *Q*-statistic with a *p*-value and I^2 statistic. The *Q*-statistic is a measure of variation around the average. The I^2 statistic indicates the proportion of total variance attributable to between-study variation. As benchmark values, 25%, 50%, and 75% were used to identify low, moderate and high heterogeneity, respectively (Higgins, Thompson, Deeks, & Altman, 2003).

Follow-up subgroup and moderator analyses were conducted to explore potential sources of heterogeneity. Subgroup analyses were used to examine categorical variables (e.g., the clinical status of participants, different measures of outcomes), while the characteristics of the included population samples (e.g., BMI, mean of age, percentage of female participants, quality of the studies) and duration of the body image interventions were investigated as potential moderators to explain between-study variation. Subgroup analyses were conducted if each subgroup had a minimum of four studies (Fu et al., 2011).

2.5.4. Publication bias

Meta-Essentials has multiple ways to examine publication bias. Funnel plots were used to indicate standard error (sample size) against reported effect size, where symmetrical distribution of samples shows the absence of publication bias. Additionally, a trim and fill imputation procedure was used to produce an estimate of the number of the studies missing due to publication bias (Duval & Tweedie, 2000).

3. Results

3.1. Study selection

The search initially identified 4333 publications. The search results from each database were imported into Mendeley reference management software. All studies were then combined and duplicates removed. After removing duplicates, 4036 studies remained. Having examined of abstracts of those studies, 200 studies were retained for further consideration. Of those 200, 133 were excluded (reasons outlined in Fig. 1), leaving a total of 67 studies meeting the inclusion criteria for the review. Only 59 of those studies were included in this meta-analysis, due to their having sufficient data to calculate effect sizes.

3.2. Study characteristics

Table 2 presents an overview of the characteristics of the included studies. The sample size of those studies ranged from 9 to 1306. The majority used only a female sample (n = 48) or a predominantly female sample (n = 5). Fourteen studies recruited eating disorder patient samples (four assessed only binge-eating disorder patients; one targeted bulimic symptoms). Twenty-nine studies recruited student participants. The included studies came from a number of countries: USA (n = 26), Canada (n = 13), Portugal (n = 13), Australia (n = 4), UK (n = 2), and Thailand (n = 1). The majority of studies (n = 43) were published after 2014, supporting the need to update on the Braun et al. (2016) systematic review.

The majority of studies measured self-compassion using the Self-Compassion Scale (Neff, 2003b; n = 35), some used the Self-Compassion Scale-Short Form (Raes et al., 2011; n = 14), and the remainder did not measure self-compassion directly but used a self-compassion intervention (n = 10). The most commonly used measures of eating pathology were the EDE-Q (n = 19), the Eating Attitudes Test (Garner, Olmsted, Bohr, & Garfinkel, 1982; n = 4), and the Dutch Eating Behavior Questionnaire (Van Strien, Frijters, Bergers, & Defares, 1986, n = 2). In terms of body image, the majority of the studies used the Body Appreciation Scale (Avalos, Tylka, & Wood-Barcalow, 2005; n = 12) or the Body Appreciation Scale-2 (Tylka & Wood-Barcalow, 2015; n = 5). Other studies used the Objectified Body Consciousness Scale (McKinley & Hyde, 1996; n = 8), the Body Shape Questionnaire (Evans & Dolan, 1993; n = 3), or the Body Esteem Scale (Franzoi & Shields, 1984; n = 3).

3.2.1. Nature of the correlational studies

Of the 59 studies, 39 were correlational designs. Four of the 39 were longitudinal studies and two were daily diary studies. The remainder were correlational studies. Nine addressed only eating pathology, 16 addressed only body image, and 14 measured both.

3.2.2. Nature of intervention studies

The intervention studies identified included a variety of designs, such as randomized controlled trials, case series, nonrandomized control studies. Of the 20 studies examining the effectiveness of self-compassion interventions, 16 had a control group (three addressed eating pathology, nine body image, and four both). Only four studies were with a single group, examining the effectiveness of uncontrolled interventions on eating pathology.

Of the 16 studies with control groups, a variety of treatment methods were used to address body image and eating pathology, including writing interventions, self-compassion meditation, and a number of proprietary programs (e.g., Bodies in Motion, BEFree). Of the four studies that lacked a comparison condition, four were delivered in a group format, and the other delivered compassion-focused therapy individually.

3.3. Quality assessment

Quality rating of studies is presented in Table 3. Attrition could not be considered in understanding the quality of cross-sectional correlational studies because there was only one data point (meaning that attrition could not take place). Confounders and blinding do not apply in non-intervention studies within the EPHPP assessment tool. Therefore, cross-sectional correlational studies were assessed using only the remaining three criteria. Of the 59 studies, only five received strong quality score ratings, 21 were rated as moderate, and 33 were rated as weak.

The main limitation across studies was selection bias. Most of the studies (n = 37) failed to recruit a representative sample, which limits the generalizability of the findings. The majority of the samples were based on young college women. However, body image issues and eating pathology are more prevalent among younger adult females (e.g., Pritchard, 2008), so that might not be a weakness per se. Another methodological weakness was study design. Thirty-nine studies used correlational designs, which preclude causal inferences. The major strength was the data collection method, as almost all studies (n = 56) used reliable and valid measures. However, the self-report questionnaires used in those studies are subject to response bias (Van de Mortel, 2008). Intervention studies most commonly received weak ratings due to the presence of confounders (n = 7). Regarding blinding, most intervention studies failed to state whether assessors were aware of the exposure status of participants. However, participants were not aware of the research questions (n = 15).

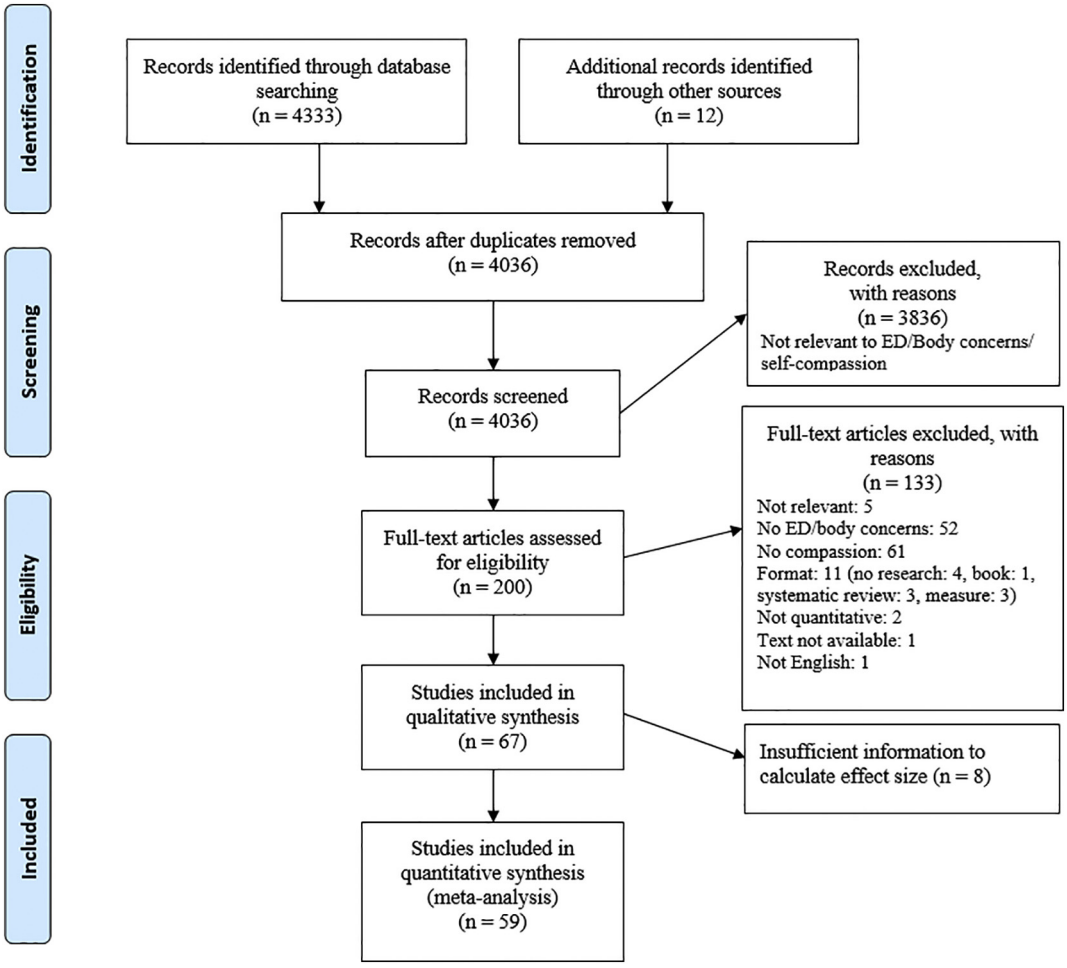

Fig. 1. PRISMA flowchart of inclusion of studies.

3.4. Meta-analysis of association between eating pathology and self-compassion (hypothesis 1)

Fig. 2 displays a forest plot for eating pathology, with each individual effect size representing a correlation between eating pathology and self-compassion. The combined random effects estimate for the association between eating pathology and self-compassion was $r = -0.34$ (95% CI = −0.40 to −0.28, Z = −10.58; $p < .001$), based on 5132 participants taken from 22 studies. This overall effect (r) was of a medium size (Cohen, 1992), showing that greater self-compassion is associated with lower levels of eating pathology. There was substantial variability across the studies (Q = 82.81, $p < .001$), with a high level of heterogeneity ($I^2 = 74.64\%$).

Subgroup analysis and meta-regression results are presented in Table 4. The correlation between self-compassion and eating pathology was not significantly affected by the type of self-compassion measure ($p = .19$). The effect size for the eating disorder group ($r = -0.49$) tended to be larger than for the non-clinical group ($r = -0.31$). However, a note of caution is necessary here, since each subgroup has high heterogeneity.

Medium to large heterogeneity was observed in the subgroups. Moderating effects for age, gender, and BMI were non-significant. Therefore, the relationship between self-compassion and eating pathology did not differ according to participants' age, gender, or BMI. Only the quality of the studies was associated with the relationship between self-compassion and eating pathology. Self-compassion was more strongly linked to eating pathology in the higher-quality studies.

The funnel plot (see Fig. 3) suggested a slightly asymmetric distribution of study findings. The blue dots indicate the observed studies, and the green circle show the missing studies imputed by the trim-and-fill method. Trim and fill bias analysis imputed two studies. When the meta-analysis was adjusted for this potential bias, the new effect size slightly reduced ($r = -0.33$, 95% CI -0.42 to −0.25).

3.5. Meta-analysis of effects of self-compassion interventions on eating pathology (hypothesis 2)

3.5.1. Studies with no comparison group

The effects of self-compassion intervention studies with a single group from baseline to post-intervention were examined. There were four studies with a total sample size of 187. The combined effect size in this group was large and significant ($g = 1.30$, 95% CI = 0.25 to 0.50; Z = 5.18; $p < .001$), showing that self-compassion interventions reduced eating pathology substantially from baseline to post-intervention (see Fig. 4). Between-study variance was large and significant (Q = 20.10, $p < .001$, $I^2 = 85.15\%$). There were too few studies to test moderators or publication bias.

3.5.2. Studies with a comparison group

The effects of the self-compassion-related intervention on eating pathology were compared with a control group in six studies ($N = 153$ in self-compassion interventions; $N = 133$ in control groups). Self-compassion interventions had a significant impact on eating pathology compared to the control conditions (only Kelly et al. (2007) had an active control group, in the form of treatment as usual), with an effect size of 0.58 (95% CI = 0.16 to 0.20; Z = 3.22; $p < .001$). The

Table 2
Characteristics of included studies.

Study	Design	Measure	Construct Measure	Sample
Correlational Studies				
Eating Pathology and Self-compassion				
Fresnics, Wang, & Borders, 2019	Cross-sectional Correlational	*Self-Compassion Scale-Short Form* *Eating Disorder Examination Questionnaire* Freiburg Mindfulness Inventory Ruminative Response Scale	Self-compassion Eating pathology	190 female undergraduate
Pullmer, Zaitsoff, & Coelho, 2019	Cross-sectional Correlational	*Self-Compassion Scale-Short Form* *Eating Disorder Examination Questionnaire* Hopkins Symptom Checklist	Self-compassion Eating pathology	58 female ED patient
Gouveia, Canavarro, & Moreira, 2019	Cross-sectional Correlational	Child and Adolescent Mindfulness Measure *Self-compassion Scale short form* Difficulties in Emotion regulation Scale *Emotional eating subscale of the Dutch Eating Behaviour Questionnaire*	Self-compassion Eating pathology	245 Adolescent (120F/ 125 M)
Kelly & Tasca, 2016	Longitudinal	*Self-Compassion Scale-Short Form* Experiences of Shame Scale *Eating Disorder Examination Questionnaire*	Self-compassion Eating pathology	78 ED patient (76F/ 2 M)
Taylor, Daiss, & Krietsch, 2015	Cross-sectional Correlational	*Self-compassion scale short form* Mindful Eating Questionnaire *Eating Attitudes Test-26*	Self-compassion Eating pathology	150 college student (128F/ 22 M)
Tylka, Russell, & Neal, 2015	Cross-sectional Correlational	Perceived Sociocultural Pressures Scale *Self-compassion Scale—Short Form* Internalization subscale of the Sociocultural Attitudes towards Appearance Questionnaire *Eating Attitudes Test-26*	Self-compassion Eating pathology	435 community women
Ferreira et al., 2014	Cross-sectional Correlational	*Eating Disorder Examination 16.0D* Shame Experiences Interview Impact of Event Scale—Revised Centrality of Event Scale *Self-Compassion Scale*	Self-compassion Eating pathology	34 ED patient
Kelly & Carter, 2014	Longitudinal Correlational	*Eating Disorder Examination–Questionnaire* Experience of Shame Scale Social Safeness and Pleasure Scale Social Provisions Scale *Self-Compassion Scale-Short Form*	Self-compassion Eating pathology	89 ED patient (86 F/ 3 M)
Kelly, Carter, Zuroff, & Borairi, 2013	Cross-sectional Correlational	*Eating Disorder Examination Questionnaire* Experiences of Shame Scale *Self-Compassion Scale-Short Form* Fear of self-compassion	Self-compassion Eating pathology	74 ED patient (72F/ 2 M)
Body Image and Self-compassion				
Lonergan et al., 2019	Cross-sectional Correlational	Photo Manipulation and Investment Scales *Body Shape Satisfaction Scale* *Self-Compassion Scale Short-Form*	Body image Self-compassion	184 students (95F/ 89 M)
Modica, 2019	Cross-sectional Correlational	Facebook use The Facebook Questionnaire Physical Appearance Comparison Scale Facebook Intensity Scale *Body Esteem Scale* *Body Surveillance subscale of Objectified Body Consciousness Scale* Appearance subscale of the Contingencies of Self-Worth Scale *Self-compassion Scale*	Body surveillance Self-compassion Body esteem	232 women
Schmidt, Raque-Bogdan, & Hollern, 2019	Cross-sectional Correlational	*Self-Compassion Scale* *Body Appreciation Scale* *Multidimensional Body-self Relations Questionnaire* Body Image Quality of Life Inventory Positive and Negative Affect Schedule	Self-compassion Body appreciation	152 female undergraduate students
Barnett & Sharp, 2016 (Study, 1)	Cross-sectional Correlational	The Almost Perfect Scale – Revised Short Form *The Body Image Satisfaction Scale* *The Self-Compassion Scale*	Self-compassion Body satisfaction	580 female student
Marta-Simões et al., 2016	Cross-sectional Correlational	Other as Shamer Scale *Self-Compassion Scale* *Body Appreciation Scale*	Self-compassion Body appreciation	155 individuals (111 F/ 44 M)
Raque-Bogdan, Piontkowski, Hui, Ziemer, & Garriott, 2016	Cross-sectional Correlational	Experiences in Close Relationships –Relationship Structures scale *Self-Compassion Scale* *Body Appreciation Scale*	Self-compassion Body appreciation	1306 female
Webb, Fiery, & Jafari, 2016	Cross-sectional Correlational	Anti-Fat Attitudes questionnaire The Fat Talk Scale *Objectified Body Consciousness Scale* *Self-Compassion Scale*	Self-compassion Body shame	309 undergraduate women

(*continued on next page*)

Table 2 (*continued*)

Study	Design	Measure	Construct Measure	Sample
Andrew et al., 2016	Cross-sectional Correlational	*Body Appreciation Scale* Media consumption Body Acceptance by Others Scale *Self-Compassion Scale-Short Form* Emotional Autonomy Scale *Body Surveillance Subscale of the Objectified Body Consciousness Scale* Physical Appearance Comparison Scale Internalization subscale of the Sociocultural Attitudes Towards Appearance Questionnaire	Self-compassion Body appreciation Body surveillance	266 undergraduate women
Homan & Tylka, 2015	Cross-sectional Correlational	*Self-Compassion Scale Short Form* The Body Comparison Orientation subscale from the Body, Eating, and Exercise Comparison Orientation Measure *Body Appreciation Scale* Contingencies of Self-Worth Scale	Self-compassion Body appreciation Body comparison	263 Female
Duarte, Ferreira, Trindade, & Pinto-Gouveia, 2015	Cross-sectional Correlational	*Figure Rating Scale* Physical Appearance Scale *Self-Compassion Scale* World Health Organization Brief Quality of Life Assessment Scale	Self-compassion Body dissatisfaction	662 female student
Breines et al., 2014 (Study 2)	Lab based*	State appearance-related self-compassion Objectified Body Consciousness scale Disordered eating scale adapted from Eisenberg and Neumark-Sztainer	Self-compassion Body surveillance Eating pathology	158 female undergraduate
Daye, Webb, & Jafari, 2014	Cross-sectional Correlational	The Caregiver Eating Messages Scale *Objectified body consciousness* *Self-Compassion Scale*	Body shame Self-compassion	322 college women
Pinto-Gouveia, Ferreira, & Duarte, 2014	Cross-sectional Correlational	Other as Shamer Scale Striving to Avoid Inferiority Scale Social Comparison through Physical Appearance Scale The Forms of Self-Criticizing and Self-Reassuring Scale *Self-Compassion Scale* *Body dissatisfaction scale of Eating Disorder Inventory* Eating Disorder Examination 16.OD	Self-compassion Body dissatisfaction	123 women non clinical 102 patient with ED
Pisitsungkagarn, Taephant, & Attasaranya, 2014	Cross-sectional Correlational	*Body Appreciation Scale* Rosenberg's Self-esteem Scale *Self-compassion Scale*	Self-compassion Body appreciation	302 Thai female undergraduates
Wasylkiw, MacKinnon, & MacLellan, 2012	Cross-sectional correlational	Rosenberg Self-Esteem Scale *Self-Compassion Scale* *Body Shape Questionnaire* *Body Appreciation Scale* Weight concern subscale from the Body Esteem Scale	Self-compassion Body appreciation Body dissatisfaction	142 female undergraduates
Mosewich, Kowalski, Sabiston, Sedgwick, & Tracy, 2011	Cross-sectional Correlational	*Self-Compassion Scale* Rosenberg Self-Esteem Scale Self-Conscious Affect for Adolescents Social Physique Anxiety Scale Obligatory Exercise Questionnaire *Objectified body consciousness* Performance Failure Appraisal Inventory Fear of Negative Evaluation Scale	Self-compassion Body surveillance Body shame	151 women athletes
Eating Pathology and Body Image and Self-compassion				
Kramer & Cuccolo, 2019	Intervention*	*Body Appreciation Scale-2* *Self-Compassion Scale Eating Disorder Examination Questionnaire* *Multidimensional Body-Self Relations Questionnaire* Five Facet Mindfulness Questionnaire	Self-compassion Eating pathology Body appreciation Body dissatisfaction	99 students (76 F/ 23 M)
Pullmer, Coelho, & Zaitsoff, 2019	Cross-sectional Longitudinal	*Body Areas Satisfaction Scale* *Self-Compassion Scale Eating Disorder Examination Questionnaire* Hopkins Symptom Checklist	Self-compassion Body satisfaction Eating pathology	238 adolescent student (134 F/ 104 M)
Gouveia, Canavarro, & Moreira, 2018	Cross-sectional Correlational	Interpersonal Mindfulness in Parenting Scale *Self-Compassion Scale* *Experience of Shame Scale* *Emotional Eating subscale of the Dutch Eating Behavior Questionnaire*	Self-compassion Eating pathology Body shame	572 dyads mother/father and adolescent (445 F/ 127 M)
Marta-Simões & Ferreira, 2018	Cross-sectional Correlational	Early Memories of Warmth and Safeness Scale—Peers Version *Self-Compassion Scale* Social Safeness and Pleasure Scale *Body Appreciation Scale-2* *Eating Disorder Examination Questionnaire*	Self-compassion Body appreciation Eating Pathology	387 women

(*continued on next page*)

Table 2 (*continued*)

Study	Design	Measure	Construct Measure	Sample
Stutts & Blomquist, 2018	Longitudinal Correlational	*Self-Compassion Scale* *Weight concern and shape concern subscales of the Eating Disorder Examination Questionnaire* ADD Health Survey *Eating Loss of Control Scale* Perceived Stress Scale	Self-compassion Body dissatisfaction Eating pathology	765 student (535 F/ 230 M)
Ferreira, Oliveira, & Mendes, 2017	Cross-sectional Correlational	Early Memories of Warmth and Safeness Scale *Self-Compassion Scale* *Body Appreciation Scale* *Eating Disorder Examination Questionnaire*	Self-compassion Body appreciation Eating pathology	490 women general population
Barnett & Sharp, 2016 (Study 2)	Cross-sectional Correlational	The Almost Perfect Scale – Revised Short Form *The Body Image Satisfaction Scale* *Self-Compassion Scale – Short Form* *Eating Attitudes Test*	Self-compassion Body satisfaction Eating pathology	398 female students
Kelly et al., 2016	Daily surveys	*Self-Compassion Scale-Short Form* Intuitive Eating Scale-2 *Body Appreciation Scale* *three items derived from the Eating Disorder Examination Questionnaire* the Positive and Negative Affect Schedule	Self-compassion Body appreciation Body dissatisfaction Eating attitudes	92 undergraduate female
Webb & Hardin, 2016	Cross-sectional Correlational	Modified Weight Bias Internalization Scale *Body Image Shame Scale* *Body Image Acceptance and Action Questionnaire* *Self-Compassion Scale* Intuitive Eating Scale-2	Self-compassion Body shame Body acceptance Eating attitudes	333 college women
Kelly & Stephen, 2016	Daily Dairy	*Self-compassion Scale Short form* The Rosenberg Self-Esteem Inventory The Intuitive Eating Scale-2 *1 item of Restraint subscale of the Eating Disorders Examination Questionnaire* *The Body Appreciation Scale* The Body Areas Satisfaction Scale Body Image States Scale	Self-compassion Body appreciation Eating Pathology	92 female college students
Kelly, Vimalakanthan, & Miller, 2014	Cross-sectional Correlational	*Self-compassion scale* Rosenberg Self-esteem inventory *Body-Image Acceptance and Action Questionnaire* *EDE-Q*	Self-compassion Body acceptance Body dissatisfaction Eating Pathology	153 female student
Ferreira et al., 2013	Cross-sectional correlational	*Self-Compassion Scale* Other as Shamer Scale Depression, Anxiety and Stress Scales *Eating Disorder Inventory* *Eating Disorder Examination 16.0D*	Self-compassion Eating pathology Body dissatisfaction	102 ED female patient 123 female general population
Schoenefeld & Webb, 2013	Cross-sectional Correlational	*Self-compassion Scale* Distress Tolerance Scale *Body Image-Acceptance and Action Questionnaire* Intuitive Eating Scale Rosenberg Self-Esteem Scale	Self-compassion Eating attitudes Body acceptance	322 female undergraduate students
Wasylkiw et al., 2012	Study 2: Cross-sectional correlational	Rosenberg Self-Esteem Scale *Self-Compassion Scale* *Body Shape Questionnaire* *Rigid Restraint Scale* The Center for Epidemiologic Studies Depression Scale	Self-compassion Body dissatisfaction Eating pathology	189 female undergraduates
Intervention Studies				
Eating Pathology and Self-compassion				
Kelly, Wisniewski, Martin-Wagar, & Hoffman, 2017	Group-Based CFT RCT- 12 weeks	Eating Disorder Examination Questionnaire Self-compassion Scale Fears of Compassion Scale Experience of Shame Scale	Self-compassion Eating pathology	22 ED patient
Williams, Tsivos, Brown, Whitelock, & Sampson, 2017	Retrospective study CFT intervention- 12 months	Eating Disorder Examination Questionnaire	Self-compassion Eating pathology	9 female
Kelly & Carter, 2015	CFT based self-compassion RCT- 3 weeks	Eating Disorder Examination Questionnaire Binge Eating Frequency Self-compassion Scale The Center of Epidemiological Studies for Depression Fears of Compassion Scale Credibility/Expectancy Questionnaire Homework Rating Scale	Self-compassion Eating pathology	41 individuals with BED
Gale, Gilbert, Read, & Goss, 2014	Repeated measures design CFT intervention- 16 weeks	The Eating Disorder Examination Questionnaire The Stirling Eating Disorder Scale The Clinical Outcomes in Routine Evaluation – Outcome Measure	Eating Pathology Self-compassion	139 ED patient
Adams & Leary, 2007	Experimental manipulation of self-compassion	Revised Rigid Restraint Scale	Eating pathology	84 female student
Body Image and Self-compassion				

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Table 2 (*continued*)

Study	Design	Measure	Construct Measure	Sample
Ziemer, Lamphere, Raque-Bogdan, & Schmidt, 2019	Randomized controlled study of writing intervention- 3 weeks	Body Appreciation Scale 2 Body Image Quality of Life Inventory Positive and Negative Affect Schedule Self-Compassion Scale	Self-compassion Body image	152 female student
Moffitt, Neumann, & Williamson, 2018	Mixed experimental design- 3 min	Self-Compassion Scale Rosenberg Self-Esteem Scale Body Dissatisfaction subscale from the Eating Disorders Inventory Visual analogue Scales Self-improvement motivation	Self-compassion Body Dissatisfaction	153 female undergraduate
Rodgers et al., 2018	Bodimojo: grounded in self-compassion mobile-based intervention- 6 weeks	The Self-Compassion Scale Appearance Esteem subscale of the Body Esteem Scale Physical Appearance Comparison Scale Body Image-Acceptance and Action Questionnaire Positive and Negative Affect Schedule 10-Children	Self-compassion Body image	274 adolescent (71 Male/ 203 Female)
Stern & Engeln, 2018	Study 1: experimental manipulation- 15 min Study 2: experimental manipulation- 15 min Study 3: online intervention- 3 min	Positive and Negative Affect Schedule Body Image States Scale Positive and Negative Affect Schedule Body Image States Scale Positive and Negative Affect Schedule Body Image States Scale	Body satisfaction Body satisfaction Body satisfaction	251 female undergraduate 240 undergraduate female 158 sorority female
Seekis, Bradley, & Duffy, 2017	Experimental manipulation- 5 min	State Body Appreciation Scale-2 Body Image States Scale The Physical Appearance State and Trait Anxiety Scale – state version	Body Image	96 female university student
Toole & Craighead, 2016	Online self-compassion intervention- 2 weeks	The Self-Compassion Scale The Body Appreciation Scale Rosenberg Self-Esteem Scale Body Surveillance subscale of the Objectified Body Consciousness Scale Body Shame subscale of the OBCS Contingencies of Self-Worth Scale-Appearance Subscale Body Shape Questionnaire	Self-compassion Body dissatisfaction Body surveillance Body shame	87 undergraduate women
Albertson, Neff, & Dill-Shackleford, 2015	RCT brief meditation intervention- 3 weeks	The Self-compassion Scale Body Shape Questionnaire Body Shame subscale of the Objectified Body Consciousness Scale Body Appreciation Scale The Contingencies of Self-Worth Scale	Self-compassion Body dissatisfaction Body shame Body image	228 adult women
Eating Pathology and Body Image and Self-compassion				
Pinto-Gouveia et al., 2019	Non controlled BEfree intervention	Binge eating symptomatology (BES) EDE 16.0D The Acceptance and Action Questionnaire-II Cognitive Fusion Questionnaire-Body Image The Engage Living Scale Other as Shamer Scale Forms of Self-Criticizing/Attacking & Self Reassuring Scale Self-Compassion Scale Five Facet Mindfulness Questionnaire-15	Self-compassion Eating Pathology Body Image	31 women with BED and overweight/ obese
Voelker, Petrie, Huang, & Chandran, 2019	Bodies in motion intervention- 4 weeks	Weight Pressures in Sport for Females Perceived Sociocultural Pressures Scale Sociocultural Attitudes Towards Appearance Questionnaire-4 Concerns about Weight and Concerns about Shape subscales from the EDE-Q Body Shame Scale Body Appreciation Scale-2 Body Parts Satisfaction Scale-Revised Positive and Negative Affect Schedule bulimic symptomatology score from nine items on the EDE-Q Dietary Intent Scale Frieberg Mindfulness Inventory-Short Form Self-Compassion Scale-Short Form	Self-compassion Body image Eating pathology	97 athletes
Kelly & Waring, 2018	Self-compassionate letter-writing intervention- 2 weeks	Self-Compassion Scale Fear of Compassion Scale Other as Shamer Scale Experience of Shame Scale Autonomous and Controlled Motivation for Treatment Questionnaire Readiness Ruler Eating Disorder Examination Questionnaire	Self-compassion Eating pathology Body shame	40 nontreatment seeking female

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Table 2 (*continued*)

Study	Design	Measure	Construct Measure	Sample
Duarte, Pinto-Gouveia, & Stubbs, 2017	Low-intensity 4-week intervention	Eating Disorder Examination The Binge Eating Scale Body Image Shame Scale Depression, Anxiety, and Stress Scale Cognitive Fusion Questionnaire for food craving Body Image Acceptance and Action Questionnaire Five-Facet Mindfulness Questionnaire Compassionate Engagement and Action Scales Self-Compassion Scale Self-Criticism and Self-Reassurance Scale	Self-compassion Body image Eating pathology	20 BED women
Palmeira, Cunha, & Pinto-Gouveia, 2017	Kg-free: an acceptance-mindfulness, compassion-Intervention-12 weeks	Weight Self-Stigma Questionnaire Obesity Related Well-Being Questionnaire Three Factor Eating Questionnaire–21R Acceptance and Action Questionnaire for Weight-Related Difficulties–Revised Other as Shamer Scale Self-Compassion Scale Five Facet Mindfulness Questionnaire	Self-compassion Eating pathology	53 overweight/ obese women
Pinto-Gouveia et al., 2017	Nonrandomized Controlled Longitudinal design-12 weeks	EDE 16.0D Binge Eating Scale Beck Depression Inventory-I Other as Shamer Scale Obesity-Related Well-Being Questionnaire Body Image-Acceptance and Action Questionnaire Cognitive Fusion Questionnaire-Body Image The Engaged Living Scale Self-Compassion Scale Five Facet Mindfulness	Self-compassion Body image Eating pathology	36 BED female overweight/ obese

Note. Measures in italic font indicate chosen measures for meta-analysis *: only correlational data used in meta-analysis.

distribution of effect sizes is displayed in Fig. 5. I^2 indicates that 40.48% of the variation was attributable to between-study variance (Q = 10.08 p = .12). There were insufficient studies to examine publication bias.

3.5.3. Summary

Overall, higher levels of self-compassion were associated with lower levels of eating pathology, with a medium effect size. Similarly, self-compassion-related interventions are effective in reducing eating pathology compared to controls, again with a medium effect size.

3.6. Meta-analysis of association of positive body image and self-compassion (hypothesis 3)

Twenty studies examined the relationship between self-compassion and positive body image variables, including a total of 6230 participants. Fig. 6 shows that there was a large combined effect for the association between higher self-compassion and greater positive body image, r = 0.52, (95% CI = 0.46 to 0.57, Z = 16.28; p < .001). Across the studies, heterogeneity was significant and large (Q = 115.66, p < .001, I^2 = 83.57%).

Subgroup analysis examined the association between the effect sizes and the different measures of self-compassion. The differences in effect sizes between SCS (r = 0.52) and SCS-SF (r = 0.51) was not significant (p = .82; see Table 5). However, that conclusion should be treated with caution, because these subgroups are not sufficiently homogenous.

The results of the meta-regression analyses indicate that gender and quality of studies were not significant predictors of effect size. However, the moderating effects of age and BMI were significant, indicating that the association between positive body image and self-compassion is higher in individuals with higher BMI and a greater age (see Table 5).

Considering publication bias, the inspection of the funnel plot suggests symmetric distribution of results (see Fig. 7). After adjustment for omitted studies (n = 1), the effect size changed slightly to an r of 0.55 (95% CI 0.47 to 0.63).

3.7. Meta-analysis of association of body image concerns and self-compassion (hypothesis 4)

As shown in Fig. 8, the results of 21 studies (N = 5966) showed that the combined uncorrected random effects estimate for the relationship between body image concerns and self-compassion was r = −0.45 (95% CI = −0.50 to −0.39; Z = −14.37; p < .0001). This represents a medium effect size, indicating that higher levels of body image concerns are related to lower levels of self-compassion. There was significantly high heterogeneity (Q = 130.29, p < .001, I^2 = 84.65), with 84% of the variance in the effect size attributable to between-study variance.

Subgroup analysis shows that the correlation between self-compassion and body image concerns was not significantly affected by the type of the body image measure (p = .26) or the type of self-compassion measure (p = .44; see Table 6). However, the high heterogeneity in those two subgroups means that these conclusions are not reliable.

The results of the meta-regression analyses showed that the moderating effects of age, gender, BMI and study quality were not significant (see Table 6). Visual inspection of the funnel plot (see Fig. 9) suggested a relatively symmetric distribution of study findings. Additionally, the trim-and-fill analysis showed that there were no missing studies.

3.8. Meta-analysis of impact of self-compassion interventions on body image (hypothesis 5)

The effects of self-compassion-related interventions were compared with a control group in 13 studies, totalling N = 1714 (N = 819 in intervention group; N = 895 in control). In Fig. 10, studies 1 to 7 had active control groups, while studies 8 to 13 were studies with waitlist control groups. The overall effect was small to moderate at g = 0.39 (95% CI = 0.22 to 0.55; Z = 5.02; p < .001), indicating that the self-compassion group had more improvement in body image than the control group. Between-study heterogeneity was low but significant (I^2 = 49.06%; Q = 23.56, p < .05).

Table 3
Quality assessment of included studies using the EPHPP tool*.

Author (date)	Component Rating						Overall rating
	Selection Bias	Study Design	Confounders	Blinding	Data Collection Method	Attrition	
Correlational Studies							
Eating Pathology and Self compassion							
Fresnics et al., 2019	W	M	M	NA	S	M	Moderate
Pullmer, Zaitsoff, & Coelho, 2019	M	W	NA	NA	S	NA	Moderate
Gouvenia, Canavarro & Moreira, 2019	M	W	NA	NA	S	NA	Moderate
Kelly & Tasca, 2016	M	M	NA	NA	S	M	Strong
Taylor et al., 2015	W	W	NA	NA	S	NA	Weak
Tylka et al., 2015	W	W	NA	NA	S	NA	Weak
Ferreira et al., 2014	M	W	NA	NA	S	NA	Moderate
Kelly & Carter, 2014	M	W	NA	NA	S	NA	Weak
Kelly et al., 2013	M	M	NA	NA	S	M	Strong
Body Image and Self-compassion							
Lonergan et al., 2019	W	W	NA	NA	S	NA	Weak
Modica, 2019	W	W	NA	NA	M	NA	Weak
Schmidt et al., 2019	W	W	NA	NA	S	NA	Weak
Barnett & Sharp, 2016 (Study 1)	W	W	NA	NA	M	NA	Weak
Marta-Simões et al., 2016	M	W	NA	NA	S	NA	Moderate
Raque-Bogdan et al., 2016	W	W	NA	NA	S	NA	Weak
Webb et al., 2016	W	W	NA	NA	S	NA	Weak
Andrew et al., 2016	W	W	NA	NA	S	NA	Weak
Homan & Tylka, 2015	W	W	NA	NA	S	NA	Weak
Duarte et al., 2015	W	W	NA	NA	S	NA	Weak
Breines et al., 2014 (Study 2)	W	M	W	M	S	NA	Weak
Daye et al., 2014	W	W	NA	NA	S	NA	Weak
Pinto-Gouveia et al., 2014	M	W	NA	NA	S	NA	Moderate
Pisitsungkagarn et al., 2014	W	W	NA	NA	S	NA	Weak
Wasylkiw et al., 2012(Study 1)	W	W	NA	NA	S	NA	Weak
Mosewich et al., 2011	M	W	NA	NA	S	NA	Moderate
Eating Pathology and Body Image and Self-compassion							
Kramer & Cuccolo, 2019	W	M	M	NA	S	M	Moderate
Pullmer, Coelho, & Zaitsoff, 2019	M	M	NA	NA	S	S	Strong
Gouveia et al., 2018	M	W	NA	NA	S	NA	Moderate
Marta-Simões & Ferreira, 2018	W	W	NA	NA	S	NA	Weak
Stutts & Blomquist, 2018	W	M	NA	NA	S	M	Moderate
Ferreira et al., 2017	W	W	NA	NA	S	NA	Weak
Barnett & Sharp, 2016 (Study 2)	W	W	NA	NA	S	NA	Weak
Kelly et al., 2016	W	W	NA	NA	S	NA	Weak
Webb & Hardin, 2016	W	W	NA	NA	S	NA	Weak
Kelly & Stephen, 2016	W	W	NA	NA	S	NA	Weak
Kelly et al., 2014	W	W	NA	NA	S	NA	Weak
Ferreira et al., 2013	M	W	NA	NA	S	NA	Weak
Schoenefeld & Webb, 2013	W	W	NA	NA	S	NA	Weak
Wasylkiw et al., 2012 (Study 2)	W	W	NA	NA	S	NA	Weak
Interventional Studies							
Eating Pathology and Self-compassion							
Kelly et al., 2017	M	S	S	M	S	W	Moderate
Williams et al., 2017	M	M	W	W	S	W	Weak
Kelly & Carter, 2015	M	S	S	M	S	M	Strong
Gale et al., 2014	M	M	W	W	S	M	Weak
Adams & Leary, 2007	W	M	W	M	S	NA	Weak
Body Image and Self-compassion							
Ziemer, Lamphere, Raque-Bogdan, & Schmidt, 2019	W	S	M	M	S	S	Moderate
Moffitt et al., 2018	W	S	S	M	S	S	Moderate
Rodgers et al., 2018	M	S	M	M	S	S	Strong
Stern & Engeln, 2018 (Study 1)	W	S	M	M	S	S	Moderate
(Study 2)	W	S	M	M	S	S	Moderate
(Study 3)	W	S	W	M	S	M	Weak
Seekis et al., 2017	W	S	S	M	S	M	Moderate
Toole & Craighead, 2016	W	S	S	M	S	S	Moderate
Albertson et al., 2015	M	S	S	M	S	W	Moderate
Eating Pathology and Body Image and Self-compassion							
Pinto-Gouveia et al., 2019	M	M	M	M	S	W	Moderate
Voelker et al., 2019	W	S	S	W	S	M	Weak
Kelly & Waring, 2018	W	S	S	M	S	W	Weak
Duarte et al., 2017	M	S	M	M	S	W	Moderate
Palmeira et al., 2017	M	M	W	M	S	M	Moderate
Pinto-Gouveia et al., 2017	M	M	S	W	S	W	Weak

Note: *, EPHPP, Effective Public Health Practice Project. S: Strong, no weak component rating; M: Moderate, one weak component rating; W: Weak, two or more weak component ratings.NA: not applicable.

Study name	Cohen's r	[95%	CIs]
1 Fresnics et al. (2019)	-0.42	[-0.53	-0.29]
2 Gouvenia et al. (2019)	-0.38	[-0.48	-0.26]
3 Kramer & Cuccolo (2019)	-0.45	[-0.59	-0.27]
4 Pullmer et al. (2019,a)	-0.68	[-0.80	-0.50]
5 Pullmer et al. (2019,b)	-0.39	[-0.49	-0.27]
6 Gouvenia et al. (2018)	-0.28	[-0.35	-0.20]
7 Marta-Simões & Ferreira (2018)	-0.26	[-0.35	-0.16]
8 Stutts and Blomquist (2018)	-0.2	[-0.26	-0.13]
9 Ferreira et al. (2017)	-0.22	[-0.30	-0.13]
10 Barnett & Sharp (2016)	-0.12	[-0.21	-0.02]
11 Kelly & Tasca (2016)	-0.54	[-0.68	-0.35]
12 Kelly & Stephen (2016)	-0.24	[-0.42	-0.03]
13 Kelly & Carter (2015)	-0.45	[-0.67	-0.15]
14 Taylor et al. (2015)	-0.17	[-0.32	-0.01]
15 Tylka et al.(2015)	-0.39	[-0.46	-0.30]
16 Breines et al. (2014)	-0.36	[-0.48	-0.21]
17 Ferreira et al. (2014)	-0.14	[-0.46	-0.22]
18 Kelly & Carter (2014)	-0.45	[-0.60	-0.26]
19 Kelly et al. (2014)	-0.41	[-0.53	-0.26]
20 Ferreira et al. (2013)	-0.28	[-0.39	-0.15]
21 Kelly et al. (2013)	-0.59	[-0.74	-0.37]
22 Wasylkiw et al. (2012)	-0.37	[-0.48	-0.23]
Combined effect	-0.34	[-0.4	-0.28]

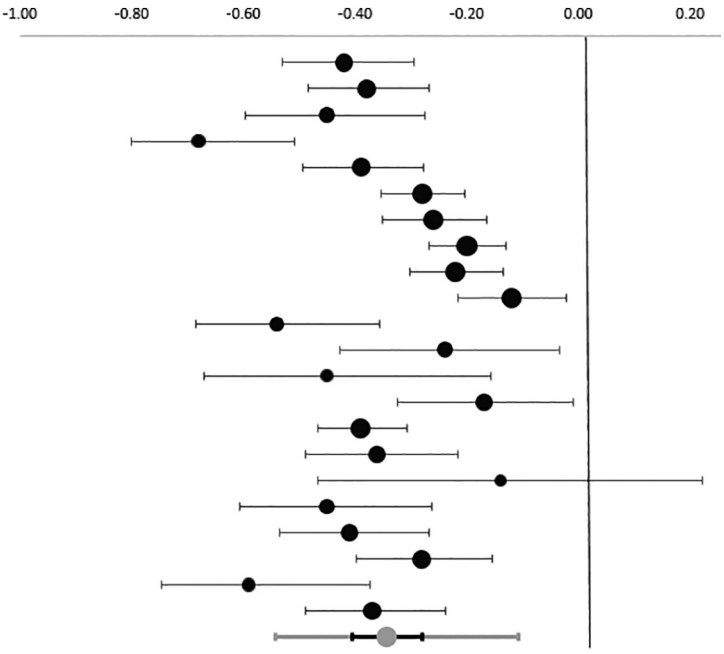

Fig. 2. Forest plot of the correlations between self-compassion and eating pathology.

The effect sizes were similar for studies involving active control groups (g = 0.39) and waitlist control groups (g = 0.38), though Meta-Essentials cautions that such analyses are not meaningful. There was no significant moderator effect of the duration of interventions (b = −0.08, 95% CI [0.00, 0.00], p = .80). Therefore, longer self-compassion interventions were no more effective than brief ones.

Inspection of the funnel plot and trim and fill procedure identified an asymmetric distribution of the study results (see Fig. 11). After adjusting for missing studies (n = 3), the effect size dropped from g = 0.39 to g = 0.29 (95% CI = 0.12 to 0.46), representing a small effect size in favour of self-compassion interventions over controls.

3.8.1. Summary

Self-compassion interventions resulted in more positive body image and lower body image concerns, with medium effect sizes. This outcome demonstrates that the relationship between self-compassion and body image variables is causal, rather than simply being correlational. Thus, self-compassion interventions are effective in enhancing healthy body image.

4. Discussion

The objective of this meta-analysis was to examine the relationship of self-compassion with eating concerns and body image. Where possible (particularly where RCTs were used), the causality of that relationship was addressed in order to understand the effectiveness of self-compassion related interventions. The findings support the hypotheses throughout, showing significant correlations and causal effects of self-compassion on eating pathology and body image. They broadly support previous reviews and meta-analyses on self-compassion in relation to mental health (e.g., Ferrari et al., 2019; Kirby, Tellegen, & Steindl, 2017; MacBeth & Gumley, 2012; Marsh, Chan, & MacBeth, 2018; Zessin, Dickhäuser, & Garbade, 2015).

The relationship of self-compassion with eating concerns and body image was characterized by a medium to high level of heterogeneity. Follow-up meta-regression analysis indicated that the association between self-compassion and eating pathology was higher in better quality studies, indicating the importance of stronger studies in this field. Regarding positive body image, BMI and age were significant moderators, indicating that self-compassion is more related to positive self-perception if individuals are older and bigger in size, suggesting that these findings need to be understood in the context of demographic

Table 4
Subgroup and meta-regression analysis of relationship between eating pathology and self-compassion.

	Number of Studies	Correlation (r)	95% CI	I^2	p
Clinical status					0.04*
ED	5	−0.49*	−0.69 to −0.23	62.92	
Non ED	17	−0.31*	−0.37 to −0.25	73.58	
Independent measure					0.19
SCS	10	−0.31*	−0.38 to −0.23	59.56	
SCS-SF	12	−0.38*	−0.48 to −0.26	80.57	
Moderator	Number of Studies	B-Coefficient	95% CI	SE	p
Age (mean)	19	−0.10	−0.01 to 0.01	0.01	0.65
Percentage of female participants	21	−0.03	−0.55 to 0.47	0.24	0.88
BMI (mean)	13	−0.16	−0.04 to 0.03	0.01	0.56
Study Quality Rating (0–3 criteria)	22	−0.53	−0.20 to −0.03	0.04	0.005*

Note. *significant at p < .05, BMI: Body Mass Index; CI: confidence interval; DEBQ: Dutch Eating Behavior Questionnaire; EAT; Eating Attitudes Test-26; EDE-Q: Eating Disorder Examination Questionnaire; ED: eating disorder group; SE; standard error; SCS: Self-Compassion Scale, SCS-SF: Self-compassion Scale-Short Form.

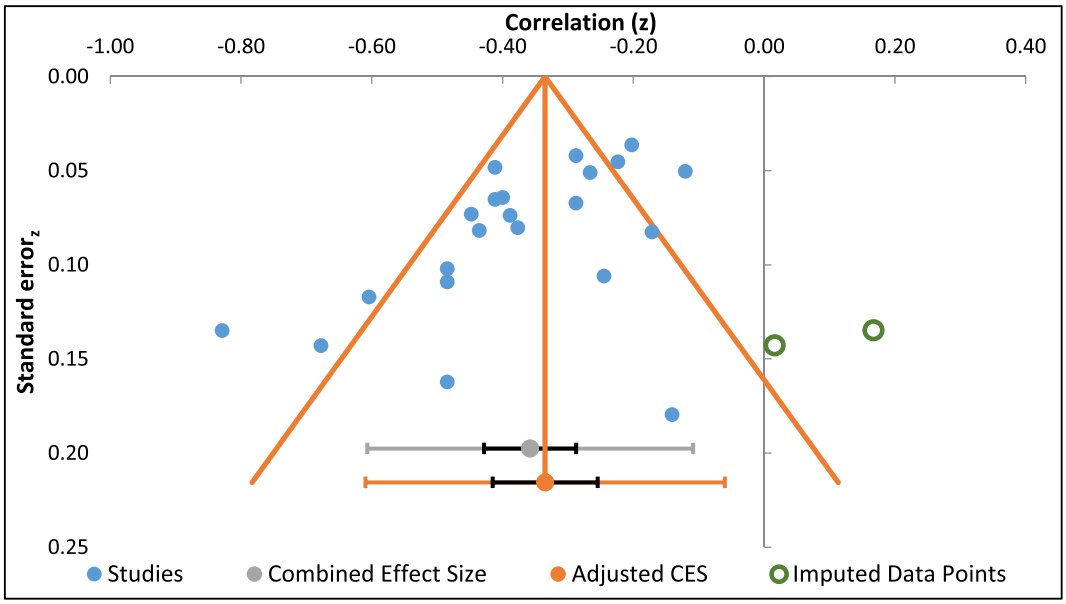

Fig. 3. Funnel plot for the relationship between self-compassion and eating pathology. CES: Combined Effect Size.

factors. Considering body image interventions, it is important to note that there was no moderator effect of the duration of interventions, suggesting that short self-compassion interventions are still effective.

4.1. Limitations of this review

The current review is the first meta-analysis to examine the relationship of self-compassion with eating pathology and body image, and shows evidence of both correlational and causal links. However, this current review also has limitations. First, only studies published in the English language were included. Thus, the findings might be an under-representation of non-Western cultures, potentially resulting in limited generalizability or inflation of the findings due to positive findings being more likely to be published in English language journals. The current review is also limited by the quality of existing studies, which rely heavily on correlational designs.

The combined effect sizes here must be interpreted with caution. A recent meta-analysis indicated that the association between psychopathology and negative indicators of self-compassion is stronger than the link with positive indicators (Muris & Petrocchi, 2017). Therefore, the protective role of self-compassion against eating and body image concerns could be overestimated due to the negative subscales (self-judgment, isolation and over-identification) that have already been shown to be related to psychopathology.

It is also important to note that the small number of samples in several analyses mean that it was not possible to interpret heterogeneity fully. When larger numbers of interventions have been reported, it will become possible to undertake the necessary moderator and subgroup analyses to account for the heterogeneity. Similarly, larger numbers of intervention studies with active control groups would ensure that effect sizes were more reliable (Cuijpers, Weitz, Cristea, & Twisk, 2017; Cunningham, Kypri, & McCambridge, 2013). Finally, many of the self-compassion interventions were part of a wider therapy, meaning that the apparent effect size might have been affected. 'Pure' self-compassion studies need to be compared with other treatment approaches.

It is also important to note that positive and negative body image have been identified as being qualitatively different constructs (Tylka & Wood-Barcalow, 2015). As most studies in this review used either positive or negative body image measures, it is not possible to compare them directly. Future research should consider both constructs in order to distinguish the impact of self-compassion on these two different indicators of body image.

4.2. Research and clinical implications

As it is clear that self-compassion plays a role in understanding eating concerns and body image, it is important to consider the underlying mechanism that explain why and how self-compassion has its impact. Further research is needed to determine such mechanisms. For example, self-compassion has been suggested to be a moderator (e.g., Lonergan et al., 2019; Pisitsungkagarn et al., 2014) which interacts with other risk factors (e.g., body surveillance, thin-ideal internalization) to drive eating and body image concerns. Others have proposed self-compassion as a potential mediator, where lower levels of self-compassion partially or fully account for the effect of a range of risk factors (e.g., shame, perfectionism) on eating pathology and body image (e.g., Marta-Simões et al., 2016; Raque-Bogdan et al., 2016). However, it will be particularly important to consider self-compassion as a potential causal factor, given that the evolutionary theory of compassion suggests that individuals who do not develop self-

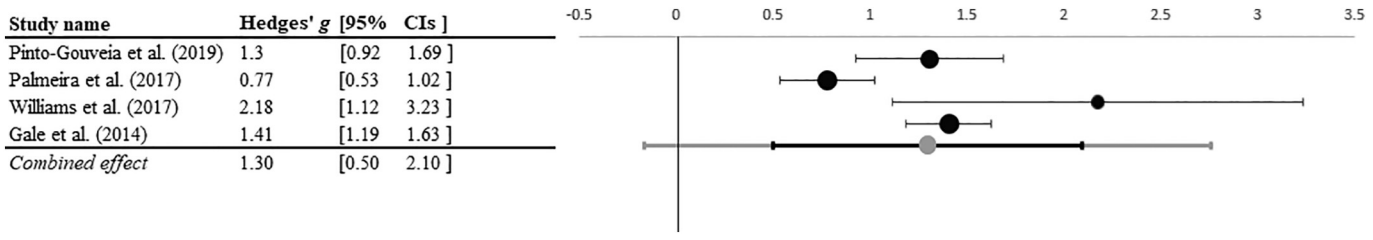

Fig. 4. Forest plot showing the effect of the self-compassion interventions on eating pathology in studies with no comparison group.

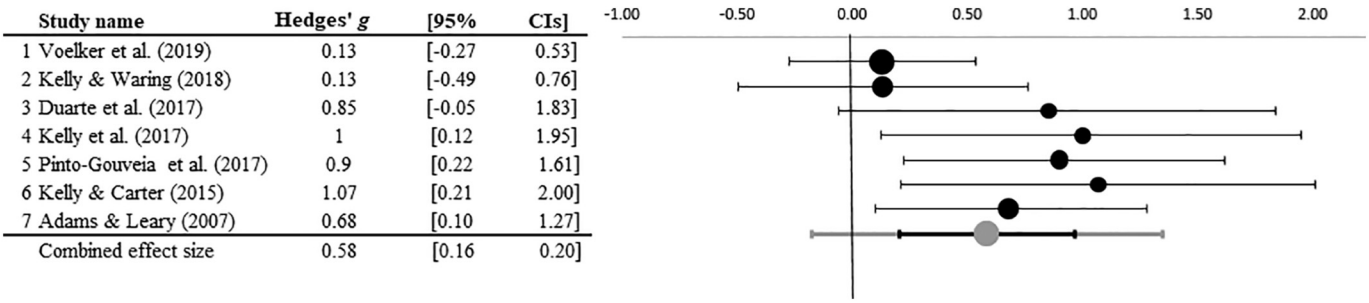

Fig. 5. Forest plot showing effect sizes for changes in eating pathology compared to the control group.

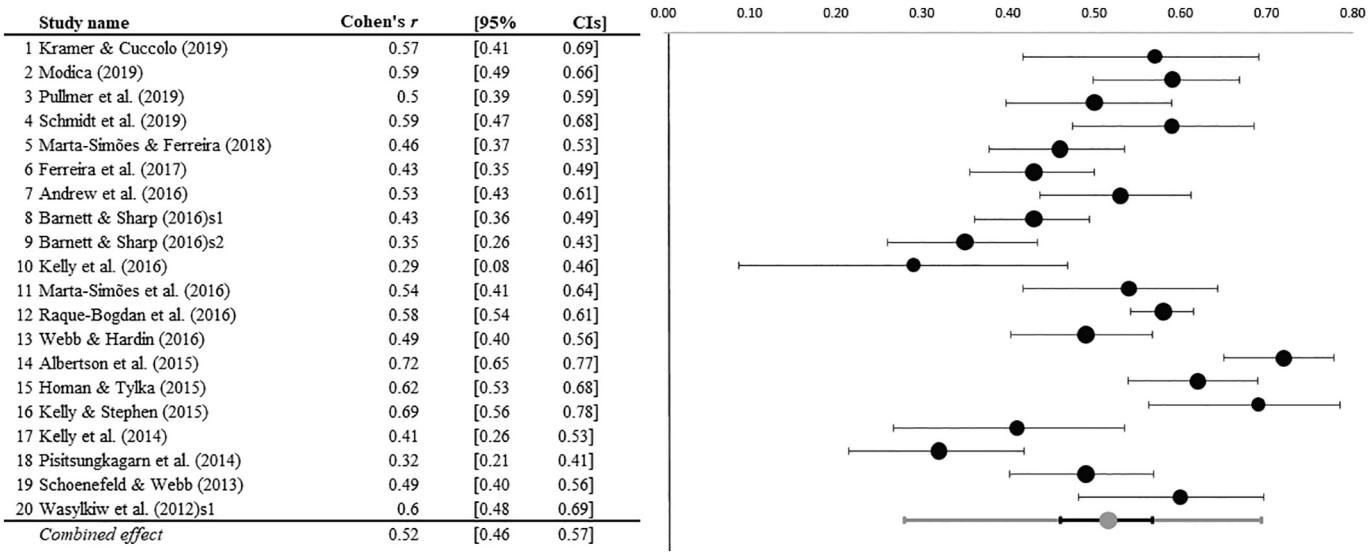

Fig. 6. Forest plot for the correlation between positive body image and self-compassion.

Table 5
Subgroup and meta-regression analysis of relationship between positive body image and self-compassion.

	Number of Studies	Correlation (*r*)	95% CI	I^2	*p*
Independent Measure					0.82
SCS	14	0.52*	0.46 to 0.58	83.56	
SCS-SF	6	0.51*	0.33 to 0.65	85.80	
Moderator	Number of Studies	B-Coefficient	95% CI	SE	*p*
Age (mean)	18	0.47	0.00 to 0.02	0.01	0.03
Percentage of female participants	20	−0.5	−0.65 to 0.55	0.29	0.86
BMI (mean)	13	0.71	0.02 to 0.09	0.01	0.01
Study Quality Rating (0–3 criteria)	20	0.24	−0.06 to 0.20	0.06	0.27

Note. BMI: Body Mass Index; CI: confidence interval; SE; standard error, SCS: Self-Compassion Scale; SCS-SF: Self-compassion Scale-Short Form.

compassion in their early childhood might be prone to shame, self-criticism and guilt, leading to increased eating and body image concerns (Gilbert, 2014). Such models need to be tested in the field of eating disorders, and considered within prevention as well as treatment approaches.

Given the role of negative emotions in eating pathology (as outlined above), it can be hypothesized that self-compassion operates by providing a more adaptive means of coping with emotion (e.g., Neff, 2003a). Self-compassion requires mindful awareness of negative emotions, so that unwanted feelings are not avoided or suppressed (Neff, 2003a). Therefore, it is possible that self-compassion enables individuals to confront distressing emotions (Finlay-Jones, Rees, & Kane, 2015), rather than coping with them maladaptively by engaging in pathological eating behaviours (e.g., restriction, binging, vomiting). Future research should more closely monitor the psychological and biological correlates of self-compassion that might reflect such a process.

As raised above, self-compassion is likely to work via its impact on emotion regulation in eating disorders. One could argue that Gilbert's (2014) approach is relevant to understanding the aetiology of eating pathology and body image, given its focus on evolutionary theory. On the other hand, Germer and Neff's (2013) approach might be more useful in understanding the maintenance of eating pathology and body image, and provides more immediate methods of directing clinical change (e.g., self-compassion mediation/letter writing). However, the data to date do not allow us to differentiate between the models in such a way. Therefore, future research and clinical work should look at which models are related to self-compassion.

5. Conclusion

The results of the present meta-analysis suggest that self-compassion

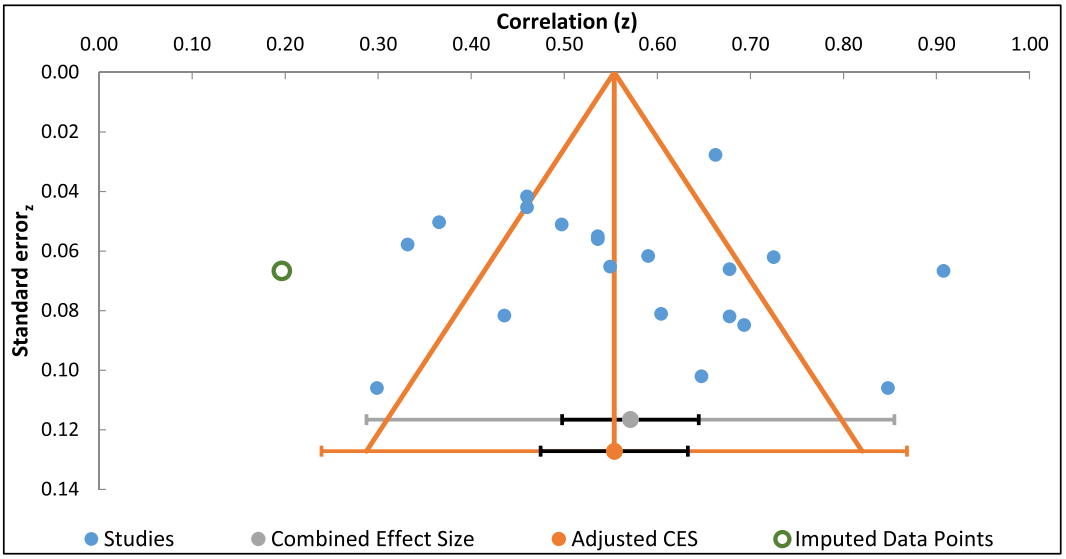

Fig. 7. Funnel plot for relationship between self-compassion and positive body image. CES: Combined Effect Size.

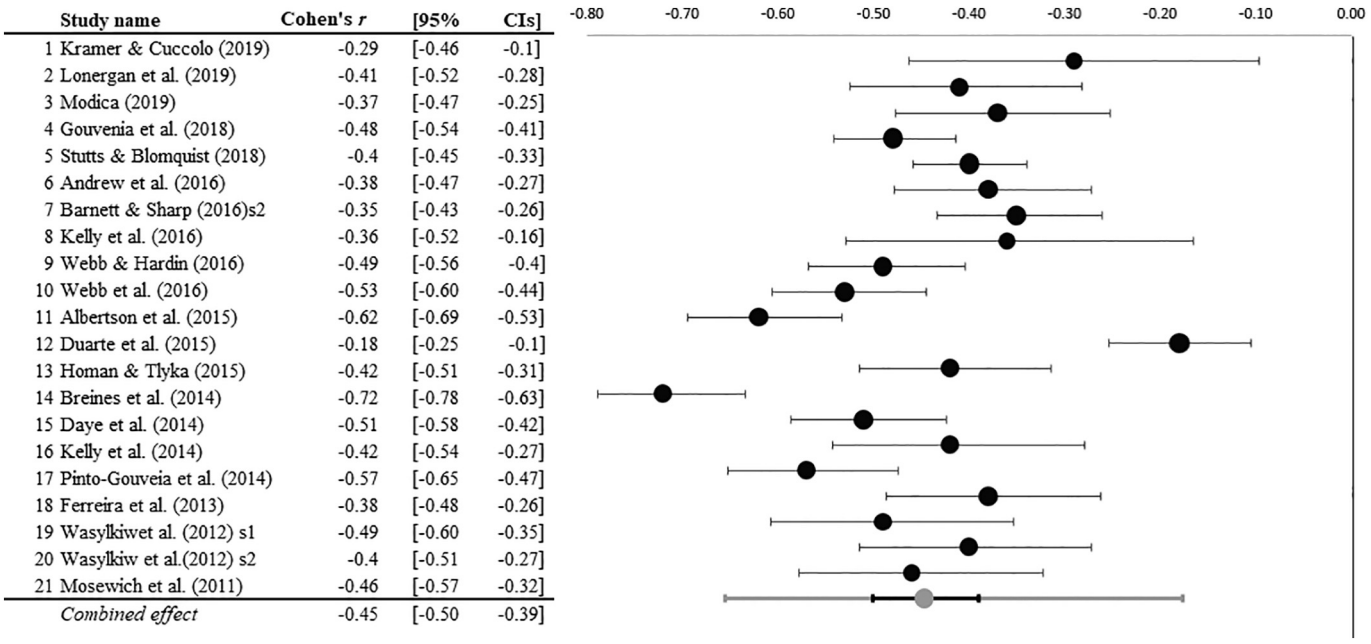

Fig. 8. Forest plot for the relationship between self-compassion and body image concerns.

Table 6
Subgroup and meta-regression analysis of relationship between body image concerns and self-compassion.

	Number of Studies	Correlation (*r*)	95% CI	I^2	*p*
Variables					0.26
Body Dissatisfaction	11	−0.43*	−0.53 to −0.32	88.79	
Body Shame	6	−0.49*	−0.52 to −0.45	00.01	
Independent measure					0.44
SCS	14	−0.47*	−0.51 to −0.42	63.60	
SCS-SF	7	−0.41*	−0.57 to −0.23	91.51	
Moderator	Number of Studies	B-Coefficient	95% CI	SE	*p*
Age (mean)	18	−0.09	−0.02 to 0.01	0.01	0.74
Percentage of female participants	21	−0.12	−0.63 to 0.38	0.24	0.60
BMI (mean)	13	0.24	−0.03 to 0.07	0.02	0.37
Study Quality Rating (0–3 criteria)	21	−0.18	−0.22 to 0.10	0.08	0.42

Note. *significant at $p < .05$, BMI: Body Mass Index; CI: confidence interval; SE; standard error; SCS: Self-Compassion Scale; SCS-SF: Self-compassion Scale-Short Form.

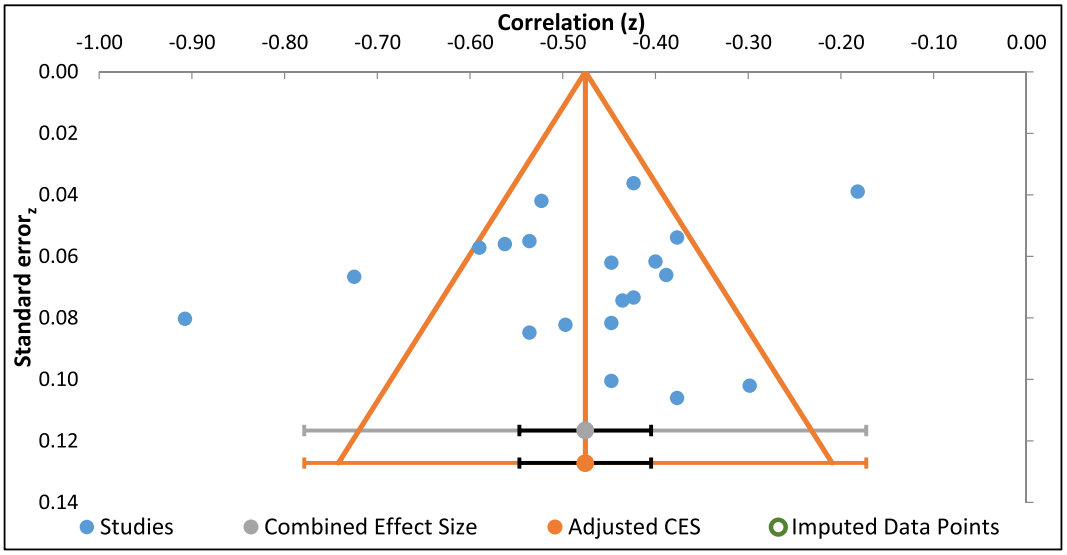

Fig. 9. Funnel plot for relationship between self-compassion and body image concerns. CES: Combined Effect Size.

Study name	Hedges' *g*	[95%	CIs]
1 Ziemer et al. (2019)	0.07	[-0.32	0.46]
2 Moffitt et al. (2018)	0.68	[0.27	1.09]
3 Rodgers et al. (2018)	0.26	[0.00	0.60]
4 Stern& Engeln (2018)s1	0.50	[0.14	0.86]
5 Stern& Engeln (2018)s2	0.35	[-0.02	0.72]
6 Stern& Engeln (2018)s3	0.22	[0.04	0.40]
7 Seekis et al. (2017)	1.02	[0.50	1.55]
8 Voelker et al. (2019)	0.06	[-0.35	0.46]
9 Kelly & Waring (2018)	0.64	[-0.01	1.29]
10 Duarte et al. (2017)	0.71	[-0.19	1.67]
11 Pinto-Gouveia et al. (2017)	0.47	[-0.20	1.15]
12 Toole & Craighead (2016)	0.05	[-0.39	0.49]
13 Albertson et al. (2015)	0.62	[0.35	0.89]
Combined Effect Size	0.39	[0.22	0.55]

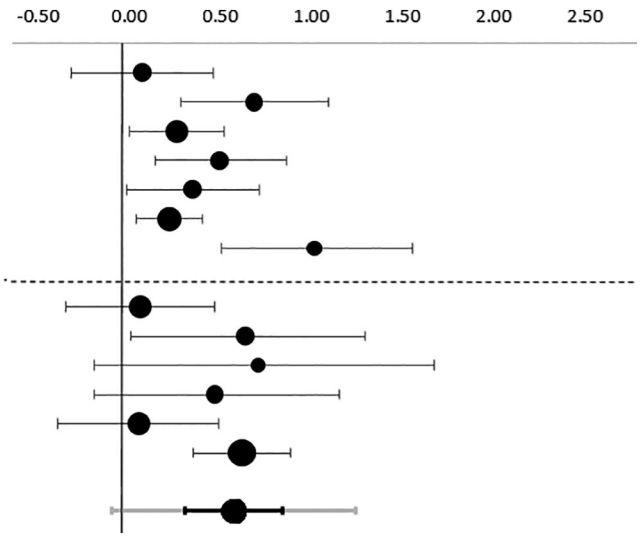

Fig. 10. Forest plot showing the effect of self-compassion interventions compared to the control group.

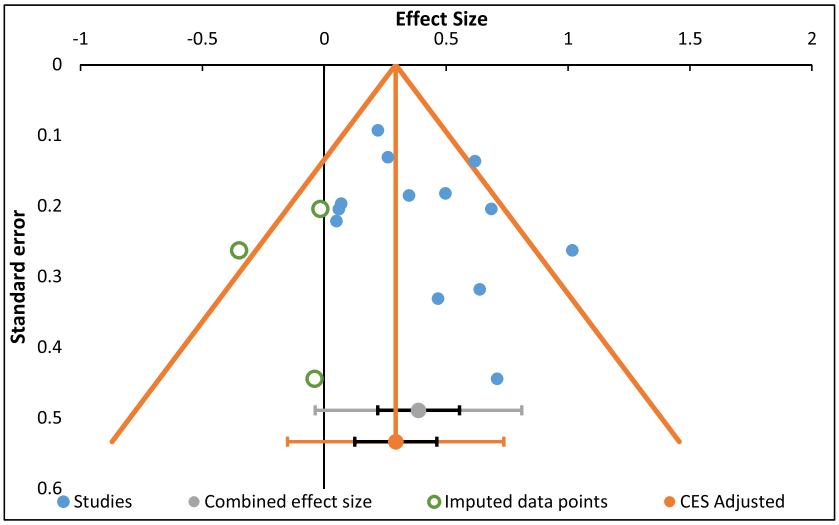

Fig. 11. Forest plot of body image effect sizes for self-compassion group versus the control group. CES: Combined Effect Size.

is causally linked to eating pathology and body image, with broadly moderate effect sizes. Self-compassion approaches therefore provide a potentially useful tool for addressing emotionally-driven behaviours. This effect of self-compassion is robust, with little influence of moderators or demographics. Self-compassion approaches are relatively new, and their mechanisms of change not yet fully understood. Therefore, this treatment approach merits further attention and development in research, therapy and prevention settings, particularly where eating and body concerns are emotionally-driven and maintained. To determine its optimum use, self-compassion should be considered both as a stand-alone therapy and in combination with existing evidence-based approaches.

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Contributors

Both authors contributed to the conceptualization and methodology. FT conducted the formal analysis, literature search. Data management, and prepared the original draft. GW reviewed and edited drafts and supervised the process. Both authors approved the final version.

Declaration of Competing Interest

The authors declare they have no conflict of interest.

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